

# VISAKHAPATNAM DEVELOPMENT REPORT 2017

**A Forward Looking Report**

**On the City and the District**

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The views expressed in each chapter are those of the author(s). They do not in any way reflect the opinions or preferred options of GITAM, its officers and academics.

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## Foreword

In 2003, the then GITAM Institute of Foreign Trade brought out a seminal report under the title *Visakhapatnam Development Report 2003*.

Much has happened since. Two of the most recent developments are the formation of the separate state of Andhra Pradesh and the selection of Visakhapatnam to be a smart city. It is thus timely to relook into the progress of and prospects for Visakhapatnam district and the city.

*Visakhapatnam Development Report 2016* (VDR 2016) by GITAM University faculty is a *humble offering* to the general public of the District as well as the key Government decision makers at the District, State and Central levels.

My heartfelt congratulations to all those who have contributed to the report: authors, editors and advisors. I hope the authorities concerned will take interest in the report.

We at GITAM are ever ready to be of use to the State's development efforts in whatever way we can.

K. Ramakrishna Rao  
Chancellor, GITAM University

## EXECUTIVE SUMMARY

The Visakhapatnam Development Report outlines the sector-wise progress of the Visakhapatnam District in general and Visakhapatnam city in particular. The Report is divided into two Parts: Part I delineating the progress of the City exclusively, especially in the context of it being designated as a prospective Smart City and Part II discussing prospects for the development of the District as a whole.

The **Introduction** by the Editors portrays the geographic, economic and demographic leverage that the City and the District possess from a comparative perspective, while extrapolating the fact that much is still desired from the point of view of per capita indicators. While stating that the District can draw inspiration from the city-state of Singapore, the chapter sets forth the developmental agenda and priorities for the District.

**PART I** of the report begins with *Chapter 2: The What and How of a Smart City*. The chapter attempts to define a smart city and outlines a comprehensive set of parameters for Indian smart cities, with special reference to Visakhapatnam. It is pointed out that, in comparison with other designated smart cities, Visakhapatnam has the advantage of low population density but needs to work on achieving cent percent coverage with regard to safe drinking water, schools and banking facilities for its citizens.

*Chapter 3* titled **City Governance** evaluates the administrative system of Visakhapatnam city, on the basis of the universal principles of good governance, and in comparison with some proposed smart cities similar to Visakhapatnam. The chapter advocates enhancing direct participation of citizens in governance, widespread publicity for government welfare schemes, and expansion of e-governance procedures, in order to further improve the City's governance.

Juxtaposing certain **Comparative Perspectives** along the demographic, infrastructural and competitiveness dimensions, *Chapter 4* presents the competitiveness rankings of Allahabad, Bhopal, Ludhiana, Raipur and Vadodara vis-à-vis Visakhapatnam. Though the City has done well to be among the top 25 Indian cities on the Liveability Index, the chapter emphasises that Visakhapatnam needs to improve its rankings on education and safety.

*Chapter 5* on **Mobility: Traffic and Transportation** makes use of field studies and data from the Transport and Traffic Departments to map the transportation scenario of the City including the official apparatus, accident spots, roads and highways as also latest strategies used by the City Traffic Police to improve mobility. The chapter proposes a five-point Smart City Transport Plan, calling for road design improvements, upgradation of traffic signal systems, enforcement and surveillance cameras and an integrated Traffic Management Centre, to ensure high standards of road safety and convenience.

*Chapter 6 - Towards Smart Environment*, depicts through a meta-analysis, the air quality, noise pollution, water pollution and urban solid waste management milieus in Visakhapatnam. The chapter puts forth a number of significant suggestions to improve the environment of the City,

viz., stringent automobile emission norms, clean fuels, efficient public transport and afforestation to curb air pollution; strict implementation of silence zones to control the high noise levels; conservation of ground water and waste water recycling; and proper segregation, disposal and recycling of solid waste.

Mercer's Quality of Living Survey data bring home the point in *Chapter 7* that there is much to be desired with reference to making the *City – Smart and Liveable*. The chapter carves out an action agenda to make Visakhapatnam more liveable, with a focus on participative and accountable governance, women's safety, transport infrastructure, affordable health care, accessible ICT and environmental sustainability.

**PART II** of the report discusses the current state of affairs in the City as well as the District with reference to Health, Education, Agriculture, Industry, Infrastructure and NGO Initiatives and charts a future course of action for development.

Summarizing the existing *Basic Medical and Health Services*, *Chapter 8* focuses on the indicators of maternal mortality, basic health infrastructure and equity in health care. Measures are suggested to bring down the high infant and maternal mortality and achieve total immunization. It is emphasized that in terms of infrastructure, manpower and accessibility, the public health sectors in the City and the District lag behind, necessitating the setting up of a specially constituted government committee of experts to formulate appropriate action plans.

Portraying the *First Twelve Years of Education*, *Chapter 9* advocates qualitative, infrastructural, administrative and financial upgradation of government schools. Analysing data from the District Educational Office, the chapter expresses concern about the high teacher-pupil ratio and also tabulates pass percentages in Visakhapatnam district in comparison with other districts of the State. It is suggested that a District Education Foundation be set up, to ensure maximum co-ordination for improving the teaching-learning process, infrastructure, funding and administration in schools.

*Chapter 10 - Agriculture and Rural Development*, provides a bird's eye view of the agricultural situation of the District. It presents the land use pattern, sown area and yield of select crops, underlining the decline in the net sown area and yield of some principal crops. It is observed that, advancement of technology and extension of research along with widespread promotion of tank irrigation is essential to improve agricultural production. The rural development context is shown through an analysis (via extensive survey of a sample of villages) of indicators which include literacy, health, connectivity, sanitation, housing and water supply. While several villages still need to be given access to all the basic facilities, many others require the awareness and know-how to use the available facilities.

The *Industrial Development* landscape of the City and the District is depicted in *Chapter 11*, with specific reference to the investment climate, employment generation potential and government incentives across large, medium, small and micro enterprises. Iron and Steel,

Petroleum, Pharma, Heavy Engineering and Textiles emerge as the major investment and employment generators. The chapter also projects the investment and employment requirements of the District for 2021. Initiatives to promote sustainable industrial development are discussed, viz., focusing on new sectors such as energy, health, food and tourism; 24x7 power and water supply to industries; promotion of small and medium enterprises; development of IT, electronic and low cost manufacturing hubs; and early completion of an air cargo terminal at Visakhapatnam Port.

*Chapter 12* titled *The Tourism Sector* presents a SWOT analysis, adapting data from the Department of Tourism. Citing the Singapore example, a case is built for the development of man-made tourist destinations such as one-stop shops, as well as beach-side hotels, cruise and medical tourism to supplement the naturally endowed locations and increase tourist footfalls.

Focusing on *Road, Rail, Water and Air Connectivity*, *Chapter 13* analyses data on road and rail networks, vessel capacity and cargo handling at the ports, and passengers using the airport. Suggestions are offered in regard to improvement of transport services and infrastructure in the City and the District. These include: expansion of roads, terminals, parking lots and footpaths; improvements in platforms, escalators, ticket counters and security at railway stations; and extension of airport and port facilities to handle relatively more domestic and international passengers and cargo.

Reviewing *Water, Power, Housing and Sanitation* facilities, *Chapter 14* evaluates usage patterns and projects future requirements along with a discussion of government schemes and strategies to keep pace with the growing demand. With regard to Water, ground water tapping, utilisation of Godavari water, usage reduction, coverage of all homes, desalination and waste water recycling are suggested. For the Power sector, increasing generation capacity by focusing on renewable/alternate energy, minimising domestic consumption through efficient gadgets and awareness drives, punishment for pilferers, etc. are advocated. The Housing sector calls for ensuring *pucca*, affordable housing for all by 2022. As far as Sanitation is concerned, major upgradation of garbage disposal, sewerage and solid waste management systems, in tune with government missions, is urgently required.

*Chapter 15* outlines *NGO Initiatives* in Visakhapatnam city and district. The chapter profiles the evolution and roles of NGOs, emphasising the need for accreditation of these organizations to ensure managerial competency, accountability and transparency.

*The Future Course* for the District is charted out in *Chapter 16* which provides indicative projections for investment and growth. The required investment is \$4 to \$20 billion per annum during the period 2016-2030. The chapter advocates a single mechanism in the form of a lead public agency – Visakhapatnam District Development and Industrial Promotion Board (VDDIPB) for planning and implementation of development strategies in the city and district of Visakhapatnam.

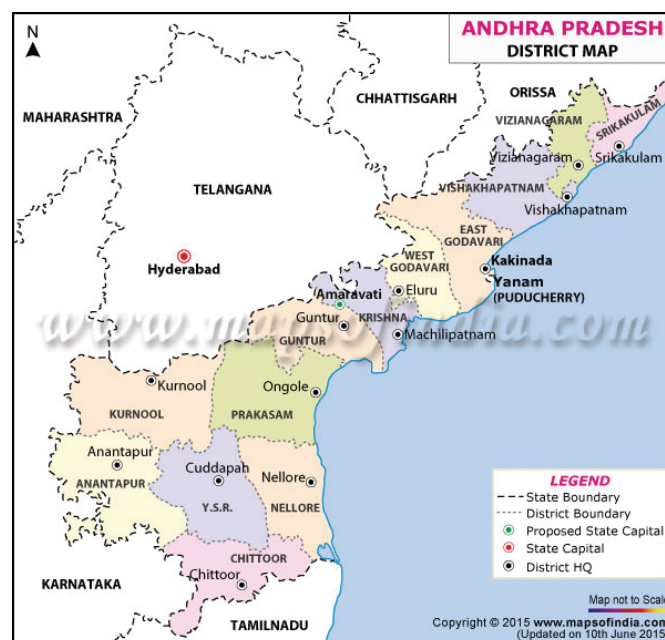


## Chapter 1 INTRODUCTION

Editors

*This Chapter offers an overview of the Visakhapatnam Development Report – 2016, its objectives and organisation. The chapter also compares Visakhapatnam district with similar economies across the globe. It points to the highly successful Singapore model that may be employed to guide Visakhapatnam to its true destiny.*

*This report is about Visakhapatnam city in particular and the district in general. It is relevant in the context of charting a dynamic development path for the new state of Andhra Pradesh. The State has the third longest coastline among all the Indian states with ocean-fronts. The dynamic port city of Visakhapatnam is the principal commercial hub in Andhra Pradesh, and contributes to the state's economy through many sectors such as heavy industries, tourism, industrial minerals, fishing and information technology.*



### Comparative Perspectives: Among the Districts of Andhra Pradesh

Visakhapatnam city was a small fishing cum trading centre, occupied a tiny six sq km area in 1884, and was then home to just about 30,000 people. Its area expanded relatively slowly for several decades and was only 11 sq km in 1960-61, with a population of 0.81 million. Physical growth and population growth since then were phenomenal, area reaching 544 sq. km as of 2011, and population doubling to more than 1.7 million, making it the 17th largest city in India (Census 2011). As the data in Table 1.1 indicate, the district of Visakhapatnam, in comparison with the 13 districts of Andhra Pradesh, occupies eighth position in terms of area, fourth in population size, seventh in terms of density and tops with regard to the extent of urbanization.

**Table 1.1: Area and Population Position among 13 Districts of AP, 2011**

Area (000 Sq Km)	Population (Million)	Density(Persons/Sq Km)	Urban Population (%)
1. Anantapur (19.1)	1. East Godavari (5.1)	1. Krishna (519)	1. Visakhapatnam (47.5)
8. Visakhapatnam (11.2)	4. Visakhapatnam (4.2)	7. Visakhapatnam (340)	2. Krishna (40.8)
13. Srikakulam (5.8)	13. Vizianagaram (2.3)	13. Cuddapah (188)	13. Srikakulam 16.2)

Source: 2011 Census. Note: Relatively more detailed tables are given in the Annex (Table I.A1).

### Economic and Social Development

Table 1.2 shows simple yet pertinent data on four developmental indicators: female literacy, worker participation, per capita GDP and banking penetration. The economic growth of the District is well reflected in its top rank in terms of GDP per capita and its second rank in respect of persons per banking facility. Despite these accomplishments, the District's seventh position in female literacy and 11<sup>th</sup> position in worker participation leave much to be desired. (Tables 1.A2 and 1.A3 in the Annexure provide literacy and economic indicators of all districts in AP.)

**Table 1.2: Literacy, Workforce, Per Capita GDP and Banking Penetration Position among 13 Districts**

Female Literacy (%) 2011	Workers as % of total population 2011	Per Capita GDP (Rs.) 2012-13	Persons Per Bank (000) 2012-13
1. West Godavari (71.4)	1. Prakasam&Kurnool (50.1)	1. Visakhapatnam (1,09,800)	1. Krishna (8.63)
7. Visakhapatnam(59.3)	11. Visakhapatnam (44)	2. Krishna ( 89,398)	2. Visakhapatnam (9.35)
13. Vizianagaram(49.9)	13. East Godavari (40.6)	13. Srikakulam (52,701)	13. Kurnool (13.77)

Sources: 2011 Census, AP State Portal. Note: See Annex for most recent estimates of per capita GDP

### Comparative Perspectives: Among Small Economies

One way to assess how far the district of Visakhapatnam can move ahead is to see where it stands in relation to independent nations broadly comparable in terms of area and population.

First, given the population size of 4.2 million in the District, initial selection of economies was limited to those in the population range of three to six million. This resulted in a total of 28 economies (See Table 1.A4 in the Annexure). Second, the choice was restricted to the economies with area as close as possible to the 11,161 sq km of the District: Singapore with its very small area, Lebanon and Jamaica coming close, and Albania, Armenia and Moldova at the high end.

### *Development Indicators*

Table 1.3 has a few development indicators for the chosen economies and the Visakhapatnam district. While it is heartening to note that the District's per capita GDP is higher than that of Albania and close to that of Moldova, none can match the showing of Singapore, the tiny island nation (\$56,270). Visakhapatnam has also a long way to go in female education and infant mortality.

**Table 1.3: Area, Per Capita GDP and Other Indicators: Selected Small Economies**

Economy	Surface Area in 000 sq. km. 2013	GDP per capita US \$ 2013 (Rounded)	% of Industry and Service Sectors in Total Workforce 2012	Female Illiteracy 2011	Infant Mortality rate 2011
Albania	28.8	670	58	4.3	15
Armenia	29.7	3,650	61	5.0	15
Jamaica	11.0	5,290	82	6.9	14
Lebanon	10.5	10,140	67	14.0	8
Moldova	33.9	2,230	74	1.9	15
Singapore	0.7	56,270	100	6.2	2
Visakhapatnam	11.0	1,880	80*	40.0	41

*Source: World Development Indicators 2014. \*Based on 2011 Census GDP per capita of Visakhapatnam district was Rs 1,13,860 in 2013-14. Average annual exchange rate was Rs 60.5 per US \$.*

The information in Table 1.3 does provide an insight of great significance. It shows that the District has a comparably high percentage of work-force in secondary and tertiary sectors. Yet it is not getting the mileage in terms of per capita GDP, notably due to the skill shortages. Investment in education and skills will go a long way in attracting sizeable domestic and foreign investments and upping the ante on income and standard of living.

### **Inspired by Singapore, the District could March Ahead**

Since its independence in 1965, the economy of Singapore has been growing rapidly and as a result, the country now has an enviously high GDP per capita (Tables 1.4 and 1.5). The economy depends heavily on foreign trade and foreign investment, both fuelled by pro-active government

policies and investments in education, skills and high class infrastructure. The nation also stands out for very high saving rates fuelled by the compulsory provident fund scheme comprising employer and employee contributions.

**Table 1.4: Singapore Builds and Transforms**

	1965	1975	1985	1995	2005	2014
Total Land Area (Sq Km)	581.5	596.8	620.5	647.5	697.9	718.3
Percent Built Up	30	38	48	49	53	54
Population (000)	1,887	2,263	2,736	3,525	4,266	5,470
Work-force % in Population	NA	38	44	50	61	65
Per Capita GDP in US \$	512	2494	6916	24,514	29,869.6	71,318

Source: Department of Statistics, Singapore/ singstat.gov.sg

**Table 1.5: Singapore: Growth, Investment and Saving**

Indicator	1987-1994	1996-2003	2005-13
Average Annual Growth Rate of GDP	8.6	4.5	6.04
<b>Share in GDP (%)</b>			
Domestic Saving	45.3	48.2	52.5
Domestic Investment	35.1	30.5	26.4
S-I Gap	+10.2	+17.7	+26.1

Source: Department of Statistics, Singapore/ singstat.gov.sg

The strategy for transformation of Visakhapatnam city and the district could be based on the following priorities: (a) basic health and education that empowers the people to make the best out of their lives and (b) attractive physical infrastructure coupled with a culture of hard work and efficiency among its people that makes the District the choicest investment destination for Indian and foreign investors.

### **Visakhapatnam Development Report 2016 (VDR 2016)**

VDR 2016 is both a perspective and a vision for the future. It presents the current stage of development and aims to set out the direction of change for the future. It covers both the City and the District. The former assumes importance in the context of the City being identified by the Government of India as one of those designated to evolve into smart cities.

VDR-16 is organized as follows. After a brief Introduction, Chapter 2 comprises a review of literature on the what and how of a smart city. The following four Chapters (3-6) are exclusively City-centric, covering various key sectors, with the final Chapter (7) providing directions for the future. Chapters 8 through 15 pertain to the District (including the City) and cover important social and economic sectors. Chapter 16 is about the future course of action.

## Annexure

Table 1.A1: Area and Demography, 2011

District	Area (000 Sq Kms)	Population (in Millions)	Density (Persons Per Sq Km)	Population Growth (2001-2011)	Sex Ratio (Females per 1000 Males)	Urban Population % in Total
Anantapur	19.1	4.08	213	0.12	977.00	28.1
Chittoor	15.2	4.17	275	0.12	997.00	29.5
East Godavari	10.8	5.15	477	0.06	1006.00	25.5
Guntur	11.4	4.89	429	0.11	1003.00	33.8
Cuddapah	15.4	2.88	188	0.12	985.00	34.0
Krishna	8.7	4.53	519	0.07	992.00	40.8
Kurnool	17.7	4.05	229	0.15	988.00	28.4
Prakasam	17.6	3.39	193	0.11	981.00	19.6
Nellore	13.1	2.97	227	0.12	985.00	28.9
Srikakulam	5.8	2.70	462	0.07	1015.00	16.2
Visakhapatnam	11.2	4.29	340	0.13	1006.00	47.5
Vizianagaram	6.5	2.34	384	-0.07	1019.00	20.9
West Godavari	7.7	3.93	490	0.04	1004.00	20.5

Sources: Population Census 2011, Andhra Pradesh State Portal

Table 1.A2 : Literacy and Economic Indicators, 2011

District	Female Literacy (%)	Workers in Agriculture as % of all Workers	Workers in Industry as % of all Workers	Per Capita GDP in INR	Percentage of Forest Area in Total Area
Anantapur	54.0	32.1	67.9	46,881	10.3
Chittoor	63.3	31.3	68.7	38,430	29.8
East Godavari	67.5	41.9	58.1	46,588	29.9
Guntur	60.1	43.5	56.5	45,310	14.2
Cuddapah	56.8	30.2	69.8	42,766	32.6
Krishna	69.2	39.7	60.3	59,061	7.6
Kurnool	49.8	42.8	57.2	35,417	19.9
Prakasam	53.1	42.4	57.6	47,858	25.1
Nellore	62.0	34.7	65.3	49,601	19.3
Srikakulam	52.1	34.3	65.7	33,503	11.8
Visakhapatnam	59.3	19.9	80.1	75,611	39.5
Vizianagaram	49.9	36.2	63.8	37,245	18.2
West Godavari	71.4	50.1	49.9	50,948	10.5

Source: Andhra Pradesh State Portal

**Table 1.A3: Banking and Agricultural Indicators- 2011**

District	Number of Banks	Persons (000) per Bank	Rice Land in Total Cultivated Land (%)
Anantapur	371	13.4	2.7
Chittoor	457	11.8	11.8
East Godavari	582	10.9	57.3
Guntur	603	10.3	24.7
Cuddapah	289	11.6	7.2
Krishna	635	8.6	35.7
Kurnool	367	13.8	9.0
Prakasam	374	11.2	8.0
Nellore	340	10.5	58.5
Srikakulam	215	14.0	49.4
Visakhapatnam	561	9.4	28.8
Vizianagaram	219	12.4	33.7
West Godavari	465	10.3	56.7

Sources: AP State Portal, Statistical Abstract (2012-13)

**Table 1.A4: Countries with 3-6 Million Population**

Sl. No	Country	Population (Millions) 2014	Sl. No	Country	Population (Millions) 2014
1	Albania	3.2	15	Liberia	4.4
2	Armenia	2.9	16	Lithuania	3.0
3	Bosnia and Herzegovina	3.8	17	Mauritania	4.0
4	Central African Republic	4.7	18	Moldova	3.5
5	Congo Republic	4.6	19	New Zealand	4.6
6	Costa Rica	4.9	20	Norway	5.1
7	Croatia	4.3	21	Oman	3.9
8	Denmark	5.6	22	Panama	3.9
9	Finland	5.4	23	Puerto Rico	3.7
10	Georgia	4.3	24	Singapore	5.5
11	Ireland	4.7	25	Slovak Republic	5.5
12	Kuwait	3.5	26	State of Palestine	4.4
13	Kyrgyzstan	5.6	27	Turkmenistan	5.3
14	Lebanon	5.0	28	Uruguay	3.4

Source: World Development Indicators 2014

**Table 1.A5: Advance Estimates of Per Capita GDP (Rs.) 2015 – 2016**

District	Per Capita GDP 2015-16 (Rs.)
Visakhapatnam	1,40,628
Krishna	1,40,593
West Godavari	1,21,784
Nellore	1,15,928
Guntur	1,09,556
Prakasam	1,07,706
East Godavari	1,04,336
Chittoor	1,00,443
Cuddapah	91,888
Anantapur	89,084
Kurnool	88,308
Vizianagaram	86,223
Srikakulam	74,638
<b>Andhra Pradesh</b>	<b>1,07,532</b>

*Source: Andhra Pradesh State Portal*

## Chapter 2

**THE WHAT AND HOW OF A SMART CITY: A BRIEF  
REVIEW**

T. V. V. Phani Kumar\*

*This Chapter provides an insight into the definition and essential characteristics of a Smart City. It also comprehensively outlines the fundamentals of the Indian Smart Cities Mission.*

**Introduction**

A year ago (in 2015), a new journal was inaugurated with the title *Journal of Smart Cities*. A note on its introduction<sup>1</sup> provides a succinct view of the concept and research dimensions of smart cities: “The Journal... adopts a wide perspective on Smart Cities, as the broad use of information and telecommunication technologies to support an innovative and sustainable urban infrastructure and environment; as participatory action within cities, engagement of citizens, and investment in ICT, Internet technologies and smart objects, which increase the intelligence and problem solving capacity of cities; as an urban laboratory, a Living Lab, and a generator of solutions for wicked problems of inclusion, sustainability, climate change, and global competitiveness.” It is also worth noting that in 2008 IBM began work on a ‘smarter cities’ concept as part of its Smarter Planet initiative<sup>2</sup>.

In the Central Budget of 2014, Government of India announced the development of 100 smart cities in course of time. More on this will be said in the subsequent sections.

**Latest Research**

In 2014, Springer brought out an edited volume with papers offering valuable insights into the conceptualization and practical aspects pertaining to smart cities<sup>3</sup>. In one paper entitled *Smart*

\* At the time of writing this chapter, Dr. Phani Kumar was Associate Professor, Department of Finance, GITAM Institute of Management

*and Digital City: A Systematic Literature Review*,<sup>4</sup> Annalisa Cocchia of University of Genoa (Italy) makes an important point at the outset: “The concept of Smart city embraces several definitions...: intelligent city, knowledge city, ubiquitous city, sustainable city, digital city, etc. Many definitions of Smart City exist, but no one has been universally acknowledged yet.”

In 2015, an International Conference on Public Policy was held at Milan, Italy. Walter Castelnovo, Gianluca Misur and Alberto Savoldelli<sup>5</sup> presented in their paper a holistic approach to assess the ‘smartness’ of cities, paying particular attention to city governance and the management of the policy making process. Citizen engagement was given a central role in the proposed framework. They opined that “citizen engagement is not considered simply as a way to stimulate citizen participation in the public debate but as a process of social innovation which aims to allow citizens to co-produce Public Value”.

Elsa Negre and Camille Rosenthal-Sabroux<sup>6</sup> proposed a kind of recipe for a smart city with the ingredients of citizens, environment and ICT and with an essential dressing of knowledge. They viewed smart city not merely as an Information System, but as an Information and Knowledge System.

Hafedh Chourabi et al<sup>7</sup> developed an integrated framework focusing on the factors that should be taken into consideration while examining smart city initiatives. They found that Effective Governance, Participative People Communities, Growing and Employment generating Economy, Excellent Infrastructure and Pollution Free Natural Environment are the most influential factors for the success of the smart city initiatives.

Clara Benevolo, Renata Paola Dameri and Beatrice D’Auria<sup>8</sup> analysed the Smart Mobility initiatives as part of a larger Smart City initiative portfolio, and the role of ICT in supporting Smart Mobility actions, their impact on the citizens’ quality of life and on the public value created for the city as a whole. They summarized the six benefits from Smart Mobility initiatives as reducing pollution, reducing traffic congestion, increasing people safety, reducing noise pollution, improving transfer speed and reducing transfer costs.

Jaehak Byun Berntzen et al<sup>9</sup> examined the possible business models that can implement IoT (Internet of Things) in a smart city. IoT is the network of physical devices, vehicles, buildings and other items embedded with electronics, software, sensors and network connectivity that enable these objects to collect and exchange data<sup>10</sup>. IoT allows objects to be sensed and controlled remotely across existing network infrastructure. Smart City Implementation models based on IoT like Smart Traffic Service and Smart Education Service can be considered for implementation by local governments.<sup>11</sup>

Minako Hara, Tomomi Nagao, Shinsuke Hanno and Jiro Nakamura<sup>12</sup> proposed key performance indicators (KPIs) based on the Gross Social Feel-Good Index to evaluate a Smart Sustainable City (SSC). “SSC is an innovative city that uses ICTs and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social and environmental aspects”<sup>13</sup>.

**World’s Smartest Cities (Based on Cities in Motion Index)**

IESE Business School of the University of Navarra started ranking cities in motion very closely incorporating various dimensions of smart cities. The Cities in Motion Index (CIMI) was designed to understand a city’s performance through TEN INDICATORS:

- (i) Governance, (ii) Urban Planning, (iii) Public Management, (iv) Technology, (v) Environment, (vi) International Outreach, (vii) Social Cohesion, (viii) Mobility and Transportation, (ix) Human Capital and (x) the Economy.

A total of 72 indicators were used to measure the ten fundamental dimensions and 148 cities were analyzed for the year 2015. Included were four cities from India (Bengaluru, Kolkata, Mumbai and Delhi), *with Kolkata sadly at the last (148<sup>th</sup> rank) position. It is worth noting that Singapore ranks ninth and Delhi 132<sup>nd</sup>(Table 2.1).*

**TABLE 2.1: Top 10 Global Cities in Motion and Rankings of Four Indian Cities**

Top 10 Globally			Indian Cities		
Rank	City	CIMI	Rank	City	CIMI
1	London	100.00	132	Delhi	42.94
2	New York	92.24	140	Bengaluru	38.54
3	Seoul	88.47	141	Mumbai	38.21
4	Paris	87.69	148(LAST)	Kolkata	35.35
5	Amsterdam	85.05			
6	Vienna	84.78			
7	Tokyo	84.15			
8	Geneva	83.85			
9	Singapore	83.37			
10	Munich	83.21			

Source: <http://www.ieseinsight.com/doc.aspx?id=1582>

**Indian Smart Cities Initiative**

In the context of India, which is still a developing country (IMF 2015 Per Capita GDP Rank of 122 out of 185 countries), it is necessary to adopt an appropriate concept of smart cities. Such a concept should embrace the ICT and related dimensions (noted earlier) and also incorporate direct citizen welfare factors such as adequate water supply. The Indian Smart Cities Initiative has evolved accordingly.

A comprehensive development of physical, institutional, economic and social infrastructure (Four Pillars of Smart City) is vital for improvement of quality of life of the people and to attract investments to the city. Indian Smart Cities Mission is aimed at promoting cities that provide *core infrastructure* and give a decent quality of life to their citizens by the application of ‘Smart’ Solutions. The core infrastructure elements include the following:

- i. Adequate water supply; ii. Assured electricity supply; iii. Sanitation including solid waste management; iv. Efficient urban mobility and public transport; v. Affordable housing, especially for the poor; vi. Robust IT connectivity and digitalization; vii. Good governance, especially e-Governance and citizen participation; viii. Sustainable environment; ix. Safety and security of citizens, particularly women, children and the elderly; and x. Health and education (See Annex 2.A1 for features of Smart City).

In January 2016, Government of India announced the list of 20 cities shortlisted for the “Smart Cities Mission”.<sup>14</sup> A comparative profile of Visakhapatnam with three other prime cities (Pune, Ahmedabad and Chennai) is presented in Table 2.2

**Table 2.2: Smart City Profile of Visakhapatnam Vis-a-Vis Pune, Ahmedabad and Chennai : An Illustrative Comparison**

Parameter	Visakhapatnam	Pune	Ahmedabad	Chennai
Population (Million)	1.7	3.1	5.6	4.6
Area (Sq. Km rounded)	514	276	469	175
Density (persons/Sq. Km)	3,365	11,304	11,895	26,553
Per Capita Income at 2004-05 prices	Rs 50,580	88,341	NA	57,706
% of households with Access to tap water (from treated source) within premises	71	99	80	84
Access to toilet within premises	84	76	92	95
Access to banking facilities	64	86	71	71
Schools/1,00,000 people				
Primary				
Middle				
Secondary				
College	87122	3228219	24NA92	2819242
Swachh Bharat ranking	205	31	79	61

Source: Smart Cities Mission, Ministry of Urban Development, Government of India.(www.smartcities.gov.in)

Visakhapatnam has a long way to go compared to some of the other cities in respect of development into a smart city. The following observations can be made from the comparative indicators in the above table:

- i) With low population density advantage, the concerned authorities have the opportunity to develop Visakhapatnam into a well planned city.
- ii) Only 70% of the population has access to tap water. The great challenge before the local authorities is achieving 100% coverage in the next five years.

- iii) Education plays a critical role in the process of transformation into a smart city. The statistics show that Visakhapatnam has less number of schools per one lakh people. There is an urgency to improve infrastructure in education sector within the City to impart world class education and employability skills.
- iv) Only 64% of the population in the City has access to banking facilities. This has to increase to 100% since financial inclusion is a primary necessity for a smart city.

### Smart City Mission: Monitoring

The Government of India plans to invest Rs 50,802 crores in the 20 designated smart cities over the next five years. Out of the 20, Pune and Visakhapatnam will get foreign financial assistance for improving infrastructure from France and USA respectively.

The process of implementation is monitored at the national level, state level and at city level. At the national level, an Apex Commission and a National Mission Directorate are responsible. At state level, a High Powered Steering Committee (HPSC) will monitor the mission program. Implementation and monitoring functions at the City level will be done by a Special Purpose Vehicle (SPV) created for the purpose.

In respect of Visakhapatnam, the *Greater Visakhapatnam Smart City Corporation Limited (GVSCCL)*, incorporated in March 2016, is responsible for implementing the projects under the Smart City Mission.

### Suggested Monitoring Parameters for Visakhapatnam

The key parameters that need to be monitored during the evolution of Visakhapatnam into a smart city are listed in the box below. A baseline survey should be initiated by the concerned authorities to identify the current concerns of Vizagites in the process. The results of the baseline study will help in prioritizing the Smart City development projects and attracting the needed financial and non-financial investments.

Quality of Life Parameters	Road, Safety and Infrastructure Parameters
1. 24x7 Power supply	1. Reliable, Efficient, High quality and High frequency Public Transport system
2. 24x7 Water supply	2. Monitoring of all roads through Radar
3. Slum Free City (Housing for all with toilet facility)	3. Underground Electricity Cables
4. Underground Drainage & Sanitation	4. Availability of Parking Places in high traffic areas
5. Underground LPG pipelines	5. Improved Traffic Management (Including route restrictions like One Way Streets)
6. Effective Crime Prevention	6. Unobstructed Footpaths on either side of roads
7. Cycling Track	

Environmental Parameters	ICT and Governance Parameters
1. Significant reduction in environmental pollution	1. Citizen's direct participation in the planning and execution of smart city programmes.
2. Time bound ending of noise pollution	2. Online application for all public utility services
3. Green Energy Initiatives	3. Online payment facility for as many services as feasible.
4. 100% recycling of solid waste	4. 100% WIFI connectivity
5. 100% rain water harvesting	5. Availability of telemedicine facility to all the residents
<b>Citizen Safety and Security</b>	
1. Area-wise quarterly monitoring meetings between citizens and security officials	
2. Charter of measures to enhance security for women and children	
2. Citizen participation for joint patrolling	

### Annexure 2. A1: Indian Smart City Initiatives: The Smart City Features

Some typical features of comprehensive development in Smart Cities are described below.

- i. Promoting mixed land use in area based development - planning for 'unplanned areas' containing a range of compatible activities and land uses close to one another in order to make land use more efficient. The States will enable some flexibility in land use and building bye-laws to adapt to change;
- ii. Housing with inclusiveness - expand housing opportunities for all;
- iii. Creating walkable localities - reduce congestion, air pollution and resource depletion, boost local economy, promote interactions and ensure security. The road network is created or refurbished not only for vehicles and public transport, but also for pedestrians and cyclists, and necessary administrative services are offered within walking or cycling distance;
- iv. Preserving and developing open spaces - parks, playgrounds and recreational spaces in order to enhance the quality of life of citizens, reduce the urban heat effects and generally promote eco-balance;
- v. Promoting a variety of transport options - Transit Oriented Development (TOD), public transport and last mile para-transport connectivity;
- vi. Making governance citizen-friendly and cost effective - increasingly rely on online services to bring about accountability and transparency, especially using mobiles to reduce cost of services and providing services without having to go to municipal offices. Forming e-groups to listen to people and obtain feedback and use online monitoring of programs and activities with the aid of cyber tour of worksites;
- vii. Giving an identity to the city - based on its main economic activity, such as local cuisine, health, education, arts and craft, culture, sports goods, furniture, hosiery, textile, dairy, etc; and
- viii. Applying Smart Solutions to infrastructure and services in area-based development in order to make them better. For example, making areas less vulnerable to disasters, using fewer resources, and providing cheaper services may be mentioned in this context.

(Footnotes)

- 1 <http://jsc.whioce.com/index.php/JSC> (accessed May 1, 2016)
- 2 See *The Hindu* of August 15, 2014.
- 3 R. P. Dameri and C. Rosenthal-Sabroux (eds.), *Smart City: How to Create Public and Economic Value with High Technology in Urban Space*, Springer International Publishing, Switzerland, 2014.
- 4 *Ibid*, pages 13-43
- 5 Castelnovo, W., Misuraca, G., & Savoldelli, A. (2015). *Citizen's engagement and value co-production in smart and sustainable cities*. In *International Conference on Public Policy* (pp. 1-16).
- 6 Negre, E., & Rosenthal-Sabroux, C. (2015). *Smart Cities: A Salad Bowl of Citizens, ICT and Environment*. *Handbook of Research on Social, Economic, and Environmental Sustainability in the Development of Smart Cities*, p.61.
- 7 Chourabi, H., Nam, T., Walker, S., Gil-Garcia, J. R., Mellouli, S., Nahon, K., ...& Scholl, H. J. (2012, January). *Understanding smart cities: An integrative framework*. In *System Science (HICSS), 2012 45th Hawaii International Conference on* (pp. 2289-2297).IEEE.
- 8 Benevolo, C., Dameri, R. P., & D'Auria, B. (2016). *Smart Mobility in Smart City*. In *Empowering Organizations* (pp. 13-28). Springer International Publishing.
- 9 Byun, J., Kim, S., Sa, J., Kim, S., Shin, Y. T., & Kim, J. B. (2016). *Smart City Implementation Models Based on IoT Technology*. *Advanced Science and Technology Letters Vol.129 (Mechanical Engineering )*, pp.209-212
- 10 [https://en.wikipedia.org/wiki/Internet\\_of\\_Things](https://en.wikipedia.org/wiki/Internet_of_Things), 10th May 2016
- 11 Lizhe Wang, Shiyang Hu, Gilles Beti, and Rajiv Ranjan opined that "With the massive deployment of networked smart devices/sensors, an unprecedentedly large amount of sensory data can be collected and processed by advanced computing paradigms, which are the enabling techniques for smart city". The data collected helps to simulate the impact of potential city planning strategies, which will be critical for intelligent decision-making. See Wang, L., Hu, S., Betis, G., & Ranjan, R. (2016). *A Computing Perspective on Smart City*. *IEEE Transactions on Computers*, 65(5), pp.1337-1338.
- 12 Hara, M., Nagao, T., Hannoe, S., & Nakamura, J. (2016). *New Key Performance Indicators for a Smart Sustainable City*. *Sustainability*, 8(3), p.206.
- 13 ITU-T Focus Group Technical Specifications. *Overview of Key Performance Indicators in Smart Sustainable Cities; International Telecommunication Union: Geneva, Switzerland, 2014*.
- 14 Bhubaneswar, Pune, Jaipur, Surat, Kochi, Ahmedabad, Jabalpur, Visakhapatnam, Solapur, Davangere, Indore, New Delhi, Coimbatore, Kakinada, Belagavi, Udaipur, Guwahati, Chennai, Ludhiana and Bhopal.

## Chapter 3

# CITY GOVERNANCE

Nalini Bikkina\*

*This Chapter describes the key pillars of Visakhapatnam city's governance architecture. The City, as it evolves into the smart city stature, will need fine-tuning of the key pillars. The Chapter also brings about a comparative perspective between Visakhapatnam and to-be smart cities similar to Visakhapatnam, i.e., Allahabad, Bhopal, Ludhiana, Raipur and Vadodara and identifies unique practices of these five cities which are not being implemented in Visakhapatnam.*

### Principles of Good Governance

The United Nations Development Programme (UNDP) enunciates the principles of good governance which are grouped under five broad themes as follows:

**Legitimacy and Voice:** All men and women should have a voice in decision making, either directly or through intermediate institutions that represent their interests. Such broad participation is built on freedom of association and speech, as well as capacities to participate constructively. Good governance mediates differing interests to reach a broad consensus on what is in the best interests of the group and, where possible, on policies and procedures.

**Direction:** Leaders and the public have a broad and long-term perspective on good governance and human development, along with a sense of what is needed for such development.

**Performance:** Institutions and processes are responsive and try to serve all stakeholders. They produce results that meet needs while making the best use of resources.

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**Accountability and Transparency:** Decision-makers in government, the private sector and civil society organizations are accountable to the public, as well as to institutional stakeholders. This accountability differs depending on the organizations and whether the decision is internal or external to an organization. Transparency is built on the free flow of information.

**Fairness:** All men and women have opportunities to improve or maintain their well-being in an equitable way. Legal frameworks should be fair and enforced impartially, particularly the laws on human rights.

While these principles are indicative of good governance in general, they serve as imperative guidelines for development of smart cities in particular. A crucial factor in the management of smart cities is the organization of administration and its procedures in an efficient manner for and by the citizens. While Visakhapatnam is poised to be a Smart City, a glimpse of various facets of its administration through the good governance lens would serve the broader purpose of providing a perceptual map of the City and its functioning as it exists today, along with the path that needs to be travelled towards being a Smart City and further evolving into a Smarter City.

### Revenue Services

Revenue generation for the city of Visakhapatnam is through levy of taxes, especially Property Tax, Vacant Land Tax, remunerative enterprises like *Kalyana Mandapams* and Water Charges. Activities of the revenue department conveniently accessible to the public include information on tax dues, details of taxes paid, calculation of taxes and online payment facilities. These services are offered without payment of additional charges. Property Tax, Water Tax, Vacant Land Tax, Shop Lease & Rent Tax and D&O (Dangerous and Offensive) Trade Taxes can be paid online via the portal: <http://www.gvmc.gov.in/gvmc/index.php/menu-styles/2013-12-06-07-00-51>.

The other five smart cities under study reveal additional taxes including Vehicle Tax (Allahabad), Animal Tax (Allahabad), Urban Development Cess (Bhopal), Shops and Establishments Certification (Vadodara), Food Licensing (Vadodara), Octroi on Electricity (Ludhiana), Slaughter house fee (Ludhiana) and Tehbazari (Ludhiana). Additionally, certain state governments provide financial aid to Nagarpalikas (Allahabad). Online payment of taxes is facilitated in Allahabad and Ludhiana, whereas there is no mention of such a facility for the convenience of the citizens in the other cities studied.

### Corporation Services

Being one of the oldest municipalities in the state of Andhra Pradesh, the Greater Visakhapatnam Municipal Corporation (GVMC) is the civic body that governs the City. The Corporation operates through a zonal organization structure. The Corporation facilitates ease of service through its Virtual Civic Center offering online services, providing access to various services anytime from anywhere. Forms and tenders can be filled in online and grievances can be filed online through a complaints registration window. Birth and Death Certificates are issued through *Mee Seva* Centres. These centres have been set up as a good governance initiative that incorporates the vision of National E-Governance Plan, thereby bringing public services closer to home through smart, citizen centric and efficient governance facilitated by technology.

GVMC also e-publishes a monthly newsletter updating the citizens regarding state of service provision, future plans, ongoing projects along with their progress and sector-wise e-governance applications. The newsletter also solicits active feedback from the citizens and businesses thereby facilitating a citizen-government interface.

Budget for the current financial year and revised budgets for the past financial year are published on the website thereby ensuring transparency and accountability. The latest development in terms of smart governance initiatives of GVMC include the rolling out of a Smart Vizag App using a mobile phone platform for online payments.

The section-wise listing of staff and their functions are given on the website to provide ready information to the citizens (<http://www.gvmc.gov.in/gvmc/>).

While the comprehensive features in terms of service provision of GVMC are not available on the websites of the other cities studied for the purpose, the municipal corporation of Bhopal, however, offers non-food licenses through e-services. A horticulture service is unique to Ludhiana. Periodic maintenance services of residential facilities are also being taken up by the Raipur Municipal Corporation.

### Public Health Services

Services offered by the GVMC in terms of public health include sanitation, medical care, AIDS and Malaria specific services, prevention of food adulteration, and D&O (Dangerous and Offensive) trade licensing. Urban health centres, first referral units and Ayurvedic dispensaries are run by the Public Health Department. Information related to health projects and health initiatives are posted on the website for the convenience of the citizens (<http://www.gvmc.gov.in/gvmc/index.php/menu-styles/2013-12-06-07-19-58>).

The Allahabad Municipal Corporation in addition to providing for general medical services also provides complementary medicine related services through a number of Homeopathic, Unani and Ayurvedic clinics in the city. Through these, free medical treatment is made available to the residents of Allahabad. Vadodara has a unique emphasis on urban reproductive and child health programme with the objectives of reducing total fertility rate, maternal mortality ratio and infant mortality ratio; improving couple protection rate and proactive immunization coverage. Vadodara has also set up a School Health Programme which provides for periodic health check-ups for children upto the age of 14. An Integrated Disease Surveillance Project also functions with the aim of detecting early warning signals of impending outbreaks and initiation of effective response in a timely manner. Raipur issues insurance cards for its residents. Additionally, Raipur Municipal Corporation provides for an online hazardous waste inventory for the perusal of its citizens.

### Judicial System

The City Civil Court is presided over by a Chief Judge and five additional judges in the cadre of District and Sessions Judges. There is one Special Judge of the rank of District Judge to deal with the cases arising out of economic offences and five Additional Judges of the cadre of Sub-Judges and Eleven Assistant Judges of the cadre of District *Munsifs*.

The City Criminal Courts are presided over by one Metropolitan Sessions Judge and three Additional Metropolitan Sessions Judges of the cadre of District Judges. There is one Special Judge for Essential Commodities Act cases, one Special Judge for CBI Cases, twenty Metropolitan Magistrates and thirty two Special Metropolitan Magistrates.

There is a Mobile Court in Visakhapatnam for dealing with offences under the AP Municipalities Act. In addition to this, there is also a Special Mobile Court in Visakhapatnam. There is also a Labour Court presided over by a District Judge. The Family Court and Additional Family Court deal with matrimonial matters of the Greater Visakhapatnam Municipal Corporation.

Metropolitan Sessions Judge, First Additional Metropolitan Sessions Judge and Second Additional Metropolitan Sessions Judge exercise jurisdiction over all the police stations on original and appellate side in the metropolitan area of Visakhapatnam. VI Additional District and Sessions Judges Court being a *Mahila* Court, exercises territorial jurisdiction of Visakhapatnam urban limits exclusively relating to sexual offences.

E-services for the convenience of citizens and to ensure transparency are in place in judicial matters. The services enable online information on the status of cases based on Case Number, FIR Number, Party Name, Advocate Name, Case Code, Act or Case Type. Court Orders too are accessible online through Case Number, Court Number, Party Name or Order Date. Cause List or Daily Board for each of the court complexes is available online. Information on the judges, territorial jurisdiction of civil and criminal courts and rules and regulations are easily accessible for public viewing on the site <http://ecourts.gov.in/vishakhapatnam>.

Allahabad had additional special courts for SC/ST Act and economic crimes. However, online services although available, are fairly limited across the other cities studied for the purpose of this chapter.

### Public Distribution System

The nodal officer for Public Distribution System for Visakhapatnam (Urban) is the District Supply Officer. There are a total of 354 Fair Price Shops as part of the Public Distribution System in Visakhapatnam, distributed across Circle-I with 141, Circle-II with 122 and Circle-III with 91 shops. *Mee Seva* Services also allow access to ration card related information and modifications, including change in address, change of fair price shops, issue of new ration cards, and member addition/deletion. Retail price of essential commodities and comparison of prices of these commodities in the previous month are placed on the website for the information of the consumers. Additionally, all information about the officers from the Commissioner down to the District Supply Officers and their contact details are provided on the website. This facilitates direct linkage between the consumer and the concerned authorities for information and general purposes as well as for redressal of grievances.

A notable system offered by the Vadodara Corporation is the deputation of a District Supply Officer who works as a Consumer Protection Officer with specific reference to civil supplies.

### Welfare Services

The Urban Community Development Activities undertaken by the Greater Visakhapatnam Municipal Corporation include Social Security Pensions, Self Help Groups, *Rajiv Yuva Kiranalu*, Urban Self-Employment Programme, SHG-Bank Linkage, *Bangaru Talli* Scheme, *Ana Sri Bheema Yojana*, *Dr. Y.S.R. Abhayastam*, *Vaddi Leni Runalu*, *Deepam* Scheme, Street Vendors and City Livelihood Centres. Some of the details are given in Table 3.1.

**Table 3.1: Welfare Services Provided by Greater Visakhapatnam Municipal Corporation**

Scheme	Objectives	Eligibility
Social Security Pensions	Extend support to elderly, weavers, widows & disabled	Elderly individual, weaver, widow or disabled belonging to BPL Family & a local resident
Self Help Groups	Facilitate formation & functioning of SHGs	18-55 age group, married individuals below poverty line with white ration card
Rajiv Yuva Kiranalu	Unemployed youth educated but not having skills to be selected & trained to be placed in private sector	Above 18 years of age below poverty line with white ration card
Urban Self-Employment Programme	Urban Poverty Alleviation through gainful self employment by encouraging setting up of self employment ventures	Unemployed Urban Poor
SHG-Bank Linkage	Extension of financial assistance through micro credit plans	SHGs which completed six months of active existence

Scheme	Objectives	Eligibility
Bangaru Talli Scheme	To eliminate discrimination between genders & to provide support to female child socially & economically	Female baby born in Andhra Pradesh after 1 <sup>st</sup> May 2013
Ana Sri Bheema Yojana	Life and Disability Insurance	SHG members & spouse between 18-55 years of age with white ration cards
Dr. Y.S.R. Abhayastam	Co-contributory Cash deposit & scholarship benefits for two children & Life and Disability Insurance	SHG member aged between 18-55 years having white ration card
Vaddi Leni Runalu DeepamScheme	100% subsidy over interest on bank loans Provision of LPG Connections	Regular Loan Payment by SHGs for loans taken after 1 <sup>st</sup> January 2012 Below Poverty Line members with white ration cards

Scheme	Objectives	Eligibility
Street Vendors	Issue of ID Cards, formation of SHGs and Provision of Loans	Vendors in GVMC Limits within demarcated vending zones
City Livelihood Centres	Identification of segments for doorstep quality service provision to citizens	Carpenters, Electricians, Plumbers, Masons & Artisans

Source: [www.gvmc.gov.in](http://www.gvmc.gov.in)

Raipur Corporation has in place a Raipur Capacity Development Project which prioritizes slum development including access to all basic services as well as housing for urban poor.

### Three General Suggestions

As the city evolves into one among the *Smart Cities League*, it may be necessary to fine-tune the governance architecture. The following suggestions might be relevant in this context:

1. People's direct participation in governance of the City seems to be restricted to voting in the Corporation elections. Further avenues for direct participation could be explored. For instance, citizens' groups on special subjects could be put in place (goal setting, performance evaluation, finance, auditing, welfare etc.)
2. Governance in Visakhapatnam is observed to have a strategic direction with a long-term citizen development perspective and a special focus on sections of society below the poverty line as illustrated by the various welfare schemes put forth by the Greater Visakhapatnam Municipal Corporation. These activities need wider local, national and global publicity in order to benefit from such awareness financially and otherwise.
3. Performance with reference to responsiveness of institutions and efficiency seems to have improved especially with e-governance procedures being put into place. The processes must be expanded for serving areas that have not yet been covered.

## Chapter 4

## COMPARATIVE PERSPECTIVES

P. Sheela\*

*This Chapter compares Visakhapatnam with the other proposed Smart Cities across India. It attempts to assess the standing of the City on the Liveability Index.*

**Introduction**

Over the next two decades, India will have around 68 cities with populations of one million each, 13 with more than four million, and six mega cities with more than 10 million. This is integral to the natural developmental progression of villages growing into towns, towns into cities and cities into metros.

The concept of a smart city is a relatively new one. Cities in the developed world are formulating technology master plans and then using these plans to develop a citywide command and control network that monitors and optimizes the delivery of services like power, water, traffic and healthcare. *The basic premise of a smart city is making infrastructure network and delivery of services more efficient – across telecommunication, logistics, water and gas supply.*

Recently, the Government of India announced the vision to set up around 100 smart cities across the nation. The first lot of 20 will get Rs 50,802 crores over five years to become ‘Smart Cities’. The 20 cities in alphabetical order are Ahmedabad, Belgaum, Bhopal, Bhubaneswar, Chennai, Coimbatore, Davangere, Guwahati, Indore, Jabalpur, Jaipur, Kakinada, Kochi, Ludhiana, New Delhi, Pune, Solapur, Surat, Udaipur, and Visakhapatnam.

**Visakhapatnam in Comparison: Demography, Infrastructure and Competitiveness**

Visakhapatnam experienced rapid industrialization with the onset of major industries viz., Hindustan Petroleum Corporation Limited (HPCL), Coromandel Fertilizers Limited (CFL),

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Hindustan Zinc Limited (HZL) and Rashtriya Ispat Nigam Limited (RINL). The construction of the outer harbor and steel plant has considerably changed the character of the City. On account of rapid industrialization, there has been tremendous amount of migration into the City.

*Demography:* Visakhapatnam and five other cities with population of one to two million are shown in Table 4.1. The following are the comparative features of Visakhapatnam: population growth has been the lowest; literacy lowest; and sex ratio highest. These indicate considerable scope for further immigration into the City that could boost population growth and educational advancement in general, leading to improvement in literacy rates.

**Table 4.1: Key Demographic Features of Six Cities as Per Census 2011**

Cities	Allahabad	Ludhiana	Vadodara	Raipur	Bhopal	Visakhapatnam
Population (Million)	1.1	1.7	2.1	1.1	1.8	1.9
Decadal growth %	12.8	13.9	38.5	19.3	20.3	11.9
Literacy rate %	86.5	82.5	94.1	86.9	85.2	81.8
Sex ratio	876	873	934	945	918	977

Source: Census 2011.

*Infrastructure:* With regard to developmental infrastructure such as water, sanitation and electricity, the data in Table 4.2 portray the status of Visakhapatnam in comparison. The City has the highest coverage of household water supply connections (85%); highest also in terms of metered water connections; but second lowest in terms of supply of water per capita (better than Raipur).

**Table 4.2: Water, Sanitation and Power 2013: Situation in the Six Cities**

Indicators	Allahabad	Ludhiana	Vadodara	Raipur	Bhopal	Visakhapatnam
<b>Water</b>						
Coverage of supply connections %	73	100	78	31	67	85
Per capita supply of water LPCD $\varnothing$	253	220	156	60-65	135	100-110
Metering Extent %	1	NA	3	20	NA	23
<b>Sewerage and Sanitation</b>						
Toilets Coverage %	20	65	87	71	56	56
Coverage sewerage network services	20	12	37	25	30	26
Adequacy of sewerage treatment capacity %	85	36	106	NA	30	45

Indicators	Allahabad	Ludhiana	Vadodara	Raipur	Bhopal	Visakhapatnam
<b>Solid Waste Management</b>						
Coverage %	50	50	100	25	30	77
Efficiency of collection %	80	NA	98	86	NA	91
Extent of scientific disposal %	100	NA	100	0%	0%	9%
<b>Roads and Transport</b>						
Surfaced roads %	97	76	80	45	NA	80
Public Transport System Share %	32	38	25	22	35	20
<b>Electricity</b>						
Domestic Connectivity %*	99.2	99.3	99.2	97.2	99.7	99.9

Source: CRISIL Infrastructure Advisory-Rapid Baseline Assessment Report, Visakhapatnam, Allahabad and Raipur.

ø Litres per Capita per Day

\*Based on 2011 Census. City Development Plan Bhopal 2013/ Bhopal, Ludhiana City Profile Report.

On most other indicators in Table 4.2, the City is neither on the top nor at the bottom, thus indicating some scope for further improvement. The exception is electricity where the City has full coverage of households.

*Competitiveness:* The Institute of Competitiveness has been bringing out a report on Indian City Competitiveness since 2008, the latest being the 2013 report<sup>1</sup>. The report reviews 50 cities every year on selected pillars of competitiveness such as factor conditions (covering financial, communication, physical, administrative, human capacity and innovation), and demand conditions (covering demographics and income). Strategy and rivalry are also considered (covering competition intensity, diversity of firms and business incentives) along with related and supporting industries (covering suppliers' sophistication and industrial support). Table 4.3 shows selected aggregated ranks for Visakhapatnam and five other cities. The city is fairly comparable to the others and there is no inherent disadvantage to be addressed immediately.

**Table 4.3: Competitiveness Ranks of Six Cities**

	Allahabad	Ludhiana	Vadodara	Raipur	Bhopal	Visakhapatnam
<b>Overall</b>	39	32	22	34	27	30
<b>Factor Conditions</b>	34	33	20	18	26	38
<b>Demand Conditions</b>	50	29	30	44	26	28
<b>Supporting Industry</b>	19	41	27	38	39	26

Source: 2013 Competitiveness Index- Institute for Competitiveness

### Liveability Index 2013: A Comparison

The Liveability Index 2013 also was developed by the Institute of Competitiveness, for the top 50 cities in India. The factors taken into consideration while determining the index are social, natural, economic and physical environment. These factors consist of eight core pillars viz., demographics, education, health and medical standards, safety, housing options, socio-cultural-natural environment, economic environment, and planned environment. Table 4.4 provides the ranks obtained by the six cities on some of these core pillars.

**Table 4.4: 2013 Liveability Index: The Six Cities**

	Allahabad	Ludhiana	Vadodara	Raipur	Bhopal	Visakhapatnam
Overall Rank	29	34	44	47	36	23
Education Rank	24	25	48	42	39	38
Health and Medical Rank	17	46	21	19	48	16
Safety Rank	10	25	19	24	44	38

*Source: Institute of Competitiveness Report 2013*

According to the Liveability Index 2013, the top three positions on liveability were taken by Mumbai, Chennai and Hyderabad. The last position (50) was taken by Patna. Thus Visakhapatnam with its overall rank of 23 is far better than most cities among the 50. It should improve on education and safety – currently fetching a rank of 38 on each.

### Concluding Note

Visakhapatnam has been among the fastest growing urban areas in India since 1971. Its population increased from 3,63,467 in 1971 to 18,97,823 in 2011. The key features of Visakhapatnam include its natural harbour, rail, road and air connectivity to national and international destinations. The City's signal accomplishment has been the place in the top 25 on the Liveability Index. Yet there is a lot to be done with regard to education and safety.

### (Footnotes)

1 *The India City Competitiveness Report (ICCR) 2013, 6<sup>th</sup> report, published by the Institute of Competitiveness, New Delhi.*

## Chapter 5

**MOBILITY: TRAFFIC AND TRANSPORTATION**

D. Mukund\*

*Transportation has played a crucial role in economic development right from the beginning of human civilization. Early cities grew up on natural bays and ports, and on rivers and lakes where transport was available. Geographic characteristics such as proximity to oceans, seas, waterways, plains, mountains and oases defined early transport systems. The intensive use of infrastructure makes the transport sector an important component of the economy and a common tool used for development. This is even more so in a global economy where economic opportunities are increasingly related to the mobility of people, goods and information. A relation between the quantity and quality of transport infrastructure and the level of economic development is apparent. High density transport infrastructure and highly connected networks are commonly associated with high levels of development. When transport systems are efficient, they provide economic and social opportunities and benefits that result in positive multiplier effects such as better accessibility to markets, employment and additional investments.*

**Introduction**

Transportation has always been a crucial aspect of human civilization, but it is only in the second half of the last century that the phenomenon of traffic congestion has become predominant due to the rapid increase in the number of vehicles throughout the world. This tendency is continuing to cause immense pressure on existing road infrastructure. Expansion in the road network, motorization and urbanization, in the country in general and Andhra Pradesh in particular, has led to the increase in road accidents. The volume of traffic has increased rapidly in the combined state of Andhra Pradesh in the last decade. The growth rate of vehicles is around 14%. The total number of vehicles in Andhra Pradesh was 98.42 lakhs of which 70% were two wheelers, by the end of March 2016<sup>1</sup>.

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Visakhapatnam is a port city in Andhra Pradesh with a total population of 17.28 lakhs and an area of 540 sq km in 2011. It has been recently expanded into Greater Visakhapatnam Municipal Corporation (GVMC), incorporating several areas in the outskirts into the City limits. This has increased the population of Visakhapatnam by more than five lakhs. The volume of traffic in Visakhapatnam city has been growing by leaps and bounds. Particularly, automobiles are multiplying every year. The total number of motorized registered vehicles was 2,09,000 in 2001, and is growing annually at the rate of 4%. Today more than seven lakh vehicles of all categories ply on Visakhapatnam city roads. Every year, not less than 20,000 of all types of new vehicles are getting registered<sup>2</sup>.

## Transportation Infrastructure

### *Present Status of Traffic Wing – Visakhapatnam Police*

The traffic wing is headed by Additional Deputy Commissioner of Police (ADCP), assisted by two Assistant Commissioners of Police (ACP) and a team consisting of eight Circle Inspectors (CI) representing eight traffic circles, 25 Sub Inspectors, 36 Assistant Sub Inspectors, 81 Head Constables and 410 Police Constables. However, the numbers in reality fall short of the sanctioned numbers mentioned before. A comparison of the sanctioned and actual strength is presented in Table 5.1.

**Table 5.1: Personnel Statistics of Traffic Wing**

Position	Sanctioned Strength	Actual Strength	Vacancy
ADCP	1	1	-
ACP	2	2	-
CI	8	8	-
SI	25	21	4
ASI	36	28	8
HC	81	58	23
PC	410	351	59
<b>Total</b>	<b>563</b>	<b>469</b>	<b>94</b>

(Source: Office of Additional Deputy Commissioner of Police – Traffic, Visakhapatnam)

### *Deployment of Beats for Traffic Regulation*

After a thorough study of all the intersections and volume of traffic on the roads, a total of 266 beats have been deployed for effective regulation of traffic. These comprise of 76 Double Beats, 124 Single Beats, 32 Moving Beats, 20 Motorcycle Beats and 14 Mobile Tra-colts. For emergency management, in addition to the two national highway mobiles, supporting staff are being deployed round the clock at Maddilapalem and NAD junctions. The two highway mobiles cover two stretches of highway: North Highway Mobile from Tatichetlapalem to Rajapulova (34 km) and

South Highway Mobile from Tatichetlapalem to Salapuvanipalem (30 km). Besides these two highway mobiles, Highway Operating Patrol (HOP) mobile also moves on NH 16 from Rajapulova to Salapuvanipalem with strength of one CI, one head constable and two police constables / home guards round the clock in four shifts. In addition to all these vehicles, Traffic Mobiles and 14 Tra-colts Mobiles are deployed to regulate the traffic, consistently covering accident prone spots on both National Highway as well as local roads<sup>3</sup>.

## Traffic Safety

### Visakhapatnam - Accident History and Analysis

The map of Visakhapatnam city is rapidly changing every year due to industrialization and other developmental activities. A stretch of 73 kilometers of National Highway No.16 from Rajulapalem junction to Salapuvanipalem passes through Visakhapatnam City Police jurisdictional area. Based on the statistics of accidents from 2011 to 2014, the traffic division identified a total of 148 locations in the City as black spots or high ranked accident prone areas. Figure 5.1 shows the distribution of these black spots in the City limits.

As is evident from the Figure 5.1, nearly 50% of these identified black-spot areas are on the National Highway No.16. Table 5.2 presents the summary of accidents at 148 identified black-spots in the Visakhapatnam City Limits. The number includes crashes recorded under three categories (IPC 304A, IPC 338 and IPC 337) for years 2011, 12, 13 and 14. IPC 304A indicates “death due to negligence” whereas IPC 338 and 337 indicate grievous injury and minimal injury crashes.

**Table 5.2: Crashes on Visakhapatnam Roads**

	2011	2012	2013	2014
<b>Total Black Spot Locations</b>	148			
<b>Total Recorded Accidents at Black Spots (IPC 304A, 338 and 337)</b>	539	487	526	578
<b>Fatal Accidents (IPC 304A)</b>	166	167	155	144
<b>Black Spots with Fatal Accidents</b>	69	74	78	70
<b>Black Spots with Fatal Accidents on NH 16</b>	40	42	46	43
<b>% of Black Spots on NH 16 with Fatal Accidents</b>	58 %	57 %	59 %	61 %

(Source: Office of Additional Deputy Commissioner of Police – Traffic, Visakhapatnam)

As evident from the table above, from 2011 to 2014, there is an increase in the rate of total accidents. However, there was a decrease in total number of accidents from 2011 to 2012. This decrease can be partly attributed to the aggressive safety measures implemented by the Visakhapatnam Traffic Police such as introduction of highway barriers for the first time in the City limits. As per the national statistics, crash rate of Visakhapatnam is on par with the other cities with similar population (Indore, Nagpur and Kanpur). When compared with other cities within the State, Visakhapatnam ranks much lower than its counterparts<sup>4</sup>.



### Traffic Control

To improve existing conditions, different strategies and measures were adopted by Visakhapatnam City Traffic Police Wing. These strategies address the *3 Es (Engineering, Education and Enforcement)* concept.

- **Engineering** involves improvements and innovation in roads, vehicles and related features, systems and equipment.
- **Education** means creating a road safety-oriented society through research, analysis, training, awareness and publicity.
- **Enforcement** stands for administering traffic laws, rules and regulations and upholding them to optimize road safety and promote a smooth flow of traffic.

### Engineering Measures

The increased use of roundabouts, median dividers, better signage, reflective markings and speed breakers has effectively improved road conditions. The following are some of the engineering measures undertaken by Visakhapatnam City Traffic Police Wing with the cooperation of GVMC and National Highways Authority of India (NHAI):

- i. Interdepartmental Coordination with officials from GVMC, APSRTC, NHAI, etc.
- ii. Road stoppers were introduced on NH 16 to reduce the speed which resulted in tremendous decline in road accidents.
- iii. Better illumination was provided by GVMC upon the request of police at 14 locations which improved safety during night time.
- iv. Usage of Pre Cast Cement Blocks to provide free lefts and Central Dividers to avoid road accidents.
- v. Cautionary Sign Boards were installed on NH 16 road and other roads in the City limits to promote safety.
- vi. Speed Breakers were laid at the required places to control speed and to prevent possible accidents.
- vii. The road under Asilmetta flyover was put to use after six years by removing encroachments with the help of GVMC authorities.

### Educational Measures

Education includes traffic and driver education. Education also includes ongoing research into the causes of traffic accidents and crashes, which leads to future improvements and innovations in road safety. Public information, publicity campaigns and road safety-oriented media programs are also part of education. Education can vary in type and intensity for certain target groups, but

the overall goal is to target human behavior on the road and promote a community-wide safety-oriented mentality. The educational measures implemented in the Visakhapatnam City Police jurisdictional area are listed below:

- i. Frequent Traffic Awareness Classes are being conducted for all two, three and four wheeler as well as heavy vehicle drivers to inculcate traffic discipline.
- ii. Special drives are being conducted to nab minor riders every day and counselling for the minors and their parents is being conducted every Monday.

### *Enforcement Measures*

Traffic enforcement is usually associated with over-speeding, red light running, non-use of seat belts and helmets, and use of alcohol and mobile phone. Sanctions may include fines, suspension or revocation of driving license, educational measures and increased insurance premiums. The City Traffic Wing is actively involved in the following enforcement measures to improve the traffic safety in the City:

- i. Traffic check posts have been opened for checking drunken drivers and regulation of traffic at Maddilapalem and NAD junctions.
- ii. Organizing “drink-drive” check posts at 10 different locations in the City every night from 10 pm to 1 am.
- iii. Red Light Violation detection systems were launched at three junctions in the City. Currently these are not functioning due to damage during Cyclone Hudhud.
- iv. Cases are being registered against the Auto drivers for prevention of dangerous driving and wrong parking (Bus bay parking).
- v. Entry is restricted for heavy vehicles into the City from 8 am to 10 pm.
- vi. Restriction of autos on the Beach Road from Coastal Battery Junction to Park Hotel Junction to ensure free flow of traffic on Saturdays, Sundays and holidays.

### *Travel Demand Modelling*

#### *Traffic Volume Counts*

Traffic Volume Counts have been carried out at various locations in the City for understanding the existing traffic situation. Turning Movement Counts (TMC) have been carried out at 20 intersections to obtain the traffic volumes. Also, Pedestrian Movement Counts have been carried out in all the intersections to observe the demand for footpaths and crossing facilities. Out of the 20 intersections, four have been selected at the outer cordon points of the City i.e. the four entry points to the area under study and the rest of the 16 locations are within the City. The 16 locations within the City represent the major intersections in the City and they also represent imaginary screen lines which divide the traffic movements in the City from north to south, east to west,

between two major regions etc. Table 5.3 gives the list of intersections selected for Turning Movement Counts (TMC).

**Table 5.3 List of Intersections for Turning Movement Counts**

Name of the Intersection	Location	Arms
Palm Beach	Inner Cordon	3 armed
Seven Hills Hospital	Inner Cordon	3 armed
Purna Market (To Police Barracks)	Inner Cordon	3 armed
Gopalapatnam	Inner Cordon	3 armed
Hanumanthawaka	Inner Cordon	4 armed
Maddilapalem	Inner Cordon	4 armed
Siripuram	Inner Cordon	4 armed
Asilmetta	Inner Cordon	4 armed
Diamond Park	Inner Cordon	4 armed
Jagadamba	Inner Cordon	4 armed
Dolphin Hotel	Inner Cordon	4 armed
Convent Junction	Inner Cordon	5 armed
Collector's Office Junction	Inner Cordon	4 armed
NAD Junction	Inner Cordon	4 armed
Dabagardens-Ambedkar Statue	Inner Cordon	5 armed
Gurudwara	Inner Cordon	4 armed
Bheemunipatnam	Outer Cordon	3 armed
Thagarapuvalasa	Outer Cordon	3 armed
Lankelapalem	Outer Cordon	4 armed
Gajuwaka Circle	Outer Cordon	4 armed

### *Inner Cordon TMCs*

Sixteen hour Turning Movement Counts have been carried out at each of these intersections on a typical working day. The mode shares and hourly variation of passenger vehicles, goods vehicles and non-motorized vehicles at each of the screen-line points were recorded. The salient features observed from the traffic flow trends are:

- Auto-Rickshaws form the majority of the total vehicles at most intersections followed by two-wheelers and cars. Buses, in spite of carrying the maximum number of passengers, are observed to be in the minority, except at intersections along the NH 16, which are observed to be having a significant proportion of buses. This indicates the efficiency of space utilization of the City-bus system.

- The peak hour volume of pedestrians reaches up to 3000 at some of the intersections whereas the infrastructure provided for crossing facilities is minimal.
- The vehicular traffic flow at various times of the day follows a similar pattern at various points in the City, with only the magnitude of traffic volume varying between locations.
- Clear distinction exists between the peak hours observed for motorized and non-motorized modes.
- The morning and evening peaks for non-motorized vehicles are from 8.00 am to 9.00 am and 5.00 pm to 6.00 pm respectively, while for passenger motorized modes it is observed to be 9.00 am to 10.00 am and 6.00 pm to 7.00 pm respectively.

### *Outer Cordon TMCs*

The four locations selected for outer-cordon TMCs represent the four entry points to the City. Sixteen hour Turning Movement Counts have been conducted on a typical working day for each of these intersections. The hourly variation of passenger vehicles, goods vehicles and non-motorized vehicles at each of the outer-cordon points were recorded. The following are the salient features observed from the data:

- Auto-rickshaws are again observed as the predominant mode among passenger vehicles even at the outer-cordon points followed by two-wheelers and cars.
- Significant numbers of pedestrians use the intersections even at the outer-cordon locations of the City.
- The peak hour for both motorized passenger and non-motorized vehicles is observed to be 8.00 am to 9.00 am in the morning while it differed in the evening with 5.00 pm to 6.00 pm being the peak for non-motorized vehicles and 6.00 pm to 7.00 pm the peak for passenger vehicles.
- The movement of goods vehicles remains relatively constant throughout the day

### *Origin-Destination (OD) Surveys*

OD surveys have been conducted at eight locations to capture the travel characteristics of trips originating outside the City. These trips could either be destined to the City or just be passing through the City. Four of these locations are the outer cordon locations where TMCs were carried out. Two were at the entry points to the core-City area i.e. NAD Junction and Hanumanthawaka and other two were the Visakhapatnam Railway Station and the regional bus depot, locations from where external trips using public transport enter the City. Table 5.4 gives the sample size of trips captured at each location through the OD surveys.

**Table 5.4 Sample size of trips captured in OD Surveys**

Name of the Intersection	Sample Size	
	Passenger	Goods
<b>New Gajuwaka</b>	1689	690
<b>Tenneti Park</b>	905	
<b>Tagarapuvalasa</b>	1468	784
<b>Lankelapalem</b>	1112	826
<b>NAD Junction</b>	3542	1681
<b>Railway Station</b>	3705	
<b>RTC Complex</b>	3317	
<b>Hanumanthawaka</b>	3259	949

**Road inventory survey**

The main objective of the road inventory survey is to evaluate the existing street infrastructure available for various modes. While the municipal agencies are expected to maintain the database of their existing infrastructure, no such data exists with the GVMC and hence a sample of the total road network is selected for the survey. The major arterials in the City have been identified in consultation with GVMC and existing road inventory for various modes has been collected.

It was observed that only 77 km of roads out of the total 1,100 km of urban roads have footpaths constructed or being constructed along them. But their quality is questionable as they are not observed to be continuous, with encroachments like parked vehicles, crossings and entry to properties along the road blocking free movement of the pedestrians. Also, at many locations, concrete blocks covering the sewage lines are being used as footpaths. Footpaths have high kerb heights, gaps between blocks, and electric poles, street lights and trees planted in the middle, making them inaccessible to many pedestrians.



**Figure 5.2 Inadequate footpath infrastructures along the BRT corridor**

Adequate bus-stop infrastructure is also observed to be lacking at most places in the City and bus users are made to stand on open roads even during extreme weather conditions like the summer heat and rain.



Figure 5.3 Inadequate bus-stop facilities

The available carriage-way widths for vehicle users have been collected for all major roads. Organized off-street parking is very minimal in the City, but on-street parking is observed predominantly on many arterial roads.



Figure 5.4 On-street parking observed on most arterials

## Smart City Initiatives

### *Visakhapatnam – Smart City Transport Plan*

The prominence of Visakhapatnam got highlighted once again when it figured along with Ajmer and Allahabad during Prime Minister Sri Narendra Modi’s US tour. These three cities have been

identified for development as smart cities with the funding and assistance of the US. Smart cities are those which have smart (intelligent) physical, social, institutional and economic infrastructure. It is expected that such a smart city will generate options for a common man to pursue his/her livelihood and interests meaningfully. Ease of being able to move from one place to another is at the core of a smart city.

The “smart” transport system emphasizes walking, cycling and public transport as the primary means for mobility with personal motor vehicles being actively discouraged. In fact, smart cities lay considerable emphasis on the walkability in the city. The pedestrian is given a place of prominence as every trip has a leg that involves walking. Hence, improved mobility will involve a three pronged approach whereby there are:

- i. Improvements in infrastructure for walking, cycling and waterways
- ii. Improvements in public transport – Metro Rail, Bus Rapid Transit (BRT), Light Rail Transit (LRT), Monorail, etc
- iii. Improvements in infrastructure for other motor vehicles – ring roads, bypasses, elevated roads and improvements in the existing roadways

Benchmarks of different parameters for a smart city have been set up by the Government of India. Some of the transportation related benchmarks are listed below:

- Maximum travel time of 30 minutes in small and medium size cities and 45 minutes in metropolitan areas
- Continuous unobstructed footpath of minimum two metres width on either side of all streets with Right-of-Way (RoW) of 12 m or more
- Dedicated and physically segregated bicycle tracks with a width of two meters or more, one in each direction, should be provided on all streets with carriageway larger than 10 m (not RoW)
- High quality and high frequency mass transport within 800 m (10-15 minute walking distance) of all residences in areas over 175 persons / hectare of built area
- Access to paratransit within 300 m walking distance

To fulfill the objective of the smart city transportation, a strategic plan has to be articulated to enhance traffic enforcement program priorities over the next five years. This plan should be flexible enough to enable all stakeholders to proactively respond to emerging issues or new opportunities vis-à-vis road safety in the city of Visakhapatnam. The plan would be a guide for program resource allocation and the development of traffic enforcement operational plans. It will ensure that enhanced traffic enforcement priorities can be identified, addressed and delivered within the annual budget allocation. It will also seek alignment with provincial policing and road safety partner priorities. Enhanced traffic enforcement will be accountable, performance-based and evidence-led and will work in an integrated manner with provincial policing, regional sectors and road safety stakeholders. Most importantly, the plan has to guide the traffic / transportation division to reach the goals specified for a smart city. Various components form a part of this strategic plan, some of them being:

- i. Road Improvements and Road markings
- ii. Upgradation of Signals including Vehicle Actuation
- iii. Enforcement Cameras and Surveillance Cameras
- iv. Public Transportation Prioritization and Dynamic Information Boards
- v. Traffic Management Centre

### *Road Improvements*

The road system should be designed in a manner that promotes appropriate behavior and that, to the largest extent possible, prevents human error from resulting in serious consequences. Road crashes can be prevented by better planning and more safety conscious design of the road network. This can be achieved through a major effort to improve the physical infrastructure in terms of investments, operation and maintenance.

The potential for accident reduction through low-cost engineering measures at hazardous sites is particularly high. Simple measures can significantly reduce problems at such sites. Drivers are often presented with misleading information or no advance warning, sightlines may be inadequate, pedestrians may not be catered to and accidents may occur because of a driver's inability to cope with the particular combination of circumstances and environment. By identifying and eliminating the features that make sites hazardous, engineers can improve road safety. This often means reducing the complexity of an intersection or enabling movements to be made in stages. Reducing the number of decisions drivers must make at any one time, simplifies the driving task, and helps drivers to progress in safety and comfort, with a minimum of conflict with other traffic and pedestrians. There are four basic strategies for accident reduction through the use of countermeasures. These are:

- i. Single site (black-spot programmes) - the treatment of specific types of accident at a single location;
- ii. Mass action plans - the application of a known remedy to locations with a common accident problem;
- iii. Route action plans - the application of known remedies along a route with a high accident rate;
- iv. Areawise schemes - the applications of various treatments over a wide area of town/city, i.e. including traffic management and traffic calming (speed reducing devices).

Black-spot treatment is likely to be the most effective and straightforward in countries with no prior experience of accident remedial work. Many highway/police authorities in industrialized countries began in this way and only later moved on to mass and route action plans as they gained more experience. All these strategies rely on the availability of data describing accidents and their locations, to identify where accidents occur and what are the common causes that contribute to them. The following are the road improvement measures suggested by Visakhapatnam City Traffic Police for better management of traffic and improving safety:

- Improvements to National Highway No.16 including:
  - o Increase of median height to discourage pedestrian crossings

- o Decrease of median gaps / openings
- o Construction of service roads on either side of the entire stretch of 73 km
- o Proper road markings and road signs
- Developing alternative routes to NH 16 within the City limits:
  - o From Yelamanchili to NH 16 via Srungavarapu Kota and Vizianagaram.
  - o Existing State Highway connecting Anandapuram and Anakapalli is under the process of realignment and transformation to a four lane State Highway from the existing two lane road.
  - o From NAD to Venkojipalem via Muralinagar, Madhavadhara, Kailasapuram, Narasimhanagar and Seethammadhara
- Identification of suitable locations for construction of multilevel parking garages (underground structures preferred) in the central business area of the City. This is very much essential to decrease congestion. Possible locations for such construction are:
  - o Old Jail / Central Park
  - o Saraswati Park
  - o Diamond Park
  - o TSR Complex
  - o Visakha Jala Udyana Vanam
  - o Old Gajuwaka – New Gajuwaka road
  - o NAD – Gopalapatnam road
- To decrease traffic on the NH 16 and also to improve movement of traffic between suburban residential areas in the north (Simhachalam / Arilova / Pineapple Colony) to main City areas in the south (Narasimhanagar / Seethammadhara / Asilmetta), two tunnels are proposed. These tunnels would be connecting (i) Doctors Colony to Peda Gadili and (ii) Narasimhanagar to Simhachalam. This would decrease the travel distance from North side to South side by more than 66%, leading to decrease in travel time. It would also relieve congestion on the NH 16 at critical (bottleneck) locations such as Venkojipalem and Isukathota.
- Construction of truck terminals for local industrial goods vehicles (Visakhapatnam Port Trust, Visakhapatnam Steel Plant etc.)
- Provision of Traffic Ponds for proper storage of seized / accident vehicles
- NHAI had proposed construction of 12 flyovers at critical intersections on NH 16 between Anandapuram and Kurmannapalem. This will relieve the traffic congestion at those junctions. The 12 proposed flyovers are - Kurmannapalem, Old Gajuwaka, BHPV Road, Ayyappaswamy Temple, NAD, Thatichetlapalem, Akkayyapalem, Santhipuram, Gurudwara, Maddilapalem, Isukathota, and Venkojipalem. Currently, the process of transferring the jurisdiction of a stretch of NH 16 - Anandapuram to Kurmannapalem - from NHAI to GVMC is under way. Once the transfer is completed, GVMC will have complete control over the operations and maintenance of this stretch. In that case, construction of flyovers will be the responsibility of GVMC.

- Construction of foot over bridges for enabling pedestrians to safely cross the high speed and high traffic roads at different junctions - 1) Lankelapalem, 2) Aganampudi, 3) Natayyapalem, 4) Kakaninagar, 5) R&B Office, 6) Punjab hotel, 7) Muralinagar, 8) Kancharapalem Police Station, 9) Urvasi, 10) Satyam, 11) Hanumanthawaka, 12) Adarshnagar, 13) Car shed, 14) Kommadi and 15) Tagarapuvalasa.
- Apart from the above mentioned locations, foot over bridges are also proposed within the City for high traffic roads such as 1) Jagadamba Junction, 2) Beach Road, 3) Purna Market Junction, 4) Dabagardens Road and 5) Sampath Vinayak Temple Road.
- Speed breakers to be provided at all the approach roads abutting the National Highway and State Highway
- Illumination of the highway at identified locations that are high risk to pedestrians especially during the night time conditions
- Installation of regulatory and mandatory signs and Cat Eye Studs (Raised Pavement Markers) for safe driving during the night time conditions
- Studies to check the improper/unauthorized use of the roadway.

### *Signal Upgradation*

The normal functioning of traffic lights requires sophisticated control and coordination, to ensure that traffic moves as smoothly and safely as possible and that pedestrians are protected when they cross the roads. The City's traffic signals are in need of upgradation, as traffic has increased three-fold since the signals were introduced in the mid-80s. The traffic signals are unable to cope with the increase in the number of vehicles. Also, on account of the poor coordination of traffic signals which are situated at the wrong places, traffic management in the City is chaotic. Greater Visakhapatnam Municipal Corporation has to develop a modern traffic management system with the installation of new traffic signals and upgradation of the existing traffic signals to Light Emitting Diodes (LED) technology and extend it further to an Advanced Area Traffic Control System. LEDs will ensure better visibility for longer distances compared to conventional incandescent lights.

Traffic signal control systems coordinate individual traffic signals to achieve network-wide traffic operations objectives. These systems consist of intersection traffic signals, a communications network to tie them together, and a central computer or network of computers to manage the system. The goal of traffic signal coordination is to get the greatest number of vehicles to pass through the system with the fewest stops in a comfortable manner. It would be ideal if every vehicle could proceed without stopping. This is not possible, even in well-spaced, well-designed systems. Therefore, in traffic signal coordination, the green times for the heaviest traffic movements are given more weight than the smaller traffic movements. The overall result is lowered total traffic delay for the driving public. Some of the benefits of coordination are:

- Reduction in overall stops and travel delays
- Reduction in the number of stops reduces vehicle emissions and thus improves air quality. Most of the vehicle emissions occur during acceleration (stop and go traffic).

- Allowing large groups of vehicles to efficiently flow through a series of traffic signals without stopping
- Reduction in the number of severe accidents.
- Reduction in aggressive driving behaviors.

In the city of Visakhapatnam, especially on the National Highway between Kurmannapalem and Madhurawada, there are 17 traffic signals as shown in Figure 5.5. Signal Coordination should be considered as the highest priority as it eases the traffic delays and assists VIP movement on the National Highway. Additionally, signal coordination can have a dramatic impact on the drivers themselves. As most of us realize, delays and frustrations caused by the operation of traffic signals can lead to accidents and road rage. Traffic signal coordination is strongly influenced by dynamic conditions such as corridor speeds, traffic signal spacing, congestion, traffic volumes on major streets, pedestrian volumes, traffic signal cycle lengths, additional phasing and safety considerations. In addition to the signal coordination on the National Highway, it is also strongly recommended to synchronize the existing traffic signals with the upcoming Bus Rapid Transit System (BRTS) signals.

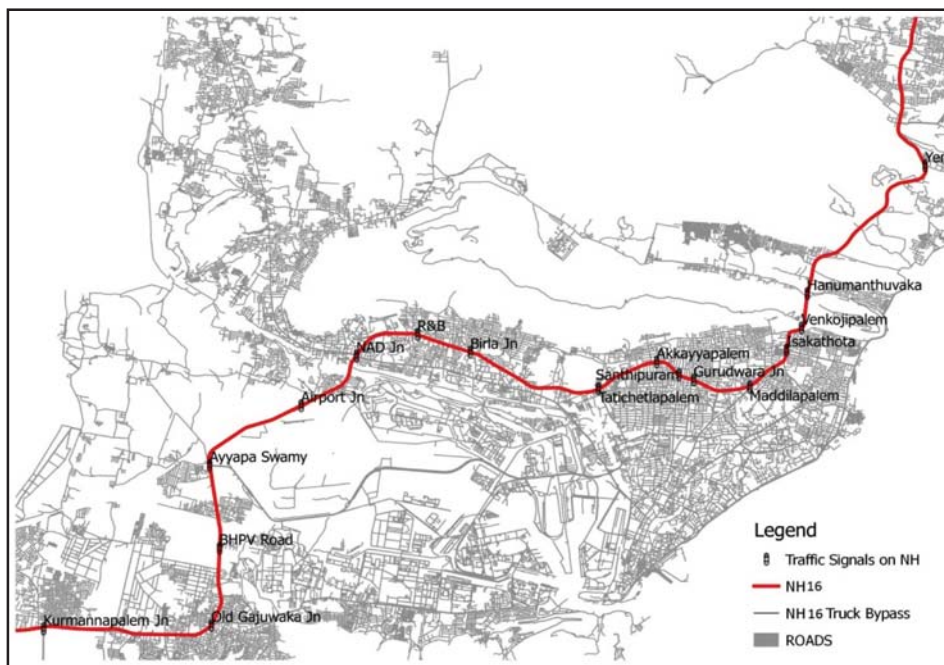


Figure 5.5: Traffic Signals on NH 16

### Traffic Enforcement

Specialised cameras are a vital component of traffic enforcement systems. A traffic enforcement camera (also known as road safety camera, road rule camera, photo radar, speed camera) is an automated ticketing machine. It may include a camera which may be mounted beside or over a highway or installed in an enforcement vehicle to detect traffic regulation violations. A red light camera is a traffic camera that captures an image of a vehicle that goes through an intersection where the light is red. The system continuously monitors the traffic signal and the camera is triggered by any vehicle entering the intersection above a preset minimum speed and following a specified time after the signal has turned red. In Visakhapatnam, three enforcement cameras

were installed at Jagadamba, Satyam and Urvasi junctions. However, due to poor maintenance of the cameras, none of the three cameras are working at present.

A Video Traffic Surveillance and monitoring system enables better:

- Traffic Management
- Law and Order
- Management of special events like public gatherings, processions etc.
- Incident Management
- Information dissemination to road users

The system collects real time videos from the specified locations by using Pan Tilt Zoom (PTZ) camera system, transmitting these to the Traffic Control Center through an IP network. The system therefore comprises of outstation equipment installed at various locations in the city of Visakhapatnam and complementing equipment installed at the Traffic Control Center.

### *Public Transportation*

#### *Dynamic Information Boards*

A significant measure in improving public transportation is dynamic information boards, which represent actuators within the scope of an urban traffic management system. They forward up-to-date information to the road users and supply travel time comparisons or recommend directions, with respect to the traffic situation or modal travel alternatives.

#### *Public Transportation Prioritization*

Public transportation prioritization is one of the most important measures a city can take to improve the attractiveness of public road transportation and thus to positively influence the modal split in line with environmental protection. At the same time, the reduction in travel time leads to an increased efficiency of the vehicle fleet and thus to a possible reduction of the number of vehicles while maintaining the same level of performance.

The increasing need for urban mass transit mobility is now being addressed by various cities in India, following the best practices in the world. The Jawaharlal Nehru National Urban Renewal Mission (JNNURM) which aims to encourage reforms and fast track planned development in 63 cities does consider projects in the field of urban public transport. Safe, versatile, flexible and economic, the Bus Rapid Transit System (BRTS) also known as the High Capacity Bus System (HCBS) is increasingly being adopted by cities in India.

As the smart city concept directly depends on how effective public transportation works, it is high time for the buses using the BRTS corridor in Visakhapatnam to be provided with improvised signals delivering better performance. As of now, the City has two BRTS routes on Pendurti and Simhachalam corridors. This is shown in Figure 5.6.

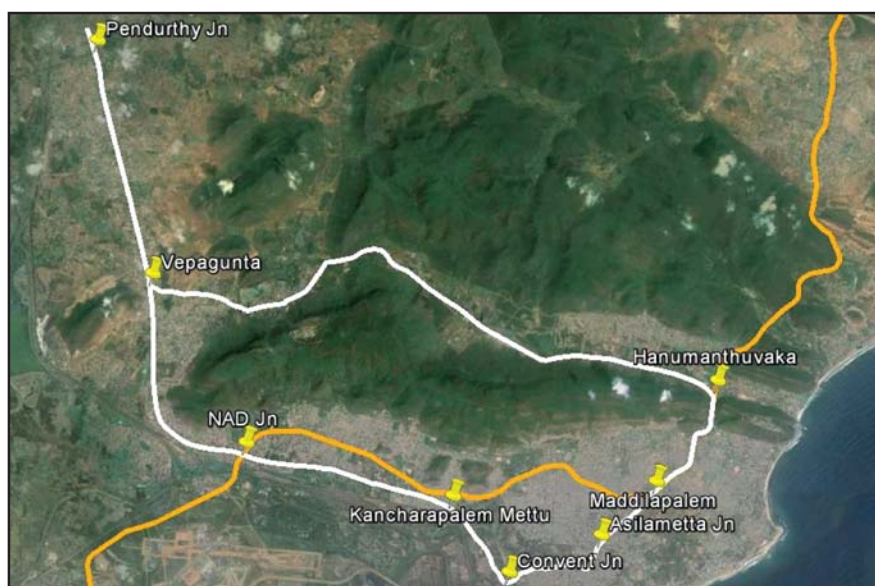


Figure 5.6: Existing BRTS Corridors in the Visakhapatnam City Area

The Visakhapatnam BRTS was originally expected to be fully functional by 2015, but has been delayed due to certain constraints.

In addition to the existing BRTS, a project proposal submitted by the GVMC to the Ministry of Urban Transport for Metro Rail project has identified three corridors for Mass Rapid Transit (MRT). These three corridors are listed below:

- i. Corridor 1: NH 16 Corridor from Madhurawada to NAD Junction to Kurmannapalem
- ii. Corridor 2: From Gurudwara Junction to Park Hotel via RTC Complex, GVMC, Tycoon Junction and Siripuram
- iii. Corridor 3: From Thatichetlapalem to Old Post Office via Railway New Colony, Railway Station, South Jail Road, Ambedkar Junction, Gollalapalem, Court, and Jagadamba Junction.

These three corridors have been identified based on a detailed study under the United Nations Environment Programme (UNEP) that prepared Low Carbon Mobility Plan (LCMP) with comprehensive mobility and suggested integrated transport solutions. The plan says that that future Central Business Districts (CBDs) will be in Gajuwaka, Pendurthy and Madhurawada and transport axes will be along these growth corridors. Experts are of the view that depending on the population and spread, the City requires support transport for mass rapid transit systems to provide last mile connectivity. The proposed metro corridors are shown in the Figure 5.7.

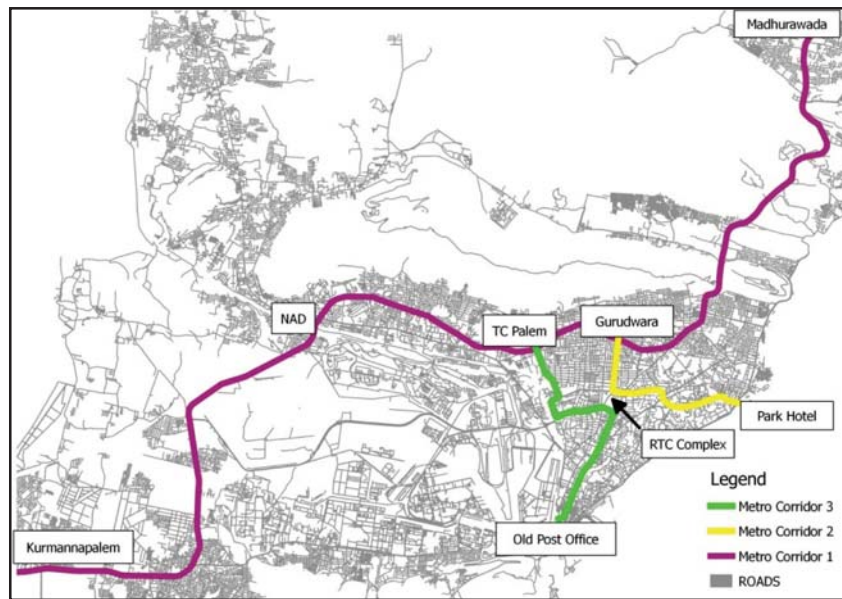


Figure 5.7: Proposed Metro Corridors in the Visakhapatnam City Area

### *Traffic Management Centre*

Traffic control and management remains a particular challenge in densely populated cities and towns. A more efficient use of existing roadway capacities, harmonized traffic flows, emission-related traffic control, prioritization of public transportation and focus on traffic safety (pedestrian and driver) – are some approaches to better manage urban mobility. Dynamic traffic control takes into consideration the current traffic situation and influences the traffic flow by means of previously defined strategies, such as a green wave or by giving priority to public transportation. It helps to considerably improve traffic flow. Various components form a part of the improvement plan, some of them being:

- Road Improvements
- Upgradation of Signals including Vehicle Actuation
- Road markings
- Signage - Overhead and Stand alone
- Enforcement Cameras
- Surveillance Cameras

In order to establish an integration of all the above components, a Traffic Management Centre (TMC) has to be set up. The Traffic Management Centre (TMC) will be the hub of transportation management system, where information about the transportation network shall be collected and combined with other operational and control data to manage the transportation network and to produce traveller information. The proposed TMC would house a traffic wireless system, traffic surveillance system, traffic signalling system, traffic helpline, traffic planning operations, etc and it shall handle the following components:

- Collection of information from the traffic signals spread across the City
- Provision of live feed from the surveillance cameras installed at various junctions in the City
- Collection of traffic violation data from the enforcement cameras
- Provision of up-to-the-minute information to news reporters, particularly radio and television reporters.

The TMC shall link various elements of Intelligent Transportation Systems such as vehicle actuated traffic signals, surveillance cameras, enforcement cameras etc., installed at various locations in the City, enabling decision makers to identify and react to an incident in a timely manner based on real-time data. The TMC will help reduce incident response times, lower incident rates (mainly secondary incidents), disseminate traveller information and hence reduce congestion and enhance safety. A sample photograph of the proposed Traffic Management Centre is provided in Figure 5.8.



Figure 5.8: Schematic View of Proposed TMC Operation Centre

### *TMC Operations*

The TMC would receive the data/information from the field and the same would be considered for decision making. The decisions from the centre would be communicated to the end user to achieve the desired result. In order to enable better understanding of the situation, domain experts in the form of Transportation Engineers shall also be housed in the TMC to provide their expertise in analyzing and communicating the desired output on the field.

### *Traffic Signals*

From the traffic signal system, a steady flow of traffic signal timings, traffic flow data etc would be received and this real time data would be processed immediately to achieve a synchronized/optimized effect in the chosen corridors. The TMC shall receive the real time data from the field and the same shall be witnessed on a monitor and then an optimized plan would be generated. The plans so generated shall be communicated to the local police officers on the field either through the wireless system present in the TMC or by the operations team.

*Traffic Surveillance Cameras*

The cameras located at strategic locations across the City would be beaming live pictures into the TMC. The traffic management team shall look at the live feeds coming in from the field and then based on certain parameters like tolerable queue length, congestion or an accident/incident that has occurred on the field, would be able to communicate to the field officers and necessary action would be initiated.

*Traffic Enforcement Cameras*

The enforcement cameras at different locations across the City would be recording and beaming the traffic violations into the TMC. The enforcement team would have to download the violations and then transfer the information to the automated enforcement system. Also violations occurring on the field can be seen through the system and recorded for further use as evidence in the court.

*Traffic Helpline*

The TMC would provide a separate traffic helpline number for road users to register their grievances, which would be addressed in a time bound manner.

**Present Scenario**

The Government of Andhra Pradesh and GVMC have sanctioned 94 traffic signals and surveillance cameras at important junctions for effective monitoring of traffic and safety in Visakhapatnam city on Build, Operate, Transfer (B.O.T) model. The work was awarded to M/s STANPOWER, Hyderabad and is in progress.

Out of the five mentioned components of the Strategic Transportation Plan, Upgradation of Signals including Vehicle Actuation, Enforcement & Surveillance Cameras and Traffic Management Centre, are in different stages of implementation. STANPOWER is playing an active role in the implementation of these components. The remaining two components namely Road Improvements & Road markings and Public Transportation Prioritization & Dynamic Information Boards have been taken over by the GVMC authorities.

**(Footnotes)**

- 1 *Transport Department, Government of Andhra Pradesh, [http://www.aptransport.org/html/statistics\\_vehicles.html](http://www.aptransport.org/html/statistics_vehicles.html).*
- 2 *Transport Department, Government of Andhra Pradesh, [http://www.aptransport.org/html/statistics\\_vehicles.html](http://www.aptransport.org/html/statistics_vehicles.html).*
- 3 *Office of Additional Deputy Commissioner of Police – Traffic, Visakhapatnam.*
- 4 *Report on “Accidental Deaths and Suicides in India 2014”, published by National Crime Research Bureau, Ministry of Home Affairs.*

## Chapter 6

**TOWARDS SMART ENVIRONMENT**

Namuduri Srinivas and Ch. Ramakrishna\*

*In order to enable Visakhapatnam city to emerge as clean, green and sustainable, this Chapter suggests strategies for improving the environment of the City on dimensions such as Air Quality, Noise Pollution, Water Conservation and Solid Waste Management.*

Visakhapatnam city is situated on the north-eastern coast of Andhra Pradesh, lying at a latitude of 17°42'N and longitude of 83°20'E. The City extends from north to south on a ridge and is located in a bowl shaped basin, surrounded by hills on three sides, with the Bay of Bengal on the east. The entire City is situated within a distance of 10 km from the shore and all the residential areas fall within this area.

Smoke and emissions are increasing rapidly with ever growing residences, commercial establishments, railways, automobiles and the burning of garbage. Similarly, given the industrial and commercial activities and population concentration in some areas, water pollution and problems associated with human and industrial waste disposal abound. Additionally and worst of all, the City is replete with noise pollution, a manifestation of the freedom of the polluter destroying the freedom of the rest.

**Air Pollution**

The City has been growing both demographically and economically and is now witnessing environmental problems, as a result of high levels of air pollution. Population grew rapidly over the decades and has crossed two million. Vehicles, which emit air pollutants at a very low height, are one of the major sources of air pollution in the City. The majority of vehicles in the City are two wheelers (82%), followed by cars (11%), three wheelers (5%) and public transportation (1%).

\*Prof. Srinivas and Prof. Ramakrishna are with the Department of Environmental Studies, GITAM Institute of Science.

Green House Gas (GHG) emissions (per unit area) for vehicular traffic are summarized in Table 6.1 for Visakhapatnam and five other major comparable cities. In terms of total number of vehicles, Kanpur and Visakhapatnam are comparable, however, the emission rate is not dependent on the number of vehicles alone, but is also influenced by quality and type of fuel used, type of vehicle, its maintenance and traffic planning of the city etc. Transport sector contributes around 14% towards the global emissions of greenhouse gases. Carbon dioxide is the largest component in the basket of greenhouse gas emissions. During the past three decades, carbon dioxide emission from transport sector has increased faster than those from all other sectors and is projected to increase more rapidly in the future. Among the five cities compared, Visakhapatnam stood in the fourth position with respect to CO<sub>2</sub> emission rates and much lower than Surat, Nagpur and Jaipur. Vadodara has the best showing amongst all the six cities.

**Table 6.1: GHG Emissions/Unit-Area from Vehicular Transport in Major Cities**

City	Number of road vehicles	CO <sub>2</sub> (mg km <sup>2</sup> )	CO (mg/km <sup>2</sup> )	CH <sub>4</sub> (mg/km <sup>2</sup> )	HC (mg/km <sup>2</sup> )	NO <sub>x</sub> (mg/km <sup>2</sup> )	PM (mg/km <sup>2</sup> )	SO <sub>2</sub> (mg/km <sup>2</sup> )
Visakhapatnam	411691	5034.01	77.60	3.66	21.52	54.35	3.84	15.42
Surat	692118	10967.65	145.94	5.88	31.30	82.18	6.63	29.09
Vadodara	586438	2481.43	21.33	0.81	5.52	29.16	1.47	8.66
Nagpur	543322	7955.70	110.49	4.60	22.90	63.00	5.03	22.00
Jaipur	823715	6571.53	72.76	2.83	17.61	65.61	4.13	18.35
Kanpur	424652	4570.50	59.85	2.56	15.07	32.01	2.65	12.30

Source: Ramachandra T.V, Shwetmala, 2009: Emissions from India's transport sector: Statewise synthesis, Atmospheric Environment xxx 1-8)

### Air Quality Index (AQI)

Visakhapatnam industrial sector comprises of Agro-based units; Cotton textile, Wool, Silk and Artificial thread based clothes; Chemical/Chemical-based units; Rubber and Plastic; Mineral-based and Metal-based (Steel Fab) units; Engineering units; Electrical Machinery and Transport Equipment; and Electronics. It can be inferred from the list that some of these sectors are by nature polluting.

Table 6.2 has information on the Air Quality Index in respect of various locations in the City. AQI indicates environmental condition in terms of the quality of air. It increases due to an increase of air emissions or from a lack of dilution of air pollutants. Stagnant air, often caused by an anticyclone, temperature inversion, or low wind speeds lets air pollution remain in a local area, leading to high concentrations of pollutants, chemical reactions between air contaminants and hazy conditions. In most of the areas, the AQI level of PM<sub>10</sub> is satisfactory. A moderate level of PM<sub>10</sub> is reported at GVMC area (RTC complex) and APIIC (industrial estate) area. Gaseous pollutants are well within limits.

Table 6.2: AQI grade of different study sites in Visakhapatnam City for the year 2014-15

Study sites	SO <sub>2</sub> in µg/m <sup>3</sup>			NO <sub>x</sub> µg/m <sup>3</sup>			PM <sub>10</sub> µg/m <sup>3</sup>		
	Conc.	Break point conc.	Grade	Conc.	Break point conc.	Grade	Conc.	Break point conc.	Grade
Mindi	11.2	0-40	G	17.2	0-40	G	61	51-100	S
Marripalem	10.6	0-40	G	17.1	0-40	G	58	51-100	S
Pedagantayada	10.0	0-40	G	15.0	0-40	G	56	51-100	S
Police Barracks	17.3	0-40	G	32.1	0-40	G	99	51-100	S
Gnanapuram	15.5	0-40	G	29.1	0-40	G	81	51-100	S
Ramky (CWMP)	10.2	0-40	G	13.4	0-40	G	49	0-50	G
ESI	11.3	0-40	G	18.2	0-40	G	58	51-100	S
Seethammadhara	12.3	0-40	G	16.6	0-40	G	50	0-50	G
GVMC Building	12.69	0-40	G	44.52	41-80	S	106	101-250	M
APIIC (104 area)	16.6	0-40	G	34.6	0-40	G	107	101-250	M

Grade: G - Good; S - Satisfactory; M - Moderate; P - Poor

Break point conc. for SO<sub>2</sub> in µg/m<sup>3</sup>: 0-40 Good; 41-80 Satisfactory; 81-380 Moderate; 381-800 Poor

Break point conc. for NO<sub>x</sub> in µg/m<sup>3</sup>: 0-40 Good; 41-80 Satisfactory; 81-180 Moderate; 181-280 Poor

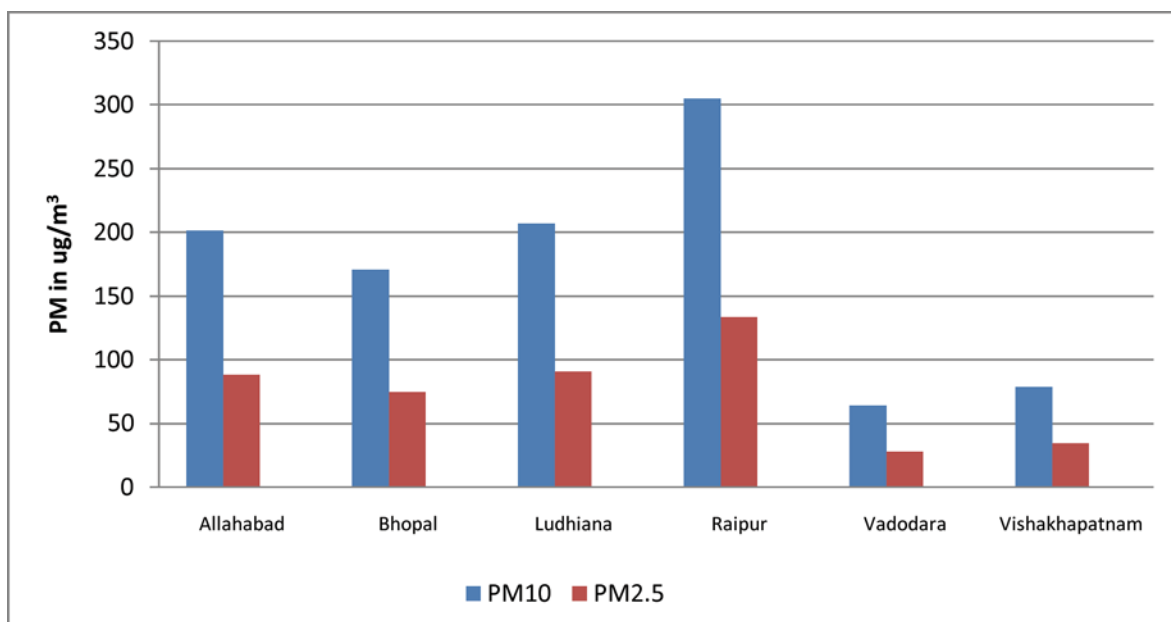
Break point conc. for PM<sub>10</sub> in µg/m<sup>3</sup>: 0-50 Good; 51-100 Satisfactory; 101-250 Moderate; 251-350 Poor

Data Source: Andhra Pradesh Pollution Control Board (APPCB), Visakhapatnam.

AQI is based on report of National Air Quality Index – CUPS/82/2014-15 published by CPCB, New Delhi.

The ambient air quality of Visakhapatnam is compared with five other cities of India namely Allahabad, Bhopal, Ludhiana, Raipur and Vadodara which are similar to Visakhapatnam in relation to population size (Fig. 6.1). Among the five cities, Raipur is most polluted based on ambient particulate matter (PM) concentration, followed by Allahabad, Bhopal and Ludhiana which reported PM at moderate levels. The PM levels at Vadodara and Visakhapatnam are satisfactory (WHO, 2016).

**Fig. 6.1 Annual Mean of Ambient PM<sub>10</sub> and PM<sub>2.5</sub> in different Cities of India**



PM <sub>10</sub>	202	171	207	305	65	79
PM <sub>2.5</sub>	88	75	91	134	28	35
AQI based on PM <sub>10</sub>	<b>Moderate</b>	<b>Moderate</b>	<b>Moderate</b>	<b>Poor</b>	<b>Satisfactory</b>	<b>Satisfactory</b>

Ref: *WHO Global Urban Ambient Air Pollution Database (update 2016)* -  
[www.who.int/phe/health\\_topics/outdoorair/databases/cities/en/](http://www.who.int/phe/health_topics/outdoorair/databases/cities/en/)

### **Suggested Initiatives to Control Air Pollution**

The last decade has seen various interventions from different stakeholders and the air quality has shown some improvements, though more can be done in order to make the air in Visakhapatnam safe for breathing. Some of the measures that could be taken are as follows:

- Air pollution is largely attributed to automobile emissions and accordingly, it is important to regulate traffic at various junctions and see that it does not stagnate for long durations.
- Consideration should be given to adopting stringent emission norms for automobiles, promoting clean fuels and phasing out old vehicles in the transport sector to minimize green house gas emissions.
- Other measures could include promoting an effective and efficient public transport system to discourage excessive use of private transport; introduction of CNG for better air quality; industries to switch to cleaner fuels like natural gas; and use of resources like solar panels instead of generators.

## Noise Pollution

Unwanted, unpleasant or disagreeable noise causes discomfort and often interferes with normal and crucial human activities such as work and sleep. It has thus the potential to cause serious threat to physical and mental well-being. Taking these aspects into account, the Central Pollution Control Board (CPCB) has recommended sound level limits for different zones in terms of ambient noise level standards.

The noise levels that have been measured at different road junctions of Visakhapatnam in relation to traffic are given in Table 6.3. At all the junctions, the noise threshold value exceeds the CPCB permissible limit of 65 dB. Higher levels of noise could lead to change in physical and physiological behavior of the individuals. It may cause nausea, vomiting, pain, hypertension, high blood pressure, cardiovascular problems, sleep disturbance, restlessness, depression, fatigue, allergy, mental stress and annoyance.

**Table 6.3: Noise Levels (dB) at Different Areas in the City**

S.No	Location	Morning	Evening
1	Isukathota Junction	85.1	82.3
2	Maddilapalem Junction	86.3	85.4
3	RTC Complex Area	88.3	88.9
4	Gurudwara Junction	74	86.4
5	Jagadamba Junction	84.2	89.7
6	Isukathota Junction(weekend)	79	77.7

*Source: Ambient Noise levels in Visakhapatnam, Project Work carried out by Department of Environmental Studies, GITAM Institute of Science, 2014.*

The noise levels in Visakhapatnam were compared with the results of Visakhapatnam Development Report (VDR) of 2003. The average decibel value recorded in various locations in the City was 76 dB in 2003 and increased to 84 dB in 2014. The increase in businesses including shopping malls, markets, restaurants, bars, shops and transportation services is responsible for generation of noise because of use of vehicles, ventilation or refrigeration equipment, powered machines and tools, and musical equipment etc. There is an urgent need to implement zoning controls and land use policies to limit or avoid noise pollution.

### *Suggested Initiatives to Control Noise Pollution*

- There should be campaigns about the ill effects of noise pollution along with a ban on the use of loudspeakers in open spaces before 9 am and after 9 pm, in the interests of those who are studying, those who are sick and need rest, and those whose freedom and privacy is too precious to be taken for a ride.
- Other measures could include ban on pressure horns, extensive plantation of trees on the roadsides, encouraging use of noise-absorbent materials, and adequate noise barriers around silence zones.

## Water Pollution

Water supply and treatment capacity is being increased in Visakhapatnam periodically, taking into account the requirement of drinking water for the population. In spite of the best efforts, problems continue in some areas because of raw water scarcity, transmission and distribution losses, supply with less pressure, uneven distribution, depleting ground water level, non-recharge of ground water due to rapid urbanization, increasing cost of water treatment and increasing gap between water supply cost and tariff.

*Resource availability:* Visakhapatnam depends on reservoirs, partially on river Godavari and other infiltration wells for its share of raw water. Future supply critically depends on the progress of the proposed water conservation processes like rainwater harvesting and waste water treatment. However, to some extent, localized ground water extraction and its supply after treatment at the prescribed quality level may also be required to meet the demands.

*Surface water supply:* Greater Visakhapatnam Municipal Corporation (GVMC) is predominantly dependent on surface water supply. Raw water is drawn through an open channel and piped network from one of the main source rivers, Godavari, which is 200 kms away from the City. The Corporation is serving 52.00 million gallons per day (MGD) of drinking water to 20.35 lakh population of the City at the rate of 116 litres per capita per day (LPCD) (on average) as against the norm of 150 LPCD. It is also catering to the industrial needs by supplying about 8.00 MGD of drinking water. There is a deficit of 15 to 16 MGD in supply of drinking water.

*Ground water:* In Visakhapatnam, most of the ground water comes from bore wells. Ground water is mostly used for domestic and commercial purposes. Ground water quality parameters in Visakhapatnam are assessed and shown in Table 6.4. The analysis of the water quality is important to preserve and protect the natural ecosystem, and also to find out its suitability for human consumption. There are many industries located in the City and many more are likely to be developed which make use of ground water. Thus ground water forms a major supplement for water supply in the City.

**Table 6.4: Chemical constituents present in Ground water, exceeding the limits as per Bureau of Indian Standards (2012)**

Sample Parameter	IP 1		IP2		IP 3		IP 4		IP 5		IP 6		IP 7		IP 8		IP9		IP 10	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Ec μS/cm							✓	✓	✓											
Cl																	✓	✓		
Alka linity	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
HCO <sub>3</sub>	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓			✓		✓			
TDS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TH							✓	✓	✓	✓					✓					
K	✓		✓	✓	✓	✓	✓	✓	✓	✓					✓	✓	✓	✓	✓	
SO <sub>4</sub> <sup>2-</sup>							✓													
Cr	✓	✓	✓	✓	✓		✓	✓			✓	✓	✓	✓			✓	✓		✓
Mn											✓									
Co	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pb	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓

Pre – Premonsoon  
IP2-Malkapuram  
IP5-Gnanapuram  
IP8-Port area

Post – Postmonsoon  
IP3-Sriharipuram  
IP6-Sheelanagar  
IP9-Scindia

IP1-Zinc Smelter post office  
IP4-Mindi  
IP7-Autonagar  
IP10-Steel Plant area

Source: Ramakrishna, Ch., Sivapulliah, P.V., Vykunta Rao, L. Sustainable water quality management for Greater Visakhapatnam Municipal Corporation (GVMC) Area, Andhra Pradesh (2011-14). DST sponsored project, New Delhi.

The quality of these samples in both pre-monsoon and post-monsoon has been studied in terms of pH, Temperature, Electrical Conductivity (EC), Total Alkalinity (TA), Total Dissolved Solids (TDS), Total Hardness (TH), Calcium (Ca), Magnesium (Mg), Sodium (Na), Potassium (K), Bicarbonate (HCO<sub>3</sub>), Chloride (Cl), Sulphate (SO<sub>4</sub>), Nitrate (NO<sub>3</sub>), Cobalt (CO), Nickel (Ni), Copper (Cu), Chromium (Cr), Iron (Fe), Zinc (Zn), Manganese (Mn) and Lead (Pb). The results were compared with standard guidelines of BIS 2012. In all areas, Total Alkalinity, TDS, Chloride, Sulphates, Total Hardness, Potassium, Sulphate, Chromium, Manganese, Cobalt and Lead, are above the acceptable limits in pre and post-monsoon periods. This confirms that the quality of ground water is controlled by local geochemical reactions.

**Sewerage:** Visakhapatnam city consists of 14 sewer blocks according to the topography conditions. The sewage is collected from individual properties and is sent to Sewage Treatment

Plants (STPs). Nearly 149 million litres per day (MLD) of sewage is generated but its treatment capacity in the City is only 52% (78 MLD). The extent of reuse and recycling of sewage water is limited.

### *Suggested Initiatives: Water and Sewerage*

- Conservation of water resources and prevention of over-exploitation of ground water
- Precipitation run-off to be tapped and stored suitably
- Recycling wastewater to meet the demand in non-drinking category
- Installation of cost-effective waste water treatment systems
- Strict monitoring of discharge of waste water by industry and effective steps towards its reduction/prevention
- Creation of more capacity to treat sewage
- Exploration of options for maximum reuse and recycling of sewage.

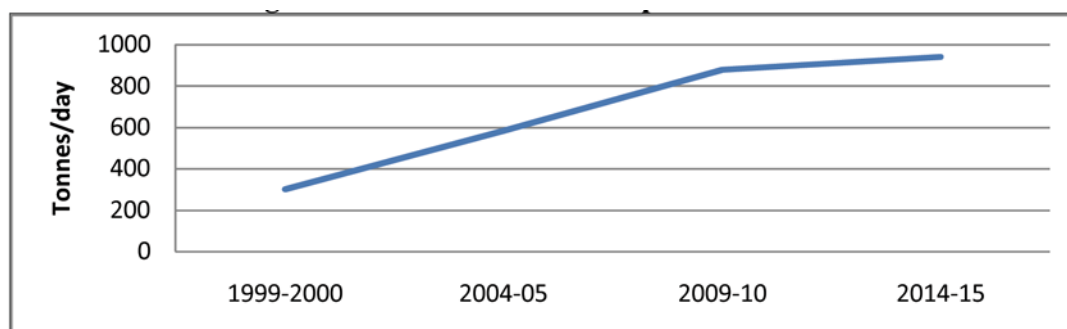
### **Solid Waste Management**

Visakhapatnam generates the highest solid waste in Andhra Pradesh state. Due to its large size and multiple activities, different types of solid waste are being generated from different sources. These are - municipal solid waste (from the domestic and commercial sectors and common areas such as parks, gardens, street sweepings and drain silt), infectious or bio-medical waste, slaughterhouse waste, electronic or e-waste and ‘special’ waste (small quantities of toxic and hazardous waste generated by the household and trade sectors).

### *Municipal Solid Waste (MSW)*

The City generates nearly 941 metric tonnes of MSW every day from eight zones. Visakhapatnam municipal solid waste has increased from 1 to nearly 1.5 times every five years (Figure 6.2).

**Figure 6.2: Growth of Municipal Solid Waste**



*Source: CPCB, 2010-11 and GVMC, Visakhapatnam*

*Composition and Collection:* MSW at source of generation and collection point was determined on a wet weight basis and it consists mainly of a large organic fraction (40-60%), ash and fine earth (30-40%), paper (3-6%), and plastic, glass and metals (each less than 1%). Most of the generated waste (91%) is collected on a daily basis. Night sanitation and sweeping are also in place, whereby street cleaning and collection of waste from the roads is carried out during the night.

*Transportation:* The waste collected at the source is transferred to secondary collection points. From the secondary collection points, the waste is sent to transfer stations using dumpers and other vehicles. It is then transported to a dumping yard which is located about 25 kms from the City.

*Processing and Disposal:* There is no engineered landfill site in the GVMC area. However, the current disposal facility is located at Kapuluppada, which has an extent of 100 acres and is about 25 kms away from the City. A part of organic household waste is transported and processed as windrows at Kapuluppada, Vepagunta, Gajuwaka and KRM colony. Non- recyclable plastics are stored in dry resource centers. Silt, sand and leftover mixed waste are disposed in abandoned quarry pits.

*Biomedical Waste:* Biomedical or infectious waste includes any type of material generated in health care establishments including aqueous and other liquid waste. Visakhapatnam generates approximately 2,500 kgs of biomedical waste per day. The waste generated in hospitals and nursing homes is covered under a special arrangement whereby the private agencies approved by the Andhra Pradesh Pollution Control Board collect and transport the bio-medical waste to their hydroplaning/autoclaving plants. The biomedical waste is treated and finally disposed off at the plant sites.

*E-Waste Management:* E-waste is the waste generated when electronic items like computers, mobile phones, batteries and other household electronic items are discarded. It is one of the fastest growing segments of waste streams in India. There is no separate arrangement for E-waste disposal in the City.

### *Suggested Initiatives for Solid Waste Management*

- It is essential to estimate the quantity and composition of garbage generated from each ward to improve the collection / transport mechanisms and to study the possibility of recyclable options and disposal mechanisms.
- Segregation of the waste into various categories is to be done at source level. Rag pickers should be trained to rationalize collection door to door and to segregate solid waste at the source itself.
- Other measures include the following:
  - i) Entrepreneurs should be trained to recycle and reuse the segregated waste;
  - ii) Leak proof transportation system is to be used for disposal of wastes;
  - iii) Possibilities for conversion of waste into energy must be explored and exploited;

- iv) Efficient collection system is to be adopted for e-waste from residential and commercial sectors; and
- v) Waste minimization measures are to be strengthened by reduction of waste generation at source level, encouraging recycling and reuse of plastic and metal wastes, development of protocol for biodegradable plastic and creating awareness among the public about solid waste management and usage.

## Green House Gases and Urban Greenery

### *Green House Gas Emissions*

In the international arena, efforts are being made through the United Nations Framework Convention on Climate Change to stabilize GHG (greenhouse gas) concentrations in the atmosphere. As for Visakhapatnam, emissions from transport, residential and power sectors constitute a significant quantity of greenhouse gas emissions. The policy measures therefore need to be directed towards reducing emission in these sectors.

### *GHG Initiatives*

- In the industrial and power sectors, all the capacity additions being proposed for the future are gas based. In the domestic sector, cleaner fuels such as LPG (liquefied petroleum gas) are being encouraged instead of kerosene and coal.
- The prudent response to climate change is to adopt a wide range of actions aimed at controlling emissions, adapting to impacts, and encouraging scientific, technological and socio-economic research.

### *Urban Greenery*

Forest Area under the control of Forest Department in 2013 was 63,813.73 sq.kms ([www.forests.ap.gov.in/Facts&Figures.13.pdf](http://www.forests.ap.gov.in/Facts&Figures.13.pdf)). Visakhapatnam supports more number of angiosperms and most of the dominant tree species are plantation varieties. Out of these, 19 plant species were found to be common in all areas of Visakhapatnam city. The information available globally suggests that the cities in developed countries, in general, have more trees compared to the cities in developing countries, which often fall below the minimum standard set by WHO of 9 m<sup>2</sup> green open space per city dweller.

### *Urban Greenery Initiatives*

A massive tree plantation campaign has been initiated with the assistance of the local public and private sector units to grow trees in and around Visakhapatnam. Speeding up the activity would help overcome many environmental problems.

## Chapter 7

## CITY – SMART AND LIVEABLE

P. Sheela\*

*This Chapter offers a comprehensive agenda for making Visakhapatnam a truly smart and liveable city for all sections of the population.*

**Quality of Living Rankings**

The latest Mercer's Quality of Living Survey released on 24<sup>th</sup> Feb, 2016, provides valuable data on the quality of living and Quality of Living Ranks for almost all prominent cities of the world – 230 in all. The parameters taken into account for the survey and ranking include political and social environment, medical care and health considerations, public services, recreation facilities and natural environment. Not even a single Indian city could make it among the top 100.

Vienna continues its reign in the top spot for overall quality of living, followed by Zurich (2), Auckland (3), and Munich (4). Vancouver at the 5<sup>th</sup> spot is North America's highest ranking city. Singapore is the highest ranking Asian city, with a rank of 26.

Table 7.1 displays Mercer ranks of top five Indian Cities. Among these cities, Hyderabad though at rank 139 globally, is best in terms of quality of living. Hyderabad, Pune and Chennai emerged as cities of choice due to factors such as relatively lower crime rates, lesser air pollution and presence of reputed English medium schools. The national capital New Delhi ranked at 161 is not even among India's top five.

\*Prof. Sheela is Principal, GITAM Institute of Management.

**Table 7.1: Top Five Indian Cities on Quality of Living Ranks Globally**

Rank	City	Rank	City
139	Hyderabad	150	Chennai
144	Pune	152	Mumbai
145	Bengaluru		

For most people, governance efficiency is seen in terms of personal safety and security. Mercer's survey identifies personal safety ranking for the cities based on internal stability, crime levels, performance of local law enforcement and the country's relationship with other countries.

Luxembourg tops the personal safety list followed by Bern, Helsinki, and Zurich at second place. Baghdad (safety rank 230) and Damascus (229) are the world's worst cities in terms of safety. The safest Indian cities are Chennai, Hyderabad and Bengaluru - ranked 113, 121 and 123 respectively.

Visakhapatnam city designated to become Smart City does not figure in the 230 cities surveyed by Mercer. One hopes that it will figure in the list in the near future, hopefully in the top hundred or in very close ranks

### **Key Features of a Smart City**

There is no universally accepted definition of a smart city. In the final analysis, the objective of a smart city is to provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'smart' solutions to each and every individual and societal concern affecting quality of life.

In a smart city, area-based development is expected to transform existing areas (for instance, slums will be transformed into better planned ones), thereby improving liveability of the whole city. New areas will be developed in order to accommodate the expanding population and developmental instruments such as schools, colleges, universities, research centres, factories, financial and other service institutions etc. Application of smart solutions will enable cities to use technology, information and data to improve infrastructure and services. Such comprehensive development will improve quality of life, create employment and enhance incomes for all, especially the poor and the disadvantaged, leading to inclusive cities.

### **The City: For Work and Life; Smart and Liveable**

#### ***For Work and Life***

According to David Engwich, the city is "an invention to maximize exchange opportunities and to minimize travel."<sup>1</sup> How then should cities be? Places where one can easily encounter many people and ideas, good schools and jobs; in short, all the entire advantages one obtains from having many people and objects within a relatively small place. Cities should be pleasant and liveable. A well designed city, one that is meant for people, would be a city all love to live in.

But, what is happening in reality? As Jan Gehl<sup>2</sup> puts it, “Automobiles have invaded the cities and squeezed everyone else to the side.” The very idea of living space perhaps got disrupted. Vuchic<sup>3</sup> defined liveability as “generally understood to encompass those elements of home, neighborhood, and metropolitan area that contribute to safety, economic opportunities and welfare, health, convenience, mobility, and recreation”.

### *Smart and Liveable*

The key aim of the Indian Smart Cities Mission should be to improve the quality of life of the average city dweller. The Mission should place ‘substantial improvement in liveability’ as the top objective, by making the development of physical infrastructure as the means and not the end. Furthermore, since the world’s most liveable cities are also the safest, the Mission should spell out the strategies (including the carrots and sticks that apply) to ensure safety and security.

### **Visakhapatnam: Smart City Agenda**

It is a proud moment for Visakhapatnam city to be included in the first lot of 20 cities selected in the very first round of the Smart City Challenge. Central and State Government funds will be available for five years to help many in-city development projects<sup>4</sup>.

The overall action agenda for helping Visakhapatnam city to transform into a smart and liveable city could be formulated along the following lines:

- i. Greater liveability, sustainability and improved public accountability are important aims. The efforts should also be to deliver jobs by attracting new investments. These are not feasible if there is no clear focus on basics such as clean and reliable energy, safe and secure streets, transparency and citizen engagement.
- ii. Effective governance is crucial. Since the Smart Cities Initiative involves the Central, State and City governments, there needs to be complete clarity on authority, functions and responsibilities at each level with minimal overlaps. In this context, it is worth noting that according to Johnston and Hanssen<sup>5</sup>, smart governance depends on the implementation of a smart governance infrastructure that should be accountable, responsive and transparent.
- iii. Smart governance is to be based on citizen participation and private/public partnerships<sup>6</sup>. Citizens of the city are to participate in the governance and management of the city.
- iv. Smart cities have to be safe for women, girls and senior citizens. According to Ms. Lakshmi Puri of the United Nations, “No city can be smart and sustainable if half of its population is not safe and lives in fear of violence”. She also emphasizes that, “Safe cities for women and girls must therefore be part of this new urbanization movement and made part of its DNA”. She also suggests that the Smart Cities Project should fully integrate the perspectives of women and girls and be truly inclusive. She hopes that women’s safety will figure prominently in the Smart City Mission<sup>7</sup>.
- v. The next important item on the agenda is the development of an efficient transport system that ensures excellent connectivity. The mega ideas on infrastructure development must not miss seemingly simple features such as neat and clean footpaths and pedestrian crossings.

- vi. Providing affordable health care for all will be the greatest challenge in the evolution and development of a smart city.
- vii. ICTs are key drivers of smart city initiatives. These should be easy to understand by even the least educated and must not be baffling due to complexity of language, concepts and processes.
- viii. Finally, smart city initiatives should be forward-looking on the environmental front. Core to the concept of a smart city is the use of technology to increase sustainability and to better manage natural resources. Protection of natural resources and the related infrastructure such as waterways, sewers and green spaces such as parks is integral to the smart city.

### (Footnotes)

- 1 *Engwich is an Australian Writer and Advocate. David Engwich., (1993), Reclaiming Our Cities and Towns, New Society Publishers.*
- 2 *Jan Gehl, Danish architect and professor. Jan Gehl, (2010), Cities for People. Island Press.*
- 3 *Vuchic, V.(2007), Urban Transit Systems and Technology, Wiley Online Library.*
- 4 *In addition to this, the City would also be receiving funds from the U.S. Government for infrastructure development.*
- 5 *Johnston, E.W., & Hansen, D.L. (forthcoming). Design Lessons for Smart Governance Infrastructures. In Ink, D., Balutis, A., & Buss, T.F.(Eds.), American Governance 3.0: Rebooting the Public Square?*
- 6 *Giffinger, R., Fertner, C., Kramar, H., Kalasek, R., Pichler-Milanovic, N., & Meijers, E.(2007). Smart Cities: Ranking of European Medium-Sized Cities. Vienna, Austria: Centre of Regional Science (SRF), Vienna University of Technology. Curis.ku.dk/ws/files/37640170/smart\_cities\_final\_report.pdf.*
- 7 *www.unwomen.org/en/news/stories/2016/6/lakshmi.puri.lecture, delivered on 10 July, 2016.*

## Chapter 8

**BASIC MEDICAL AND HEALTH SERVICES**

P. Sheela and N. Deepa Mohan\*

*The most effective way to enhance Visakhapatnam district's public health image is to achieve an infant mortality rate of 10 by 2020 or soon thereafter, which currently stands at about 40. Initiatives to be undertaken include ensuring significant reductions in maternal mortality and child malnutrition, as well as minimizing inequalities in the availability of medical and health services between and within urban and rural areas. This Chapter recommends the constitution of a Government Committee of Experts to study the District's health infrastructure requirements and suggest time-bound action plans.*

The most quoted definition of 'health' given by the World Health Organization (WHO) six decades ago reads: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." Health is a fundamental human right recognized in the Universal Declaration of Human Rights (1948). "Health for all by 2000 AD" was advocated by the WHO way back in the 1980s. Despite all these international initiatives, fairly healthy life is a far cry for millions across most developing nations.

**A Review of Health Infrastructure in Visakhapatnam City**

The City has a fair number of specialty and super-specialty hospitals and nursing homes with good facilities. King George Hospital (KGH) is the oldest and largest tertiary care Government hospital in the State. The bed strength of KGH is 1,100 and the hospital caters to over 3,000 patients daily. It has more than 20 clinical and 10 super-specialty departments. It also serves as the teaching hospital for Andhra Medical College. The hospital provides free of cost therapeutic services, free medicines and other specialized diagnostic services at a nominal cost to the patients and free medical and surgical services to the white ration card holders under the NTR Vaidya Seva Scheme. The hospital also runs specialized clinics for HIV afflicted patients in association with National AIDS Control Organisation (NACO), and offers them free Anti Retro-viral Therapy (ART) medication and other diagnostic and counselling services on a regular basis.

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Another Government hospital with teaching function is the Victoria General Hospital (VGH), popularly known as the “Gosha” hospital, catering to the women and children. It is a 150 bedded hospital, and it provides antenatal and prenatal services to white card holders as well as to other women. In addition, the hospital also has facilities for the Prevention of Parent to Child Transmission of HIV (PPTCT) programme and looks after the needs of HIV positive pregnant women, taking care of their health and ensuring a healthy delivery. The Government Hospital for Mental Care with its 300 bed strength is well-known in the region for its services as well as teaching facilities.

Tables 8.1 and 8.2 provide information relating to major government and private hospitals in the City with their bed-strengths along with identification of the teaching role if any. In addition, there are 15 Public Health Centres (PHCs) with one or two beds each and these are equipped to conduct deliveries, sterilization procedures and other minor surgeries. Hospitals are but an instrument in terms of health delivery, and one must hope that the District will indeed see the final health outcomes, notably in terms of significant reductions in infant, child and maternal mortality on the one hand and incidence of morbidity on the other.

**Table 8.1: Bed Strength of Government Hospitals at a Glance (2015-16)**

S.No.	Name of the Hospital	No. of Beds
1.	* King George Hospital (KGH) Maharanipeta	1,100
2.	* Victoria General Hospital (VGH)	150
3.	* Government Hospital for Mental Care, Chinna Waltair	300
4.	* Hospital for Infectious & Respiratory Diseases (TB Hospital)	280
5.	* Rani Chandramani Devi Hospital (RCD) for Children	70
6.	* Regional Eye Hospital (REH), Visakhapatnam	75
7.	Agnampudi Hospital	30
8.	Gopalapatnam Hospital	30
9.	Visakha Institute of Medical Sciences (VIMS)	300

*\*Teaching hospitals under control of Directorate of Medical Education*

*Source: Directorate of Medical Education, AP*

**Table 8.2: Bed Strength of Private Hospitals at a Glance (2015-16)**

S.No.	Name of the Hospital	No. of Beds
1	Seven Hills	250
2	Care	300
3	Apollo	300

4	Manipal (Women and Child & Super specialty)	80
5	Indus	70
6	Omni RK	100
7	St. Joseph's	100
8	St. Ann's	100
9	GIMSR	360
10	Gayatri	300
11	ANITS	300
12	Pinnacle	250

Source: Respective websites of hospitals

Finally, mention must be made of three private sector teaching hospitals, viz., GITAM Medical College and Hospital, ANITS NRI Medical College and Hospital and Gayatri Medical College and Hospital with bed strengths of 360, 300 and 300 respectively. KGH, VGH and other private hospitals have been attracting not only the residents from the City and the District but also people from the states of Odisha, Madhya Pradesh and Chhattisgarh.

## Health and Medical Status of Visakhapatnam District

### Infant Mortality

IMR or Infant Mortality Rate<sup>1</sup> is a simple and concise measure of the health status of a population. Data from the Sample Registration System (SRS) indicate the following state level trends. It was 106 in 1971 and was lower than the national average of 129. IMR declined from 66 in 1991 to 64 in 2000, both estimates coming from the sample registration system. One decade later in 2012, it was 39 in AP not much different from the 42 for India. Goa, Manipur and Kerala have the best showing with an IMR of 10-12. The IMR of Visakhapatnam district is higher than that of AP as Table 8.3 shows<sup>2</sup>.

**Table 8.3: Visakhapatnam and the Best and Worst Districts on IMR, 2012**

Rank	District	IMR
1	Krishna	26
8	Visakhapatnam	41
13	Srikakulam	49
	AP State	39

Source: [http://cfw.ap.nic.in/health\\_indicators.html](http://cfw.ap.nic.in/health_indicators.html) (accessed 24/2/2016)

The mother's health and the infant's health are intertwined to a large extent. Maternal Mortality Rate (MMR)<sup>3</sup> of AP stood at 92 during 2012. Sad to say, the showing has been dismal in respect of the Visakhapatnam district – an MMR of 137, the highest across all districts in AP, as shown in Table 8.4. (The district-wise MMR in AP can be found in the Annexure – Table 8.A2.)

**Table 8.4: Visakhapatnam District in Comparison with the Best and Worst on MMR, 2012**

Rank	District	IMR
1	East Godavari	86
12	Kurnool	129
13	Visakhapatnam	137
	AP State	92

Source: CHFV Report, Government of AP, 2014

Addressing the challenge of IMR and MMR reduction in AP in general and Visakhapatnam in particular, calls for universal institutional deliveries which are essential for safe childbirth. As can be seen from Table 8.5, percentage of home deliveries is higher in the District relative to the State. Even with 90 PHCs located in Visakhapatnam district, institutional deliveries still have not touched 100 percent. (The statistics related to district-wise institution and home deliveries in the state of Andhra Pradesh are shown in the Annexure – Table 8.A1.) Most reports and evaluation studies point to the lack of equipment, poor or nil repairs, improper functioning, lack of complementary facilities, poor accommodation for medical personnel and inadequate transport facilities, which are all factors contributing to low institutional deliveries. *Improving the institutional deliveries in terms of quality and quantity is an urgent priority for the District to accomplish a better record on IMR and MMR.*

**Table 8.5: Percentage of Home Deliveries - AP and Visakhapatnam, 2014**

	Total Deliveries	Home Deliveries	% of Home Deliveries
AP	4,93,451	19,871	4.0
Visakhapatnam	36,097	3,554	9.8

Source: Maternal & Child Tracking System (March 2014)

### **Child Health via Immunization**

Institutional deliveries along with high quality institutional facilities help in safe childbirth and also provide necessary information to the mother about the care of the child, including the various stages of immunization. Data collected from the 2012-13 District Level Household Survey pertaining to the immunization status of children aged 12- 23 months show 59.2 percent full immunization in rural areas and 70.8 percent in the urban areas (Table 8.6). Lack of awareness about the timing of immunization schedule and programme could be among the reasons for the mothers dropping out of the immunization programmes. *Ways have to be found to ensure cent percent immunization in due time.*

Table 8.6. Child Health via Immunization

Indicators	DLHS-4 (2012-13)		DLHS-3 (2007-08)	
	Total	Rural	Total	Rural
Received full vaccination (%)	65.0	59.2	60.0	50.0
Received BCG vaccine (%)	95.1	94.0	86.9	81.6
Received 3 doses of DPT vaccine (%)	85.2	81.6	67.6	60.5
Received 3 doses of polio vaccine (%)	81.7	76.0	77.1	76.3
Received measles vaccine (%)	91.4	91.8	73.9	68.4
Children (age 9-35 months) received at least one dose of Vitamin A supplement in last 6 months (%)	78.1	80.9	65.0	59.4

Source: District Level Household and Facility Survey-4 (2012-13)

### Fertility Control

It is encouraging to note that the Total Fertility Rate (TFR)<sup>4</sup> in Visakhapatnam district has declined from 2.9 in 1990 to 1.9 in 2012 (Table 8.7). While the Vision 2020 of AP aims at a TFR of 1.5, that level was achieved in 2012 itself in the districts of Vizianagaram and West Godavari (Table 8.8). The rate was highest in Visakhapatnam district at 1.9 though shared by two other districts (Chittoor and Guntur). Table 8.8 also shows Contraceptive Prevalence Rate (CPR) in different districts of Andhra Pradesh. It is needless to mention that rise in CPR leads to decline in TFR. CPR in Visakhapatnam was 66.6 in 2012 while it was the highest in East and West Godavari districts with 78.5. Steps are to be taken to improve the CPR in Visakhapatnam district. (The district-wise TFR across 13 districts of AP is shown in the Annexure – Table 8.A4.)

Table 8.7. Total Fertility Rate, Visakhapatnam District

Period / Year	TFR
1990	2.9
1995	2.3
2001	2.2
2007	2.2
2012	1.9

Source: District Level Household Survey (DLHS) – 2012-13.

**Table 8.8: District wise Total Fertility Rate and Contraceptive Prevalence Rate-2012**

S. No	District	Total Fertility Rate	Contraceptive Prevalence Rate	S. No	District	Total Fertility Rate	Contraceptive Prevalence Rate
1	Srikakulam	1.7	74.2	8	Prakasam	1.8	70.1
2	Vizianagaram	1.5	70.4	9	SPSR Nellore	1.8	66.3
3	Visakhapatnam	1.9	66.6	10	Chittoor	1.9	65.2
4	East Godavari	1.8	78.5	11	Cuddapah	1.8	51.2
5	West Godavari	1.5	78.5	12	Anantapur	1.7	64.4
6	Krishna	1.7	76.4	13	Kurnool	1.8	61.8
7	Guntur	1.9	71.8		State	1.8	66.7

Source: District Level Household Survey (DLHS) – 2012-13

### **Family planning: Knowledge, Practice and Incentives**

In order to realize the desired family size, it is vital that women (and men) be educated and also have the knowledge and practical means to control fertility. As per the District Level Household Survey 2012-13, nearly 74% of the respondents were following family planning through some method or the other (Table 8.9) which is comparatively higher than that reported in 2007-08. The table also shows a significant increase in female sterilizations along with a pronounced decline in male sterilizations. In this context, research findings on the relative merits of both are worth noting. In a 1985 publication in the *American Journal of Public Health*, the following has been asserted: “Male sterilization procedures were found to have zero attributable deaths and significantly less major complications when compared to female sterilization procedures. No less than 14 deaths a year can be attributed to female sterilization procedures in the US.”<sup>5</sup> If that was the case in the US, what can one say about India / AP ? The matter needs serious attention from the public as well as the government.

**Table 8.9: Current use of Family Planning Methods (%) in the District**

Methods	DLHS-4 (2012-13)		DLHS-3 (2007-08)	
	Total	Rural	Total	Rural
Any modern method (%)	73.8	70.3	66.5	60.3
Female sterilization (%)	66.9	62.0	45.4	36.9
Male sterilization (%)	5.3	6.5	18.6	23.0
Pill (%)	0.2	0.1	0.1	0.0
IUD (%)	0.0	0.0	0.7	0.0
Condom (%)	1.3	1.3	1.6	0.3

Source: District Level Household Survey (DLHS) – 2012-13.

### Health Care Facilities

The aim of AP Vision 2020 is to provide complete access to basic health care services to the people of the State. This calls for appropriate infrastructure such as public health centres, hospital beds, dispensaries and manpower (regular and contract doctors).

Despite having the facilities, the District continues to fall short of infrastructure requirements (Table 8.10). A key constraint is the distance to be travelled in order to reach a health centre, given the dependence of a vast majority of the population on public transportation which falls short of the requirement. Furthermore, majority of the health centres do not have facilities such as telephones to answer emergency calls, generators/inverters to help tide over power shortages, drinking water of adequate quality and quantity, operation theatres and well-equipped rooms for deliveries.

**Table 8.10: Government Medical Facilities in Visakhapatnam District as of 31/3/2014**

<i>Medical Facilities</i>	<i>Total Number</i>
Primary Health Centres	90
Beds Available	3,119
Dispensaries	7
Regular doctors	608
Contract Doctors	38

*Source: Statistical Abstract of Andhra Pradesh, 2014*

The District has more than 4,800 Anganwadis and all are functioning effectively in the community, with an aim to create health and hygiene awareness among women and take care of young children. The Anganwadi workers work in association with the PHCs, educate the community regarding various diseases and help people access medical and health services in their vicinity. They also take care of the immunization of the young children and help provide DOTS treatment for TB patients in association with the TB hospital. It is also important to note that there are numerous practitioners of Homeopathic, Ayurvedic and Unani systems of medicine catering to the needs of the people. (Data relating to district-wise government medical facilities in AP may be found in the Annexure – Table 8.A3.)

### The Future: Addressing Infrastructure and Manpower Gaps

The Primary Health Centres (PHCs) in the District are exposed to multiple problems such as poor physical facilities including buildings and essential equipment, inadequate supply of essential drugs and consumables, as well as insufficient medical and paramedical staff. Just to point out the ground reality, consider the bed strength. As against the global average of three beds per 1000 people, India has just 0.8. The situation is worse in the case of Visakhapatnam city with 0.3, not to speak about the District as a whole. The situation needs to be addressed and as the infrastructure grows, the manpower too has to be augmented. In addition, key bottlenecks need to be identified and tackled. For instance, there is an urgent need to establish a full-fledged

burns treatment centre in the government sector, to ensure that patients needing urgent attention do not have to be airlifted to Mumbai or other cities for treatment.

As could be observed from the above, the health sector in Visakhapatnam city is in dire need of attention and improvement. Visakhapatnam urban area lacks strong healthcare infrastructure and has several inherent weaknesses in its healthcare system. The segment is dominated by more private and corporate hospitals confined to the City limits. Very few of them have made inroads at the District and Mandal levels. This poses a challenge and opportunity to not only increase the penetration of quality health services but also to be the growth driver in this region.

*It is suggested that the District health infrastructure and manpower needs are to be studied in depth by a specially constituted government committee of experts and appropriate action plans need to be formulated.*

### (Footnotes)

- 1 *IMR for a given year is measured as the ratio of the number of children dying before their first birthday during the year to the year's total live births times 1000. Thus IMR of 39 means as many children dying out of 1000 live births.*
- 2 *Note that data pertaining to all the districts of AP are provided in the Annexure.*
- 3 *Measured as maternal deaths per one lakh child births*
- 4 *TFR refers to the average number of children born to a woman in her total reproductive life span.*
- 5 *Smith G L et al (1985), Comparative risks and costs of male and female sterilization, American Journal of Public Health, April, 75(4), pp 370-374.*

ANNEXURE

Table 8.A1: District wise Institution and Home deliveries (2013-14)

S. No.	Districts	Total Deliveries	Public Institution Deliveries	% of Public Institution Deliveries	Private Institution Deliveries	% of Private Institution Deliveries	Home Deliveries	% of Home Deliveries
1	Prakasam	23,407	5,532	23.6	16,752	71.56	1,123	4.8
2	<b>Visakhapatnam</b>	<b>36,097</b>	<b>22,477</b>	<b>62.3</b>	<b>10,066</b>	<b>27.88</b>	<b>3,554</b>	<b>9.8</b>
3	Nellore	19,325	5,904	30.6	12,961	67.06	460	2.4
4	Guntur	64,979	19,890	30.6	44,140	67.92	949	1.5
5	Cuddapah	32,246	10,752	33.3	19,711	61.12	1,783	5.5
6	West Godavari	40,266	15,650	38.9	24,201	60.10	415	1.0
7	Krishna	49,829	18,005	36.1	31,723	63.66	101	0.2
8	East Godavari	50,297	20,551	40.9	28,877	57.41	869	1.7
9	Anantapur	45,848	18,864	41.1	25,289	55.15	1,695	3.7
10	Kurnool	28,831	13,022	45.2	9931	34.44	5,878	20.4
11	Srikakulam	39,643	19,315	48.7	18,824	47.48	1,504	3.8
12	Chittoor	41,814	26,518	63.4	14,178	33.90	1,118	2.7
13	Vizianagaram	20,869	13,81	66.2	6629	31.76	422	2.0
<b>Andhra Pradesh</b>		<b>4,93,451</b>	<b>2,10,298</b>	<b>42.6</b>	<b>2,63,382</b>	<b>53.35</b>	<b>19,871</b>	<b>4.0</b>

Source: Maternal & Child Tracking System (March 2014)

Table 8.A2: District wise Maternal Mortality Ratio (MMR)-2012 in AP

S.No	District	Ratio
1	Srikakulam	117
2	Vizianagaram	128
3	<b>Visakhapatnam</b>	<b>137</b>
4	East Godavari	86
5	West Godavari	96
6	Krishna	94
7	Guntur	99
8	Prakasam	104
9	SPS Nellore	92
10	Kurnool	129
11	Cuddapah	102
12	Anantapur	117
13	Chittoor	103
<b>Andhra Pradesh</b>		<b>92</b>

Sources: CHFW Report, Government of AP, 2014

Table 8.A3: District wise Government Medical Facilities (in number) (As of 31.3.2014)

S. No.	Districts	No.of PHCs	No.of Beds Available	No.of Dispensaries	No.of Regular Doctors	No.of Contract Doctors
1	Anantapur	87	1,782	6	319	96
2	Chittoor	103	2,730	7	528	30
3	East Godavari	122	2,707	8	464	80
4	Guntur	90	2,407	7	456	36
5	Cuddapah	73	1,818	4	398	17
6	Krishna	91	2,058	11	394	5
7	Kurnool	87	2,107	6	479	32
8	Prakasam	90	1,320	3	264	34
9	Nellore	75	2,124	6	286	9
10	Srikakulam	81	1,376	1	237	38
<b>11</b>	<b>Visakhapatnam</b>	<b>90</b>	<b>3,119</b>	<b>7</b>	<b>608</b>	<b>38</b>
12	Vizianagaram	68	958	6	182	21
13	West Godavari	98	1,468	7	183	44
<b>Andhra Pradesh</b>		<b>1,155</b>	<b>25,974</b>	<b>79</b>	<b>4,798</b>	<b>480</b>

Sources: Commissioner of Andhra Pradesh, Vaidya Vidhana Parishad, AP- Hyderabad

Table 8.A4: District wise Total Fertility Rate of 13 districts of AP (2013-14)

Sl.No	District	Total Fertility Rate
1	Anantapur	1.7
2	Chittoor	1.9
3	East Godavari	1.8
4	Guntur	1.9
5	Kadapa	1.8
6	Krishna	1.7
7	Kurnool	1.8
8	Prakasam	1.8
9	Nellore	1.8
10	Srikakulam	1.7
<b>11</b>	<b>Visakhapatnam</b>	<b>1.9</b>
12	Vizianagaram	1.5
13	West Godavari	1.5

Source: Statistical Abstract of Andhra Pradesh, 2014

## Chapter 9

**FIRST TWELVE YEARS OF EDUCATION**

P. Sheela and G. Arti\*

*To march ahead with building the strongest foundations for economic and social development, Visakhapatnam district could proceed on a mission mode to upgrade government schools by improving access to education, infrastructure set-up, administration, financial resource utilization and quality of teaching, in the first 12 years of education. The constitution of a District Education Foundation is also suggested.*

There are a number of schools and colleges in Visakhapatnam that cater to the needs of the local inhabitants as well as students from other parts of India. The schools in Visakhapatnam are affiliated to the Council for the Indian School Certificate Examinations (CISCE), the Central Board of Secondary Education (CBSE) and the State Board. In spite of a good number of schools and colleges located in Visakhapatnam city, the concern is that the basic learning and reading levels of children, especially in rural parts of the City and the District have fallen. The time has come to focus on learning outcomes and skill development among the students in order to take advantage of the opportunities offered by the smart city initiatives.

**Education in the City of Visakhapatnam*****Schooling: Teacher Pupil Ratio (TPR) Differentials***

Table 9.1 clearly brings out the number of schools, under different managements in Visakhapatnam Urban. There were 422 schools belonging to the different managements in the Visakhapatnam Urban area for the year 2013-14. Out of these, 10 are Central government schools; 17 State government schools; 80 are MPP schools; 27 Municipal schools; 24 Private aided schools and 264 Private unaided schools. Visakhapatnam Urban includes Visakhapatnam Full Urban, Visakhapatnam Rural, Pendurthi, Anandapuram, Padmanabham, Bheemunipatnam, Anakapalli, Peda Gantyada, Gajuwaka and Paravada mandals.

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**Table -9.1 : Number of schools in Visakhapatnam Urban area, 2013-14**

Category	Number of schools
Central Government	10
State Government	17
Municipal	27
Private unaided	264
Private aided	24
Mandal Parishad	80
<b>Total</b>	<b>422</b>

*Source: Office of District Educational Officer, Visakhapatnam.*

The school teaching staff in Visakhapatnam Urban area are 5,279 out of which 2,187 are men and 3,092 are women. The total number of students is 1,58,763 out of which 81,668 are boys and 77,095 are girls. The Teacher Pupil Ratio (TPR) is around 30 (Source: Office of the District Educational Officer, Visakhapatnam).

### **Intermediate Education**

The City has around 90 junior colleges, out of which 7 colleges are Government colleges offering science, commerce, technical and arts courses. The rest of the intermediate colleges are privately managed. Majority of private intermediate colleges are offering only science courses such as MPC and BiPC combinations.

Coming to the facilities and infrastructure, it is observed that majority of the colleges formed after 2000 do not have their own buildings. They are functioning in private premises in which constructions were originally made for residential and other purposes. Playground facilities are also not available in majority of the cases. There is no permanent teaching staff. Laboratory and library facilities are barely sufficient (Source: [www.apsche.org/profiles\\_statistical\\_booklet.pdf](http://www.apsche.org/profiles_statistical_booklet.pdf)).

### **Literacy and Education in the District: Current Status**

The data for the 13 districts of Andhra Pradesh with regard to urban population and literacy is presented in Table 9.2. Visakhapatnam is right in the middle position on both male and female literacy as well as the gender gap.

**Table 9.2: AP Districts: Percentage of Urban Population, Male & Female Literacy Rates and Ranks (Census: 2011)**

S. No.	Districts	Male Literacy Rate	Rank	Female Literacy Rate	Rank	Gender Gap in Literacy Rate
1	Srikakulam	71.60	11	52.10	11	19.5
2	Vizianagaram	68.10	13	49.90	12	18.2
3	Visakhapatnam	74.60	7	59.30	7	15.3
4	East Godavari	74.50	8	67.50	3	7.0
5	West Godavari	77.00	4	71.40	1	5.6
6	Krishna	78.00	2	69.20	2	8.8
7	Guntur	74.80	6	60.10	6	14.7
8	Prakasam	72.90	10	53.10	10	19.8
9	Nellore	75.00	5	62.00	5	13.0
10	Cuddapah	77.80	3	56.80	8	21.0
11	Chittoor	79.80	1	63.30	4	16.5
12	Anantapur	73.00	9	54.00	9	19.0
13	Kurnool	70.10	12	49.80	13	20.3
	Andhra Pradesh	74.80		60.00		

Source: AP State Portal, May 2014

The simple correlation coefficients between literacy rates and per capita GDP across AP districts is as follows: 0.41 with regard to male literacy and 0.56 with regard to female literacy. This obviously indicates that improving female literacy and arresting the gender gap is the most urgent development initiative to be undertaken.

Equality of opportunity as well as of quality in education must be paramount. In addition to teacher quality, infrastructure also plays a crucial role in the quality of education. Therefore, some of the selected aspects of educational infrastructure, based on field visits to a few schools in the District, are taken up to assess equality in the quality of education provided by different types of schools.

### *Selected Aspects of School Quality*

The number of schools by category and other pertinent data are provided in Table 9.3. The central government schools stand out with respect to school size, manifest in the relatively very large number of students and teachers per school. Both magnitudes help in generating economies of scale. The Right to Education (RTE) Act recommends a TPR of 1:30 for primary classes and 1:35 for upper primary classes. On paper, India has achieved these targets in a span of seven years. There is not much to complain with regard to the teacher-pupil ratio *variation across school types*, except for the relatively high values in state government and private aided schools. Still, the fact remains that the TPR deserves to be reduced across the board to 20 or

less in order to improve the learning levels. Studies carried out in other states proved that performance dropped sharply as the TPR increased, particularly when the number of children was more than 30.

**Table 9.3: Visakhapatnam District: Types of Schools and Related Data (2013-14)**

Category	Number	Teachers Per School	Boys/Girls Ratio	Students per School	TPR
Central Government	10	44	1.09	1,268	29
State Government	1,010	3	1.01	98	34
MPP/ZP	2,919	3	0.92	80	25
Municipal	149	6	0.88	164	27
Private aided	86	6	0.82	241	42
Private unaided	1,092	9	1.24	254	27
<b>Total</b>	<b>5,266</b>	<b>5</b>	<b>1.06</b>	<b>127</b>	<b>27</b>

*Source of basic data: Office of the District Educational Officer, Visakhapatnam*

### **School Infrastructure**

In order to assess the quality of educational facilities, the infrastructure available in ten schools of each mentioned category (Table 9.3) was studied through field visits. It is observed that the Central School buildings are well maintained with good ventilation and drinking water facility. All the schools under this category have library, laboratory, toilets and playground facilities. In the case of schools run by the State Government and especially the high schools from 1<sup>st</sup> to 10<sup>th</sup> standards, buildings are in bad condition due to poor maintenance and in good number of cases classes are held in open sheds. Some classrooms do not have proper ventilation. These schools also lack hygienic water facility. All the schools of this category do have library, laboratory, toilets and playground facilities, but without proper maintenance, especially with regard to higher secondary schools. Tables and benches in classrooms are not sufficient and in good number of cases half of the students are made to sit on the floor, while the other half sit on the benches. Schools run by the Municipal Corporation have comparatively newer buildings. They all have drinking water and playground facilities. The Municipal High Schools (6<sup>th</sup> to 10<sup>th</sup> class) are an exception without any laboratory and library facilities. In all the Municipal Schools, toilet facilities exist, but are not maintained properly.

Zilla Parishad (ZP) Schools do not have sufficient classrooms and some classrooms require repairs. Water facility exists but not in hygienic conditions. Schools under this category do have library, laboratory, toilets and playground facilities. Mandal Praja Parishad (MPP) schools have buildings and classrooms but lack proper drinking water facility. There is no toilet facility available. Playgrounds are available. There are no library and laboratory facilities in elementary schools, whereas upper primary schools have small laboratories.

In case of Private aided schools, buildings and classrooms are good with drinking water facilities. All these schools have playgrounds and toilet facilities. In case of elementary schools (1<sup>st</sup> to

5<sup>th</sup> class) there are no library and laboratory facilities. But in case of upper primary schools, library facility is available. Coming to high schools, library and laboratory facilities are in existence. The classrooms are comparatively bigger. All the schools have drinking water and toilet facilities; however, the toilets in high schools are not maintained properly. Private unaided schools have buildings with small classrooms. The private schools have library, laboratory and toilet facilities which are insufficient relative to the student strength. Majority of the private schools are being operated in leased out buildings and they do not have playground facilities.

The overall impression is that infrastructure is good in the private schools. A quantum change in infrastructure is needed in most of the schools outside the private sector.

### *Student Performance*

Good infrastructure, capable, committed and motivated teachers and a culture of learning by the students within and beyond their classroom, will ultimately be reflected in the school performance. Table 9.4 gives the district wise pass percentage. Visakhapatnam district recorded 91.76 pass percentage in tenth examinations held for the first time after the bifurcation of the State in 2014. More than six lakh candidates appeared for the examination in 2015. It may be noted that Cuddapah district stood first in the pass percentage with 98.54, while Visakhapatnam stood at eighth position and Chittoor district came last with a pass percentage of 71.86.

**Table 9.4: District wise pass percentage 2012-13 to 2014-15**

Rank	District	Percentage 2012-13	Percentage 2013-14	Percentage 2014-15
1	Cuddapah	93.80	95.14	98.54
2	East Godavari	94.40	96.26	96.75
3	West Godavari	92.45	85.37	95.15
8	Visakhapatnam	87.89	90.86	91.76
13	Chittoor	94.92	92.87	71.86

*Source: The Directorate of Government Examinations, Hyderabad, Andhra Pradesh*

Table 9.5 gives the district-wise rank based on number of students securing 10 GPA in the SSC examination for the years 2014 and 2015. It may be noted that in the year 2014, the highest number of candidates who secured 10 GPA was from Guntur district, whereas Visakhapatnam district stood at the fifth rank and Vizianagaram district stood last. Coming to the year 2015, it is observed that the largest number of candidates who secured 10 GPA was from Krishna district, while Visakhapatnam district still stood at fifth rank and Vizianagaram district stood last.

**Table 9.5: SSC March 2015 - District-wise Number of Candidates who Secured 10 GPA**

Rank	District	2014			Rank	District	2015		
		Total No.of Candidates Appeared	No.of Candidates secured 10 GPA	% of Candidates secured 10 GPA			Total No.of Candidates Appeared	No.of Candidates secured 10 GPA	% of Candidates secured 10 GPA
1	Guntur	51,638	586	1.13	1	Krishna	55,110	646	1.17
5	Visakha- patnam	50,685	147	0.29	5	Visakha patnam	55,260	441	0.8
13	Vizia- nagaram	27,582	46	0.17	13	Vizia- nagaram	29,803	126	0.42

*Source : The Directorate of Government Examinations, Hyderabad, Andhra Pradesh*

The above two tables clearly emphasize an urgent need for decision makers in the district of Visakhapatnam to focus on the quality of schooling at the secondary level. The learning outcome is a cause of concern in the District, due to poorly maintained classrooms, lack of infrastructure, untrained teachers, lack of teaching and learning materials, poor teaching methods and learning processes. The Teacher-Pupil ratio in schools is high.

### *Junior Colleges*

The District has 324 junior colleges with a total enrollment of 74,696 in the year 2013-14, out of which 39,442 students are boys and 35,254 are girls. Out of 324 junior colleges, 86 are government colleges, 19 are private aided colleges and the rest 219 (67% of total) are private unaided. The strength of teaching staff in the junior colleges is 3,628 with a proportion of two-thirds males and the rest females. The results have been improving over time with the girl students generally doing better: intermediate pass rates in 2012-13 were 64% for boys and 69% for girls, moving up in 2013-14 to 69% and 79% respectively (Source: [www.apsche.org/profiles/profiles\\_statistical\\_booklet.pdf](http://www.apsche.org/profiles/profiles_statistical_booklet.pdf)).

### **Towards an Action Agenda**

#### *Quality at the Core*

There is a need to review the syllabus and the textbooks and other materials from the larger perspective of the challenges facing humanity and the nation today. Adequate infrastructure, teaching-learning materials, adequate teaching and non - teaching staff, along with a conducive learning atmosphere, are all essential to ensure high quality education.

#### *District Education Report and Additional Forms of Evaluation*

To establish an action agenda for the District in order to impart the first ten years of quality education, AP Secondary Board of Education has suggested preparation of District Education Reports with focus on quality of education at all levels. These will take stock of the situation,

identify the gaps and formulate the agenda for action. In addition to this, it is also time to give importance to additional areas of evaluation such as project work, reading and writing skills, participation in co-curricular activities and improvements in attitude and behaviour.

### *Improving TPR*

A time-bound plan is required to have enough motivated and trained teachers to reduce the TPR to less than (or at the most equal to) 20 by 2020 or earlier. Teachers should be provided with a relatively better system of training and other facilities, evaluation, rewards and awards.

### *District Education Foundation*

A District Education Foundation (DEF) is to be set up in Visakhapatnam, with the key objective of achieving excellence in all schools and doing whatever is required in this direction. In particular, it must ensure highest level of coordination in matters of planning, implementation, monitoring and evaluation of many initiatives in primary and secondary education. All government funds from the State and Centre meant for education upto class 10/12 in the District could be channelled through DEF. It will have all elected representatives and officials as trustees, while the overall membership should also include a few eminent senior educationists with the responsibility of raising funds as well as bringing some equality in the disbursements.

DEF could also spearhead the eventual achievement of uniformity of architecture in the temples of learning, under unique names such as Mahatma Gandhi Primary and Jawaharlal Nehru Secondary Schools. *Just as one can make out a temple, mosque and church based on their unique architectures, so too must be the case with regard to the schools. It is the schools that set the solid foundation for national unity.*

### *DEF and Cambridge Exams*

DEF should explore the possibility of some (to begin with) of the students to opt for the General Certificate of Education (Ordinary Level) [GCE (O)] and the General Certificate of Education (Advanced Level) [GCE (A)] examinations. Great indeed would be the day when one of the local schools in a remote village can proudly announce that one of its students has obtained top ranks at the Cambridge A-level!

Chapter 10

AGRICULTURE AND RURAL DEVELOPMENT

K. Manju Sree Naidu

*This Chapter first looks at the current status of the agricultural sector in Visakhapatnam district. It identifies the decline in agricultural productivity in a few areas and calls for urgent improvement in agriculture produce through a better use of technology and research. Then the chapter delves into the state of the rural population in the District and the way forward with regard to its development.*

**Agriculture**

Visakhapatnam district presents two distinct geographic divisions. The strip of land along the coast and in the interior is called the plains, while the hilly area of the Eastern Ghats flanking it on the north and west is called the Agency area. The District has differing climatic conditions in different parts. Near the coastal area, the air is moist and relaxing; but it gets warmer towards the interior, and cools down in the hilly areas on account of elevation and vegetation. The District receives normal annual rainfall of 1303.04 mm with variations from time to time. The soil present in the District is 69.9% red loamy, 19.2% sandy loamy and 10.9% black cotton. (Source: District Handbook of Visakhapatnam, 2014).

Agriculture is the main occupation of nearly 70% of the households in the District. Rice is the staple food of the people. Paddy is the principal food crop of the District followed by Ragi, Bajra and Jowar. The major cash crops are Sugarcane, Groundnut, Sesame, Niger and Chillies. Since there is no major irrigation system, only about 36% of the cropped area is irrigated under the ayacut of the medium irrigation system and minor irrigation tanks. The rest of the cultivated area is under dry crops and depends upon the vagaries of the monsoon. The productivity of the crops here is low. (Source: District Handbook of Visakhapatnam, 2014).

**Land Use Pattern**

Visakhapatnam district has a total land area of 1.12 million hectares. Its distribution in terms of land use in 1990-91, 2000-01 and 2013-14 is presented in Table 10.1.

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As shown in Table 10.1, the three major segments of land use showed a declining trend during the period under study – forests (42.12% to 39.52%); net sown area (30.2% to 25.7%) and barren uncultivable land (14.09% to 11.68%). On the other hand, there was an increasing trend in respect of current fallows (1.12% to 5.29%); other fallow lands (1.15% to 3.85%); and land put to non-agricultural uses (7.58% to 9.78%).

**Table 10.1: Land Use Pattern (%), 1990 -91, 2000-01 and 2013-14**

S.No.	Category	1990-91	2000-01	2013-14	Change (1990-2014)	Change (2000-2014)
1	Forests	42.12	42.15	39.52	-2.60	-2.63
2	Barren & uncultivable land	14.09	11.78	11.68	-2.41	-0.1
3	Land put to non-agricultural uses	7.58	8.75	9.78	+2.20	+1.03
4	Cultivable Waste Lands	1.21	0.85	0.91	-0.30	+0.06
5	Permanent pastures and other grazing lands	0.38	0.27	0.24	-0.14	-0.03
6	Land under miscellaneous tree crops & groves not included in net area	2.15	2.84	2.98	+0.83	+0.14
7	Other fallow lands	1.15	0.65	3.85	+2.70	+3.2
8	Current fallows	1.12	2.49	5.29	+4.17	+2.8
9	Net Area Sown	30.20	30.23	25.7	-4.50	-4.53
	<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>		

Note: The above percentages are calculated from the absolute figures given in:

- i) District Statistical Year Book, 2000-2001 and earlier issues.
- ii) Handbook of Statistics, Visakhapatnam District, 2013.
- iii) Statistical Abstract of AP, 2014.

### **Crop-wise Sown Area**

Table 10.2 displays the data on crop-wise area changes during 1990-2013. The dominant crop was Rice, accounting for an increase in sown area from 34.11% in 1990-91 to 36.36% in 2012-13. The top four crops other than Rice are Bajra, Ragi, Groundnut and Sugarcane, which, on the other hand, accounted for a decline in sown area from 42.86% in 1990-91 to 35.94% in 2012-13. Changes have occurred over the years demonstrating the impact of profitability and demand. For instance in 2012-13, Bajra and Sugarcane have relatively high shares of 14.3% and 13% respectively. In contrast, the share of Ragi went down to 7.7% while Groundnut plummeted to less than one percent.

Total net sown area of Visakhapatnam district decreased from 30.20% in 1990-91 to 25.70% in 2013-14. As of May 2014, in terms of net sown area of Andhra Pradesh districts, Visakhapatnam

stands at the 11<sup>th</sup> position, West Godavari stands first and Cuddapah district stands last. Rice is the major crop in Visakhapatnam district. In respect of rice production in Andhra Pradesh, Visakhapatnam district is at seventh position while Nellore district is at first position whereas Anantapur occupies the last position. In terms of cereals and pulses rankings, Visakhapatnam is at fifth position, West Godavari district is at first position whereas Anantapur comes last<sup>1</sup>.

**Table 10.2: Distribution of Sown Area by Different Crops (Area in ‘000 ha)**

Name of the Crop	1990-91		2000-01		2012-13	
	Area	%	Area	%	Area	%
Rice	117	34.11	118	34.40	104	36.36
Jowar	6	1.75	2	0.58	0.5	0.17
Bajra	40	11.66	18	5.25	41	14.34
Ragi	40	11.66	36	10.50	22	7.69
Blackgram	5	1.46	5	1.46	6	2.10
Groundnut	36	10.50	20	5.83	2.5	0.87
Seasumum	21	6.12	15	4.37	6.3	2.20
Redgram	6	1.75	6	1.75	2	0.70
Greengram	5	1.46	5	1.46	4.5	1.57
Horsegram	9	2.62	6	1.75	1.7	0.59
Sugarcane	31	9.04	43	12.54	37.3	13.04
Maize	9	2.62	8	2.33	7	2.45
Chillies	6	1.75	5	1.46	1.5	0.52
Other Pulses	2	0.58	1	0.29	7.7	2.69
Other crops	10	2.92	55	16.03	42	14.69
Total net sown area	343	100.0	343	100.0	286	100.0

*Note: The above percentages are calculated from the absolute figures given in the Handbook of Statistics, Visakhapatnam District, 2013.*

### **Crop-wise Production and Productivity**

Table 10.3 has pertinent information on production and productivity of eight major crops, notably those with sizeable revenue contribution. The disturbing feature is the negative change in yield in respect of four crops (Bajra, Ragi, Sesame and Sugarcane), a trend that should be addressed in general and in respect of Sugarcane in particular. Rice being the staple food of the population, it is good that the yield has gone up over the years. Yet, one must not lose sight of the fact that 1,752 kilograms per hectare is nothing in comparison to the 7,400 kgs achieved in China

as well as Japan, as per the information available from the Food and Agricultural Organisation (FAO)<sup>2</sup> of UNO. The rice yield in the District is also rather low compared to the best performers in the State such as SPS Nellore (4,051 kgs) and Prakasam (3,841 kgs) districts<sup>3</sup>.

**Table 10.3: Production ('000 tonnes), Value (Rs. Millions) and Yield of Selected Crops**

Name of the Crop	2000-01		2013-14		Yield (Kg/Ha)		
	Production	Value	Production	Value	2000-01	2013-14	% Change
Rice	190	1,003	152	2,604	1,608	1,752	9.0
Bajra	20	-	3.8	401	1,108	689	-37.8
Ragi	35	155	22	330	976	855	-12.4
Blackgram	2	-	4.8	222	460	753	63.7
Groundnut	24	266	3.6	138	1,157	1,567	35.4
Sesame	4	-	1.6	121	277	232	-16.2
Greengram	3	-	2.9	152	389	583	49.9
Sugarcane	2,590	3,807	2,071	5,320	60,769	57,232*	-5.8**

Sources: (i) District Statistical year book 2000-01.

(ii) Handbook of Statistics, Visakhapatnam District-2013.

(iii) Statistical Abstract of AP, 2014

\*Refers to 2010-11 \*\*Refers to growth 2000-01 to 2010-11

### Water and Fertilizer Use

Table 10.4 displays the source wise irrigated area in hectares as well as percentage of hectares under total irrigated area in Visakhapatnam district. The major change is extensive use of tube wells and a reduction in the extent of use of tank irrigation. *A concerted effort needs to be made to promote tank irrigation on a wide scale.*

The major reasons for the reduction in the extent of use of tank irrigation may be -

- Decrease in inflows to the tank due to inadequate rainfall, upstream obstructions, poor conditions of feeder channels and
- Decrease in storage due to silting etc.

**Table 10.4: Source Wise Irrigated Area (in hectares) in Visakhapatnam District**

Source	1990-91	%	2000-01	%	2013-14	%
Canals	52,764	39.23	46,508	38.68	45,054	40.27
Tanks	46,553	34.61	36,121	30.04	27,824	24.87
Tube Wells	2,293	1.70	7,148	5.94	11,926	10.66

Other Wells	13,635	10.14	4,597	3.82	4,641	4.15
Other Sources	19,262	14.32	25,879	21.52	22,439	20.05
Total	1,34,507	100	1,20,253	100	1,11,884	100

Source: *Statistical Abstract of AP, 2014.*

As for the use of chemical fertilizers, 69 kgs per hectare was used in 1999 -2000; this went up in 2011-12 to 234 kgs and dropped to 161 Kg in 2012-13<sup>4</sup>. The reason for the decrease could be due to changes in the crop mix, cultivation methods and use of organic farming.

## Rural Development

### *Intra-District Development Diversities*

Rural development assumes special significance since two thirds of the population still lives in villages. Village dwellers face serious constraints in living standards such as lack of safe drinking water, basic health and reasonable transport facilities.

A study published in the *Economic and Political Weekly*<sup>5</sup> (EPW) of January 3, 2015 provides backwardness ranks<sup>6</sup> for 640 districts of the country. Rank one denotes the most backward district and rank 640 refers to the least backward. At rank one is Bijapur district in the state of Chhattisgarh. Best of all, with rank 640, is Mahe district in the state of Pondicherry. Visakhapatnam district has a rank of 369, a little off the half-way mark, with some 270 districts better off. Within AP, out of 13 districts, only West Godavari and Krishna districts fare better than Visakhapatnam district.

The EPW study also provides the backwardness ranks for 5,955 sub-districts. It turns out that among the 43 sub-districts of Visakhapatnam district, the 11 most backward are all in Paderu division (See Table 10.5). The relatively better off are in Anakapalle and Visakhapatnam divisions. Paderu is mostly a tribal area, Visakhapatnam and Anakapalle divisions are mostly urban and Narsipatnam division lies in between the two – partly tribal and partly rural-urban. The challenge for policy makers is to bring about a fair degree of equality in the development levels of all the four divisions.

**Table 10.5: Backwardness Ranks of 43 Sub-districts**

Rank	Paderu	Narsipatnam	Anakapalle	Visakhapatnam
49-630	9			
631-1000	2	2		
1001-2000		4	5	2
2001-3000		2	1	

3001-4000		1	5	1
4001-5000		1		1
5001 and +			1	6
Total	11	10	12	10

Source: EPW article cited earlier.

### *Paderu and Narsipatnam: Results from Field Study<sup>7</sup>*

To analyze the status of rural development in Visakhapatnam district, a field survey was conducted in Paderu and Narsipatnam revenue divisions. From out of the two divisions, six villages were selected – two each, from developed, developing and underdeveloped categories. The criteria used for selecting the villages are - number of Below Poverty Level (BPL) ration card holders, proportion of agricultural workers, female literacy ratio, infrastructure facilities like electricity, drinking water and sanitary latrines within the premises, etc. The two villages which fall into the developed category, Makavarapalem and Burugupalem of Narsipatnam division and another two villages from the developing category of Narsipatnam division – Rolugunta and J.Naidupalem have been identified for the purpose. In addition, the two villages of Chintapalle and Tagangi from Paderu division, were selected to represent the underdeveloped category.

A questionnaire was used for collecting data in order to assess the status of rural development in the sample villages. Random sampling was used to identify the sampling units and a sample size of five percent of the households was considered. The questionnaire had two parts: A and B. In part A, the data relating to number of households, literacy ratio, availability of common facilities like health centres, schools, connectivity, physical infrastructure, sanitation, solid waste management, drinking water, Public Distribution System (PDS) and additional facilities such as water harvesting pits, library, Self Help Groups (SHGs) / Development of Women and Children in Rural Area (DWCRA) and Skill Development Centres were focused upon. In part B, data from the respondents was collected, relating to their occupation, type of housing and the use of common facilities.

### *Literacy and Health*

The literacy rate of the four villages of developed and developing categories varied from 54.6% to 66.4%. In respect of underdeveloped category villages, the literacy rate varied from 53.4% to 54.1%. Public and private health centres are available in both the villages of the developed category, viz., Makavarapalem and Burugupalem. Among developing category sample villages, Rolugunta has better access to public and private health facilities, whereas J.Naidupalem village does not have access to health facilities. In the underdeveloped sample, in the villages of Chintapalle and Tagangi, only public health centres are available. An important observation is that, there is a variation in the access to health facilities among the developing villages. It is essential to study the reasons for the non-availability of health facilities against the backdrop of the National Rural Health Mission, which was launched in the year 2005 for provision of accessible, affordable, accountable, effective and reliable primary health care facilities to poorer

sections of the population. Primary and secondary public school facilities were in existence in all the sample villages.

### *Connectivity, Sanitation, Drinking Water and Other Facilities*

Connectivity facilities like bus, bank, telecommunication, internet, post office and partial street lighting facilities are available in Makavarapalem village in the developed category, Rolugunta of developing category and Chintapalle of underdeveloped category. These villages happen to be Mandal headquarters. In respect of the other three villages, the bank and bus facilities are lacking.

All the villages have partial drainage and sanitation facilities. Drinking water is available from public water tanks, bore wells and wells. PDS facility is available in all the villages with three ration shops in each village. Additional facilities such as SHGs/DWCRA groups are present in all the six villages. Water harvesting pits are not present in any of the sample villages. Library facility is present in Makavarapalem, Rolugunta and Chintapalle.

In Makavarapalem, one micro water plant and one large scale Anarak Aluminium Refinery exist; in Burugupalem, a small scale cashew processing unit is present. In Chintapalle of underdeveloped category, one micro water plant and two small scale lemon oil and coffee processing plants are present.

### *Observations*

Three out of the six villages lack the basic infrastructure facilities such as bus connectivity and banking facilities, but they do have telecommunication and internet facilities. This underscores the need for all-round development.

The presence of SHGs / DWCRA in all the villages shows the success of the micro finance scheme in Andhra Pradesh, which has been the role model for other states. The presence of such groups in all the villages is indicative of the concerted efforts of women to achieve economic independence on the one hand and contribute towards rural development on the other.

As per Swachh Bharat Abhiyan (SBA), every village should be provided with safe drinking water and sanitation facilities at household level. According to the survey, all the sample villages have partial sanitation and drainage facility and therefore priority should be given to sanitation. Except for one developed village (Makavarapalem), no village in the study has a dumping yard for solid waste management and thus, this needs to be given priority as part of SBA.

The government is giving top priority to the establishment of Skill Development Centres as a move towards enabling employment generation. However, this facility is found only in two villages out of the six studied.

### *Type of Houses and Housing Scheme Facility*

In five out of six villages, 70% to 90% of the population lives in *pucca* houses. In sharp contrast,

only 46% of residents in Tagangi have such housing. Out of the 244 sample households, 213 (87.3%) have used housing scheme facility. Out of the six sample villages, 90% of the households in four villages are using housing scheme facility, except for two villages (Burugupalem and Tagangi) where around 30% of the households are not availing the housing scheme.

### *Toilet Facility and Drinking Water*

Only in Makavarapalem, just a little over half (50.9%) of the sample households have toilet facility in the house. In all the other sample villages, just 42% to 47% of the households have toilet facility. The matter requires urgent attention. The survey results also show that public source of drinking water is being used by 198 (81.1%) households and the remaining 46 (18.9%) households have their own sources.

### *Use of Mahatma Gandhi National Rural Employment Guarantee Scheme facility*

Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) aims to provide employment in rural areas for 100 days for doing casual manual work. Out of the 244 sample households, 410 members were employed in the scheme, of which, male workers are 213 (51.5%) and female workers are 197 (48.1%).

### *Type of Roads in the Locality*

In the sample localities, concrete roads are more in number in all the villages (covered under the Pradhan Mantri Gram Sadak Yojana), followed by tar and mud roads. Mud roads are present only in Chintapalle and Tagangi. In Makavarapalem and Rolugunta, 100% concrete roads are present in the sample locality. In Burugupalem and J.Naidupalem, nearly 85% of the sample localities have concrete roads.

### *Usage of Public Distribution System (PDS)*

The objective of PDS is to provide essential consumer goods at subsidized rates for families below the poverty line. Majority of the households (159) purchase six items (Rice, Sugar, Kerosene oil, Dal and Tamarind) and 32 households purchase three items (Rice, Sugar and Kerosene) supplied through PDS. An important observation is that Rice is purchased by all the sample households, irrespective of other combinations of items.

### *Availing Pension Scheme Facility*

The source of income for senior citizens in rural areas is a big challenge, because they do not have any other income, particularly in case of below poverty line families. To protect the elderly population, the government is providing old age pension. The survey data shows that out of 185 senior citizens in the sample households, 167 are availing pension facility, while the remaining 18 are not availing the facility.

## *Use of other Common Facilities by Households*

Primary school, secondary school, electricity, telecommunication and internet are the common facilities used by all the respondents in the sample villages. DWCRA / SHG facilities are used by 81.97% of the respondents. Health centre, bank, post office, library and skill development centre facilities are used in the villages where they are available (Makavaripalem, Rolugunta, Chintapalle).

## *Selected Villages: Comparison vis-a-vis Smart Village Parameters*

Assessed from the standpoint of smart village parameters, the selected villages require many facilities to be developed. Based on the survey data, the following facilities are compared with the smart village parameters : homes for all, diversified livelihood opportunities, functional Mee Seva Centre, telecom / internet connectivity, access of youth to skills development, bank facility, electricity, Anganwadi Centres, schools, health centres, solid waste management etc. Out of the six villages, Makavaripalem is the only one having all the above facilities, whereas Rolugunta does not have solid waste management facility and skill development centre. Chintapalle does not have solid waste management facility. In the remaining three villages, a huge gap is observed when compared with the above parameters. It is significant to note that, all the six sample villages do not have cent percent household toilet facility, which is one of the major smart village parameters.

## *Concluding Note*

According to the field survey, Makavarapalem and Rolugunta villages have all the infrastructure facilities, compared to the other villages. Chintapalle village, a predominantly tribal area, is underdeveloped inspite of the availability of all the basic facilities. To achieve balanced rural development, top priority should be given by the government to provide basic facilities in the rural areas, followed by creation of awareness among the rural people about the use of these facilities. *The study leads to an interesting conclusion that rural people are ready to use all the important common facilities provided by the government.*

## *Foot Note*

- 1 *Statistical Abstract of Andhra Pradesh, 2014.*
- 2 *FAO Website, 2014.*
- 3 *Statistical Abstract of Andhra Pradesh, 2014.*
- 4 *Handbook of Statistics, Visakhapatnam District, Andhra Pradesh, 2013.*
- 5 *Sanchita Bakshi et al (2015), Regional Disparities in India: A Moving Frontier, EPW, L(1), January 3, 44-52 and 52 pages of ranking tables of districts and sub-districts.*
- 6 *The ranks are based on composites of three indicators of backwardness: infrastructure, human and economic development.*
- 7 *This section is brief and provides the core findings of the field study. For details on the questionnaire, collected data and its analysis, the author may please be contacted.*

## Chapter 11

**INDUSTRIAL DEVELOPMENT**

T.V.V. Phani Kumar\*

*This Chapter focuses on the industrial development in Visakhapatnam city and district in terms of investment and employment generation in the past decade. The chapter also portrays the sectoral classification of the various industrial units established in the City and District over the period. It concludes with a view of the future and suggestions to promote balanced industrial development in the District.*

**Introduction**

Visakhapatnam city and the district at large, have major public and private sector enterprises in such diverse sectors as steel, metals, petroleum, polymers, fertilizers, heavy engineering equipment and ship building. The District headquarters is blessed with a natural harbour facilitating the development of a port – the only major port in Andhra Pradesh.

Major enterprises include RINL, popularly known as the Visakhapatnam Steel Plant, Hindustan Petroleum Corporation Limited (HPCL), Hindustan Shipyard Limited (HSL), Bharat Heavy Electricals Limited (BHEL), Dredging Corporation of India (DCI), National Thermal Power Corporation (NTPC), Essar Pellet Plant, LG Polymers, Jindal Stainless Steels, Synergies Castings and Rain CII Carbon Limited. Besides the major industries, Visakhapatnam has a number of medium and small scale industries, linked (backward and forward) to the major industries. Subsequent government initiatives have especially helped to attract investments, viz., Visakhapatnam Special Economic Zone (VSEZ), Andhra Pradesh Industrial Infrastructure Corporation (APIIC), Agnampudi Industrial Park, Brandix Apparel City and Jawaharlal Nehru Pharma City (JNPC).

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Visakhapatnam has been gearing up to foster the growth of the IT sector, with the recent establishment of an IT Special Economic Zone and Incubation Centre, attracting IT firms such as Tech Mahindra, IBM, Wipro, Infotech, WNS, Patra Corporation and Concentrix.

### Structure of the Large and Medium (L&M) Sectors in Visakhapatnam City

There were 37 large and medium scale units in operation in Visakhapatnam city as of 31<sup>st</sup> March 2015, which accounted for a total investment of Rs 47,414.53 crores in capital assets and employment of 35,382 people. A brief profile of the large and medium scale units operating in the city of Visakhapatnam is presented in Table 11.1

**Table 11.1: Large and Medium Units – Sector Wise in Visakhapatnam City  
(As of 31<sup>st</sup> March 2015)**

Sector	Units		Investment		Employment	
	Number	% to Total	Rs. in Cr	% to Total	Number	% to Total
<b>Agro-based</b>	2	5.41%	220.50	0.50%	1,640	4.64%
<b>Cement &amp; Construction</b>	5	13.51%	240.83	0.50%	912	2.58%
<b>Chemicals &amp; Fertilizers</b>	3	8.11%	117.19	0.20%	1,978	5.59%
<b>Heavy Engineering</b>	3	8.11%	177.87	0.40%	1,700	4.81%
<b>Minerals</b>	1	2.70%	60.00	0.10%	100	0.28%
<b>Petroleum</b>	4	10.81%	18,501.53	39.00%	2,853	8.06%
<b>Pharma</b>	2	5.41%	52.46	0.10%	150	0.42%
<b>Power</b>	1	2.70%	133.00	0.30%	96	0.27%
<b>Ship Building</b>	1	2.70%	150.00	0.30%	3,137	8.87%
<b>Iron &amp; Steel</b>	7	18.92%	26,644.86	56.20%	18,997	53.69%
<b>Others</b>	8	21.62%	1,116.29	2.40%	3,819	10.79%
<b>TOTAL</b>	<b>37</b>	<b>100.00%</b>	<b>47,414.53</b>	<b>100.00%</b>	<b>35,382</b>	<b>100.00%</b>

Source: District Industries Centre (DIC), Visakhapatnam.

Note: Of the total L&M units in Visakhapatnam district, the units in the city account for 77% of investment and 45% of employment.

Iron and Steel (56.2%) and Petroleum (39.0%) are the two major sectors in which the investments were made in the City. More than half of the total employment is generated from the Iron and Steel Sector. Thus, as evident from Table 11.1, the Iron and Steel industry occupies first place in respect of number of units, investment and employment.

Table 11.2 gives the salient features of the ten year old units. Out of 63 units established in Visakhapatnam district during the period 2005-15, only 14 units (22.22%) were established within the City limits<sup>1</sup>. Further, majority of the units established in Visakhapatnam city are from Iron & Steel sector (28.57%) followed by Pharma (14.29%) and Heavy Engineering (14.29%) during the period. The Mandals in the District around the City limits were considered for establishment of the new plants. Establishment of the Special Economic Zone around the City

limits also fuelled the growth of large and medium industries in the District. Out of the total investment of Rs. 10,215.84 crores made in L&M units in Visakhapatnam district (Table 11.6), a mere 853.68 crores (1.8%) were made in the units established in the City. Petroleum (25.55%) and Agro-based Industries (20.50%) were the two major sectors in which the investments were made. Nearly 50% of total employment generated during the period 2005-15 was in three sectors – Iron & Steel (22.60%), Petroleum (15.60%) and Heavy Engineering (11.40%).

**Table 11.2: Large and Medium Industries Established during 2005-2015 – Sector Wise in Visakhapatnam City**

Sector	Units		Investment		Employment	
	Number	% to Total	Rs. in Cr	% to Total	Number	% to Total
<b>Agro-based</b>	1	7.14%	175	20.50%	100	5.70%
<b>Cement &amp; Construction</b>	1	7.14%	9.83	1.15%	80	4.50%
<b>Heavy Engineering</b>	2	14.29%	98.66	11.56%	200	11.40%
<b>Petroleum</b>	1	7.14%	218.13	25.55%	274	15.60%
<b>Pharma</b>	2	14.29%	52.46	6.15%	150	8.50%
<b>Iron &amp; Steel</b>	4	28.57%	94.76	11.10%	398	22.60%
<b>Others</b>	3	21.43%	204.84	23.99%	558	31.70%
<b>TOTAL</b>	<b>14</b>	<b>100.00%</b>	<b>853.68</b>	<b>100.00%</b>	<b>1760</b>	<b>100.00%</b>

Source: DIC, Visakhapatnam

Note: Of the total SMEs, units within the City account for 72% of the employment.

### Small and Micro Enterprises (SMEs) in Visakhapatnam City

The number of small and micro units registered in Visakhapatnam city during the FY 2014-15 was 426, in which investments of Rs. 425.54 crores were made. The small and micro units generated an additional employment of 9,897 in the City. The number of small and micro units registered in Visakhapatnam city during 2010-2014 is presented in Table 11.3 and a brief profile of the registered small and micro units functioning during the financial year 2014-15 is presented in Table 11.4

**Table 11.3: Small and Micro Enterprises (SMEs) registered during 2010-2014 in Visakhapatnam City**  
(As of 31<sup>st</sup> December 2014)

Year	Units			Employment		
	Manufacture	Service	Total	Manufacture	Service	Total
2010	172 (23.79)	162 (12.26)	334 (16.34)	2,599 (20.40)	2,477 (9.36)	5,076 (12.94)
2011	174 (24.06)	236 (17.86)	410 (20.06)	2,783 (21.85)	3,475 (13.12)	6,258 (15.96)
2012	143 (19.78)	317 (24.00)	460 (22.51)	3,274 (25.70)	7,849 (29.65)	11,123 (28.37)
2013	125 (17.29)	280 (21.20)	405 (19.81)	2,370 (18.61)	5,565 (21.02)	7,935 (20.23)
2014	109 (15.08)	326 (24.68)	435 (21.28)	1,712 (13.44)	7,109 (26.85)	8,821 (22.50)
<b>TOTAL</b>	<b>723</b> <b>(100.00)</b>	<b>1,321</b> <b>(100.00)</b>	<b>2,044</b> <b>(100.00)</b>	<b>12,738</b> <b>(100.00)</b>	<b>26,475</b> <b>(100.00)</b>	<b>39,213</b> <b>(100.00)</b>

Note: Figures in parentheses are percentages to column total

Source: DIC, Visakhapatnam

**Table 11.4: Small and Micro Enterprises (SMEs) registered in FY 2014-15 in Visakhapatnam City**  
(As of 31<sup>st</sup> March 2015)

Category	Manufacturing			Service			Total		
	Units	Investment (in Rs. Crores)	Employ- ment	Units	Investment (in Rs. Crores)	Employ- ment	Units	Investment (in Rs. Crores)	Employ- ment
Small	55 (44.70)	43.98 (41.50)	922 (36.91)	187 (61.72)	193.55 (60.58)	4,735 (64.00)	242 (56.81)	237.53 (55.82)	5657 (57.16)
Micro	68 (55.30)	62.09 (58.50)	1,576 (63.09)	116 (38.28)	125.93 (39.42)	2,664 (36.00)	184 (43.19)	188.01 (44.18)	4240 (42.84)
<b>Total</b>	<b>123</b> <b>(100.00)</b>	<b>106.07</b> <b>(100.00)</b>	<b>2,498</b> <b>(100.00)</b>	<b>303</b> <b>(100.00)</b>	<b>319.48</b> <b>(100.00)</b>	<b>7,399</b> <b>(100.00)</b>	<b>426</b> <b>(100.00)</b>	<b>425.54</b> <b>(100.00)</b>	<b>9,897</b> <b>(100.00)</b>

Note : Figures in parentheses are percentages to column total

Source : DIC, Visakhapatnam

There is a rising trend in the establishment of SMEs units and employment generation in service sector. The percentage of SMEs established in service sectors to total SMEs established has gone up from 12.26% to 24.68% over a period of five years (2010-2014). During 2014-15, out of total units established in the City, 56.81% are small scale and 43.19% are micro units. The proportion of investment and employment in respect of small and micro units established during 2014-15 is also more or less the same. Out of the total small scale units of 272 established in

Visakhapatnam district, 242 units (90%) are established in Visakhapatnam city. Further, out of the total number of micro units of 214 established in Visakhapatnam district, 184 units (86%) are established in Visakhapatnam city (Source: DIC, Visakhapatnam).

### Structure of the Large and Medium (L&M) Sectors in Visakhapatnam District

There were 106 large and medium scale units in operation as of 31<sup>st</sup> March 2015. These units accounted for a total investment of close to Rs. 62,000 crores in capital assets and provided employment to a little less than 80,000 people. A brief profile of the L&M units operating in the district of Visakhapatnam is presented in Table 11.5

**Table 11.5: Large and Medium Units in Visakhapatnam District (As of 31<sup>st</sup> March 2015)**

Sector	Units		Investment		Employment	
	Number	%	Rs Cr.	%	Number	%
<b>Agro-based</b>	9	8.49	438.41	0.71	10,656	13.55
<b>Cement &amp; Construction</b>	10	9.43	850.81	1.38	1,715	2.18
<b>Chemicals &amp; Fertilizers</b>	13	12.27	943.74	1.53	3,591	4.57
<b>Heavy Engineering</b>	4	3.77	278.99	0.45	2,598	3.30
<b>Minerals</b>	2	1.89	447.88	0.72	365	0.46
<b>Petroleum</b>	5	4.72	18,502.53	29.91	2,903	3.69
<b>Pharma</b>	27	25.47	3,585.27	5.80	14,069	17.89
<b>Power</b>	4	3.77	5,028.49	8.13	1,505	1.91
<b>Ship Building</b>	1	0.94	150.00	0.24	3137	3.99
<b>Iron &amp; Steel</b>	11	10.38	29,650.78	47.93	20,240	25.75
<b>Textiles</b>	7	6.60	442.00	0.71	13,125	16.69
<b>Others</b>	13	12.27	1,539.72	2.49	4,734	6.02
<b>TOTAL</b>	<b>106</b>	<b>100.00</b>	<b>61,858.62</b>	<b>100.00</b>	<b>78,638</b>	<b>100.00</b>

Source: DIC, Visakhapatnam

Pharmaceuticals, Chemicals and Fertilizers and Cement and Construction sectors have close to half of the total number of establishments. Major investments are in Iron and Steel (47.93%), Petroleum (29.91%) and Power (8.13%). The ranking in terms of employment contribution is: more than 25% from Iron and Steel followed by Pharma (17.89%) and Textiles (16.69%). Of the 106 units as of March 2015, 74 were units set up in the ten years since 2005.

Table 11.6 gives the salient features of the ten year old units. Pharma, Chemicals and Fertilizers and Iron and Steel account for nearly 60% of the total number of units. More than 65% of total investments were in Pharma and Iron and Steel. The major job creators were Pharma and Textiles as they have provided more than 70% of the total employment. This is in tune with the well-known fact of iron and steel being capital intensive and textiles and clothing being labour intensive.

**Table 11.6: Large and Medium Industries Established in Visakhapatnam District During 2005-2015**

Sector	During the period 2005-15					
	Units		Investment		Employment	
	Number	%	Rs Cr.	%	Number	%
<b>Agro-based</b>	2	2.70	214.63	2.10	2,740	7.18
<b>Cement &amp; Construction</b>	5	6.76	583.01	5.71	623	1.63
<b>Chemicals &amp; Fertilizers</b>	10	13.52	826.55	8.09	1,613	4.23
<b>Heavy Engineering</b>	3	4.05	199.78	1.96	1,098	2.88
<b>Minerals</b>	1	1.35	387.88	3.80	265	0.69
<b>Petroleum</b>	2	2.70	219.13	2.14	324	0.85
<b>Pharma</b>	26	35.14	3,550.42	34.75	13,955	36.57
<b>Power</b>	2	2.70	63.49	0.62	1,300	3.41
<b>Iron &amp; Steel</b>	8	10.81	3,100.68	30.35	1,641	4.30
<b>Textiles</b>	7	9.46	442.00	4.33	13,125	34.40
<b>Others</b>	8	10.81	628.27	6.15	1,473	3.86
<b>TOTAL</b>	<b>74</b>	<b>100.00</b>	<b>10,215.84</b>	<b>100.00</b>	<b>38,157</b>	<b>100.00</b>

Source: DIC, Visakhapatnam

Note: Of the L&M units noted here, the units in the City account for just 8.4% of investment and 4.6% of employment.

While this has been the past trend, evidence in Table 11.7 indicates the emergence of energy, food and health sectors with the promise of over 75% of employment and with a little over half the investment proposed.

**Table 11.7: L & M Industries under Implementation in Visakhapatnam District  
(As of 31<sup>st</sup> March 2015)**

Sector	Units		Expected Investment		Expected Employment	
	Number	%	Rs. Cr	%	Number	%
Agro-based	2	3.17	25.00	0.05	230	1.21
Cement & Construction	4	6.35	1,647.75	3.41	416	2.19
Chemicals & Fertilizers	11	17.46	2,461.08	5.09	1,585	8.34
Petroleum	3	4.76	6,394.58	13.22	400	2.11
Pharma	3	4.76	1,243.84	2.57	308	1.62
Power	7	11.11	5,404.36	11.17	859	4.52
Iron & Steel	1	1.59	551.00	1.14	40	0.21
Textiles	1	1.59	1,173.22	2.42	74	0.39
Energy	19	30.16	11,313.50	23.39	8,416	44.31
Food	3	4.76	9,455.00	19.55	3,400	17.90
Health Services	3	4.76	6,866.64	14.20	2,554	13.45
IT	1	1.59	1,012.00	2.09	40	0.21
Minerals	1	1.59	257.50	0.53	150	0.79
Others	4	6.35	565.78	1.17	522	2.75
<b>TOTAL</b>	<b>63</b>	<b>100.00</b>	<b>48,371.25</b>	<b>100.00</b>	<b>18,994</b>	<b>100.00</b>

Source: DIC, Visakhapatnam

### Employment Trends, 2001-2011

The total population and the workforce of Visakhapatnam District as per 2001 and 2011 census is presented in Table 11.8 along with the contribution of the large and small industrial sectors. In 2011, half the workforce was in Agriculture and Household Industries (AHI), down from 56% in 2001. Trends outside AHI were - L&M absorption rose from 3% to 4.2%; that of SME from 15% to 20%; and all other sectors' employment absorption remained more or less constant at around 25%. Most of the latter could be informal services and petty trades. *The challenge for the future is significantly improving the absorption of L&M and SME industrial sectors in the backdrop of further steep reductions in agricultural employment and pressures to minimize informal sector employment.*

**Table 11.8: Population and Workforce 2001-2011**

	2001	2011
Total Population of the District (Millions)	3.8	4.3
Total Workforce of the District (Millions)	1.6	1.9
Workforce to Total Population (%)	42.1	44.2
<i>Workforce by Major Sectors of Employment (%)</i>		
Workforce in Agriculture & Household Industries to Total Workforce	56.2	50.5
Workforce in L&M units to Total Workforce	3.0	4.2
Workforce in SMEs to Total Workforce	15.0	20.0
Workforce outside the three sectors noted above	25.8	25.3
Total of all four major sectors	100.0	100.0

Sources of basic data: Census 2001, Census 2011 and DIC, Visakhapatnam

### Investment Needs: Rough and Ready Projections

Available data show that the investment required is around Rs. 0.78 crore (in plant & machinery alone) to create a job in L&M sector. Corresponding figure for SME is Rs. 25,000. Since these figures are based on capital costs at historical prices and considering the need to upgrade the jobs via capital investment, future investment requirements may have to be revised to one crore rupees per new job in L&M and Rs. 40,000 in SME. Table 11.9 provides population, workforce and sector-wise employment projections.

**Table 11.9: Projections of Population and Workforce 2011-2035**

Item	2011	2016	2021	2035
Total Population of the District ( in Millions)	4.3	4.6	4.9	5.8
Total Workforce (in Millions)	1.9	2.1	2.3	2.9
Workforce in Non-agricultural sector ( in Millions)	0.94	1.09	1.26	1.91
Percentage of Workforce to Total Population	44.19	45.65	46.94	50.00
Percentage of Non-Agricultural Employment to Workforce	47.24	51.90	54.79	65.86
Percentage of Agricultural Employment to Workforce	52.76	48.10	45.21	34.14

#### Investment Requirements

New jobs needed in Non-Agriculture during 2016-2035: 9,70,000. Based on the data in Table 7 it is found that an investment of Rs 25.5 million is needed per job. At an average exchange rate of Rs 65, the US\$ equivalent of the total investment needed for 1,70,000 jobs is a staggering \$374.8 billion.

The numbers are provided just to demonstrate two challenges: it is by no means easy to get all the jobs in L&M and thus the need to specifically ensure good investment climate not only overall but also in SME sector.

**Note:** The present average annual growth rate of population of 1.24% is expected to remain unchanged for the next decade, thus assuming that any further moderation in the rate of natural increase would be offset by immigration into the District from other areas. Workforce participation, based on past trends, is expected to go up from 44.19% in 2011 to 45.65% in 2016 and further to 50.00% in 2035. It is assumed that the percentage of non-agricultural employment to total workforce will increase from 47.24% to 51.09% in 2016 and 65.86% in 2035.

### The Future of Industry in Visakhapatnam District

The State Government has identified thrust areas based on the District’s potentialities. The areas for key investment opportunities in Visakhapatnam district are identified as:

- |                         |                    |
|-------------------------|--------------------|
| 1. Defence and Aviation | 5. Food Processing |
| 2. Petro Chemicals      | 6. Pharmaceuticals |
| 3. Integrated Textiles  | 7. ITES            |
| 4. Electronics          | 8. Tourism         |

The government is optimistic about realizing sizeable industrial investments in the District in the aforementioned and related sectors. The proposed Visakhapatnam–Chennai Industrial Corridor (VCIC) and other industrial infrastructure initiatives are expected to help attract sizeable domestic and foreign investments. The upcoming Industrial Infrastructure Projects are presented in Table 11.10.

**Table 11.10: Upcoming Industrial Infrastructure Projects in Visakhapatnam District**

Project	Cost (Rs.)	Status
<b>Makavaripalem</b> :Aluminum & General Engineering Cluster	<b>27.72 Crores</b>	Filed application to DC – MSME, New Delhi for in principle approval / grant.
<b>Achutapuram</b> :Marine Cluster : Min 100 acres Fine & Specialty chemicals cluster : 300 acres Petrochemicals – Plastic Cluster : 300 acres	-	Preparation of DPRs is under progress.
<b>IT Incubation Centre</b> , Iconic Signature Towers at Vishakhapatnam	-	Preparation of Feasibility Study Report is in process
<b>Vizag-Chennai Industrial Corridor (VCIC)</b> (More details are in the next section)	<b>One Lakh Crores</b>	Department of Industrial Policy and Promotion (DIPP) has accepted Asian Development Bank’s conceptual development plan report

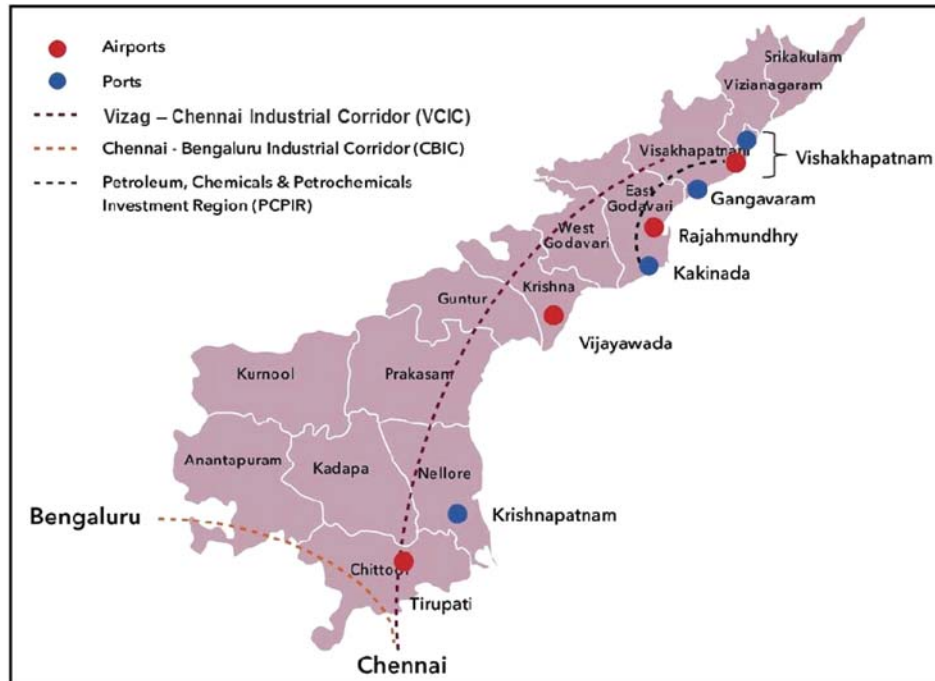
Source: APIIC

### Visakhapatnam-Chennai Industrial Corridor (VCIC)

The proposed Visakhapatnam–Chennai Industrial Corridor (Figure 11.1) is expected to give a fillip to the economic prospects of the Seemandhra region. This project is expected to create more than 50,000 jobs, both directly and indirectly, in the first phase alone. VCIC is to create a

strong economic base with globally competitive environment and state-of-the-art infrastructure to attract foreign investment and promote local trade and commerce. Asian Development Bank (ADB) has evinced interest in the project and will help set up industrial zones in the State as a part of VCIC.

**Figure 11.1: Proposed Visakhapatnam-Chennai Industrial Corridor**



Source: Industrial Development Policy 2015-20

### Towards promoting Industry in the City

The mission of developing Visakhapatnam into a smart city, promoting the City as an IT hub and establishment of Electronic Manufacturing Clusters (EMCs) are set to fuel the development of the industrial sector in the city. The following initiatives could promote a sustained and competitive industrial sector development in the City:

- Twenty four hours power and water supply are the basic requirements of the industrial sector. The Government should take necessary measures for quick completion of underground power supply project for all the major areas in the City. Solar power generation should be considered as an alternative source to meet the rising power requirements of the City.
- SMEs play a vital role in meeting the rising non-agricultural employment needs in the City. With the increasing trend of establishment of SMEs in service sector within the City, the state government should establish specialized institutions to impart the skill sets required by the industry. Under Skill-India initiative launched by the Government of India in July 2015, it should promote entrepreneurship as the key to successful skills strategy.
- The IT exports from Visakhapatnam are mere Rs. 1,400 crores whereas Hyderabad alone generates exports of Rs. 64,000 crores annually. This clearly depicts the growth potentiality

of IT Sector in Visakhapatnam city. Promoting Visakhapatnam as an IT hub requires local talent pool. The establishment of educational institutions, specialized universities and training centres in the City will help in grooming the local talent as per the requirements of the IT sector.

- The Government should take steps to expedite the work of the construction of an air cargo terminal at Visakhapatnam port, as the pharma sector and others are forced to route their exports through Chennai and Hyderabad. A strong domestic and international air cargo terminal will facilitate the growth of manufacturing sector in the City.

### **Towards Promoting Industry in the District**

While the industrial infrastructure development is going in the right direction and the policy climate is conducive for growth, the following initiatives could foster relatively more sustained and competitive industrial sector development in the District:

- Power, telecom, infrastructure and water supply need to be upgraded to global standards to attract investments – domestic and foreign.
- The qualitative targets for power should be the demise of the voltage stabilizer and the standby generator. As long as these are needed, it would imply less than world class power infrastructure.
- SMEs will continue to play a key role in employment generation. To promote the sector to global standards, a special study should be carried out to understand the current situation and problems, in comparison with the success factors of the sector in economies like China and Taiwan. The results of the study should provide inputs for the development of SME sector in the District and elsewhere.
- Many MNCs are looking for low cost and cost effective destinations, as the manufacturing costs are escalating in China. As a part of 'Make in India' initiative, Visakhapatnam can be promoted as a destination for establishment of manufacturing units.
- Successful promotion of Visakhapatnam as Mega Electronic Hub by establishment of Electronic Manufacturing Clusters (EMCs) will depend on improving air and road connectivity along with world class infrastructure, skills, knowledge and ability to absorb technology.

In this context, it may be noted that the highlights of the AP Industrial Development Policy 2015-2020 and the various government incentives for large, medium, small and micro enterprises in AP are depicted in the Annexure.

## Annexure 11.A1

## Highlights of AP Industrial Development Policy 2015-20

The objectives of the Industrial Development Policy 2015-20 announced by the Government of Andhra Pradesh on 1<sup>st</sup> April 2015 are:

- (a) To ensure sustainable and inclusive industrial growth
- (b) To be among the Top Three states in terms of industrial investments by 2022
- (c) To be the most preferred logistics hub and India's gateway to East and Southeast Asia by 2029
- (d) To enhance the quantum and quality of skilled manpower and create significant employment opportunities

The policy targets are:

- (a) Increase the contribution of manufacturing to GSDP from 9.95% (2013-14) to 15% by 2020.
- (b) Increase the contribution of industries to GSDP from 20.7% (2013-14) to 25% by 2020.
- (c) Attract investment to the tune of Rs. Two lakh crores by the end of 2020.
- (d) Create employment opportunities for an additional 10 lakh people by the end of 2020.

The highlights of the industrial policy are:

- (a) Separate sectoral policies for automobile and auto components, textile and bio technology sectors.
- (b) Establishment of 'Single Desk' system to provide all clearances required to set up an industrial unit in 21 days.
- (c) Proposal to create a land bank of one million acres for allotment to industries and to provide land on 99 years lease for setting up industrial units.
- (d) Special package of incentives for mega industries which involve an investment of 500 crores or employment to 2000 people.
- (e) Reimbursement of 100% of VAT/GST to Small and Micro units for five years, 75% to medium and 50% to large units for seven years.
- (f) SC, ST and women entrepreneurs will be provided additional incentives for establishing industrial units.
- (g) Reimbursement of fixed power cost @ Rs 1.00 per unit for a period of five years from the date of commencement of commercial production.
- (h) Reimbursement of 100% stamp duty and transfer duty on purchase of land, mortgages and hypothecation.

## Annexure 11.A2

### Incentives announced for Large, Medium, Small and Micro Enterprises in Industrial Development Policy 2015-20

#### Incentives to Large Industries:

**Large Industry** means an industry in which the investment on plant and machinery is less than Rs. 500 crores except Micro, Small and Medium Enterprises.

1. Reimbursement of 100% stamp duty and transfer duty paid by the industry on purchase of land meant for industrial use.
2. Reimbursement of 100% stamp duty for lease of land/shed/buildings, mortgages and hypothecations
3. Stamp duty will be reimbursed only one time on the land. Stamp duty will not be reimbursed on subsequent transactions on the same land
4. Government of Andhra Pradesh is committed to supplying uninterrupted 24x7 quality power to all industries operating in the State.
5. Fixed power cost reimbursement @ Rs1.00 per unit for a period of five years from the date of commencement of commercial production.
6. Reimbursement of 50 % net VAT/CST/SGST for a period of seven years from the date of commencement of commercial production or up to realization of 100% fixed capital investment, whichever is earlier, to Large Industries.
7. Large Industries engaged in recycling waste into environment friendly products/energy (such as waste to energy, waste to bio-gas, waste to manure) will be brought under zero rated category schedule of the VAT Act.
8. 10 % subsidy on cost of plant & machinery for specific cleaner production measures limited to Rs 35 lakhs for large industries, provided the measures are certified by Andhra Pradesh Pollution Control Board (APPCB).
9. 25% subsidy for sustainable green measures on total fixed capital investment of the project (excluding cost of land, land development, preliminary and pre-operative expenses and consultancy fees) for below mentioned green measures with a ceiling of Rs.50 crores.
  - a. Waste water treatment: Constructing effluent treatment plant and sewage treatment plant and using recycled water for industrial purpose, especially zero discharge systems.
  - b. Green Buildings: Buildings which obtain green rating under the Indian Green Building Council (IGBC/LEED Certification) or Green Rating for Integrated Habitat Assessment (GRIHA) systems.
  - c. Use of renewable sources of power (erecting captive sun, wind and biomass plants etc.).

- d. Installing Continuous Emission Monitoring System (CEMS) for red category industries. The information should be disseminated continuously to APPCB.
- e. Adopting rain water harvesting; restoring water bodies by de-silting defunct water bodies.

#### Incentives to Medium, Small and Micro Enterprises (MSMEs):

1. Reimbursement of 100% stamp duty and transfer duty paid by the industry on purchase of land meant for industrial use
2. Reimbursement of 100% stamp duty for lease of land/shed/buildings, mortgages and hypothecations
3. Government of Andhra Pradesh is committed to supplying uninterrupted 24x7 quality power to all industries operating in the State.
4. Fixed power cost reimbursement @ Rs 1.00 per unit for a period of five years from the date of commencement of commercial production.
5. Reimbursement of 100% net VAT/CST/SGST for a period of five years from the date of commencement of commercial production to Micro and Small Enterprises.
6. Reimbursement of 75% net VAT/CST/SGST for a period of seven years from the date of commencement of commercial production or up to realization of 100% fixed capital investment, whichever is earlier, to Medium Enterprises
7. MSME projects engaged in recycling waste into environment friendly products /energy (such as waste to energy, waste to bio-gas, waste to manure) will be brought under zero rated category schedule of the VAT Act.
8. 35% subsidy on cost of plant & machinery for specific cleaner production measures limited to Rs 35 lakhs for MSME, provided the measures are certified by Andhra Pradesh Pollution Control Board (APPCB).
9. 25% subsidy for sustainable green measures on total fixed capital investment of the project (excluding cost of land, land development, preliminary and pre-operative expenses and consultancy fees) for below mentioned green measures with a ceiling of Rs.50 crores.
  - (a) Waste water treatment: Constructing effluent treatment plant and sewage treatment plant and using recycled water for industrial purpose, especially zero discharge systems.
  - (b) Green Buildings: Buildings which obtain green rating under the Indian Green Building Council (IGBC/LEED Certification) or Green Rating for Integrated Habitat Assessment (GRIHA) systems.
  - (c) Use of renewable sources of power (erecting captive sun, wind and biomass plants etc.).

- (d) Installing Continuous Emission Monitoring System (CEMS) for red category industries. The information should be disseminated continuously to APPCB.
- (e) Adopting rain water harvesting; restoring water bodies by de-silting defunct water bodies.
- (f) Any other environment management project approved by Empowered Committee of Secretaries.
- (g) An exclusive MSME Policy will be brought out separately to address the needs of MSME sector.

**(Footnotes)**

1 Information furnished by DIC, Visakhapatnam.

## Chapter 12

## THE TOURISM SECTOR

K.V. Sandhyavani\*

*Visakhapatnam is situated in a very picturesque location, surrounded by beautiful blue seas and green hills. The City has a lot of attractions, viz., natural beaches, harbour, parks, ancient temples, heritage spots, museums, etc. The District too has a variety of attractions: hills, wildlife, forests, temples and so on. This Chapter reviews the status of the City and the District in attracting tourists. A SWOT analysis is carried out in order to frame strategies for further promoting the District in general and the City in particular, as important tourist destinations.*

**Introduction**

According to the *India Tourism Statistics at a Glance, 2014<sup>1</sup>*, ten Indian States received over 80% of the domestic tourists in 2014: Tamil Nadu with 25.6% of domestic tourism share stood at the top position, followed by UP (14.3%), Karnataka (9.2%) and Maharashtra (7.3%). Andhra Pradesh stands at fifth position with a share only slightly less than that of Maharashtra. When it comes to foreign tourists, the top ten states accounted for a whopping 89% share, but the sad fact is that AP does not figure in the top ten.

The problem is clear: the tourism potential of the State is yet to be realized. In this mission, the City as well as the District as a whole has a crucial role to play, with its natural and scenic location, the mountains, beaches, parks, places of religious importance, heritage monuments and historically important places.

\*Dr. Sandhyavani is Assistant Professor, Department of Human Resource Management, GITAM Institute of Management.

## Recent Trends

Even though the State does not figure among the top rankers in the country on tourism, data on tourist numbers in Table 12.1 is encouraging. There was a drastic increase in the number of tourists during the year 2003 due to Godavari Pushkaralu. This speaks well of the need for innovation regarding a wide variety of events, to attract domestic and foreign tourists. It may be that such occasions lead to lasting relationships with places and keep bringing visitors again and again as well as promote tourism by word of mouth.

As noted earlier in the introduction, there is not much to celebrate with regard to foreign tourism in the State. The District is like its mirror reflection – foreign tourists account for one percent or less of domestic tourism. Suffice it to say that, concerted efforts are needed on the tourism front in the District to realize its full potential.

**Table 12.1: Visakhapatnam District: Domestic and Foreign Tourists 1997-2014**

Year	Domestic (thousands)	Foreign (thousands)	Growth (%)	% Foreign to Domestic
1997	506.5	5.6		1.11
2002	634.2	5.1	19.4	0.80
2003	3906.8	15.7	<b>513.5</b>	0.40
2009	4001.5	21.6	2.6	0.54
2012	5273.2	53.8	32.4	1.02
2013	6700.7	57.5	26.9	0.86
2014	6782.8	54.3	1.2	0.80

*Source: Department of Tourism, Visakhapatnam*

## Tourist Attractions and Facilities

Table 12.2 below presents a brief summary of some of the important tourist places in Visakhapatnam district which have been attracting a good number of tourists.

**Table 12.2: Some of the Major Tourist Places in Visakhapatnam District**

Tourism Category	Tourist Places in Visakhapatnam District
Beaches	Rama Krishna Beach, Yarada Beach, Rushikonda Beach, Bheemili Beach, Lawson's Bay, Water Sports
Parks	VUDA Park, Tenneti Park, Shivaji Park, Yarada Park, MGM Park, Kartheekavanam, Theme Park.
Museums	Kursura Submarine Museum, Visakha Museum, Aquarium, Museum at Araku, Jatara, Tribal Craft Village
Heritage Spots	Borra Caves, Araku Valley, Kailasagiri Hills, Dolphin Nose & Harbour, Matsyadarshini, Red Hills (Yerra Matti Dibbalu)
Ecotourism	Jungle Bells at Tyda, Anantagiri, Paderu
Wildlife Tourism	Indira Gandhi Zoological Park
Religious Tourism	Simhachalam, Venkateswarametta (three hillocks with a Temple, Mosque, Church on each), ISKCON Temple, Kanakamahalakshmi Temple
Buddhist Spots	Thotlakonda, Bavikonda, Gudilova, Kondakarla Ava, Bouddharamam, Saligudam, Sankaram and Devipuram
Resorts	Senora Beach Resorts, Dream Health Resorts, Indo-American Resorts, Haritha Resorts (APTDC).

Andhra Pradesh Tourism Development Corporation (APTDC) manages 56 hotels and resorts and 140 tourist buses and coaches in the State. Around 2,300 employees of APTDC provide support to the tourists. Following are a few hotels and resorts run by APTDC at various destinations in Visakhapatnam district - Haritha Hill Resort (Mayuri), Araku Valley; Haritha Valley Resort, Araku; Jungle Bells (an ecotourism project), Tyda; Haritha Hill Resorts, Anantagiri; Haritha Beach Resorts, Rushikonda and Haritha Hotel, Visakhapatnam. In addition, there are a good number of hotels at Visakhapatnam, which serve the tourists who may not make use of the APTDC facilities.

### SWOT Analysis

Table 12.3 provides a SWOT analysis aimed at promoting Visakhapatnam district as a preferred destination by tourists. Capitalizing on strengths and overcoming weaknesses is the priority.

**Table 12.3: SWOT Analysis for Tourism Sector in Visakhapatnam District**

Strengths	Weaknesses
<ol style="list-style-type: none"> <li>1. A coastline of 132 kms length.</li> <li>2. Natural scenic beauty because of the clear blue sea and the green mountains around the City.</li> <li>3. Traditionally popular religious heritage sites.</li> <li>4. All categories of tourism destinations are available like wildlife tourism, ecotourism, religious tourism etc.</li> <li>5. Traditional arts and crafts, handicrafts and cottage industry, cuisine and cookery, music and dance, literature, painting and sculpture are abundant.</li> <li>6. Infrastructural development: the City is well connected to the world through three modes of transportation – road, rail and air.</li> </ol>	<ol style="list-style-type: none"> <li>1. Cultural differences between the host City and the tourists from the West, with reference to the way they would enjoy the sun, sea and sand.</li> <li>2. Ecotourism to reserved forests or socially insulated rare and ancient tribal areas has adversely affected their living styles and ecosystem. The tribals are not respected.</li> <li>3. Poor infrastructure at many tourist destinations in the interiors (tribal areas).</li> <li>4. Humid climatic conditions of the City.</li> </ol>
Opportunities	Threats
<ol style="list-style-type: none"> <li>1. Long coastline.</li> <li>2. Large number of media channels/ social media offer a golden opportunity for low cost promotion of cultural heritage tourism.</li> <li>3. There is a huge scope for promotion and development of adventure sports and recreational tourism, beach tourism, para-sailing, sky diving, rafting, water surfing, trekking, heritage and nature walks, cycling etc.</li> <li>4. Buddhist destinations are becoming popular and recently a large number of monuments were discovered in the area; the Buddhist monuments and relics in the District create an opportunity to attract Buddhist tourists from all over the world.</li> <li>5. City is being identified to be developed as a smart city by the United States of America.</li> </ol>	<ol style="list-style-type: none"> <li>1. Supreme Court’s orders prohibiting construction and business within 500 mts of coastline prevents construction of resorts or any tourist related infrastructures on the sea shores.</li> <li>2. Sea life/ ecologically fragile zones will be adversely affected.</li> <li>3. Reserve forests and ancient tribal lifestyles are threatened by unwanted, unwelcome intrusion and environmental degradation.</li> <li>4. Beach and coastal erosion due to changing climatic conditions and the insufficient infrastructure to protect the beaches.</li> </ol>

*Source: An adaptation from “Methods of Tourism Promotion”, by R Kumar. [http://shodhganga.inflibnet.ac.in/bitstream/10603/37439/12/12\\_chapter\\_6.pdf](http://shodhganga.inflibnet.ac.in/bitstream/10603/37439/12/12_chapter_6.pdf)*

### Institutional Infrastructure, Targets and Strategy

At the District level, there are agencies supporting tourism and these are listed in Table 12.4. The agencies perhaps need a medium term strategy to set targets and take action to accomplish them.

**Table 12.4: Agencies Involved in Tourism at the District Level**

Agency	Activity
Department of Tourism	Identifies and implements projects and hands over to the Tourism Development Corporation for maintenance.
Andhra Pradesh Tourism Development Corporation (APTDC)	Looks after the maintenance of various tourist projects, hotels, resorts that are specially constructed by the government, ensures transport arrangements and promotes tourism through various packages.
APTDC Central Reservation Office (CRO)	It is the main booking office for the tours.
Visakhapatnam Urban Development Authority (VUDA)	Responsible for the development and maintenance of tourist spots, parks etc. and providing infrastructural facilities to support tourism.
District Tourism Promotion Committee (DTPC)	Monitors the activities for development of tourism and works as a single window for clearance of tourism related projects to enable speedy resolution of multi-departmental issues.

Proactive policies and programmes are needed. The Singapore example (Box 1) gives an indication of how man-made attractions and numerous shopping avenues help promote tourist arrivals and raise earnings.

#### Box 1: Singapore Tourism

Singapore Tourist Promotion Board is charged with the responsibility of obtaining not only tourist inflow into the city-state but also tourist dollars. In just five years (2009-13) tourist arrivals increased by 50% and tourism revenue almost doubled from S\$12 billion to S\$23 billion. Tourists spend some 20 to 25 percent of their total expenditure on shopping. They come predominantly from the Asia-Pacific region.

#### Target

The percentage of foreign tourists should take a great leap forward. The Greater Visakhapatnam Municipal Corporation (GVMC) has proposed to undertake four projects at a cost of Rs. 43 crores to boost tourism by giving a facelift to the City while restoring its heritage and traditional richness.

### *Shopping*

Shopping is integral to tourism. Just as Singapore provides shopping at one place for globally demanded commodities, “India One-Stop Shop” could be the trump card that AP could use at Visakhapatnam and Amaravathi. *A special conference of global executives in retail could kick-start the idea of the one-stop shops.*

### *Institutional Development*

The Singapore Tourism Development Board model is recommended for the District. What it entails, needs to be carefully studied and action taken.

### *City Tourism Development*

The following are suggested initiatives with regard to promoting the city of Visakhapatnam as the core for regional tourism take-off:

- i. The beach needs to gradually become the mainstay of hotels. Towards this end, a strategy is needed to bring in a dozen or more MNC hoteliers.
- ii. The potential for *Cruise tourism* can also be evaluated and planned.
- iii. One of the tourism themes under the Tourism Mission of Andhra Pradesh is *Medical Tourism*. Visakhapatnam city has a lot of potential in attracting medical tourists from across the countries.
- iv. Areas for shopping need to be earmarked and developed along with easy road connectivity.

#### Foot Notes:

<sup>1</sup><http://tourism.gov.in>

## Chapter 13

## ROAD, RAIL, WATER AND AIR CONNECTIVITY

P. Sheela and K.V. Sandhyavani\*

*This Chapter focuses on Road, Rail, Water and Air connectivity within Visakhapatnam city and district. Development of an additional seaport and airport has set the stage for Visakhapatnam to become a logistic hub. Further enhancement of the connectivity through road, rail and air is expected.*

**Introduction**

A city's infrastructure provides foundations for all the key aspects related to a city viz., mobility, economy, living, governance, people and environment. But these infrastructure components are highly context specific and their nature is determined by the level of development of the city as well as by the specific developmental challenges. For a city in a developing country, the immediate need is to provide adequate urban infrastructure to keep up with the increasing pace of urbanization. Transport is a key component of urban infrastructure. Mobility and Transport are best described as approaches which reduce congestion and promote faster, greener and cheaper transportation options. A city's transport infrastructure should aim at optimizing the journeys within the city, saving energy and reducing carbon emissions.

Visakhapatnam is the largest city in the state of Andhra Pradesh and also the third largest city on the east coast of India. It calls for suitable transport infrastructure in order to ensure the sustainable development of the City as well as the District.

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## Transport Infrastructure in the City

### Roadways

The City has a broad network of roads extending over a length of 126 kms. It also consists of 30 kms of State Highway and 107 kms of Corporation roads. There are as many as 350 intersections in the Greater Visakhapatnam Municipal Corporation area and about 73 kms of the National Highway No.16 passes through Visakhapatnam city.

The road network in the City is very dense and congested due to narrow carriage way, high pedestrian traffic and concentration of vehicles leading to slow movement. As per the existing land usage, the area under road is only 7.9 percent and it is inadequate for effective traffic management. Vehicle Free Zones (VFZ) have been implemented on two stretches in the City from 5 am to 7 am everyday where free cycles are provided to people during these hours.

### The Future of Road Network

To overcome growing road traffic congestion in the City, the State Government has proposed a six lane road from Anandapuram to Anakapalle, to facilitate road link for heavy vehicles without entering the City, at an estimated cost of Rs. 1,000 crores. Similarly, for promotion of tourism and IT sector, the State Government is building a four lane beach road from Visakhapatnam city to Bheemili. More emphasis needs to be given to the development of road infrastructure like expansion of roads, terminals, parking lots and footpaths for pedestrians in order to ensure smooth traffic flow. This is crucial, keeping in view the increasing movement of cargo, which is expected to go up to 200 million tonnes by 2020. This has to be accomplished by involving all the stakeholders viz., GVMC, VUDA, City Police etc.

Disciplined pedestrian crossing arrangements, at least a few no-traffic pedestrian malls, concerted efforts at promotion of one way streets and hefty fines for traffic violations are needed. In their absence, it will be business as usual, regardless of rhetorical progress reports and positive exhortations.

### Railways

The City's Railway Station was originally called Waltair. In 1987, the name was changed to Visakhapatnam. It is a crucial transport hub in the region. The following three centres are also located at Visakhapatnam - Diesel Loco Shed (the largest in Indian Railways), Electric Loco Shed and Divisional Hospital (150 bed capacity). Duvvada Railway Station, a suburban station on the main line (near Visakhapatnam Steel Plant) is being developed into a satellite hub to ease passenger congestion at the main station.

Visakhapatnam Railway Station is a major freight carrier for important public sector units such as the Visakhapatnam Port Trust, Rashtriya Ispat Nigam Limited, National Mineral Development Corporation, National Aluminium Company, Indian Oil Corporation, Bharat Petroleum Corporation Limited and Hindustan Petroleum Corporation Limited. In addition, private sector industries like Hindustan Lever, Hindustan Zinc, Bharat Aluminium Company, Vedanta, Maa Mahamaya, Varalaxmi Sugars, Vikram Ispat, Ispat Industries, ESSAR Gujarat, Duncan Goenka, GMR Vasavi and J.K. Paper Mills are also important customers in the division's freight operations.

*Railways: Plans for Implementation*

- (i) The City Railway Station is proposed to be developed as A-1 grade railway station with two more escalators, two lifts and Wi-Fi facility. Also three Automatic Ticket Vending Machines (ATVMs), four retiring halls and a separate dormitory for women passengers are in the pipeline. At Duvvada Railway Station, two waiting halls and a booking counter on the fourth platform are planned.
- (ii) *Executive Lounge:* Visakhapatnam Railway Station services are to be made smarter very soon. An executive lounge is going to be constructed in an area of two acres of land at the Gnanapuram side. IRCTC is going to undertake the construction of the four floors and provide these facilities in the lounge: Free Wi-Fi, A/C Rooms, Live TV, Restaurant and Information Kiosks.
- (iii) *Metro Rail:* A Metro Rail project is planned by the Greater Visakhapatnam Municipal Corporation. The project comprises three corridors of 42.5 kms. The total project cost is estimated to be Rs. 12,727 crores and this is to be completed in two phases by December 2018.

*Passengers' Problems and Perception*

The annual traffic of 33.72 million passengers (2014-15) translates to around 93,660 passengers per day<sup>1</sup>. In the context of this huge number, the Visakhapatnam Railway Station has many inadequacies. First, there are four over bridges at present, but passengers are only using the first two bridges extensively during the peak hours as they are close to the main exit/entrance. Second, for the commutation of the large number of passengers of 132 express and passenger trains passing per day, there are only eight platforms, which are terribly overcrowded, especially during the peak hours. Third, the number of reservation and general ticket issuing counters is inadequate. Fourth, drinking water and toilet facilities are inadequate on all the eight platforms. Finally, for a traffic outflow of close to one lakh persons per day, the standby accommodation<sup>2</sup> is inadequate.

*Suggestions for Service Improvement***(i) Platforms, Escalators/Lift and Underpass**

In addition to the increase in the number of platforms, steps are to be taken for regulating the outgoing passengers through two of the bridges, enabling passengers to board trains through other bridges as well as for construction of underpass. There are two escalators at connection platforms 2-3 and 4-5. There is a great demand for more number of escalators to cover all platforms.

**(ii) Reservation and Ticketing Counters**

GVMC, VUDA, APSRTC and IRCTC may establish public services complexes or citizen centres at prime locations and densely populated areas for issue of reserved tickets.

**(iii) More Retiring Rooms**

The existing four retiring rooms are not at all sufficient to meet the growing demand. The situation needs improvement.

**(iv) Food**

One or more leading hotels in the City could set up restaurants at the station, with railways collecting lease rent.

**(v) Water**

Special water kiosks are needed for sale of bottled water and supply of filtered water to passengers.

**(vi) Security**

Monitoring through surveillance cameras and security measures similar to those at airports are to be taken up.

**Transport Infrastructure in the District**
**Road Connectivity**

A good road network constitutes the basic infrastructure that propels economic and social development through connectivity, notably by opening up backward regions to trade and investment. The data in Table 13.1 portray Visakhapatnam district at the ninth position among the thirteen districts of AP. Table 13.2, however, reveals the reality in terms of road length per million people (Visakhapatnam district at the last rank) and road length per one sq. km of area (District close to bottom at rank 10). As the figure 13.1 illustrates, the District has fair connectivity in the plain area, but the connectivity is poor in the hilly/tribal area.

**Table 13.1: Roads by Category in the Thirteen Districts of Andhra Pradesh (Kms)**

Districts	Cement concrete	Black top & asphalt	Metalled	Unmetalled	Total Roads (Kms) & Rank	
Anantapur	311	6,579	1,155	6,610	14,655	I
Chittoor	253	6,095	851	4,715	11,914	II
Kurnool	948	5,025	940	4,808	11,721	III
Prakasam	376	4,983	957	5,284	11,600	IV
Guntur	400	5,283	765	4,987	11,435	V
Cuddapah	409	5,545	977	4,386	11,317	VI
East Godavari	353	5,219	1,433	2,619	9,624	VII
Nellore	292	4,615	1,096	3,113	9,116	VIII
Visakhapatnam	278	3,957	1,096	3,020	8,351	IX
Krishna	97	4,724	785	2,522	8,128	X
West Godavari	217	4,548	1,018	2,097	7,880	XI
Srikakulam	146	3,234	1,106	1,590	6,076	XII
Vizianagaram	107	3,041	638	1,970	5,756	XIII

Source: Statistical Abstract (2012-13)

Table 13.2: Road Length per Million People and One Sq. Km Area

District	Kms/Million	District	Kms/Sq. Km
Guntur	3,971	Krishna	1,278
Prakasam	3,905	East Godavari	1,048
Anantapur	3,592	Srikakulam	1,047
Chittoor	2,857	West Godavari	1,024
Nellore	2,689	Nellore	894
Kurnool	2,587	Vizianagaram	886
Vizianagaram	2,460	Guntur	843
Srikakulam	2,250	Chittoor	784
Cuddapah	2,197	Anantapur	767
Krishna	2,007	Visakhapatnam	746
West Godavari	2,005	Kadapa	744
East Godavari	1,968	Prakasam	513
Visakhapatnam	1,947	Kurnool	484

Source: Statistical Abstract (2012-13)

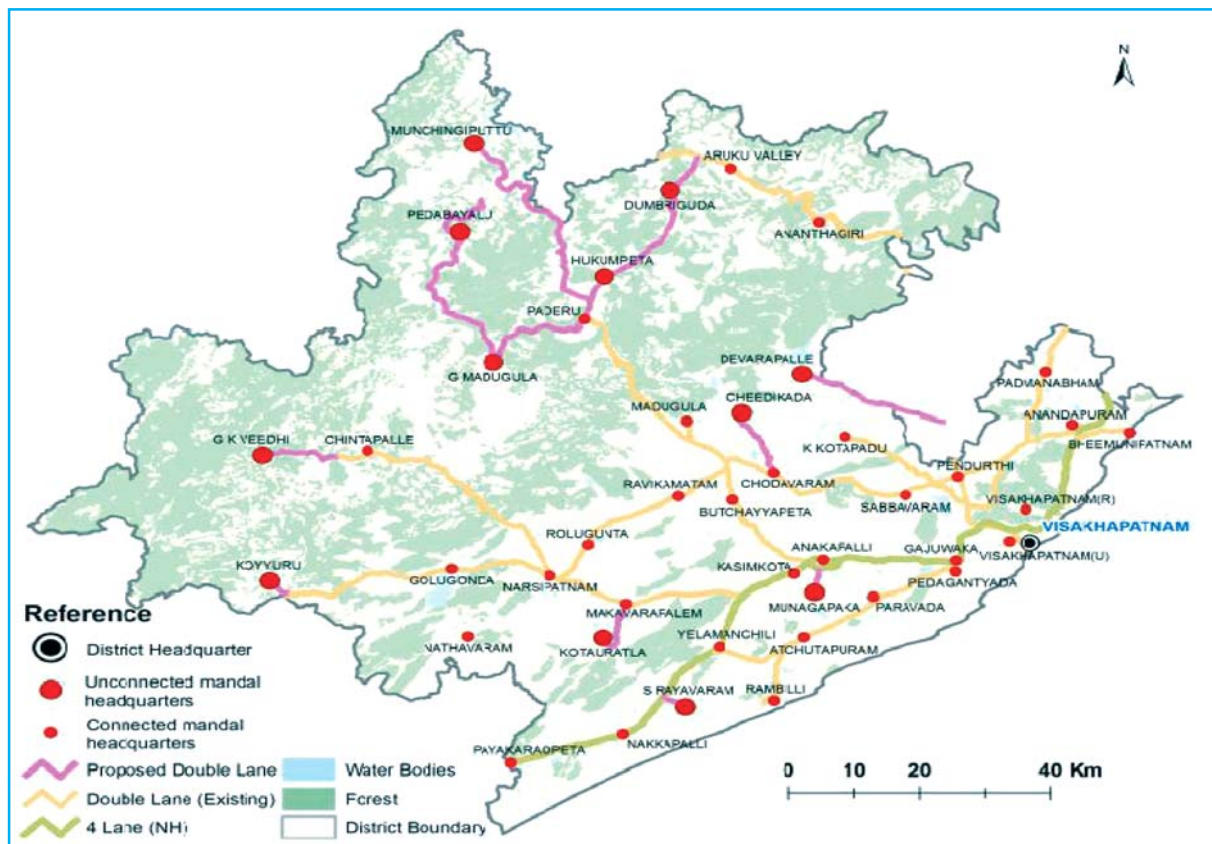


Figure 13.1: Road Connectivity in Visakhapatnam District

Source: AP Roads & Buildings Department.

While one must not expect equality in road length by population or area, the fact remains that Visakhapatnam district road network needs a quantum jump if the *smart City* and the District are to move ahead as dreamt.

### *Rail Connectivity*

A total of 82.13 kms of railway line passes through the District. Visakhapatnam (Waltair) Railway Division is one among the three divisions of the East Coast Railway (ECoR) Zone of the Indian Railways. The Headquarters (Bhubaneswar) and the other two divisions (Khurda Road and Sambalpur) are all in the state of Odisha.

For the financial year 2014-15, the Waltair Division recorded earnings of Rs. 6,653.31 crores (US \$ 980 million), with almost 93% coming from freight transport. During the last two decades of rapid industrialization in and around the district of Visakhapatnam, Waltair Division has all along been fulfilling the ever-increasing transportation needs of the District. Some of the rail stations in the District are Duvvada, Anakapalle, Simhachalam, Yelamanchili, Narsipatnam Road, Pendurti, Korukonda, Marringalem Halt, which connect most of the towns and villages in the District.

### *Port Connectivity<sup>3</sup>*

India has 12 major seaports and 185 minor seaports along a coastline of over 6,000 kms. Visakhapatnam Port is one among the twelve major ports<sup>4</sup>. The twelve major ports handle about 75% of total Indian port traffic. Visakhapatnam Port is almost equidistant from Kolkata and Chennai and is a major bulk handling port with POL, Iron Ore and Coal being the major bulk commodities. Other commodities handled in substantial quantities are Iron and Steel, Fertilizers, Fertilizer Raw Materials and Alumina.

Visakhapatnam Port ranks first among the 12 major ports in terms of throughput volumes; a position it has been holding consistently over the past several years. The Ministry of Transport has set eight percent growth target for Visakhapatnam for the medium term. Most of the growth is to come from POL related traffic, as well as coal. The growth in the previous ten years was an average of around 4.5% per year. As such, the target implies almost a doubling of the growth rates.

Railway network at Port of Visakhapatnam is the largest amongst Indian ports with over 200 kms rail length and over 30 sidings. The Port has a close interface with Waltair Division of East Coast Railway which facilitates quick transportation of EXIM cargo from/to all the states in the country and at times to Pakistan and Bangladesh also. The Port is equipped with 15 WDS-6 locos of 1,400 HP and 3 WDG-3 locos of 3,100 HP capacity for carrying rail transport operations.

The total road network within the Port limits is about 85 kms. About 23.5 kms of road network is available within the operational area connecting the entire stacking areas for free movement of vehicles. Port connectivity road length of 12.5 kms was completed and implemented jointly by the Port and the National Highways Authority of India. The flyover cum road project facilitates smooth movement of cargo traffic between the Port and the National Highway No.16.

### *Gangavaram Port*

Within Visakhapatnam district, Gangavaram Port has been developed as an all weather, multipurpose port with water depth upto 21 meters, making it the deepest, capable of handling fully laden super capesize vessels of upto 2,00,000 dead weight tonnage (DWT). Gangavaram Port, with its deep draft berths and efficient operations, has become the gateway port for a hinterland spread over eight states across Eastern, Western, Southern and Central India. Its ability to handle larger vessels efficiently has resulted in substantial savings for port users. Gangavaram Port provides efficient cargo handling services for a variety of bulk and break bulk cargo groups including Coal, Iron Ore, Fertilizer, Limestone, Bauxite, Raw Sugar, Project Cargo, Alumina, Steel products etc. The Port website says: “The Port... facilities and material handling system are among the most advanced in Asia and meeting the highest standards in terms of pollution prevention and safety.”<sup>5</sup> (Details of the Port and Container Facilities in Visakhapatnam district may be viewed in the Annexure 13.A1.)

### *Air Connectivity*

Visakhapatnam International Airport is Top of Form operated and managed by both Indian Navy and Airports Authority of India (AAI). It is approximately 12 kms from Visakhapatnam city and operates as a civil enclave on an Indian Navy airfield named INS DEGA. In the last few years, the Airport has recorded significant growth, with construction of a new terminal building, extended runway and implementation of international routes to Singapore, Kuala Lumpur and Dubai. The Airport caters to short and medium distance air travels within India and a few international travels.

The original runway was 1,800 mts long. The new runway which is 3,200 mts long and 60 mts wide, was inaugurated on 15<sup>th</sup> June, 2007 to accommodate medium-sized and wide body aircraft. The night landing facility became operational from 30<sup>th</sup> March, 2008 for commercial airlines with the installation and calibration of the instrument landing system. At least 40 to 50 specially trained personnel are required to run a night landing facility at the Airport at its bare minimum. A step towards this was taken when the Airport extended its operations time upto 8 pm, starting from 28<sup>th</sup> March, 2010.

The Airport operates 12 domestic airlines services to all major cities in India catering to the requirements of north coastal districts of Andhra Pradesh as well as neighbouring districts of Odisha and some parts of Chhattisgarh. Flights to Visakhapatnam can be easily taken from metropolitan cities like Delhi, Chennai, Hyderabad, Kolkata, Mumbai and Bengaluru. The main airlines that connect Visakhapatnam to the rest of the country are Air India, Indigo, Jet Airways, Spice Jet and Silk Air. The state-of-the-art integrated passenger terminal with an area of 20,470 sq.mts can handle 375 passengers on arrival and 750 on departure. The Airport parking area can accommodate 300 cars. Considering the growing air cargo potential, the Airports Authority of India plans to modify the old terminal into a full-fledged cargo complex.

Table 13.3 shows the number of passengers - domestic and international - handled at Visakhapatnam Airport during 2013-15. The drop in international passengers during 2014-15 could be in part due to general reduction in traffic into the City in the aftermath of Cyclone Hudhud in October 2014.

**Table 13.3: Passengers Handled at Visakhapatnam Airport, 2013-15**

	2013-14	2014-15	% Change
International	72,072	59,995	-16.8
Domestic	9,40,448	10,39,485	10.5
Total	10,12,522	10,99,480	8.6

*Source: Airports Authority of India.*

Based on the information at [https://en.wikipedia.org/wiki/List\\_of\\_busiest\\_airports\\_in\\_India](https://en.wikipedia.org/wiki/List_of_busiest_airports_in_India) (accessed March 1, 2016) covering data for April-December 2015, 35.5 million passengers were handled at Indira Gandhi International Airport (IGIA), New Delhi. At rank six is Rajiv Gandhi International Airport (RGIA), Hyderabad with 9.2 million passengers. Visakhapatnam handled a high 1.3 million and stands at 18<sup>th</sup> place. There is scope for increasing the passenger traffic and also increasing cargo handling, which currently is limited to domestic.

#### *Plans for the Future*

Expansion of the existing Airport is required to cater to the growing traffic both domestic and international. Air Asia, Thai Airways, Air Arabia, British Airways, Emirates, etc. have shown interest in launching international flights. The proposal to build the International Airport at Bhogapuram is a part of the Vision 2020 as Visakhapatnam Airport will be catering to East and South-East Asia.

### **Annexure 13.A1**

#### **PORTS AND CONTAINER FACILITIES<sup>6</sup>**

##### **A) Visakhapatnam Port**

Visakhapatnam Port with its natural harbour opened to commercial shipping on 7<sup>th</sup> October, 1933. It is the only Port possessing three international accreditations viz., ISO 14001, 2004 (EMS) / OHSAS 18001 and ISO 1900:2000 (QMS). The Port has mechanized handling facilities for iron ore, iron pellets, fertilizer raw material, alumina, crude oil, POL products, liquid ammonia, phosphoric acid, edible oil, caustic soda and liquid cargoes. The Port presently has 24 berths with a total capacity of 93 Million Tonnes per Annum (MTPA)<sup>7</sup>. The Port has handled traffic of 58.00 Million Tonnes (MT) during the year 2014-15 and 57.03 MT in 2015-16. A passenger ship from Visakhapatnam Port to Port Blair (Andaman & Nicobar Islands) also is also accommodated.

##### *Present Vessel Capacity*

The year 1984 marked the beginning of container traffic when the American President Lines brought the first liner to offload imports, and in a span of 31 years, the trade has increased significantly with some twenty four container carriers operating from the City. Capacities of vessels handled at the Port grew to 2,47,311 TEU<sup>8</sup>s in 2013. Cargo moving through this Port (in both refrigerated and non-refrigerated containers) originates not only from the state of Andhra Pradesh, but also from neighbouring states like Chhattisgarh, Madhya Pradesh, Odisha and even Maharashtra.

Refrigerated cargo is predominantly shrimps and a small movement of fish. Dry cargo ranges from granite to garments. Aluminium alloy wheels, polymers, ferro silicon, ferro manganese, aluminium ingots, jute yarn and handicrafts, stones, rice, prawn feed powder etc., are the major products that move by containers. Imports into Visakhapatnam include waste paper, newsprint, wood logs, machinery and spare parts, perfumes, carbon black, wheels, fabrics, natural rubber and others.

The Visakhapatnam Port handled 63.94 MT of cargo during 2008-09, slightly lower compared to the target of 65 MT set by the Ministry of Shipping. The dip in traffic is attributed to the global economic recession and to the fact that Gangavaram Port started operations in 2008-09. The Gangavaram Port is estimated to have taken away two to three MT of cargo. The decline in iron ore exports has affected the Visakhapatnam Port. The commissioning of a single buoy mooring at Paradip Port led to the diversion of transshipment cargo usually handled at Visakhapatnam.

The traffic handled by Visakhapatnam Port during 2012 to 2013 was 59.04 MT, as against 67.42 MT during 2011 to 2012. This indicates a drop of 13.43 per cent in the traffic handled. Slowing economy, high prices of fertilizers in the international market and competition from nearby ports like Paradip Port are some of the reasons for decline in Visakhapatnam Port's traffic. However, Visakhapatnam Port did see a positive growth in container handling, with a growth of 11.9 per cent in tonnage and 9.5 per cent in handling TEUs. The traffic handled by the Port during the year 2013-14 was 58.50 MT which was slightly lower than the previous year due to competition from other major ports in India as shown in Table 13.A1.

**Table 13.A1: Cargo handled by Visakhapatnam Port (Million Tonnes)**

<i>Description</i>	<i>2013-14</i>	<i>2012-13</i>	<i>2011-12</i>
Exports	24.42	23.00	26.57
Imports	33.28	34.51	36.53
Transshipment	0.80	1.53	4.32
Total	58.50	59.04	67.42

*Source: Port Administrative Reports*

As shown above, there is a steep decline in the cargo handled by the Port from 2011-12 to 2013-14 due to stiff competition from the other major ports. However, the Port retained its fifth position among all major ports in India.

### **Future Business**

The Union Ministry of Shipping figures state that the total capacity of Visakhapatnam Port as of 31<sup>st</sup> January, 2013 was 66.33 MT. The Port, which currently has a cargo handling capacity of 93 MT is also undergoing major expansion to handle 125 MT in the next three years mostly on Build, Operate, Transfer (BOT) basis. In the long run, Visakhapatnam Port Trust plans to invest Rs. 13,940 crores on several ongoing projects to increase its capacity to 149 MT by 2020.

There is a great potential for container trade to grow. More and more cargo like rice and steel, which are still moving by break bulk are expected to move through containers in the days to come. Even the imports like wood logs, which are predominantly moving by bulk vessels, are expected to be loaded into containers. The following are within the realm of the possible and could be part of the plans for expansion and development of the Visakhapatnam Port:

- (i) By tapping the potential and educating the market about the advantages of containerization, bigger capacity vessels can operate from the Port, helping in the reduction of ocean freight per box and thus assist in the growth of trade.
- (ii) By utilizing the rail network established by Container Corporation of India (CONCOR), cargo ex Hyderabad Inland Container Depot (ICD) can also be moved through Visakhapatnam. This will encourage the shippers out of Hyderabad region to cut the transit time to the Far East and South East Asia and the US west coast.
- (iii) For boxes from Myanmar and Bangladesh, the Visakhapatnam Port can act as the transshipment hub.
- (iv) Overall thrust for port development will be manifold with the repositioning of Visakhapatnam Export Processing Zone (VEPZ) as Visakhapatnam Special Economic Zone (VSEZ) and the establishment of another SEZ.

### **B) Gangavaram Port**

Gangavaram Port, with its deep draft berths and efficient operations has become the gateway port for a hinterland spread over eight states across Eastern, Western, Southern and Central India. Its ability to handle larger vessels efficiently has resulted in substantial savings for traders and port users. Gangavaram Port provides efficient cargo handling services for a variety of bulk and break bulk cargo groups including Coal, Iron Ore, Fertilizer, Limestone, Bauxite, Raw Sugar, Project Cargo, Alumina, Steel products etc.

The related facilities and material handling system of Gangavaram Port are among the most advanced in Asia and meet the highest standards in terms of pollution prevention and safety. The Port has set a good example by demonstrating excellence in managing the environmental performance of its own operations, equipment and assets as shown below:

- Provision of Shore Based Electricity to ships, so that engines can be shut off, leading to considerable environmental benefits.
- Deployment of Eco-friendly Berths and Yard Equipment.
- Development of Clean Truck Program: Specific programs were developed to reduce air pollution from port related truck emission by 80 per cent. Older and dirtier trucks are banned.
- Encouraging users in various ways.
- Sharing of knowledge and skills for environmental improvement in the Port area.
- Enforcing good environmental practice mechanisms for compliance by the Port users.
- Using Low sulphur diesel for diesel powered equipment.

**Expansion Plans of Gangavaram Port**

- Cargo handling capacity to be enhanced to 42 Million Metric Tonnes per Annum (MMTPA)
- One fully Mechanized Coal Berth (capable of handling cape-size vessel upto 2,00,000 DWT)
- Three Multipurpose Berths (capable of handling Panamax-size vessels)
- State-of-the-art Mechanized Bulk Material Handling Systems
- Additional Rail Sidings, Ancillary Civil Works and Additional Mechanized Stock Yards
- Other improvements/additions in the existing infrastructure at the Port
- All the above expansion plans are to be implemented within the Harbour and within the 1800 acres of land.

**C) Visakha Container Terminal Private Limited (VCTPL)**

Visakha Container Terminal (VCT) is India's fastest emerging prominent destination for global trade 'containerisation' and the vision is to evolve as a regional hub on the east coast of India. It was set up under the aegis of Visakhapatnam Port Trust as a joint venture between DP World and United Liner Agencies of India (Private) Ltd and commenced operations on 26<sup>th</sup> June, 2003. With a natural depth of 16.5 metres alongside, VCT is the only container terminal in India that can accommodate, at any time of the year, the largest container vessel sailing today. The terminal is well equipped with modern and efficient infrastructure on par with international standards.

Located at the centre of the east coast of India, VCT is ideally situated to cater to its vast hinterland covering seven states within 700 kms and extending upto North and North East India. With its excellent rail and road connectivity, it is an ideal alternative especially for shipments to and from far east and South East Asian regions to Delhi and other nearby Inland Container Depots (ICDs) of Hyderabad, Nagpur and Raipur. Presently recording an impressive growth rate of over 60% and compound annual growth rate (CAGR) of 26.74%, as against a national average of around 12 %, VCT is the only bridge at the centre of the east coast, connecting India's growing containerised volumes with the much required infrastructure.

**Table 13.A2: Visakha Container Terminal Vital Statistics**

Total Quay length	450 mtrs
Scope for future expansion	700 mtrs
Dredged depth at berth	16.5 mtrs
Permissible draft	15.0 mtrs
Ground slots	2,500 TEU

*Source: Port Administrative Reports*

Visakhapatnam Port Trust believes that with the completion of the extension of Visakha Container Terminal through an investment of Rs. 633 crores, the demand for container cargo will witness a quantum jump in the next two to three years.

#### D) Elevated Freight Corridor (EFC)

In a significant development, Visakhapatnam Port Trust (VPT) has sought funding for an Elevated Freight Corridor (EFC), under the ambitious Sagarmala project of the Central government to decongest traffic on the National Highway. The project, which is in conception stage, envisages laying of a corridor linking Port Connectivity Road, Gangavaram Port and joining the highway on Anandapuram-Anakapalle route via Sabbavaram to ensure speedy evacuation of cargo. The project will cost around Rs. 800 crores. VPT is investing a huge amount, mostly in the PPP mode, to achieve a cargo handling capacity of 125 million tonnes in the next three years.

#### E) Multilevel Logistics Park

Visakhapatnam Port Trust is planning to set up a Multilevel Logistics Park near Anakapalle on 400 acres of land with a capital cost of Rs. 500 crores, which will be the first logistics park on the east coast of India. This park will be useful for storage / distribution of items imported from Singapore, Malaysia, Japan, South Korea, New Zealand and Australia to the various destinations in the country. It will also fulfill the market needs of seven states within the range of 600 kms from Visakhapatnam. A 25 km long railway line is also to be laid from the Visakhapatnam Port to the proposed logistics park. In this logistics park, facilities like warehousing, cold storage, assembling and packing units facilities are also to be provided. With this proposed international standard logistics park, Visakhapatnam will become an international business centre.

**Table 13.A3: Visakhapatnam Port Vital Statistics for 2013-14**

<b>Number of Berths</b>	<b>24</b>	<b>No. of TEUs handled</b>	<b>2,62,091</b>
<b>Electric Wharf Cranes</b>	<b>18</b>	<b>No. of Ships sailed</b>	<b>2,005</b>
<b>Shipping Tugs</b>		<b>GRT of Ships Sailed (in millions)</b>	<b>55.63</b>
Port - 7, Private – 2	10		
<b>Storage facilities (Dry)</b>		<b>Output per berth day (Tonnes)</b>	
Covered (Lakh tonnes)		- Mechanical	17,345
- Port Owned	0.86	- Non-Mechanical	7,862
- Others	8.30	- Overall	10,928
Open (Lakh Sq.Mtrs)			
- Port Owned	13.01	Cargo moved by Port railways	
- Others	4.29	(in million tonnes)	
<b>PORT Railway System</b>		<b>- Inward (Iron ore)</b>	<b>9.37</b>
- Track Length (kms)	183	- Inward (general)	6.85
- Number of sidings	16	- Outward (general)	16.58
- Open terminals	30	Total	32.80
<b>Traffic handled (Millions)</b>			
- Exports	24.42		
Imports	33.28		
- Transshipment	0.80		
- Total	58.50		

Source: Port Administrative Report 2013-14.

**Table 13.A4: Number of Ships sailed from the Port and their Tonnage for the last Five years**

Year	Ships	Tonnage* in Cubic Meters		
		Dead Weight Tonnage (DWT)	Gross Registered Tonnage (GRT)	Net Registered Tonnage (NRT)
2013-14	2,005	91.20	55.63	30.05
2012-13	2,066	92.38	56.59	30.33
2011-12	2,470	109.67	66.38	35.55
2010-11	2,507	110.89	66.70	35.46
2009-10	2,435	101.33	60.29	32.74

Source: Port Administrative Reports

\*"Tonnage" specifically refers to a calculation of the volume or cargo volume of a ship and not displacement, which refers to the actual weight of the vessel.

#### (Footnotes)

- 1 [Wikipedia.org/wiki/waltair\\_railway\\_division](http://Wikipedia.org/wiki/waltair_railway_division) (Retrieved on 7.1.2016.)
- 2 Presently there are nine A/C retiring rooms, five non-A/C rooms and a 24 bed dormitory.
- 3 See Annexes for more details on the Visakhapatnam and Gangavaram ports.
- 4 The other eleven are Paradip, Kolkata, Ennore, Chennai, Tuticorin, Cochin, New Mangalore, Marmagao, Jawaharlal Nehru, Mumbai and Kandla.
- 5 <http://www.gangavaram.com/about-port.htm> (accessed March 1, 2016).
- 6 Data obtained from respective port websites, administrative reports and Union Ministry of Shipping website.
- 7 P.L. Harnath, Visakhapatnam Port Deputy Chairman, quoted in *Economic Times*, 5th February, 2016.
- 8 TEU: Twenty-foot equivalent unit is a standard unit for describing a ship's cargo carrying capacity, or a shipping terminal's cargo handling capacity.

## Chapter 14

**WATER, POWER, HOUSING AND SANITATION**

K. V. Sandhyavani and M. Sudha\*

*This Chapter reviews Water, Power, Housing and Sanitation facilities of Visakhapatnam city and district, evaluates the usage pattern, the future requirements and outlines the strategies to meet the growing demand.*

**AJ WATER****Water for the City<sup>1</sup>**

Urban water supply to Visakhapatnam Corporation area and Bheemunipatnam and Anakapalle Municipalities is being met mostly by surface water and about 10 % of the demand is met by ground water sources. Greater Visakhapatnam Municipal Corporation (GVMC) is supplying 52.00 million gallons per day (MGD) of drinking water to 20.35 lakhs population of the City at the rate of 116 litres per capita per day (LPCD). It is also catering to the industrial needs by supplying about eight MGD of drinking water. GVMC is plying 460 tanker trips daily for supply of drinking water in un-served areas. The City's water is drawn from sources 25 to 150 kms away from the City (Table 14.1), resulting in huge transmission losses and thefts and growing operation and maintenance expenditures.

\*Dr. Sandhyavani and Dr. Sudha are Assistant Professors at the GITAM Institute of Management.

**Table 14.1: Water Supply Sources for Visakhapatnam City**

Source	Distance from the City in Kms.	Quantity of Water drawn (MLD)*
Mudasarlova	25-30	2.30
Gosthani	30	18.20
Gambheeram	25-30	4.50
Thatipudi	56	50.00
Raiwada	58	68.20
MGR	25	40.90
Yeleru Canal	156	77.30
<b>TOTAL</b>		<b>261.50</b>

\* MLD is Million Litres Per Day

Source: GVMC Engineering Department – Water Supply Section

### ***Distribution Network<sup>2</sup>***

The total storage capacity available within GVMC is about 17.45 million gallons (79.5 million litres) comprising Elevated Service Reservoirs (ESRs) and Ground-level Service Reservoirs (GSRs). There are 161 reservoirs in all, which supply water to all the localities in the City. The total length of the distribution system is 1,035 km and consists of pipes with diameters ranging from 75 to 700 mm, catering to the needs of 85% of the City's population.

### ***Water Treatment, Storage and Supply***

Raw water is transmitted to various Water Treatment Plants (WTPs) within GVMC. Treated water is distributed to various ESRs and GSRs located in the City, through transmission lines. The total length of the transmission mains is about 244 kms and comprises CI, RCC and PSC pipes. Supply to consumers is via house connections. Domestic consumers fall into two categories: General and Below Poverty Line (BPL). However, bulk and semi-bulk users are contributing a large chunk of the revenues. Water is also supplied through public stand-posts and tankers. The category-wise number of consumers is shown in Table 14.2.

**Table 14.2: Category-wise Number of Consumers in Visakhapatnam City**

Category	Number of consumers
Bulk	64
Semi Bulk	2,657
Domestic Connections	
a) General	93,569
b) BPL	48,814
Public Taps	9587
Paid Tankers	75 trips a day

Source: GVMC Engineering Department – Water Supply Section

### *Municipal Water for Homes*

Presently, the number of *domestic consumers* with individual tap connections provided by GVMC is around 3,68,000 for a population of two million or 0.5 million families (assuming an average family size of four)<sup>3</sup>. The numbers imply a reach of municipal water to the tune of 73.6%. The remaining population is dependent upon other sources like private water suppliers. As per data obtained from GVMC in March 2015, three lakh private bore wells were present in Visakhapatnam city in addition to 7,500 public bore wells and 9,587 public taps.

### *Water for Industrial and Commercial Establishments<sup>4</sup>*

Yeleru Left Bank Canal (YLBC) presently delivers about 39.6 MGD (180 MLD) of water from Yeleru reservoir to Visakhapatnam Steel Plant (VSP). The demand in the long run would increase to 132 MGD (600 MLD). Visakha Industrial Water Supply Company (VIWSCO) supplies 86 MGD to industries which include 39.6 MGD to Rashtriya Ispat Nigam Limited (RINL), 10 MGD to National Thermal Power Corporation (NTPC), 0.20 MGD to Gangavaram Port and 38 MGD to GVMC.

### *Water Pricing*

Present GVMC water pricing policy is one of cross subsidization, charging industry to pay for domestic consumers. Domestic consumers are charged Rs.120 per month per connection and the bulk and semi-bulk consumers are charged Rs. 500 and Rs. 300 respectively. To install a house tap or a private tap connection, GVMC charges Rs.10,000 on an average as one time installation fee. The total average revenue from the bulk, commercial and residential consumers is Rs. 127 crores per annum. GVMC follows both the flat rate and volumetric base tariff structure for domestic connections and only the volumetric base tariff structure for bulk and semi-bulk users. The tariff structure is shown in Table 14.3.

**Table 14.3: Water Pricing Structure**

Type	Structure	Tariff (Rs)
General	Per Month	120
BPL	Per Month	69
Semi Bulk	Per Month	300
Domestic	0-5 KL	10
	> 5	10
Commercial	0-5 KL	10
	>5	20
Bulk	Per month	500
Raw water	Per KL	24
Clear Water	Per KL	36

*Source: GVMC Engineering Department – Water Supply Section*

### **Best Practices**

GVMC has implemented the Supervisory Control and Data Acquisition (SCADA) system for bulk consumers, in order to monitor water losses and improve its revenues. The system has been working successfully to achieve the desired goal of reduction of water losses and billing of unbilled water. GVMC got additional revenue of Rs. 2,400 lakhs in two years, and Rs. 300 lakhs worth of additional asset realization against an expenditure of Rs. 500 lakhs. (Source: GVMC, Visakhapatnam)

### **Towards Supply Augmentation and Planning for Future**

Box 1 has information on the proposed projects for augmenting the supply of drinking water. The projects under Jawaharlal Nehru National Urban Renewal Mission (JNNURM) are given in Table 14.4 while Table 14.5 provides some information on other water projects under consideration.

**Box 1: Water for Visakhapatnam City in the Medium and Long Term**

**POLAVARAM PROJECT:** AP share of Godavari waters: Polavaram project is a multi-purpose project. It could generate 720 MW of power and irrigate additional seven lakh acres of its catchment area and supply 23.44 Thousand Million Cubic (TMC) of drinking and industrial water to Visakhapatnam through its left canal. The project is estimated to be completed by 2018. Projected cost stands at Rs. 36,000 crores (2015) which has increased by Rs.20,000 crores since it was last revised in 2011.

**JANJHAVATHI WATER TO CITY:** Janjhavathi River joins Nagavali four kms below the proposed reservoir site. AP could get four TMCft=68 MGD; some think we could get as much as 10 TMCft=170 MGD. Project involves extending the existing Janjhavathi right canal by another 70 kms. Water could be dropped into Thatipudi reservoir or directly taken to Visakhapatnam by gravity.

**AUGMENTATION OF YELERU LEFT BANK CANAL:** It is proposed to rehabilitate the YLBC to improve transmission capacity and reduce the present high seepage losses to create 264 MLD. The water supply would be subsequently augmented from Godavari River, 56 kms upstream of Yeleru reservoir.

**RECOMMENDATIONS OF FARPA:** The round table conference organised by the Forum for Action Research and Policy Analysis (FARPA) in April 2015 at Visakhapatnam recommended that, without waiting for strengthening Yeleru canal, a number of alternatives could be taken up, like laying pipeline from Raiwada project to Visakhapatnam; Janjhavathi link canal to Thatipudi reservoir and utilisation of Pushkara canal and linking the same with Polavaram canal, to ensure that the flood waters of the Godavari and the Yeleru reached Visakhapatnam.

**Table 14.4: Drinking Water Projects under JNNURM- 2015****(Rs. in Crores)**

1	Augmentation of Drinking Water Supply to 32 peripheral areas of GVMC (Revised Cost: Rs.256.45 Crores)	240.74	211.93	83.5% work completed
2	Refurbishment of Distribution of Comprehensive Water Supply System in North Eastern Zone in Central Area of GVMC.	190.18	120.02	75% work completed
3	Comprehensive Water Supply System in Old City of GVMC.	47.93	38.46	86.5% work completed
4	Improvement of 24x7 Water Supply in left out areas of South West sector of GVMC	83.48	8.69	Work started
	<b>TOTAL</b>	<b>562.33</b>	<b>379.10</b>	

Source: GVMC, Visakhapatnam

**Table 14.5: Drinking Water Projects under Consideration-Year 2015**

S.No.	Description of Project	Project Cost (Rs. in Crores)	Current Status
1	Water Supply Distribution through SCADA* including implementation of 24x7 supply in North-West Sector in GVMC	266.05	Submitted for consideration of Government of India under transitional phase improvements to distribution system
2	Source augmentation of water from Raiwada Reservoir by minimizing losses	318.50	Draft Project Report (DPR) is prepared and submitted for augmentation of source by laying pipe line in place of open canal. Aims at saving 10 MGD (45 MLD) of water from various losses.
3	Yeleru Canal Project - Proposal to lay pipeline for minimising losses and for additional water	1,905.00	DPR is prepared and submitted
4	Summer Storage Tank along Yeleru Canal at Kondakarlava, Atchutapuram-Storage Capacity 175 MGD	400.00	DPR is prepared.
TOTAL		2,889.55	

\* Supervisory Control and Data Acquisition monitors bulk water supply to industries.

Source: GVMC, Visakhapatnam

### *Demand for Water*

Presently, the City's demand for water is 83 MGD, (65 for Domestic and 18 for Industrial) but supply is less than 66 MGD, out of which 52 MGD is supplied to domestic consumers. The projected population and water requirements for the next 30 years are given in Table 14.6.

**Table 14.6: Projected Population and Water Requirements for Domestic Use**

Year	Estimated Population in Visakhapatnam City (Millions)	Projected Water requirements Million Gallons Per Day (MGD)
2020	1.90	76
2022	2.96	112
2029	3.96	150
2044	4.96	188

Source: GVMC, Visakhapatnam

Then there is the non-residential water demand to take into account. To gain insight into the orders of magnitude, the case of Visakhapatnam Steel Plant (VSP) may be considered. To achieve world class productivity, it needs to produce 15 million tonnes per annum. Based on the present consumption of 35-40 MGD of water, the requirement for 15 million tonnes is 154 to 176 MGD<sup>5</sup>.

Considering these and the earlier projections for domestic use, it is easy to see how sky-high the demand in future is going to be.

### *A Four Component Plan*

First, for the immediate present, two initiatives are already under way – tapping as much ground water as possible to meet good the anticipated shortfalls and bringing Godavari water to the City. The other three components, to be simultaneously taken up in the medium term, are:

- All homes in the City to have GVMC water
- Janjhavati water to reach City to augment supply further
- Desalination of sea water and waste water recycling.

### *Desalination*

The City is likely to get two mega desalination projects shortly, one being initiated by the Government of Andhra Pradesh and the other by Visakhapatnam Steel Plant.

### *Waste Water Recycling and Reuse*

The incremental industrial water demand can be met from the treated water. GVMC's initiative to establish Tertiary Treatment Plant with a capacity of 13.2 MGD in Visakhapatnam city is a much awaited measure.

## **The District: Ground and Surface Water**

Ground water and surface water are the two sources of water catering to the demand for water in Visakhapatnam district. Over the years, water scarcity has increased due to natural reasons as well as indiscriminate drilling to meet the demands of the ever growing population.

### *Ground water*

As per the Central Ground Water Department Brochure on Visakhapatnam District, 2013, the total annual ground water recharge in the District is estimated to be 78,383 Hectare-Metre<sup>6</sup> (ha.m) and the net annual ground water availability in the District, after allowing the unavoidable natural discharges, is 71,689 ha.m. Presently, around 32% of the ground water is being utilized, leaving a balance of 48,589 ha.m of ground water still available for use. There are in all 34,943 ground water abstraction structures (dug wells, dug-cum-bore wells and bore wells/tube wells).

### *River Water*

Rivers are the sources of surface water in the district. The most important rivers drained in the District are Machikund, Tandava, Varaha, Sarada and Gostani. Most of the rivers are ephemeral in nature. However, some of the tributaries of Machikund are perennial with indications of substantial ground water discharge. Almost all the rivers and streams experience flash floods during rainy season. A good number of springs exist in Paderu and Araku areas of the District.

### Rainfall

Data on rainfall and ground water for recent years are shown in Table 14.7. Rainfall is the principal source of input for groundwater recharge. With regard to the period 2009-10 to 2013-14, the District received average rainfalls of 698.22 mm during the Southwest monsoon, (less than normal rainfall); 390.10 mm during the Northeast monsoon, (well above the normal); winter rainfall less than normal; and rains during hot weather period close to normal.

**Table 14.7: District Average Rainfall Season-Wise (In MMs)**

Year	Rainfall during Southwest monsoon	Rainfall during North east monsoon	Rainfall during Winter Period	Rainfall during Hot Weather Period	Total rainfall	Average Ground water level in (MBGL)*
Normal	<b>712.60</b>	<b>297.20</b>	<b>22.30</b>	<b>170.20</b>	<b>1,202.30</b>	<b>5-10</b>
2009-10	576.90	211.80	17.70	212.70	1,019.10	7.50
2010-11	924.30	639.50	10.70	188.30	1,762.80	4.60
2011-12	673.00	60.80	19.40	94.40	847.60	6.50
2012-13	744.80	479.60	7.40	71.60	1,303.40	6.10
2013-14	572.10	558.80	0.30	38.20	116.40	1.40
Average	<b>698.22</b>	<b>390.10</b>	<b>11.10</b>	<b>121.04</b>	<b>1,009.86</b>	<b>5.22</b>

\*Metres below ground level.

Source: Handbook of Statistics, Visakhapatnam District, 2014

### Drinking Water

Ground water forms the main source for drinking water schemes in both rural and urban areas of the District. The Protected Water Supply (PWS) schemes and de-fluoridation plants are maintained by the Panchayat Raj Department, Government of Andhra Pradesh. These schemes include river lifts, surface flow lift schemes, bore wells and large diameter dug wells and dug-cum-bore wells.

There are 981 PWS schemes, 2,149 bore wells, 2,755 open wells and 5,460 public tap connections, catering to the drinking water needs of the District population. There were 35,836 water supply sources, 8,417 delivery points and 23,706 hand pumps in the District as of April 1, 2014. According to the District Hand Book of Visakhapatnam, 2014, only 37 percent of the villages in the District have protected water supply. Table 14.8 provides the details of drinking water facilities in the District as recorded in Census 2011. Less than half the households get treated tap water.

**Table 14.8: Drinking Water Facilities in Visakhapatnam District**

CATEGORY	Households (000)	% of total
Tap water from treated sources	543	48.3
Tap water from untreated sources	91	8.1
Covered wells	11	1.0
Uncovered wells	82	7.3
Hand pumps	174	15.5
Tube wells/ bore holes	145	12.9
Spring	62	5.5
River/canal	6	0.5
Tank/ponds/lakes	10	0.9
<i>Total</i>	<i>1124</i>	<i>100.0</i>

Source: Census of India, 2011.

### *Suggested Actions at District Level*

According to the 2011 Census, the population of the District was 4.3 million with 1.1 million households. With an expected population of around 4.7 million by 2022, water requirement for drinking and domestic use is expected to be around 6.04 MGD. Following are some of the initiatives that support the future needs.

*Godavari River Water:* The proposed reservoir and canals of Polavaram Project across Godavari would provide 23.44 TMC (Thousand Million Cubic Feet) of water for drinking and industrial use of Visakhapatnam.

*Water Conservation:* Usage reduction can be developed along the lines of Singapore, which has reduced the per capita domestic water consumption from 165 litres per day in 2003 to 151 litres within a decade, and set targets of 147 litres by 2020 and 140 by 2030.<sup>7</sup> As for Visakhapatnam district, there are two issues to address: reducing the average use from 150 litres per day (as much as feasible) and minimizing the inequities in consumption since it is only 90 to 100 litres in some areas of the District.

*Groundwater Recharging and Other Measures:* Simple low cost methods for rain water harvesting such as use of recharge pits are suggested, to collect and store run-off water from roof tops of buildings, road surfaces, municipal parks, school playgrounds, stadiums, airports etc. Water spreading, recharge through pits, trenches, wells, shafts and directly diverting run-off water into existing wells, are other methods that could help. Recharging is also helped if there are open ground spaces (without cementing) around houses. Another mechanism that will help immensely across a wide spectrum of villages and small towns, is to develop ponds and percolation tanks to store rain water. One important action area is the control through regulation of drilling bore wells and tube wells for extracting ground water at close distances, especially in the urban areas. Finally, constructing underground dams will help to prevent recharge water from flowing off from the sub basin and store water below the ground level within the aquifer.

## BJ POWER

### Power for the City

The present supply of power to the city of Visakhapatnam from Andhra Pradesh Eastern Power Distribution Company Limited (APEPDCL) is 639.375 million units. The present consumption of power in the domestic category is 331.450 million units and a gradual increase in the demand for power for this category is also forecasted. The power consumption by the non-domestic and commercial enterprises is 116.423 million units and is projected to reach 225.50 million units by the year 2020. It is projected that the expected load growth for the high tension industries by the year 2020 would be around 1702.06 million units as compared to the present 181.246 million units (Table 14.9).

**Table 14.9: Category-Wise Future Load Growth for Visakhapatnam City**

Category	Demand for the year 2014-15	Future Load Growth year wise in Million Units				
		2015-16	2016-17	2017-18	2018-19	2019-20
Cat I (Domestic)	331.450	364.50	396.10	416.20	476.80	521.10
Cat II (Non domestic / Commercial)	116.423	133.89	149.95	170.94	193.60	225.50
Cat III (Industries)	181.246	208.43	233.44	266.12	306.04	1,702.06
Others	10.256	11.79	13.21	15.06	17.32	101.35
<b>TOTAL</b>	<b>639.375</b>	<b>718.61</b>	<b>792.70</b>	<b>868.32</b>	<b>993.76</b>	<b>2,550.01</b>

Source: APEPDCL, Visakhapatnam

With population projections for the City being 23,68,600 by 2022, there is an expected growth in the number of households to the extent of 5,92,150. Keeping in mind the future growth of the industrial sector, the total power need of the City is expected to grow to the tune of 2,550 million units by 2020.

### Strategies to Meet Future Demands

To meet the growing power requirements, the City has to come up with various strategies to increase the power generation, minimise consumption, prevent pilferage and minimise maintenance costs. Some of the measures could be along the following lines:

- i. Increasing power generation capacity as suggested in the discussion on the District.
- ii. Minimising domestic consumption by educating and creating awareness among the public regarding proper utilisation of various gadgets, in order to reduce power consumption and thus increase the effectiveness of the gadgets. The slab system of pricing may be fine-tuned, especially to ensure steeply progressive rates.
- iii. Steps to eradicate power pilferage via severe punishments.

- iv. Minimising maintenance costs through regular maintenance of the power distribution equipment as well as by utilising high quality material.
- v. Extensive educational programmes for conservation of power can be taken up by the government, providing tips for efficient use of power, as is done by the Singapore Power Services in Singapore.<sup>8</sup>

### Power for the District

Andhra Pradesh Power Generation Corporation Limited (APGENCO) is engaged in the generation of electricity, apart from the execution of the ongoing and new power projects under capacity addition programmes, and taking up renovation and modernization works of the old power stations. Transmission Corporation of Andhra Pradesh Limited (APTRANSCO) is in the business of transmission and bulk supply while four distribution companies (DISCOMS) undertake distribution and retail supply.

### Power Generation Scenario

The present installed capacity of APGENCO is 10,418 MW: 4,277 MW Thermal, 3,417 MW Gas, 1,751 MW Hydro, 881 MW Wind and 92 MW of Solar (Table 14.10). This supply caters to about two-thirds of the total power system demand in the State.

**Table 14.10: Power Generation Capacity Details for AP (In MW)**

Ownership	Coal	Gas	Solar	Hydro	Wind	Total
State	2,810	0	0	1,671	2	4,483
Joint Sector	0	272	0	0	0	272
Private	0	2,996	92	80	879	4,047
Central	1,467	149	0		-	1,616
<b>Total</b>	<b>4,277</b>	<b>3,417</b>	<b>92</b>	<b>1,751</b>	<b>881</b>	<b>10,418</b>

Source: APEPDCL, Visakhapatnam

The present scenario with regard to power generation in the District is brought out in Table 14.11 – exclusively referring to Hydel power.

**Table 14.11: Installed Capacity & Power Generation in Visakhapatnam District**

Name of Power Station	Installed Capacity (31-03-2013)	Annual Energy Potential	Generation (Million Units)		
			2011-12	2012-13	2013-14
Upper Sileru Power House	240 MW	575 Million Units	416.2	401.06	458.16
<b>TOTAL</b>	<b>240 MW</b>	<b>575 MU</b>	<b>416.2</b>	<b>401.06</b>	<b>458.16</b>

Source: Divisional Engineer, Operation & Maintenance, Upper Sileru

The major source of Thermal power generation in the District is National Thermal Power Corporation Limited (NTPC) – Simhadri Unit, with an installed capacity of 2000 MW. As per NTPC sources, during 2011-12, 222.07 billion units (BU) of power was generated. The figures for 2012-13 and 2013-14 are 232.0 BU and 233.269 BU respectively. In the future, three coal based major thermal power plants with total capacity of 6,150 MW are planned (Table 14.12).

**Table 14.12: Power Generating Stations Proposed in Visakhapatnam District**

S.No.	Developer	Fuel	Capacity (MW)
1	Namratha Bijli Power Pvt. Ltd	Coal	150
2	NTPC	Coal	4,000 (AP's share 2,000 MW)
3	Hinduja Power Project	Coal	1,000
4	The Chodavaram Co-operative Sugars Ltd.	Cogeneration	0.22
5	Simhadri STPS	Coal	1,000
	<b>TOTAL</b>		<b>6,150.22</b>

Source: Andhra Pradesh Central Power Distribution Company Ltd, Hyderabad.

### Power Consumption

Total power consumption in the District by consumer category is shown in Table 14.13. While growth in consumption has been very high at 59% during 2012-13 over the year before, growth in 2013-14 was 10%. Per capita consumption of power by all users decreased from 1,028 units in 2013 to 932 units in 2014. The slab system of pricing and restrictions on the number of service connections has brought the consumption down. The government is coming up with more strategies to bring down the consumption of power. For instance, most recently LED bulb scheme was introduced. Under the scheme, two LED bulbs per service connection were given free of cost.

**Table 14.13: Power Consumption in Visakhapatnam District (In Million Units)**

S. No	Category	Power Sold		
		2011 - 12	2012 - 13	2013 - 14
1	Domestic	865.28	1,531.6	1,662.12
2	Commercial	237.39	3,24.45	335.06
3	Industrial	59.42	2,94.89	292.39
4	Cottage Industries	0.32	0.76	0.68
5	Agriculture	19.71	3,98.02	457.85
6	Street Lights	56.25	1,48.67	174.71
7	General Purpose	9.54	16.90	17.78
8	Temporary	0.66	4.13	3.04
9	Low Tension (S.No.1 to 8)	1,248.57	2,719.42	2,943.63
10	Total High Tension (Including Rescos)	2,073.19	2,572.49	2,879.53
11	Total (LT+HT(s.no.9+10))	<b>3,321.76</b>	<b>5,291.91</b>	<b>5,823.16</b>

Source: Andhra Pradesh Eastern Power Distribution Company Ltd, Visakhapatnam

### *Power for the District: The Future*

Andhra Pradesh is marching towards achieving a total installed capacity of about 29,000 MW (present installed capacity is around 10,418 MW) by going for additional generation capacity of around 18,230 MW (Thermal - 7,090 MW, Hydel - 1,010, Solar - 4,530, Wind - 4,000, CGS - 1600) by 2019.<sup>9</sup>

The peak day consumption of power in the District is 17.9 million units and is expected to grow to 28.6 million units within the next five years.<sup>10</sup> The total category-wise expected load growth for the District by 2020 is 438 million units as against 255.75 million units in the year 2014-15 (Table 14.14).

### *Strategies for Increasing Power Supply and Conservation:*

The growing population in the District will also need more power. In order to meet the increasing demand for energy in the District the following strategies can be considered:

- Expansion of Installed Capacity in the PPP mode
- Promoting Renewable Energy Systems and developing Alternative Energy Resource Systems – Gas, Wind, Solar and Tidal Energy Systems
- Developing and promoting technologies that improve Plant Load Factor (PLF)
- State being Gas-hub of India, Gas-based energy systems can be developed
- Promoting Small Scale Solar Energy Systems for domestic consumption and street lighting purposes etc.

**Table 14.14: Category-wise Load Growth for Visakhapatnam District, 2016-20**

Category	Demand for the year 2014-15 in Million Units	Future Load Growth year wise in Million Units				
		2016	2017	2018	2019	2020
Cat I (Domestic)	132.58	145.80	158.20	169.80	185.20	195.20
Cat II (Non domestic/commercial)	46.57	58.20	65.20	77.10	88.50	95.20
Cat III (Industry) & HT Industry	72.50	91.20	99.80	115.20	129.20	138.20
Others	4.10	5.10	5.90	6.80	7.90	9.40
Total	255.75	300.30	329.10	368.90	410.80	438.00

*Source: APEPDCL, Visakhapatnam*

## CJ HOUSING

**Housing: The Case of Visakhapatnam City**

The national goal of Housing for All by 2022<sup>11</sup> (the 75th year after Indian Independence), is indeed a challenge, since it is not merely providing some housing but it is the provision of a decent dwelling for each and every household. The total number of families in Visakhapatnam city is estimated at 5,16,615. As against this, as reported by the Deputy Commissioner (Revenue) of GVMC, there were 5,12,107 residential units in September 2015, making up for 97.7% of the families. The number without housing would seem to be 4,508. The residential buildings comprise 3,43,589 ‘RCC-posh’ (which include most of the flats in the City), 92,176 ‘RCC- ordinary’, 60,723 ‘Madras terrace and asbestos sheet’ and 16,069 huts. The numbers in all would imply that upgrading, re-building and building activities are needed to ensure some 81,300 housing units (60,723+16,069+4508).

In addition to the backlog, one must also take into account the requirements of the growing population and resettlement of the slum-dwellers. The projected population of the City in 2022 will be 23,68,600 (as per GVMC, Visakhapatnam Draft Project Report, September 2015), which implies additional housing needs of 1,14,050 units. In addition, the needs of proper housing for slum population, presently 6,41,000 people in 600 slums, too must be taken into account. Most of the housing requirements of low and middle income category will continue to be met by government initiatives under various schemes. Currently all such schemes are going to be categorized into one class known as ‘affordable housing’ with a motive to accomplish the task of *pucca* houses for all by 2022. Annexure 14.A2 and 14.A3 have excerpts on the Affordable Housing Scheme.

**Housing in the District**

As the data in Table 14.15 indicate, the housing situation is by no means precarious, since almost three quarters of the people have *pucca* or permanent dwellings. Improvements are needed most for the 2.2% people living in *kuchcha* or temporary houses. The housing situation has progressed over time, in part due to the helping hand from various government initiatives outlined in Annexure 14.A1.

**Table 14.15: Population and Housing in the District, 2011 Census Data**

Item	Andhra Pradesh	Visakhapatnam District
Total Population (Lakhs)	493.90	42.90
% of Rural Population in Total	70.40	52.50
% of Urban Population in Total	29.60	47.40
Number of Households (Lakhs)	126.65	10.97
Population having housing facility	493.30	42.80
% of Population with <i>Pucca</i> housing	69.70	74.20
% of Population with Semi <i>Pucca</i> housing	26.80	23.60
% of Population with <i>Kuchcha</i> houses	3.50	2.20

Source: Census 2011

## D] SANITATION

### Sanitation in the City

In a recent survey conducted by the Union Urban Development Ministry in the month of August 2015, Visakhapatnam was ranked 205 out of 476 Class-I Cities and Union Territories each with a population of more than one lakh. Thus, in spite of several efforts taken by the GVMC to make Visakhapatnam a clean and green city, the City still has a long way to go with regard to sanitation. The 2011 Census reported that 14 percent of the population in Visakhapatnam was without a household toilet and most of them depended on open defecation.

GVMC data for 2015 show a total of 593 slums in the City with individual household toilets and 118 with none; and 117 slums with community toilets and 594 with no such. Policy experts might give affirmative reactions to providing toilets in slums – both community and in-house, but one must not consider slums as decent habitations and lose sight of the objective of cities sans slums.

With the possible exception of a few locations, the City does not present a very encouraging picture with regard to sanitation and waste disposal. Garbage disposal and sewerage systems call for improvement. The average daily waste generation from various sources estimated in Visakhapatnam is around 920 metric tonnes in 2015. This could reach some 1,100 MT by 2020 and 1,600 MT by 2030 based on extrapolations of past trends.

To meet the objective of achieving the mission of “Swachh Visakha and Smart Visakha”, GVMC now plans for implementation of a world class solid waste management and disposal process based on a detailed project report to be prepared by Infrastructure Leasing & Financial Services Limited (IL&FS). CRISIL presented a report on Rapid Baseline Assessment (RBA) to the Ministry of Urban Development for the year 2013. This report presented sanitation status of 30 Urban Local Bodies (ULBs) on various service delivery indicators in the area of sanitation, drainage and waste disposal. As shown in Table 14.16, GVMC has failed to intensify its efforts to improve its standing on many parameters of sanitation.

**Table 14.16: Sanitation and Solid Waste Management (SWM) Assessment, GVMC and Other Urban Local Bodies**

Name of the Service/Facility	Actual (%)	Target (%)	Names of ULBs which have achieved the standards
Coverage of Toilets	56	100	Chhindwara, Aizawl, Solapur, Chandigarh, Varanasi, and Nagpur – above 80%
Coverage of Sewage Network Services	26	100	Nagpur, Chandigarh, Gangtok
Efficiency of Sewage Network	45	100	No Data provided for this parameter
Sewage Treatment Capacity	48	100	Panaji and Shimla
Quality of Sewage Treatment	100	100	No Data provided for this parameter
Extent of Reuse and Recycling of Waste Water	3	20	Chandigarh
Extent of Cost Recovery in Sewage	60	100	Guntur, Varanasi and Nagpur
Efficiency in Redressal of Customer Complaints	80	80	Many cities including <b>Visakhapatnam</b> .
Coverage of SWM Services	77	100	Panaji, Bharuch, Shimla, Chandigarh, Ranchi, Nagpur
Efficiency of Collection of Municipal Solid Waste	91	100	Panaji, Gangtok, Chhindwara, Bharuch, Puri, Dewas, Yamuna nagar, Guntur, Hubli Dharwad, Solapur, Chandigarh, Guwahati, Raipur, Jabalpur, Ranchi, Varanasi, Allahabad, <b>Visakhapatnam</b> , Nagpur
Extent of Segregation of Municipal Solid Waste	0-5	100	No one reached 100%. Even Mysore (1 <sup>st</sup> rank in Swachh Bharat) ranks could not do it completely.
Extent of Scientific Disposal of Municipal Solid Waste	0	100	Allahabad and Chandigarh

*Source: Ministry of Urban Development -Rapid Baseline Assessment-Visakhapatnam-Draft Report and Final Report*

### **Drain/Waste Treatment**

The estimated waste generation in GVMC is close to 1,000 tonnes per day.<sup>12</sup> Presently, the waste is dumped at designated dumping yards away from the City. This practice needs to be stopped in view of the health hazards to people and the extent of land required for ever growing solid waste. The scientific process of recycling garbage and plastic has to be started at the earliest. Incineration capacity building has to be given top priority along with the proper collection of waste. The DPR on solid waste management prepared by Infrastructure Leasing & Financial Services Limited (IL&FS) also highlights the need for the establishment of one or more waste-to-energy plants in the City. Table 14.17 has details on the SWM projects in process and under consideration.

**Table 14.17: Ongoing and Under Consideration Solid Waste Management (SWM) and Sanitation Projects**

S.No.	Description of Project	Project Cost (Rs. Crores)	Current Status
1	Sewerage System in the Central Part of Visakhapatnam (Revised Cost: Rs. 264.01 Crores)	244.44	90.50% work completed. Balance work is under progress.
2	Waste to Energy Plant	530.00	The Government of Andhra Pradesh has approved the proposal and technology from Sweden would be utilised for generating power from waste
3	Tertiary Treatment Plant	170.00	Draft Project Report (DPR) under preparation
4	Providing sewerage system to Gajuwaka & Malkapuram areas	450.00	DPR appraised by Government of India
5	100% Sewer connectivity with the planned Sewage Treatment Plants (STPs) along with low density areas of 32 peripheral areas.	350.00	Project under consideration
6	Zone wise waste transfer stations - 5 (+ landfill) -Decentralized compost plants - Sorting and recycling yards	100.00	Project under consideration
7	Re-engineering Kapluppada landfill	100.00	Project under consideration
8	Waste treatment facility Sanitary landfill	100.00	Project under consideration
	<i>Total</i>	2,044.44	

Source: GVMC, Visakhapatnam

According to the United States Agency for International Development (USAID) 2015 Report on Sanitation in Visakhapatnam City, GVMC is planning to meet the future demand for sewage treatment i.e., 620 MLD by 2044. Accordingly, all the sanitation projects have to focus on expanding the sewerage system in a phased manner suitable to growing needs and current shortages.

### *Strategies for Waste Disposal*

Any strategy developed to tackle waste and sanitation issues should focus on certain basic and fundamental aspects. The four Dos are - Communication (across diversified stakeholders, government, private institutions, consumers, corporate social responsibility); Core competency strengthening by outsourcing peripheral activities like maintenance; Cost management (operation and maintenance); and Capacity building. The three Don'ts are - Open defecation, Open drains and Unhealthy waste disposal practices.

### Sanitation in the District

Proper sanitation is the basis for a healthy environment. Governments at the central and state levels have to sanction and closely monitor the construction of the sanitation facilities and solid waste management. During the period between 2010 and 2015, only 30% of the allotted houses by Andhra Pradesh State Housing Corporation Limited (APSHCL) in the Visakhapatnam district have individual sanitary latrines (ISLs) within the premises.<sup>13</sup> This indicates the lack of interest among the housing beneficiaries in building sanitary facility in the houses. Unless each home has toilet facility, there will be no end to the menace of open defecation.

At the national level, programmes such as the Total Sanitation Campaign, followed by Nirmal Bharat Abhiyan and now Swachh Bharat Mission at Grameen level (SBM-G) are aimed at tackling the issues related to sanitation. (Annexure 14.A4 gives details about the Total Sanitation Campaign Programme of the AP Government.) In the District, financial support for construction of sanitation facility at household level is available either from State or Central government under various ministries such as Ministry of Drinking Water and Sanitation and Ministry of Rural Development.

Governments are providing financial support for the construction of Internal Household Latrines (IHHLs). Centre and State governments together are funding Rs.15,000/- for a household level sanitary latrine cum bathroom with tap water facility (Rs.12,000+Rs.3,000). To avail this facility, households have to show the government the construction site in which they propose to construct the facility. Some 1,27,674 IHHLs were sanctioned under SBM-G so far in the year 2015-16, out of which only 5,872 IHHLs were completed, about 5% of the total sanctions. Similarly, under the Ministry of Drinking Water and Sanitation, sanctioned Individual House level Toilets (IHTs) in the District are 17,678 units and the completed IHTs are just 53<sup>14</sup>. As Table 14.18 indicates, the District performance is laudable with regard to school toilets, but not quite so in respect of IHHL and sanitary complexes.

**Table 14.18: Sanitation Performance (%) of the District and State 2014-15**

	IHHLs	Sanitary Complexes	School Toilets	Anganwadi Toilets
Visakhapatnam	Below 50%	Below 50%	100%	NA
AP	Below 50%	50-75%	Above 75%	Above 75%

Source: <http://www.cess.ac.in>

According to the 2011 Census, Visakhapatnam district occupies fifth position in the State with 51.3% of households having sanitation facility and second position with 23.4% in terms of closed drainage facility (Table 14.19), which require improvement.

**Table 14.19: Census 2011 Data on Availability of IHHLs and Drainage Facility:  
AP Districts in Descending Order of IHHL**

District	Latrine			Drainage		
	IHHL	Public	Open	Closed	Open	Nil
Krishna	70.4	1.0	28.6	20.3	39.8	39.9
West Godavari	64.6	6.8	28.6	10.2	39.8	50.0
Guntur	59.2	0.9	39.9	13.4	52.3	34.3
East Godavari	56.9	6.9	36.2	13.1	35.8	51.1
<b>Visakhapatnam</b>	<b>51.3</b>	<b>3.9</b>	<b>44.8</b>	<b>23.4</b>	<b>35.8</b>	<b>40.8</b>
Cuddapah	44.8	2.6	52.6	24.7	30.2	45.1
Kurnool	40.3	9.8	49.9	19.2	42.4	38.4
Nellore	39.6	0.9	59.5	14.7	30.5	54.8
Prakasam	37.5	1.1	61.4	7.9	35.8	56.3
Chittoor	37.4	1.1	61.5	21.4	35.8	42.8
Anantapur	36.8	2.7	60.5	19.7	31.3	49.0
Vizianagaram	22.0	1.4	76.6	10.9	48.0	41.1
Srikakulam	21.2	1.4	77.4	7.8	31.4	60.8

*Note : The above figures represent the percentage of households with the specific facilities.*

### **Solid Waste Management (SWM) and Drainage Facility**

According to the 2011 Census, there are 3,265 villages in Visakhapatnam district, of which 3,072 are inhabited. Out of these, 39 Gram Panchayats (GPs) have been identified for a pilot project for introduction of SWM. Out of 39 GPs, only 27 GPs have dumping yards (Table 14.20). Others are still waiting for suitable land or for construction of the dumping yard and installation of waste management and treatment plants. Those GPs which are implementing solid waste management have shown financial returns by recycling or reusing the waste. It is hoped that the success of these GPs will motivate and lead the rest.

**Table 14.20: Some Details on SWM in 39 GPs in Visakhapatnam District, October 2015**

Total population of 39 GPs	4,60,192
No. of GPs having the dumping yard facility	27
Total waste generation per day (Kg)	22,795
<i>Mode of transport used for waste collection</i>	
Tractors	9
Tricycles	47
Carts	20

*Source: Panchayat Raj Department, Visakhapatnam District.*

Table 14.21 shows data on Nirmal Gram Puraskar (NGP) awards for clean villages. NGPs indicate the actions, behaviours and practices in the villages inspite of uniform laws and rules across the country/state/district. The District's accomplishments with regard to NGP as well as target coverage under Open Defecation Free (ODF) status are lesser than the State levels. Out of all the districts, West Godavari has bagged the highest number of awards - 443 (52%) of the total 858 awards for the State, since the institution of the award in 2007. Among all the GPs of West Godavari, about 49% bagged the awards, as against only 3% in Visakhapatnam district. *All indicators point to the long way the District has to travel on sanitation.*

**Table 14.21: NGP Receiving GPs of the District & State and Targeted GPs for Open Defecation Free (ODF) Status, 2015-16**

Sl. No.	District Name	Total GPs in the District (in Numbers)	No. of Awarded GPs (in Numbers)	Percentage of total number of awarded GPs to total GPs of the district (%)	Percentage of awarded GPs to total awarded GPs of Andhra Pradesh (%)	Marked GPs for making ODF - SBM 2015-16 (in Numbers)	Percentage of total number of marked GPs to total GPs of the district (%)	Percentage of marked GPs to total marked GPs of Andhra Pradesh (%)
1	Anantapur	1,003	36	3.6	4.2	250	24.9	11.5
2	Chittoor	1,380	14	1.0	1.6	282	20.4	13.0
3	Cuddapah	791	22	2.8	2.6	108	13.7	5.0
4	East Godavari	1,023	104	10.2	12.1	233	22.8	10.8
5	Guntur	996	43	4.3	5.0	132	13.3	6.1
6	Krishna	969	101	10.4	11.8	199	20.5	9.2
7	Kurnool	899	37	4.1	4.3	142	15.8	6.6
8	Nellore	944	15	1.6	1.7	195	20.7	9.0
9	Prakasam	1,030	4	0.4	0.5	158	15.3	7.3
10	Srikakulam	1,101	4	0.4	0.5	100	9.1	4.6
11	Visakhapatnam	932	25	2.7	2.9	104	11.2	4.8
12	Vizianagaram	923	10	1.1	1.2	20	2.2	0.9
13	West Godavari	908	443	48.8	51.6	242	26.7	11.2
	Total of Andhra Pradesh	12,899	858	6.7*	100.0	2,165	16.8 <sup>#</sup>	00.0
	Totals at All India Level	12,51,219	28,589	11.4 <sup>@</sup>	3.0 <sup>^</sup>	28,534	1.4 <sup>§</sup>	7.6 <sup>&amp;</sup>

Source: Ministry of Drinking Water and Sanitation (NGP) website

\* Percentage of Total Number of Awarded GPs in AP to Total Number of GPs in AP.

@ Percentage of Total Number of Awarded GPs in India to Total Number of GPs in India.

<sup>^</sup> Percentage of Total Number of Awarded GPs in AP to Total Number of Awarded GPs in India.

<sup>#</sup> Percentage of Total Number of Marked GPs in AP to Total Number of GPs in AP.

<sup>§</sup> Percentage of Total Number of Marked GPs in India to Total Number of GPs in India.

<sup>&</sup> Percentage of Total Number of Marked GPs in AP to Total Number of Marked GPs in India.

## Annexure 14.A1

## Selected Government Initiatives in Housing

As a part of its move to resolve the housing issue, the government (both Centre and State) is extending its support by distributing land for house construction and offering financial support to construct the house. As shown in Table 14.A1, a total of 83,325 beneficiaries were assigned 86,774 hectares of land and 34,803 beneficiaries received house pattas from the government. Majority of the land is assigned to scheduled tribes. Land and house pattas are also distributed to OC-beneficiaries who belong to economically weaker sections (EWS) and low income group (LIG) category with white ration cards.

**Table 14.A1 : Distribution of Land and House Site Pattas to various Beneficiaries in Visakhapatnam District upto 31-03-2014**

Beneficiaries	Assigned Land	Distributed House Site Pattas
Total Extent of land (in Hectares)	86,774	314.19
Total Beneficiaries ( in Numbers)	83,325	34,803
SC - Beneficiaries	959	3,055
ST - Beneficiaries	77,839	817
BC - Beneficiaries	3,269	12,376
OC - Beneficiaries	1,258	18,555

Source: Visakhapatnam District Handbook 2013-14.

### Andhra Pradesh Housing Board (APHB)

Since its inception in the year 1966, Andhra Pradesh Housing Board (APHB) has constructed 25,914 housing units and majority of these units were in MIG and LIG categories. Very little contribution was made towards the housing requirements of economically weaker sections. Among various categories of housing like HIG, MIG and LIG housing units which were developed by APHB in Visakhapatnam district, MIG units constitute the highest percentage i.e., 53% followed by LIG with 42%. Only 5% of HIG units and none under EWS category were developed within a period of 50 years. The same is shown in Table 14.A2.

**Table 14.A2: Statement Showing Number of Houses Constructed and Allotted in Visakhapatnam District (1966 To 2015)**

S.No.	NAME OF THE DISTRICT	NUMBER OF HOUSES CONSTRUCTED				
		HIG	MIG	LIG	EWS	TOTAL
1	Visakhapatnam	169	1,823	1,417	-	3,409
2	Total (AP)	943	9,982	10,344	40	25,914

Source: APHB

As APHB develops housing more in the urban areas, its contribution in the rural areas (as per official sources) is not very effective and the same is reflected through a negligible contribution in the EWS housing category which is completely nil in the Visakhapatnam district. This necessitates handing over of the responsibility to another institution which can take care of the issues related to housing in the rural areas and for economically weaker sections.

**Andhra Pradesh State Housing Corporation Ltd. (APSHCL)**

Andhra Pradesh State Housing Corporation Ltd. (APSHCL) is the key institution taking care of housing requirements of economically weaker sections (EWS) and low income group (LIG) at the district level, especially in rural areas. The Andhra Pradesh and Central Governments under schemes like Indira Awaas Yojana (IAY), Indiramma, etc. provide support for construction of housing units (either construction and delivery or allocation of sites and financial support for construction) in rural areas. APSHCL mainly provides technical support and fund allocation for rural housing as also housing for slum dwellers and EWS in urban areas. For the purpose of construction, financial support of Rs.75,000/- is provided and disbursed at various stages to the beneficiaries. The construction activity is to be taken up by the villagers only. A progress report on houses constructed and houses under construction is presented in Tables 14.A3 and 14.A4.

**Table 14.A3: APSHCL in the State and Visakhapatnam District, Progress 2004-2015**

S.No.	Name of the District	Completed (in numbers)	Under Progress (in numbers)
1	Visakhapatnam	2,78,977	33,039
2	Andhra Pradesh	31,75,403	4,33,022

Source: APSHCL website.

**Table 14.A4: Housing Construction by APSHCL in Visakhapatnam District, 2010-2011 to 2015-2016**

S.No.	Year	Completed Houses (in numbers)
1	2010-11	24,399
2	2011-12	31,286
3	2012-13	26,453
4	2013-14	18,116
5	2014-15	1,387
6	2015-16 (Partial)	6,410
7	2004-2015 December	2,81,002

Source: APSHCL website

So far, about 2,81,002 houses have been completed since 2004, a little above a decade. Over a period of six years, government could only provide housing facility for a total of 1,08,051 houses (housing for all categories in all phases under all schemes) between 2010-11 and 2015-16. Based on the Census 2011 data on housing, roughly 2.75 lakh *pucca* houses are required for existing population in the District.

## Annexure 14.A2

Excerpts from Affordable Housing Policy, Andhra Pradesh, 2015<sup>15</sup>

*Affordable Housing* is defined as an individual dwelling unit with a carpet area of not more than 60 sq.m, preferably within the price range of five times the annual income of the household. Lack of cost effective housing is one of India's most pressing developmental problems. The Report of the Technical Group on Urban Housing Shortage (TG-12) (2012-17, Ministry of Housing and Urban Poverty Alleviation) has estimated the housing shortage in urban areas to be 18.78 million units; out of which 95% of the shortage is in the economically weaker section and low income group (56.18% in EWS and 39.44% in LIG). It is further estimated that another 15 million households are situated in "unacceptably congested conditions".

Andhra Pradesh is the eighth largest state in India accounting for 4.1% of the country's population. Urban areas in the State are governed under three Urban Development Authorities (UDA), 13 Municipal Corporations (MC) and 75 Municipalities. Around 29.47% of the total population of AP of 49.6 million (2011), lives in urban areas. Visakhapatnam district has the largest urban population of 47.5%. Apart from Visakhapatnam, some of the key cities in the State are Vijayawada, Tirupati, Guntur, Kakinada, Nellore and Kurnool. Since 2001, the number of towns in the State has increased by 45%. Faster urbanization can be anticipated, given the proposed strategic economic initiatives in the State such as proposed Capital City and industrial clusters in the Capital City Region, Visakhapatnam - Chennai Industrial Corridor, AP Petroleum Chemicals and Petrochemicals Investment Region, etc.

AP has around 12.6 million households. Housing in the State is currently handled by various departments such as APHB, APSHCL, APRSCL, Independent ULBs, MEPMA, etc. Majority of MIG and HIG category houses are being constructed by either private developers or by the home owners directly, and a small proportion by APHB. The affordable housing segment i.e., EWS/ LIG category housing is undertaken either by APHB or APSHCL. Private sector participation in affordable housing projects is virtually non-existent.

If percentage of households living in rented accommodation and percentage of dilapidated houses to total houses were to be considered as two of the parameters for assessing housing shortage, the geographical distribution of housing shortage in AP would be maximum in the districts of Visakhapatnam / Krishna / Guntur and West Godavari / Prakasam / Nellore respectively.

APHB estimates that of the total housing demand in the State, there is a shortage of around one million units in urban areas of AP. To tackle the affordable housing shortage for EWS/ LIG sections in urban areas, APHB has estimated an investment requirement of Rs.74,290 crores (including cost of construction of dwelling unit and infrastructure), over a 10 year time-frame. Given the huge requirement of one million dwelling units in urban areas of AP, a phased implementation plan with gradual scale-up would be adopted over a 10 year time-frame, mandating a requirement of two lakh houses over the next three years. In the initial phase, affordable housing schemes may be undertaken in the key Municipal Corporations and the proposed new Capital City of AP "Amaravathi".

While increasing housing supply is one dimension, a holistic approach towards providing affordable housing should emphasise on inclusive planning principles that reflect and support the needs of EWS and LIG families. The AP State Vision is also aligned to this: “To provide affordable housing that reflects social, economic, physical and emotional needs of the families to live with dignity.”

### Annexure 14.A3

#### Indira Awaas Yojana (IAY) and Indiramma Scheme<sup>16</sup>

At any point of time or place, the situation of the homeless reflects the affordability of the population. It is the responsibility of the government to address this issue and to design suitable policies. Two such schemes are Indira Awaas Yojana (IAY) of the Central government and Indiramma Scheme of the State government. These schemes provide housing facility in the rural areas, especially for socially and economically deprived people. Both these schemes are executed by Andhra Pradesh State Housing Corporation Limited (APSHCL). As per these schemes, an economically weaker section household will be sanctioned Rs.75,000 for the purpose of construction of the house. This support is increased to Rs. 1,00,000 for scheduled castes and Rs.1,75,000 for scheduled tribes. The proposed National Rural Housing and Habitat Policy is meant to ensure the effective implementation of the IAY in rural India.

#### *Comparative Assessment*

As per the data shown in the Tables 14.A5 and 14.A6 on IAY and Indiramma Scheme supported by APSHCL, IAY is relatively more successful compared to Indiramma Scheme, in terms of the total number of houses constructed. By the year 2013-14, out of a total of 12,121 housing units constructed, 72% are IAY units and remaining 27% units are of Indiramma Scheme. Sometimes there may be a threat of mis-representation of data by allocating funds of one scheme to another. IAY is a Central government scheme and Indiramma is a State government scheme. There is need for strict compliance and close monitoring of fund utilization and measurement of progress of the schemes. Beneficiary category-wise sanctioned and completed houses in Visakhapatnam district in 2014-15 are given in 14.A7.

**Table 14.A5: Consolidated Statement Showing Number of Houses Completed, Constructed and Registered under Various Housing Schemes in the Visakhapatnam District by APSHCL (data as of 25-12-2015)**

Sl. No.	Name of the organization/schemes	Period	Number of houses completed, constructed and registered under various categories in all three Phases
			EWS/ LIG
1	APSHCL – Completed	2014-15	1,617
2	APSHCL – Ongoing Projects (All Phases and all Schemes)	As of 25-12-2015	2,54,767
3	IAY - Constructed	2014-15	779
4	IAY- Constructed	2013-14	8,744
5	IAY (2013-14) Registered in all phases	2013-14	4,028
6	Indiramma-Constructed	2013-14	3,377
7	Indiramma - Total Registered	As of 25-12-2015	2,23,326
8	Indiramma (Rural) Registered in all phases	As of 25-12-2015	1,86,442
9	Indiramma (Urban) Registered in all phases	As of 25-12-2015	9,486

Source: APSHCL Website

**Table 14.A6: Housing Under IRH and IAYH**

Division / Mandal	Indiramma Rural Housing (IRH) (Numbers)					Indira Awaas Yojana Housing (IAYH)(Numbers)				
	SC	ST	BC	Others	Total	SC	ST	BC	Others	Total
Paderu	0	0	0	0	0	5	4,428	0	0	4,433
Visakhapatnam	106	0	0	416	522	168	5	543	108	824
Narsipatnam Division	79	0	0	1,181	1,260	545	166	550	298	1,559
Anakapalle Division	375	0	0	1,220	1,595	355	166	881	526	1,928
Total	560	0	0	2,817	3,377	1,073	4,765	1,974	932	8,744

Source: APSHCL Website

**Table 14.A7**  
**Beneficiary-wise Sanctioned and Completed Houses in the year 2014-15**

Name of the district	Target	Houses sanctioned and completed in 2014-15				
		ST	SC	Minority	Others	Total
VISAKHAPATNAM	7,015	228	374	13	1,015	1,630 (23.24%)
In terms of % to the respective column total of AP	9.19	1.71	11.18	0.55	5.54	4.37
Total of all districts of AP	76,330	13,299	3,345	2,355	18,335	37,334

Source: AP SHCL website

### Annexure 14.A4

#### Total Sanitation Campaign (TSC)

In 2003, the Government of Andhra Pradesh launched the Total Sanitation Campaign (TSC) Programme in 22 districts. At this juncture, AP government was actively involved in Food for Work Programme (FFWP) to encourage the rural poor to construct Individual Sanitary Latrines (ISLs). The government took up on a massive scale, a rural sanitation programme to construct 32.50 lakh individual sanitary latrines and 58,000 school toilets in rural areas. Resources were mobilized and awareness campaigns were launched with the objective of improving health and hygienic conditions of the people and protecting the dignity of women.

The target of the seventh Millennium Development Goal was to cover 100% rural sanitation by 2015 and the target of the Total Sanitation Campaign was to achieve 100% coverage by the end of the Eleventh Plan (2012). The reality is projected in the following section with the help of data across the regions.

#### *Solid Waste management*

Water and Sanitation ensure good health for one and all. The draft Solid Waste Management Rules 2015 issued by the Ministry of Environment, Forest and Climate Change require the Municipalities for districts and other areas to:

- a. develop infrastructure for segregation, collection, transportation, storage, processing and disposal of solid waste
- b. direct waste generators not to litter, to segregate the waste at source as prescribed under these rules and hand over the segregated waste to the waste collector
- c. give directions to waste generators, from time to time, to deposit domestic hazardous wastes at waste deposition centre, established by urban local bodies, for its safe disposal at hazardous waste disposal facilities

- d. arrange for day to day collection of segregated bio-degradable and non-biodegradable solid / wet waste and dry waste from the doorsteps of all households including slums and informal settlements, commercial, institutional and other non-residential premises
- e. collect waste from markets such as waste of vegetable, fruit, meat and fish markets on a day to day basis and promote of setting up of decentralised compost plant or bio-methanation plant at suitable locations in the markets
- f. separately collect waste from sweeping of streets, lanes and by-lanes daily, or on alternate days or twice a week depending on the density of population, commercial activity and local situation
- g. separately collect horticulture, parks and garden waste with focus on on-site processing in the parks and gardens
- h. transport non-bio-degradable (dry waste) including wrapped sanitary waste to the respective processing facility or material recovery facilities (MRF) or secondary storage facility
- i. transport segregated bio-degradable (wet waste) to the processing facilities like compost plant, bio-methanation plant or any such facility
- j. transport inert waste (non-recyclable waste, street sweepings and silt collected from the surface drains) directly to the disposal facility
- k. involve communities in municipal waste management and promote decentralised processing of waste
- l. create public awareness through Information, Education and Communication (IEC) campaign and educate the waste generators

All the local bodies and Gram Panchayats (GPs) are directed to prepare Solid Waste Management Plan as per State policy and strategy on Solid Waste Management, within six months from the date of notification of state policy and strategy and get it approved from the State Government or Union Administration or agency authorised by the State Government or Union Administration.

The Andhra Pradesh State Panchayat Raj and Rural Development departments initiated the pilot programme on Solid Waste Management in four villages in three districts in December 2014. As the programme showed a successful outcome, the Ministry has now initiated the execution of a similar model in 659 Mandal headquarters of the State. Around Rs.8,00,000 is being provided under the Swachh Bharat Abhiyan, whereas another Rs.4,00,000 is funded under MGNREGS and Rs.4,00,000 under the 13<sup>th</sup> and 14<sup>th</sup> Finance Commission funds for implementing the Solid Waste Management programme in each village.

**(Footnotes)**

- 1 *Data from GVMC Engineering Department – Water Supply Section*
- 2 *Data from GVMC Engineering Department – Water Supply Section*
- 3 *Data from GVMC Engineering Department – Water Supply Section*
- 4 *Ibid.*
- 5 *Source: GVMC, Visakhapatnam.*
- 6 *Hectare meter (ha.m) is a unit of volume used to measure the capacity of reservoirs, equal to the volume of water one meter deep covering one hectare. One hectare meter equals exactly 10,000 cubic meters or about 8.1071 acre feet.*
- 7 *Sustainable Singapore Blueprint 2015 (<http://www.mewr.gov.sg/ssb/files/ssb2015.pdf>)*
- 8 *Sustainable Singapore Blueprint 2015 (<http://www.mewr.gov.sg/ssb/files/ssb2015.pdf>)*
- 9 *APEPDCL, Visakhapatnam*
- 10 *Ibid*
- 11 *The Scheme is known as Pradhan Mantri Awaas Yojana.*
- 12 *Source: GVMC, Visakhapatnam.*
- 13 *Based on data from APSHCL and AP Socio-Economic Survey 2014-15.*
- 14 *Report of IHHL Status as of October 15, 2015(<http://111.93.8.40/RWS/UserInterface/Application/Reports/NoOfIHHLsPhysicalReport.aspx>); Physical progress of IHHLs under SBM(G) as of 2015 – 2016 (Swachh Bharat Mission Grameen (SBM-G), Nirmal Bharat Abhiyaan (G)Website)*
- 15 *Source: Andhra Pradesh State Affordable Housing Policy, 2015, Government of Andhra Pradesh, Municipal Administration & Urban Development Department (For urban areas of AP).*
- 16 *Data from APSHCL.*

## Chapter 15

# NGO INITIATIVES

Nalini Bikkina\*

*Given the widespread attention non-governmental organisations (NGOs) are receiving within the framework of development goals, policies and processes, this Chapter is an attempt to understand the activity profile of NGOs in Visakhapatnam city and district based on data from the website [indiamapped.com](http://indiamapped.com)*

### Introduction

This Chapter is based on an analysis of available secondary data on 85 NGOs, of which 47 are operating in Visakhapatnam city and 38 in Visakhapatnam district. Data are primarily analyzed on the basis of areas of work in which the NGOs are participating, roles played by the NGOs in the development areas and the stages of evolution of the NGOs.

### Key Sectors

NGOs functioning in different areas are shown in Table 15.1. Majority of the NGOs are functioning across several of the key sectors with a handful of NGOs focusing on a single area. The largest number of NGOs is present in the area of Health & Family Welfare, followed by Education & Literacy and Enterprise Development & Empowerment.

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**Table 15.1: NGO Presence in Visakhapatnam City & District across Key sectors/Areas**

Key Sector/Area	Number of NGOs	
	City	District
Health & Family Welfare	37	26
Provision of Basic Services	19	14
Education & Literacy	24	21
Environment	15	14
Enterprise Development & Empowerment	25	18
Human Rights	9	1
Information & Communication Technology	3	3
Provision of Advanced Services	17	16
Democratization	7	5
UN Millennium Development Goals (MDGs)	0	1

*Source: Data provided by indiamapped.com, 2015.*

### Roles and Activities

Within the key sectors, NGOs have not taken up all the activities/roles relating to each sector. Table 15.2 illustrates the number of NGOs playing different roles across the key sectors. Facilitating communication, particularly with reference to building awareness and information on entitlements, appears to be the predominant activity across the key sectors. Advocacy and Project Execution too is a significant activity being undertaken by the NGOs across the various areas. Also, a large number of NGOs are involved in providing training and capacity building. However, research, monitoring and evaluation have not been the focus of attention by NGOs here.

**Table 15.2: NGO Activities/Roles across Sectors/Areas in Visakhapatnam City & District**

Activities/ Roles	Infra-structure		Pilot Projects		Communi-cation		Training		Research, Monitoring & Evaluation		Advocacy & Project Execution	
	City	District	City	District	City	District	City	District	City	District	City	District
Health & Family Welfare	18	7	5	0	17	17	18	23	6	0	12	1
Provision of Basic Services	11	1	4	0	11	11	11	12	3	0	5	0
Education & Literacy	13	6	3	0	13	13	17	20	3	0	4	0
Environment	7	4	1	1	11	11	9	12	2	0	7	0
Enterprise Development & Empowerment	11	4	3	1	15	15	16	17	3	0	10	0
Human Rights	4	0	0	0	8	1	5	1	1	0	8	0
Information & Communication Technology	1	2	0	0	2	1	2	3	0	0	1	0
Provision of Advanced Services	7	6	3	1	11	11	12	14	3	0	6	0
Democratization	2	1	0	1	6	4	4	5	0	0	5	0
UN MDGs	0	0	0	0	0	1	0	0	0	0	0	0

Source : Data provided by indiamapped.com, 2015.

Health & Family Welfare sector involved work in nutrition, particularly maternal and child nutrition, disability, elderly care, prevention and assistance for victims of HIV/AIDS and other epidemics as well as acute diseases, nursing, de-addiction and prevention of substance abuse, blindness prevention, sanitation, family planning, psychological counselling and blood donation. Among Provision of Basic Services, water supply is a predominant area of work; while Provision of Advanced Services included legal aid, labour and employment issues, minority concerns, promotion of sports, tourism, art, culture and pilgrimages.

Education & Literacy areas involved work along the lines of construction and maintenance of school buildings, hostels and student messes, non-formal and adult education, career guidance, language training, training for the differently-abled, provision of books and other resources and value-based education.

In the area of Environment, NGOs focus on water harvesting and conservation, facilitation of water users' associations, promotion of renewable energy systems, solid waste management, afforestation and sustainable agriculture along with environmental protection.

Women's empowerment, promotion and capacity building in the area of food processing and small scale enterprises, particularly among vulnerable groups like trafficked women and children; youth affairs; liaison with National Rural Employment Guarantee Scheme (NREGS) and microfinance, are the thrust areas in the sector of Enterprise Development & Empowerment. Human Rights too is a key sector with a special focus on the rights of women and children.

Information & Communication Technology has picked up as a key sector over the recent decades with a predominant emphasis on capacity building in computer applications. Democratization is picking up as a sector of operation with focus on promotion of the right-to-vote and local self-governance. UN Millennium Development Goals as a comprehensive agenda or focusing on these goals separately, also found place in the key sectors across which NGOs are operating. The Millennium Development Goals include eradication of extreme poverty and hunger, achievement of universal primary education, promotion of gender equality and women's empowerment, reduction of child mortality, improving maternal health, combating HIV/AIDS, malaria and other diseases, ensuring environmental sustainability and global partnership for development.

### Registered NGOs and their Evolution

NGOs registered since 1965 in Visakhapatnam city and district are presented in Table 15.3. Information on NGOs registered prior to 1965 is not available. A vast majority of the NGOs were registered between 1990 and 2009. Introduction of economic reforms, opening up of the economy and liberalization which resulted in the withdrawal of the state from provision of welfare, led to the growth of NGOs during this period.

**Table 15.3: NGOs Registered Across Various Time Periods**

Period	Number of NGOs	
	City	District
1965-1969	1	0
1970-1974	0	2
1975-1979	0	0
1980-1984	1	0
1985-1989	4	0
1990-1994	9	10
1995-1999	4	9
2000-2004	6	11
2005-2009	18	6
2010-2014	3	0
2015-2016	1	0

Source : Data provided by indiamapped.com, 2015.

NGOs across the world and specifically in the developing countries have been evolving from focusing on provision of goods and services towards sustainable development. The role of NGOs in development, in this context, can be understood in terms of evolution from first generation to third generation through a set of characteristics as outlined in Table 15.4. Information on the NGOs in the District was analyzed to arrive at an understanding of their stages of evolution, based on the model outlined in Table 15.4 and the activities declared by the NGOs. The results are illustrated in Table 15.5. NGOs in Visakhapatnam city and district appear to have evolved predominantly into the second generation organizations with self reliant models, working on projects for extended periods and involving communities across villages and beneficiaries. While a large majority of NGOs have evolved from the first to the second generation, there is a felt need for evolution of sustainable systems, to scale up to the regional and national levels, working closely with other private and public institutions and towards strategic management in place of project management – characteristics which define the third generation NGOs.

**Table 15.4: Three Generations of NGO Development Programme Strategies**

Characteristics	First Generation	Second Generation	Third Generation
Defining Features	Relief and Welfare	Small-scale, self-reliant local development	Sustainable systems development
Problem Definition	Shortages of goods and services	Local Inertia	Institutional and Policy Constraints
Time Frame	Immediate	Project Life	Indefinite long-term
Spatial Scope	Individual or family	Neighbourhood/Village	Region or nation
Chief Actors	NGO	NGO + beneficiary organizations	All public and private institutions that define the relevant system
Development Education	Starving Children	Community self-help initiatives	Failures in interdependent systems
Management Orientation	Logistics Management	Project Management	Strategic Management

*Source: Togbolo, S.U. (2005). The Role of Non Governmental Organizations (NGOs) in Development. Nigeria Village Square. Retrieved on 5 July, 2015 from the World Wide Web: <http://www.nigeriavillagesquare.com/articles/samuel-uwhejevwe-togbolo/the-role-of-non-governmental-organizations-ngos-in-development.html>*

**Table 15.5: Stages of Evolution of NGOs in Visakhapatnam District**

Characteristics	First Generation		Second Generation		Third Generation	
	City	District	City	District	City	District
Defining Features	2	1	43	36	2	1
Problem Definition	8	7	38	30	1	1
Time Frame	5	4	38	32	4	2
Spatial Scope	0	0	36	29	11	9
Chief Actors	4	3	41	34	2	1
Development Education	7	5	38	32	2	1
Management Orientation	10	8	35	29	2	1

Source : Data provided by indiamapped.com, 2015.

### Need for Accreditation

Over the past decade, India has witnessed an exponential growth in the number of voluntary organizations operating and being funded by public and private aid agencies. Questions, however, are being raised as to the credibility of these organizations in the context of the lack of a formal regulatory mechanism to ensure accountability to stakeholders. Also, many voluntary organizations receive grants from both state and private funding. Government officials too were reported to have set up NGOs to access untapped resources and available opportunities.

None of the NGOs in the District are seeking or are being granted accreditation. NGOs would do well to seek accreditation to ensure managerial competency, accountability and transparency in their functioning. Accreditation ensures that organizations with systems for good governance are in place to support furthering the mandate of the NGOs. Besides establishing transparency, accreditation is believed to strengthen the spirit of voluntarism, along with safeguarding the autonomy of the third sector. Credibility Alliance, for instance, is a rating agency involved in accreditation of NGOs across various sectors. Accreditation will also improve the citizens' knowledge of and possible interface (via the internet and the web) with the NGOs and promote the cause of development further. At the minimum, it should be a legal obligation on the part of all NGOs to publish their annual activity profiles and income and expenditure statements.

## Chapter 16

## THE FUTURE COURSE

Editors

*This Chapter contains two sections: one giving indicative investment projections for Visakhapatnam district and the other underscoring the need for a single agency for development coordination and investment promotion in the District.*

**Growth and Investment: Indicative Projections**

The metric of investment and growth works as follows. The link between investment rate (defined as ratio of total investment to total GDP) and GDP growth is via the incremental capital output ratio (ICOR)<sup>1</sup>. In general, when an economy is investing in long gestation infrastructure projects (such as roads and ports) and constantly upgrading and replenishing them, it is necessary to assume a relatively high ICOR.<sup>2</sup>

The indicative projections for Visakhapatnam district are based on the following premises:

- (i) Over the period 2016-2030, the target annual growth rate in per capita GDP is 10%.
- (ii) Population growth will stay at 1.5%. ICOR will stay at 3.5, reflecting the continuing rural dominance on the one hand and the need for infrastructure development on the other.

	<i>Average investment to GDP (%)</i>	<i>Average annual growth rate of GDP (%)</i>	<i>Implicit ICOR</i>
1960-1969	19.6	8.1	2.4
1970-1979	35.2	8.3	4.2
1980-1989	39.2	6.3	6.2
1990-1999	36.6	8.0	4.6
2000-2009	25.3	5.3	4.8
2010-2014	28.4	6.4	4.4

Source: Department of Statistics, Singapore Government ([www.singstat.gov.sg/statistics](http://www.singstat.gov.sg/statistics)).

Table 16.1 has the projections. For per capita GDP of the District, the starting point is the 2015-16 advance estimate from the Government of AP - Rs.1,40,628. To this is applied the average exchange rate for 2015 (Rs. 65 per \$) resulting in GDP per capita of \$2,163. This was applied to the year 2015 and from then on, projected per capita GDP is simply based on the assumed growth rate of 10%. Estimated population and projected per capita GDP will give total GDP, of which 35% (investment rate) will be the projected investment. Since all the series are at constant (2015) prices, the actual investment numbers would be higher than those in Table 16.1. Suffice it to say that, between \$4 and \$20 billion will be the needed investment. As long as the investment climate is conducive, there is no reason why such investment numbers cannot be realized. The optimism is ratified by the projects in the pipeline, some of which are illustrated in Table 16.2.

**Table 16.1: Indicative Investment Projections for GDP Growth at 10%**

Year	Population (Millions)	Per Capita GDP \$	GDP \$ Billion	Investment Needed	
				\$ Billion	Rs. Crores
2016	4.52	2,380	10.7	3.7	24,050
2017	4.59	2,618	12	4.2	27,300
2018	4.66	2,880	13.4	4.7	30,550
2019	4.73	3,168	15	5.2	33,800
2020	4.8	3,485	16.7	5.8	37,700
2025	5.17	5,612	29	10.2	66,300
2030	5.57	9,038	50.3	17.6	1,14,400

Notes: 1. Assumed: Population growth 1.5%; ICOR 3.5 implying investment rate of 35% for 10% GDP growth.  
2. The investment needed in Rupees is based on constant exchange rate of Rs. 65 per US\$.

**Table 16.2: Upcoming Investments (For Illustrative Purposes)**

Location / Project	In Rs. Crores (Rounded)
Visakhapatnam-Chennai Industrial Corridor(VCIC)	1,00,000
MoUs with companies drawn from India, Japan, UAE and Canada	4,00,000
Metro Rail Project	12,727
Super Specialty Block in King George Hospital (KGH)	75
IT Tower at VSEZ	40
Convention Center at Adavivaram	1

Source: APIIC and Media Reports

### Development Coordination and Investment Promotion

Currently the largest agency in charge of the development of the City is the Visakhapatnam Urban Development Authority (VUDA). It was formed in 1978. It now covers the entire area of Greater Visakhapatnam Municipal Corporation and its suburbs. VUDA has different wings through which it has diversified its activities:

- i) Planning wing
- ii) Engineering wing
- iii) Accounts wing
- iv) General Administration wing
- v) Estate wing
- vi) Urban Forestry wing

Another important agency is the Greater Visakhapatnam Municipal Corporation (GVMC), formed in 2005, which is in charge of the civic administration of the City. There are many other structures, layers, elected representatives and numerous officials at the District, Mandal and other levels. There could well be overlapping roles, leading to growing coordination problems, high transaction costs and scope for delay and even inaction.

There is a need for one single district level mechanism that takes an overall view of needs and priorities, coordinates the various development activities, is available when agencies and sub-district constituents wish to report progress and seek resources, and acts as a link between the district and state functionaries. The mechanism suggested is a ***Visakhapatnam District Development and Investment Promotion Board (VDDIPB)*** as the lead government agency for formulating forward looking plans and executing strategies.

Membership of VDDIPB should include all elected representatives to Parliament and the Assembly from the District as well as the principal elected functionaries at the District level, District officials, CEOs of selected public and private enterprises and a few eminent citizens and intellectuals. Mandal representatives and officials will participate in the VDDIPB meetings on a need basis.

VDDIPB should meet once a month to consider the pressing issues at the District and sub-District levels, examine and fine-tune the formulated plans, programmes and policies with a view to eliminate duplication of efforts and monitor development performance in various sectors. The objective is not just reviewing progress, but must also include the important function of taking time-bound action to meet the constraints and move forward. The immediate tasks for VDDIPB could include seeking statutory recognition, detailed examination of the idea of establishing District Educational and Health Foundations and spearheading their early constitution.

#### (Footnotes)

- 1 Let  $g=(dy/Y)*100$  be the growth rate of GDP ('Y'). Let ICOR, the Ratio of incremental capital (= investment, 'I') to incremental GDP, be  $\acute{a}$ . Then the rate of investment  $I/Y$  is given by  $g*\acute{a}$ . For GDP growth rate of 5%, with ICOR of 3, a 15% investment is all that is required.
- 2 ICOR History of Singapore