Evaluation of Urban Renewal Projects under JnNURM for Sustainable Urban Development in India



Department of Architecture and Planning Indian Institute of Technology Roorkee Roorkee – 247667 (India) February, 2015

EVALUATION OF URBAN RENEWAL PROJECTS UNDER JNNURM FOR SUSTAINABLE URBAN DEVELOPMENT IN INDIA

A THESIS

Submitted in partial fulfilment of the requirements for the award of degree

of DOCTOR OF PHILOSOPHY in ARCHITECTURE AND PLANNING

by

Doreshor Khwairakpam



DEPARTMENT OF ARCHITECTURE AND PLANNING INDIAN INSTITUTE OF TECHNOLOGY ROORKEE ROORKEE – 247667 (INDIA) FEBRUARY, 2015





INDIAN INSTITUTE OF TECHNOLOGY ROORKEE CANDIDATE'S DECLARATION

I hereby certificate that the work which is being presented in the thesis entitled **EVALUATION OF URBAN RENEWAL PROJECTS UNDER JNNURM FOR SUSTAINABLE URBAN DEVELOPMENT IN INDIA** in partial fulfillment of the requirement for award of the Degree of Doctor of Philosophy and submitted in the Department of Architecture and Planning of the Indian Institute of Technology Roorkee, Roorkee. It is an authentic record of my own work carried out during a period from Jan, 2011 to Jan, 2015 under the supervision of Prof. R. Shankar, and Associate Prof. Dr. Mahua Mukherjee, Department of Architecture and Planning, Indian Institute of Technology Roorkee, Roorkee.

The matter presented in the thesis has not been submitted by me for the award of any other degree of this or any other Institute.

(DORESHOR KHWAIRAKPAM)

This is to certify that the above statement made by the candidate is correct to the best of my knowledge.

Date:

(R. Shankar) Supervisor (Dr. Mahua Mukherjee) Supervisor

The Ph.D. viva-voice examination of Mr....., Research Scholar, has been held on

Signature of Supervisors Examiner Signature of External



EXECUTIVE SUMMARY

India is a developing nation. However, urban infrastructure facilities are still poor across the country. Government of India has taken initiative and introduced many scheme/program through Five Year Plans (FYP) since first FYP (1951-56). There are policies and action plans for improvement of urban facilities. Until now, little positive impacts of the government scheme are seen in terms of getting benefits to citizens.

Urban infrastructure facilities are still poor across the country, the identified 53 towns in India as per Census, 2011 are set to continue on the path of fast urbanization. On the other hand, there is pressure on the urban services in the sectors of water supply, waste water management, storm water and drainage and solid waste management, which is challenge of urbanization in India. Housing for urban poor is another issue, slum population has reached almost 6.54 Crore in India (Census, 2011). These slum populations do not have proper sanitation and other urban services. In this context, Government of India has launched Jawaharlal Nehru Nation Urban Renewal Mission (JnNURM) to improve the quality of life and infrastructure in Indian cities.

The JnNURM has been launched by Government of India to address the urban issues in 65 cities across the country. This program was launched on 3rd December, 2005 by prime minister of India with an investment laid out planned of Rs. 50,000 Crore from central government and Rs. 50,000 Crore from state government during short period of 7 years. The central government has encouraged the state government and Urban Local Bodies (ULBs) to implement the reforms aimed at strengthening the governance as well as ensuring that the mechanisms are functions efficiently and effectively for delivery of the urban services under this program. The areas of water supply, waste water management, storm water and drainage, preservation of water body, solid waste management, other urban transport, parking, urban renewal, heritage development areas, Mass Rapid Transport System (MRTS), and road/flyover/RoB are focused under the sub-mission of Urban Infrastructure Governance (UIG) of JnNURM, whereas the other sub-mission (Basic Service to Urban Poor) focuses on housing for urban poor.

The aim of the research is to make the poor performing cities learn from the better performing cities for sustainable urban infrastructure development in India under JnNURM. This study evaluates the completed project in the sectors of water supply, waste water management, storm water and drainage, and solid waste management under UIG sub-mission as well as housing for urban poor under BSUP sub-mission of JnNURM mission, to bring about sustainable urban

infrastructure development in India. The comparative analysis among 65 JnNURM cities is conducted in terms of implementation of reforms and projects under the two sub-missions. Surat, Pimpri Chinchwad and Kolkata cities have been selected for case study to evaluate the completion of UIG and BSUP projects in the selected sectors. Imphal city is a special case study, as it has not performed well in the first phase of JnNURM. The problems and issue in Imphal leading to poor performance are thoroughly analyzed in the context of best practices followed by better performing cities in order to ensure better implementation of next phase of JnNURM in Imphal.

Special case study of Singapore city has been carried out as it is one of the best performing cities in the selected sectors of urban services. It has not only achieved best practices in sectors of water supply, waste water management, storm water and drainage and solid waste management, but also Housing for urban poor has been provided in a sustainable manner by Public Utilities Board in Singapore.

The comparative analysis of JnNURM cities has carried out considering mandatory reforms at state and city level as well as the optional reforms at city level. The performance of cities is dependent on good governance like that found in, Gujarat, Tamil Nadu, and Andhra Pradesh, who have achieved highest performance whereas Nagaland, Goa and Jammu and Kashmir have achieved least number of reforms at state level. Vishakhapatnam, Surat, Vadodara, Indore, Pune (Pimpri Chinchwad) cities have achieved highest number of mandatory reform at city level, whereas Jamshedpur, Ranchi and Panaji city have achieved least number of mandatory reforms at city level while cities of Pondicherry, Imphal and Kohima least number of optional reforms. Mumbai, Kolkata and Delhi have achieved highest number of E-governance component at city, while Nainital, Shimla and Panaji have achieved least number of E-governance components.

As far as JnNURM is concerned, mandatory state level reforms are fully achieved by Gujarat, Tamil Nadu while poor implementation is achieved by Goa and Jammu and Kashmir. Best implementing city level mandatory reform are achieved by Vishakhapatnam and Surat cities while poor implementation is achieved by Ranchi and Panaji. In the case of optional reform at city level, best implementation is achieved by Kolkata and Asansol cities while poor implementation is achieved by Imphal and Kohima In comparative analysis of sectors of UIG projects, water supply, waste water management, storm water and drainage has highest number of approved DPRs and investment while these are lowest in sectors of urban renewal, heritage development area and preservation of water body.

Comparison of UIG project implementation at state level reveals that, West Bengal, Karnataka and Tamil Nadu have maximum number of projects while Punjab, Jharkhand and Chhattisgarh have less number of projects. Comparison of UIG project implementation at city level in 65 cities reveals that, Kolkata, Bangalore, and Chennai have been more number of projects while Ludhiana, Jamshedpur and Raipur have implemented less number of projects.

Comparison of BSUP projects implementation at state level reveals that, Maharashtra, West Bengal and Andhra Pradesh have approved highest number of dwelling units while Tripura, Sikkim and Goa have approved lowest number of dwelling units. Comparison of slum population as per Census, 2011 reveals that, UT of Chandigarh has highest percentage while lowest is in Tripura and Odisha. Cities of Kolkata, Hyderabad and Delhi have approved (high numbers) 131009 dwelling unit, 78746 dwelling units and 74312 dwelling units with an investment of Rs. 3382.52 Crore, Rs. 1884.95 Crore and Rs. 3257.72 Crore respectively. And City of Gangtok, Panaji, and Haridwar have approved (low numbers) 254 dwelling units, 115 dwelling units and 96 dwelling units with an investment of Rs. 33.58 Crore, 10.22 Crore and 3.62 Crore respectively.

On the basis of better performing in term of having maximum number of project implementation as well as reforms, Surat, Kolkata and Pimpri Chinchwad (Pune) cities have been selected for detailed study. Evaluation has been carried out in sectors of "water supply", "waste water management", "storm water and drainage" and "solid waste management" under Urban Infrastructure and Governance (UIG) and "housing for urban poor" under Basic service to Urban poor (BSUP) in the completed project. Household surveys and Focus Group Discussions (FGD) with the beneficiaries has revealed the different outcome of the projects from various sectors. Surat has done well in the water supply sector in the newly developing areas of Vesu and Pal, while Pimpri Chinchwad has done well in the ward No. 19. In case of Kolkata city, water supply projects and waste water management projects have done well at Salt Lake.

Under BSUP project, Pimpri Chinchwad has done well in housing for urban poor through redevelopment in Nigadi, while Kolkata has done well and was appreciated by beneficiaries at Chandanagar where In-situ project was implemented, whereas in Surat BSUP projects have been implemented through relocation at Kosad (North zone), but beneficiaries have not appreciated the projects due to lack of sufficient urban services.

Cities are benefited from JnNURM at different levels due to different levels of performance under both sub-missions (UIG & BSUP). In this context, the aim of the research is to evaluate whether the targeted populations in the cities of Surat, Kolkata and Pimpri Chinchwad are getting benefits from the completed projects in the areas of water supply, waste water management, storm water and drainage, solid waste management, and housing for urban poor. Appraisal of level of implementation of JnNURM reforms was another evaluation to find out the city performance as part of this research work. Various tools and techniques such as Focus Group Discussion (FGD), Photographs, Field Observation, Key Interviews with Implementing Agencies, and Households survey was used to carry out the research appraisal.

The statistical analyses of secondary data from various sources at national level looks into the JnNURM physical progress, financial progress, and reforms status whereas at city level the analysis looks into city profiles describing advantage and disadvantage of projects, and planning prospect apart from the projects status.

The quantitative and qualitative analysis of data from household survey considered various parameters such as (for water supply) - source of water, water quality, duration of water supply, satisfaction level, and so on, (for waste water management sector) - sewerage connection, satisfaction level, practice of waste water recycle at home and so on (for storm water and drainage sector) - drainage system, storm water disposal mechanism, flooding problems, frequency of flooding, elogging of drains, and satisfaction level of municipalities, and for solid waste management sector parameters were door to door collection, types of disposal, segregation of solid waste, frequency of collection, environment and aesthetic and so on. The pictures of pre and post project situations of the above parameters were compared to finding out the impacts of projects. The major households survey findings in Surat city were (1) Pipe line water supply coverage had been extended to previous uncovered areas within city limits in west zone and south west zone while duration of daily water supply has increased in the post project stage as compared to pre projects stage, (2) Water quality had slightly improved at post projects stages in comparison to the pre projects situation in the west zone and south west zone whereas in east zone water quality remains the same, (3) Satisfaction level of water supply in

Surat Municipal Corporation for water supply is slightly satisfaction at post projects stage in compared to pre projects situation, (4) Sewer line had been covered in the localities of west zone and south west zone where no sewer line at pre projects situation and, (5) The waste water management projects have observed positive impacts in the benefited localities by having proper sewer connection, (6) Water logging is still observed in some of benefited localities in central zone during raining season, (7) Door to door collection for municipal solid waste is being done through private agencies and satisfaction level is high at post projects stages in comparison to pre projects situation, (8) overall littering is less practice even in the market areas (vegetable market, and fish market) as beneficiaries are well aware of municipal solid waste management practice however in few colonies in east and south east littering of solid waste along roads and streets is observed, (9) Beneficiaries of BSUP projects (group housing) at Kosad in north zone have not been improved urban services. Shortages of water, unclean surroundings, poor esthetic, less job prospect are common issues in Surat city and (10) Community participation in project implementation was total absence. The beneficiary had no involvement in planning, implementation stages as far as JnNURM projects was concern. The survey finding in Pimpri Chinchwad city were (1) Duration of water Supply duration has increased and the quality as well as quantity of water supply has increased in benefited localities in post projects stages in comparison to the pre projects situation, (2) The beneficiaries have appreciated the works done under JnNURM projects as far as water supply projects are concerned, (3) Waste water management projects have brought tremendous changes in terms of collection through sewer line and coverage to the targeted population. There has been a positive impact on water body in urban areas as discharge into river and drains has stop, (4) Storm water drainage lines are seen overflowing during rainy season in projects localities at post projects stage, (5) Solid waste collection is being done by Pimpri Chinchwad Municipal Corporation and collection is slightly improved in post projects stage in comparison to post projects, (6) More number of dustbins have been installed around the city and at every corner in residential colonies and beneficiaries are using them, (7) In regard to BSUP projects in Pimpri Chinchwad city, the beneficiaries have appreciated and bring the changes the quality of life at post projects stages in comparison to pre projects, (8) Involvement of community participation is nil as far as JnNURM projects was concern. The survey finding in Kolkata city were (1) Water supply duration is almost remained the same in both pre and post projects situation. The beneficiaries had responded that there was no change in terms of water quality and quantity and so on, (2) There is no improvement in terms of waste water

collection in post projects stage as compared to pre projects situation, (3) As far as storm water and drainage project was concerns, there is no positive impact on urban environment or citizen, (4) The solid waste collection is done through private agencies and door to door collection is not being practice at post projects. Interventions of JnNURM Projects for solid waste management litter have had no impact in Kolkata city, (5) BSUP projects have improved the quality of urban poor under In-Situ projects in various ULBs within Kolkata Metropolitan Region. The beneficiaries have appreciated the In-Situ projects in Kolkata city.

The beneficiaries have benefited at different levels depending on the nature of projects. The creation of infrastructure facilities like laying pipe line for water supply and sewer line have directly impact on the beneficiaries whereas the renewal of the existing infrastructure facilities such as renovation of pumping station and replacement of old machine has less impact on the beneficiaries. In comparison of the three cities (Surat, Pimpri Chinchwad and Kolkata), Pimpri Chinchwad city has better performance for BSUP projects in terms of planning aspect and service facilities whereas Kolkata city is better performance for In-Situ projects. Relocated of slum dwellers in Surat city is facing a lot of problems in terms of urban services and job prospects.

The lessons learnt from the study are that, urban infrastructure development planning process suffered on account of the following; (1) lack of integrated planning at city level and regional level, (2) absence of community participation in planning, (3) exclusion of peri-urban areas, (4) process heavy and lack of coordination, (5) failure to adopt service benchmark, (6) lack of capacity, (7) lack of different approaches towards reforms and (8) delay in the implementation of 74th Constitutional Amendment Act (CAA). In this context, strategies required to carry out projects effectively, in time to ensure the sustainable urban infrastructure in India have been drawn with the help of useful inference from the best practice of better performing cities such as Surat, Pimpri Chinchwad (Pune) and Kolkata. Based on the study, the following strategy have been developed – (1) Reform strategy to be adopted for Urban Renewal Project, (2) Short term Plan Strategy for JnNURM Mandatory Reform, (3) Medium term Plan Strategy for JnNURM Mandatory Reform, (3) Model for JnNURM, (5) Storm Water System Plan Strategy, and (6) Strategy for BSUP Projects. Along the same line of these strategies, the policy has suggested the "Capacity Building at city level" which is highly required for sustaining the urban infrastructure development in India.

ACKNOWLEDGEMENTS

The author has great privilege and pride to express his immense sense of gratitude to Prof. R. Shankar, and Dr. Mahua Mukherjee, Department of Architecture and Planning, Indian Institute of Technology, Roorkee for his valuable and intellectual guidance throughout the tenure of this work. He has been a motivating and driving force where targets appeared to be tough during the course of work. Without his timely help, constructive criticism, positive attitude and painstaking efforts, it would have been impossible to complete this thesis in the present form.

I express specially thanks to my family at Department of Architecture and Planning, IIT Roorkee, especially Prof. Pushplata, Prof. Ajay Gairola (Centre of Excellent in Disaster and Mitigation and Management) and Associate Prof. Dr. P. S. Chani and all faculty of Architecture and Planning, IIT Roorkee for their valuable suggestions. The essential office assistance from the Department of Architecture and Planning is also gratefully acknowledged.

I thank Ministry of Urban Human Resources Development, Government of India for providing the financial support, which made this research possible. Special thanks to my family members for constantly helping and moral supporting during my research work are valuable for me to complete this research work.

I express my deep gratitude to Planner, Engineers and other official staffs of Surat Municipal Corporation, Kolkata Municipal Corporation, Pimpri Chinchwad Municipal Corporation, and Imphal Municipal Council for their valuable guidance, support in research work and cooperation.

I express my sincere thanks to Ministry of Urban Development, Government of India for providing the information and data which made this research works.

My special thank to JnNURM projects beneficiaries who had given me the necessary information during survey pertaining to field study areas, Surat, Pimpri Chinchwad, Kolkata and Imphal.

The acknowledge obtained from the libraries of School of Planning and Architecture-Delhi, Indian Institute of Town Planner-Delhi, National Institute of Town Planner-Delhi, Indian Institute of Public Administration-Delhi for facilitating during my research work. My thanks to Mr. Aniruddha Pawar, Mr. Rahul Waikhom, Kh. Bijenkumar Meitei, Bijoychandra Takhellambam, Aaron Naorem L. Shilamanee Devi, and other colleges of the IIT Roorkee for helping my research work.

I would like to thank colleges of research scholars, Department of Architecture and Planning, IIT Roorkee, Roorkee.



Table of Contents

Candidate's Declaration	Ι
Executive Summary	III
Acknowledgements	IX
Table of Contents	XI
Abbreviation and Acronyms	XVII
List of Figures	XXIII
List of Tables	XXVII

CHAI	PTER 1: INTRODUCTION	1
1.1	Preamble	1
1.2	Urbanization Scenario in India	3
1.3	Urban Infrastructure Service Scenario in India	5
	1.3.1 Urban Water Supply in India	6
100	1.3.2 Urban Waste water Management in India	6
- 6. C	1.3.3 Urban Storm Water Drainage System in India	8
	1.3.4 Urban Solid Waste Management in India	9
1.4	Housing for Urban Poor in India	10
1.5	The Context of JnNURM	13
	1.5.1 Preamble of JnNURM	13
	1.5.2 JnNURM Scheme Approaches	14
1.6	Identification of the Research Work	14
1.7	Need for the Study	14
1.8	Aim and Objectives of the Research	15
1.9	Scope	17
1.10	Research Methodology	17
1.11	Tools and Techniques Employed	17
1.12	Organization of the Thesis	17
	PTER 2: URBAN RENEWAL	21
2.1	Introduction	21
2.2	Urban Improvement Approaches	21
	2.2.1 Urban Regeneration	22
	2.2.2 Urban Reconstruction	22
	2.2.3 Urban Rehabilitation	22
	2.2.4 Urban Renewal	23
	2.2.5 Urban Redevelopment	23
	2.2.6 Urban Revitalization	23
2.3	Holistic and Comparative View of Urban Renewal	23

	2.4	Case Study of Urban Renewal Project in Singapore	28
		2.4.1 Introduction	28
		2.4.2 Reason for Urban Renewal	28
		2.4.3 Urban Services	29
		2.4.3.1 Water Supply	29
		2.4.3.2 Waste Water Management	32
		2.4.3.3 Storm Water and Drainage	36
		2.4.3.4 Solid Waste Management	42
		2.4.4 Housing for Urban Poor	48
		2.4.5 Redevelopment in Singapore	53
		2.4.6 Economic Sustainability	53
		2.4.7 Lessons Learnt	56
		2.5. Summary	57
СНА	PTER 3	: INTRODUCTION TO JnNURM	59
	3.1	Introduction	59
	3.2	JnNURM Objectives	60
	3.3	Identified Cities under JnNURM	61
	3.4	Scope of Urban Renewal under the JnNURM	62
	3.5	JnNURM Reforms at State and City Levels	63
	3.6	Funding Pattern	65
	3.7	Institutional Frameworks	67
	3.8	Expected Outcome of JnNURM	70
	3.9	Summary	70
СНА	PTER 4	: COMPARATIVE ANALYSIS OF JNNURM AT STATE AND CITY	
LEVI			73
4.1	Genera	at	73
4.2		pt of Urban Governance	73
4.3		ns under JnNURM Scheme	74
	4.3.1	State Level Reforms under JnNURM Scheme	76
	4.3.2		82
	4.3.3	Optional Reforms under JnNURM Scheme	83
4.4	Comp	arative Analysis of JnNURM Reforms	86
	1	JnNURM Mandatory Reforms at State Level	86
		JnNURM Mandatory Reforms at City Level	90
	4.4.3	JnNURM Optional Reforms at City Level	95
4.5	E-Gov	vernance Performance	99
4.6	Comp	arative Analysis of Fund Flow under UIG	102
	4.6.1	UIG Fund Flow at State Level	102
	4.6.2	UIG Fund Flow at City Level	106
4.7	Comp	arative Analysis of Fund Flow under BSUP	111
	4.7.1	BSUP Fund Flow at State Level	111

	4.7.2 BSUP Fund Flow at City Level	114
4.8	DPRs Preparation and Proposals	117
4.9	Comparative Analysis of Projects Implementation under UIG	118
	4.9.1 UIG Project Implementation at State Level	118
	4.9.2 UIG Project Implementation at City Level	120
	4.9.3 Discussion	126
4.10	Comparative Analysis of BSUP Project Implementation	127
	4.10.1 BSUP Project Implementation at State Level	127
	4.10.2 BSUP Project Implementation at City Level	130
4.11	Summary	130
СНА	APTER 5: EVALUATION OF UIG AND BSUP FOR SELECTED C	ITIES 133
5.1	Research Techniques Adopted	133
5.2	Profile of Selected Cities - Surat, Pimpri Chinchwad (Pune) and Kolk	tata 134
5.3	Selected Urban Infrastructure Services	136
5.4	Water Supply Sector	140
1.0%	5.4.1 Project Description	140
1.1	5.4.2 Financial Progress of Water Supply Sector	142
	5.4.3 Physical Progress of Water Supply Sector	146
	5.4.4 Community Participation	149
	5.4.5 Comparative Picture of Case Study Cities–Surat, Pimpri Chin	chwad (Pune) and
Kolk	rata	150
5.5	Waste Water Management Sector	153
	5.5.1 Project Description	153
e	5.5.2 Financial Progress of Waste Water Management Sector	155
	5.5.3 Physical Progress of Waste Water Management Sector	157
	5.5.4 Community participation	160
	5.5.5 Comparative Picture of Case Study Cities- Surat, Pimpri Chin	chwad (Pune) and
Kolke	ata	160
5.6	Storm Water and Drainage Sector	166
	5.6.1 Project Description	166
	5.6.2 Financial Progress of Storm Water and Drainage	168
	5.6.3 Physical Progress of Storm Water and Drainage	170
	5.6.4 Community Participation	172
	5.6.5 Comparative Picture of Case Study Cities – Surat and Kolkata	<i>a</i> 172
5.7	Solid Waste Management Sector	179
	5.7.1 Project Description	179
	5.7.2 Financial Progress of Solid Waste Management Sector	182
	5.7.3 Physical Progress of Solid Waste Management Sector	185
	5.7.4 Community Participation	186
	5.7.5 Comparative Picture of Case Study Cities- Surat, Pimpri Chin	
Kolka		187
5.8	Basic Services to Urban Poor	191

	5.8.1	Objectives of Basic Services to Urban Poor	192
	5.8.2	Project Description	192
	5.8.3	Financial Progress of Basic Services to Urban poor	193
	5.8.4	Physical Progress of Basic Services to Urban Poor	196
	5.8.5	Community Participation	200
	5.8.6	Comparative Picture of Case Study Cities – Surat, Pimpri Chinchwad (F	Pune)
and K	Colkata		201
5.9	Specia	al Case Study of Imphal City	212
	5.9.1	Introduction	212
	5.9.2	Urban Services Scenario	214
	5.9.3	JnNURM Intervention under UIG Sub-Mission	214
	5.9.4	and the second se	217
	5.9.5	Project Glance under BSUP	218
	5.9.6	Conclusion	219
5.10	Sumn	the second se	220
			2
CHA	PTER (5: DISCUSSION	223
6.1	Gener	al	223
6.2	State	and City Levels Comparative Picture	223
	6.2.1	Reforms	233
	6.2.2	E-Governance	228
	6.2.3	Fund	231
	6.2.4	DPR	233
	6.2.5	Implementation	234
6.3	Peer I	Experience and Reflect Learning (PEARL) Model	237
6.4	Discu	ssion on Selected Infrastructure of the Selected Cities	238
	6.4.1	Water Supply	239
		6.4.1.1 Operational Inference from Best Practices of Selected Cities	239
		6.4.1.2 Useful Guideline for Sustainable Water Supply System	243
	6.4.2	Waste Water Management	244
		6.4.2.1 Operational Inference from Best Practices of Selected Cities	244
		6.4.2.2 Useful Guideline for Sustainable Waste Water Management	247
	6.4.3	Storm Water and Drainage	247
		6.4.3.1 Operational Inference from Case Studies of Selected Cities	247
		6.4.3.2 Useful Guideline for Storm Water and Drainage	249
	6.4.4	Solid Waste Management	250
		6.4.4.1 Operational Inference from Best Practice of Selected Cities	250
		6.4.4.2 Useful Guideline for Solid Waste Management	256
	6.4.5	Basic Service to Urban Poor	256
		6.4.5.1 Operational Inference from Best Practices of Selected Cities	257
		6.4.5.2 Useful Inference for BSUP	261
6.5	Specia	al Discussion on Imphal City	262
6.6	Sumn		263

CHAPTER 7: CONCLUSION		265
7.1	Conclusions	265
7.2	Policy Recommendations	268
7.3	Scope for Further Research	269

REFERENCES

10

279

LIST OF ANNEXURE

×.

Annexure I	
Annexure II	
Annexure III	
Annexure IV	JnNURM City Size (2011 Census)
Annexure V	Slum Population Targeted in Sate Wise
Annexure VI	Per Capita under UIG sub-mission, JnNURM in 65 Cities
Annexure VII	BSUP Projects Details
Annexure VIII	
Annexure IX	
Annexure X	Fact Profile of Pimpri Chinchwad City
Annexure XI	
Annexure XII	Fact Profile of Imphal City
Annexure XIII	BSUP Projects Progress in Kolkata City as on 2012
Annexure XIV	Twelfth Schedule (Article 243 W)
Annexure XV	Municipal Solid Wastes (Management Handling) Rules, 1999
Annexure XVI	
Annexure XVII	Research Paper Publication
	Lann.



ABBREVIATIONS AND ACRONYMS

ADB:Asian Development BankAGR:Avalon Global ResearchASCI:Administrative Staff College of IndiaBCA:Building and Construction AuthorityBCPs:Booster Chlorination Plants	
ASCI:Administrative Staff College of IndiaBCA:Building and Construction Authority	
BCA: Building and Construction Authority	
PCDa: Deaster Chloringtion Dlants	
bers. Booster Chiofmation Flants	
BDO: Block Development Officer	
BOT: Build Operate and Transfer	
BRC Baltimore Recycling Coalition	
BSUP: Basic Services to Urban Poor	
CAA: Constitutional Amendment Act	
CAD: Computer Aid Design	S
CBC: Centre Business Centre	2
CBD: Centre Business District	
CCS: Centre for Civil Society	2
CCTV: Closed – Circuit Television	
CDIA: Cities Development Initiative for Asia	н.
CDP: City Development Plan	
CP: Community Participation	
CPCB: Central Pollution Control Board	5
CPF: Central Provident Fund	6
CPHEEO: Central Public Health Engineering Environmental Organization	
CRWPH: Construction of Raw Water Pump House	
CSMC: Central Sanction and Monitoring Committee	
CTAG: City Technical Advisory Group	
CVTC: City Volunteer Technical Group	
CWPH: Clear Water Pump House	
CWR: Clean Water Reservoir	
CWRP: Changi Water Reclamation Plant	
DBOO: Design Build Own Operate	
DPCs: District Planning Committees	
DPRs: Detailed Project Reports	

DTSS:	Deep Tunnel Sewerage System
DUs:	Dwelling Units
EPA:	Environment Protection Agency
EPHA:	Environment Public Health Act
EPHR:	Environment Public Health Regulation
ESR:	Elevated Service Reservoir
EWS:	Economical Weaker Section
FGD:	Focus Group Discussion
FI:	Foreign Investment
GDP:	Gross Domestic Product
GIS:	Geographical Information System
GoI:	Government of India
HAHS:	Housing Authority and Housing Society
HDB:	Housing Development Board
HHs:	Households
HMC:	Howrah Municipal Corporation
HUD:	Housing and Urban Development
HUDCO:	Housing and Urban Development Corporation Ltd
ICS:	Installation of Chlorination System
ICT:	Information Communication and Technology
IEC:	Information Education and Communication
IGSN:	Indian Government Standard Norm
IMC:	Imphal Municipal Council
IRDA:	Iskandar Regional Development Authority
IRMs:	Installation of Revenue Meters
JnNURM:	Jawaharlal Nehru National Urban Renewal Mission
KMC:	Kolkata Municipal Corporation
KMA:	Kolkata Metropolitan Area
LIG:	Lower Income Group
LPCD:	Liter Per Capita per Day
MDGs:	Millennium Development Goals
MEWR:	Ministry of Environment and Water Resources
MGD:	Million Gallons Per day

MGI	•	Mckinsey Global Institute
MIC	A:	Ministry of Information, Communication and Arts
ML	A:	Member of Legislative Assembly
MLI) :	Million Liters per Day
MoH	IUPA:	Ministry of Housing Urban Poverty Alleviation
MoU	JD:	Ministry of Urban Development
MP:		Member of Parliament
MPC	Cs:	Metropolitan Planning Committees
MRT	ſS:	Mass Rapid Transport System
MSV	VM:	Municipal Solid Waste management
MTI	- 5	Ministry of Trade and Industry, Singapore
NDI	TA:	Naba Diganta Industrial Township Authority
NEA		National Environment Agency
NGC)s:	Non-Government Organizations
NIU	A:	National Institute of Urban Affairs
NSG	i:	National Steering Group
NSS	: 6 6	National Sample Survey
NSS	0:	National Sample Survey Organization
NTA	G:	National Technical Advisory Group
0&N	A:	Operation and Maintenance
OBC	2:	Other Backward Class
ОНТ	ſs:	Over Head Tanks
PAP	6.7	People's Action Party
PC:	vs.	Planning Commission
PCM	IC:	Pimpri Chinchwad Municipal Corporation
PH:		Physically Handicapped
PH:		Pump House
PHE	:	Public Health Engineering
PPP:		Public Private Partnership
PRIs	:	Panchayat Raj Institutes
PSC		Pre Stressed Concrete
PUB	:	Public Utilities Board
PWC	2:	Public Waste Collector

RCC:	Reinforce Concrete Cement
R&D:	Research and Development
RMDP:	Rising Main and Distribution Pipeline
RoB:	Road Over Bridge
RWTIA:	Raw Water Intake Arrangement
RWTS:	Raw Water Transmission System
SC:	Schedule Caste
SECs:	State Election Commissions
SFC:	State Finance Commission
SGD:	Singapore Dollar
SIT:	Singapore Improvement Trust
SLSC:	State Level Steering Committee
SMC:	Surat Municipal Corporation
SSDP:	Sing Spring Desalination Plant
ST:	Scheduled Tribe
STPs:	Sewage Treatment Plants
SUDA:	Surat Urban Development Authority
SUL:	Sustainable Urban Livelihood
SWM:	Solid Waste Management
TAG:	Technical Advisory Group
TCPO:	Town and Country Planning Organization
TPD:	Town Planning Department
UA:	Urban Agglomeration
UFW:	Unaccounted Flow of Water
UGR:	Under Ground Reservoir
UIG:	Urban Infrastructure Governance
ULBs:	Urban Local Bodies
ULCRA:	Urban Land Ceiling Regulation Act
UN:	United Nations
UR:	Urban Renewal
URD:	Urban Renewal Development
URPs:	Urban Renewal Projects
US:	United State

UTs: Union Territories

WHO: World Health Organization

WRP: Water Reclamation Plant

WTPs: Water Treatment Plants





LIST OF FIGURES

Figure No.	Figure Title	Page No.
Figure 1.1	Million Plus Cities of India	4
Figure 1.2	State wise Slum Households as percentage of Urban Households	12
Figure 1.3	Research Methodology	16
Figure 2.1	Location Map of Singapore	28
Figure 2.2	NEWater's Location Map	31
Figure 2.3	Four National Taps	32
Figure 2.4	Deep Tunnel Sewerage System	33
Figure 2.5	Phase I and II for Deep Tunnel Sewerage System	35
Figure 2.6	Flooded Areas in Singapore 1970	37
Figure 2.7	Flooding in Singapore (2010)	38
Figure 2.8	Incineration Plant Coverage Area in Singapore	43
Figure 2.9	Segregation of Solid Waste at Source	43
Figure 2.10	Conservation of China Town	53
Figure 3.1	Identified JnNURM Cities	62
Figure 3.2	JnNURM Process (Project Proposal and Policy Directive Flow)	66
Figure 3.3	JnNURM Process (Project Proposal and Fund Flow)	67
Figure 3.4	Institutional Analysis for JnNURM Policy, Monitoring	68
Figure 4.1	State Level Mandatory Reforms Performance	90
Figure 4.2	Grading of Cities as per City Level Mandatory Reforms	94
14.3	Performance	
Figure 4.3	Grading of Cities as per City Level Optional Reforms Performance	94
Figure 4.4	E-Governance Progress as on 2012	99
Figure 4.5	Fund Allocation under UIG in Eleventh Sector in Percentage wise	103
Figure 4.6	Category of Per Capita Investment at City Level under UIG	109
Figure 4.7	Variation of BSUP Investment in India	112
Figure 4.8	Highest Targeted Dwelling Units at City Level	115
Figure 4.9	Lowest Targeted Dwelling Units at City	115
Figure 4.10	Variation of BSUP Dwelling Units Approved Per Lakh Slum	128
	Family (above 10000 DUs)	
Figure 4.11	Variation of BSUP Dwelling Units Approved Per Lakh Slum	128

Figure No.	Figure Title	Page No.
	Family (between 5000-10000 DUs)	
Figure 4.12	Variation of BSUP Dwelling Units Approved Per Lakh Slum	129
	Family (below 5000 DUs)	
Figure 5.1	Location Maps of Case Study Cities	136
Figure 5.2	Project Locations in Surat City	137
Figure 5.3	Project Locations in Pimpri Chinchwad (Pune) City	138
Figure 5.4	Project Location in Kolkata City	139
Figure 5.5	Selected Sectors shared in Percentage	143
Figure 5.6	Investment in Selected Sectors in Surat City	143
Figure 5.7	Water Supply Project at Vesu	146
Figure 5.8	WTP at Pimpri Chinchwad, Ward No. 19 under DPR-I	147
Figure 5.9	Comparative Pictures of Water Supply Duration in a Day	151
Figure 5.10	Anjana STP under DPR-I	157
Figure 5.11	Comparative Pictures for Waste Water Disposal Mechanism	161
Figure 5.12	Willingness to Pay for Sewer Collection	163
Figure 5.13	Comparative Pictures for Satisfactory Level for Waste Water	164
	Management	
Figure 5.14	Storm Water Drainage Sector Project under DPR-II	166
Figure 5.15	Storm Water Disposal Mechanism	173
Figure 5.16	Flooding Problems	174
Figure 5.17	Frequency of Flooding	175
Figure 5.18	Cleaning of Drains by Municipalities	176
Figure 5.19	Satisfactory Level of Municipality Services	177
Figure 5.20	Method of SWM Disposal	188
Figure 5.21	Door to Door Collection	189
Figure 5.22	Satisfactory Level for SWM	190
Figure 5.23	New Housing at Besthan, Surat City	192
Figure 5.24	Job Prospect	202
Figure 5.25	Beneficiaries Monthly Income	203
Figure 5.26	Source of Water Supply	204
Figure 5.27	Duration of Water Supply in a Day	205
Figure 5.28	Frequency of Water Supply	206

Figure No.	Figure Title	Page No.
Figure 5.29	Satisfactory Level for Water Supply	207
Figure 5.30	Satisfactory Level for Waste Water Management	208
Figure 5.31	Types of Solid Waste Disposal	209
Figure 5.32	Frequency of Solid Waste Collection from Collection Point	210
Figure 5.33	Satisfactory Level for SWM	211
Figure 5.34	Imphal City Map	213
Figure 5.35	Preservation of Water Body Project in Imphal City	214
Figure 5.36	Impact of Preservation of Water Body Project	217
Figure 5.37	Showing No Dustbin in Ward No. 5	218
Figure 5.38	Solid Waste Dumping in Drains in Ward No. 14	218
Figure 5.39	Solid Waste Dumping Near Bridge in Ward No. 24	218
Figure 5.40	Solid Waste Dumping Near Cremation Ground in Ward No. 8	218
Figure 6.1	JnNURM Reforms Strategy	224
Figure 6.2	Short Term Plan Strategy for JnNURM Reforms	227
Figure 6.3	Long Term Plan Strategy for JnNURM Reforms	228
Figure 6.4	Surat Municipal Corporation Administrative Structure	230
Figure 6.5	Pimpri Chinchwad Corporation Administrative Structure	230
Figure 6.6	Project Distribution in India under UIG, JnNURM	235
Figure 6.7	PEARL Model for JnNURM	238
Figure 6.8	Physical Progress of the Water Supply Projects in Surat City	240
Figure 6.9	Water Supply Progress under UIG in Surat City	241
Figure 6.10	Water Quality Testing at WTP in Pimpri Chinchwad City	242
Figure 6.11	Over Head Tank at Salt Lake, Sector-V, Kolkata City	242
Figure 6.12	(a) Water Supply Benchmark	244
Figure 6.12	(b) Implementation factor to achieve benchmark	244
Figure 6.13	Physical Progress of the Waste Water Management Projects under	245
	JnNURM in Surat City	
Figure 6.14	Comparative Pictures for Waste Water Management in Pimpri	246
	Chinchwad City	
Figure 6.15	STP and Pumping at Salt Lake Sector-V	246
Figure 6.16	(a) Benchmark for Waste Water Management	247
Figure 6.16	(b) Implementation factor to achieve benchmark	247

Figure No.	Figure Title	Page No.
Figure 6.17	Physical Achievement under JnNURM for Drainage Projects in	248
	Surat City	
Figure 6.18	Physical Progress of Storm Water and Drainages in Bansberia	249
Figure 6.19	Storm Water System Plan Strategy	250
Figure 6.20	SWM Practice in Surat City	252
Figure 6.21	Best Practice for SWM in Surat City	253
Figure 6.22	Scenario of SWM in Pimpri Chinchwad at Post Project	254
Figure 6.23	Constructed Vermicomposting-Pit at Bansberia	255
Figure 6.24	Status of BSUP Project at Surat City	257
Figure 6.25	Scenario under BSUP Projects at Surat City	258
Figure 6.26	Positive Impact after BSUP along the Tapti River Bank in Surat	258
	City	i Sar
Figure 6.27	BSUP Work Performance in Pimpri Chinchwad	259
Figure 6.28	In-Situ Projects under BSUP in Kolkata City	260
Figure 6.29	Strategy for BSUP Projects	262
Figure 6.30	Scenario of SWM at Post Project in Imphal City	263

ŝ

LIST OF TABLES

Table No.	Table Title	Page
		No.
Table 1.1	Level of Urbanization and Population size	5
Table 2.1	Urban Improvement Approaches	24
Table 2.2	Urban Renewal Policies, Social Issues and Policy Action	25
Table 2.3	Strategy of Urban Renewal in Developing and Developed nations	26
Table 2.4	Chronological Development of Urban Improvement Approaches	27
Table 2.5	Water Supply Service Performance in Singapore	30
Table 2.6	Types of Solid Waste Collection based on type of Waste and Vehicles	44
Table 2.7	Incineration Plants in Singapore	47
Table 2.8	Housing trends Among Public Housing Residents in Singapore	50
Table 2.9	Comparative Economic Structure of Singapore and Hong Kong	54
Table 2.10	Service Sector in Singapore	54
Table 4.1	Objectives of Reforms under JnNURM	77
Table 4.2	Implementation status of 74 th Constitution Amendment Act	79
Table 4.3	Purposes of the Reforms Indicators	80
Table 4.4	Component wise Performance of State Level Mandatory Reforms	87
Table 4.5	State wise Performance of Sate Level Mandatory Reforms	88
Table 4.6	Grading of State Level Mandatory Reforms	89
Table 4.7	Component wise Performance of City Level Mandatory Reforms	91
Table 4.8	City wise Performance of City Level Mandatory Reforms	92
Table 4.9	Grading of City Level Mandatory Reforms	94
Table 4.10	Component wise Performance of City Level Optional Reforms	95
Table 4.11	City wise Performance of City Level Optional Reforms	96
Table 4.12	Grading of City Level Optional Reforms	98
Table 4.13	E-governance performance in JnNURM cities	100
Table 4.14	Investment and Allocation of Fund in Different Infrastructure Sectors	102
Table 4.15	UIG Fund Allocation in Sector Wise as on 2012	104
Table 4.16	UIG Fund Allocation in State Wise as on 2012	105
Table 4.17	UIG Fund Distribution in 65 Cities	106
Table 4.18	No. of Cities under Different Category of Per Capita	108

Table No.	Table Title	Page
		No.
Table 4.19	City Coverage under UIG Projects Sectors	110
Table 4.20	JnNURM Cities Investment Classification	111
Table 4.21	States/UT wise Targeted DUs and Cost per DU under BSUP	113
Table 4.22	BSUP Projects Funding Pattern	114
Table 4.23	State Level DPRs Received and Approved	119
Table 4.24	Number of JnNURM Project Sectors as on 2012	122
Table 4.25	Number of UIG Projects, JnNURM as on 2012	123
Table 4.26	Progress of Projects Completion	125
Table 5.1	DPRs Description in Pimpri Chinchwad (Pune) City	190
Table 5.2	Projects Description in Kolkata City	141
Table 5.3	JnNURM Coverage zones and Investment in Surat City	143
Table 5.4	Financial Progress in Pune (Pimpri Chinchwad) City	144
Table 5.5	Financial Progress in Kolkata City for Water Supply	145
Table 5.6	Physical Progress for Water Supply in Surat City	146
Table 5.7	Physical Status of the Water Supply Sector in Pimpri Chinchwad	147
	(Pune) City	
Table 5.8	Physical Progress of Water Supply Works in Kolkata City	148
Table 5.9	FGD Finding in Selected Cities for Water Supply Projects	153
Table 5.10	Project Description for Waste Water Management in Kolkata City	154
Table 5.11	Financial Progress for Waste Water Management in Surat City	155
Table 5.12	Financial Progress for Waste Water Management in Pimpri Chinchwad	156
Table 5.13	Financial Status for Waste Water management in Kolkata City	157
Table 5.14	Physical Progress of the Waste Water Management Projects in Surat	158
	City	
Table 5.15	Physical Progress for Waste Water Management in Kolkata City	159
Table 5.16	FGD Finding in Selected Cities	165
Table 5.17	Projects Description of the Storm Water and Drainage in Kolkata City	166
Table 5.18	Financial Progress for Storm Water and Drainage in Surat City	168
Table 5.19	Financial Progress for Storm Water and Drainage in Kolkata City	169
Table 5.20	Physical Achievement for Storm Water and Drainage in Surat City	170
Table 5.21	Physical Progress for Storm Water and Drainage for Kolkata City	171

Table No.	Table Title	Page
		No.
Table 5.22	FGD Finding in Two Cities (Surat and Kolkata) for Storm Water and	178
	Drainage	
Table 5.23	Projects Description for Solid Waste management in Surat City	180
Table 5.24	Major Components for SWM in Pimpri Chinchwad (Pune) City	181
Table 5.25	Components of Solid Waste Management Projects in Kolkata City	182
Table 5.26	Financial Status for Solid Waste Management in Surat City	183
Table 5.27	Physical progress for Solid Waste Management in Surat City	185
Table 5.28	FGD Finding for Solid Waste Management in three cities	191
Table 5.29	Financial Progress for BSUP Projects in Surat City	193
Table 5.30	Financial Status of BSUP Projects in Pimpri Chinchwad City	195
Table 5.31	BSUP Projects in Kolkata city in Six Locations	196
Table 5.32	Physical Progress of BSUP Projects in Surat City	197
Table 5.33	Physical Progress of BSUP in Pimpri Chinchwad (Pune) City as on	198
	2012	
Table 5.34	Physical Progress of BSUP Projects in Kolkata city	200
Table 5.35	FGD Finding in Selected Cities	212
Table 5.36	Detailed Projects under UIG in Imphal City	216
Table 5.37	In-Situ Project in Imphal City	219
Table 6.1	Best Practices of DPRs in Selected Cities	239
Table 6.2	Role of Private Agencies for SWMM	251
100		
- 10	The second second	
1.1.5	A TE DE VERSEN	
	(A) (A) (A)	

INTRODUCTION

1.1 PREAMBLE

In 2010, half of the world's population lived in cities and by 2030 it will be 60 percent. The number of slum dwellers is projected to double from 1 billion to 2 billion over the next 25 years. It is also speculated that the number of mega-cities (with population over 10 million) will have risen from 19 in 2007 to 27 in 2025 in the developing countries (Patricia and Johannes, 2010).

Urbanization refers to the concentration of human populations into discrete areas, leading to transformation of land for residential, commercial, industrial and transportation purposes. It can include densely populated centers, as well as their adjacent peri-urban or sub-urban fringes (EPA, 2014). The process of urbanization creates many challenges for urban infrastructure improvement in the developing countries. The problems of cities are well known: cities are congested, polluted, energy-intensive, ridden by crime, corruption and poverty are ever expanding and face difficulty in managing demand for urban infrastructure services or facilities (World Bank, 2010). The financing needs to meet the investment requirements of public infrastructure in cities are enormous. The United Nation (UN) estimated about \$ 4 billion per year is needed under Millennium Development Goals (MDGs) for slum improvement and other urban basic amenity services (United Nation, 2001).

The pace of urbanization in India is set to be accelerated. As per census 2011, about 377 (32.09%) million populations are living in cities/towns and expected to reach 600 million by 2030. The Planning Commission, 2012had reported that rapid urbanization has caused a huge gap in the urban infrastructure facilities mainly in the sectors of water supply, waste water management, storm water and drainage, water body management in urban areas. Another big problem caused by rapid urbanization is solid waste management, and shortage of housing for urban poor. Apart from these sectors, urban transports, urban environment and renewal of urban heritage need to be

accounted for overall development of urban areas. The cities and towns play a very significant role in India's socio-economic transformation and changes and behave as engine of economic growth (Planning Commission, 2008). As per Mckinsey Global Institute (MGI) report (2010), cities would share 70 percent of net jobs created by 2030, producing more than 70 percent Gross Domestic Product (GDP) and would have nearly fourfold increase in per capita income. Therefore urban infrastructure facilities are needed in order to raise self sustaining cities. The Government of India (GoI) had initiated to launch Jawaharlal Nehru National Urban Renewal Mission (JnNURM) on 3rd December 2005 for this purpose.

The JnNURM was a flagship program launched by Government of India and the biggest so far in such a huge scale in the history to address urban infrastructure issues. This scheme is to encourage reforms and fast track planned development with focus on the efficiency in urban infrastructure and services delivery mechanism, community participation and participation of Urban Local Bodies (ULBs)/Parastatal agencies (NIUA, 2009). As per 2001 Census, Government of India had listed 65 cities and classified into three categories based on the size of population. In the first category cities having population above 4 million were included, cities having population between 1 to 4 million were included in the second category while in the third category cities having less than 1 million populations were counted (Annexure –IV). The first phase of JnNURM scheme was planned for seven years (2005-2011) with an estimated budget of Rs. 1, 20,536 Crore (MoUD, 2005).

The JnNURM scheme has two sub-missions namely Urban Infrastructure Governance (UIG) and Basic Services to Urban Poor (BSUP) under Ministry of Urban Development (MoUD) and Ministry of Housing and Urban Poverty Alleviation (MoHUPA) respectively. The UIG submission covers eleven sectors such as water supply, waste water management, storm water and drainages, solid waste management, preservation of water body, other urban transport, parking, urban renewal, heritage development areas, MRTS and roads/flyover/RoB. The BSUP sub-mission focused only on the urban poor housing and sanitation (Sivarramakrishnan, 2010).

The total number of projects under Urban Infrastructure Governance (UIG) is 537 covering the total sectors with an approved projects cost of Rs. 6,205,097.16 lakh as UIG projects status, 2012. Among the eleven sectors, the water supply sector has maximum number of projects implemented

and preservation of water bodies has the minimum. Maximum numbers of JnNURM cities have implemented the sectors of water supply, waste water management, storm water and drainages, and solid waste management. The total number of projects under BSUP is 501 with an investment of Rs. 29906.53 lakh and targeting 1060446beneficiary dwelling units as per BSUP projects status, 2011.

1.2 URBANIZATION SCENARIO IN INDIA

India has reached a total population of 1210.2 million out of which 377.1 million populations are living in urban areas. The net increase in population over the last decade is 91.0 million. The percentage of urban population to the total population of the country stands at 31.6. There has been an increase of 3.35 percent in the proportion of urban population in the country during 2001-2011. The number of towns has jumped from 5161 in 2001 to 7953 in 2011. There is a net addition of 2774 towns comprising 242 Statutory and 2532 census towns over the decade (Census, 2011).

Based on the census 2011 of India, there are 53 cities in India which having population above one million (Census, 2011) (Fig. 1.1) (Annexure –II). The author had classified those 53 cities into six categories based on the level of urban population. The categorization has been done in the following manner. In the first category - cities having population of about 1 to 3 million are included, the second category consist of cities having a population of about 3.01 to 6.00 million and cities having a population of 6.01 to 9.00 million are counted in the third category. While in the fourth category cities with population of 9.01 to 12.00 million are included, cities having a population of 12.01 to 15.00 million are included in the fifth category and lastly in the sixth category cities with population ranging from 15.01 to 18.41 million are counted.

The cities in the sixth category include Delhi and Mumbai while Kolkata is the only city in the fifth category. There is no city having a population range of 9.01 to 12.00 million, which is in the fourth category. The cities in the third category are Chennai, Bangalore, Hyderabad and Ahmedabad. These bigger cities need to model in order have an effective management of growing urban pattern through remote sensing (Mahavir, 1996). While the cities of Pimpri Chinchwad (Pune), Surat and Jaipur are in the second category and the remaining cities fall under the first category and is represented in Fig. 1.1.

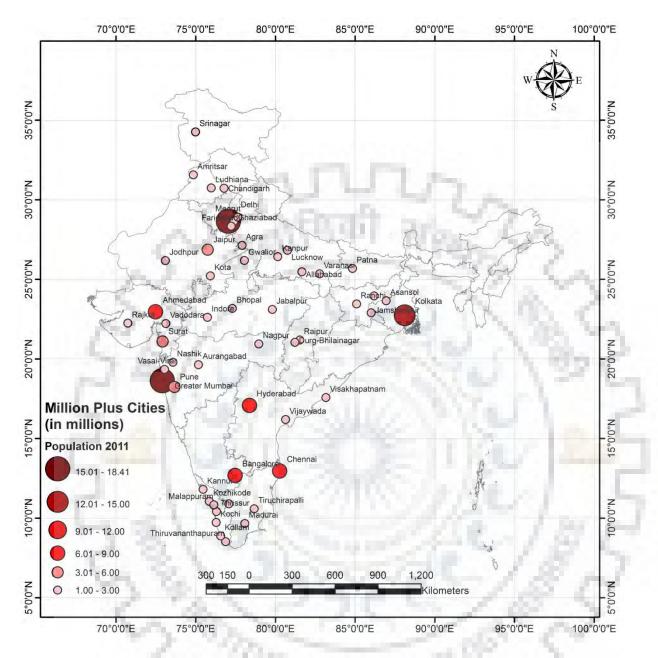


Fig. 1.1: Million Plus Cities of India, Source: Based on Census, 2011

In a comparison of states in India; Maharashtra, Uttar Pradesh and Tamil Nadu hold the top three spots in terms of population, with a population of 50.8 million (sharing 13.5%), 44.4 million (sharing 11.5%) and 34.9 million (sharing 9.3%) respectively. The lowest urban population are in the state of Sikkim, Arunachal Pradesh and Goa with a population of 0.06 million (shared negligible percent), 0.14 million (shared 0.1%) and 0.15 million (shared 0.1%) respectively (Census, 2011).

The level of urbanization has increased over the years from 17.96 percent to 31.16 percent during the period from 1961 to 2011. The size of urban population in India has been increasing from 78.0 million to 377.1 million. The scenario of urban population over the years and its level is shown in Table 1.1.

Year	Urban Population (in Millions)	Level of Urbanization (in percent)
1961	78.9	17.96
1971	109.1	19.90
1981	159.5	23.34
1991	217.6	25.71
2001	286.1	27.81
2011	377.1	31.16

Table 1.1: Level of Urbanization and Population size

100

Source: Analysis Based on Census 2011, and Pranati, 2006

100 C

1.3 URBAN INFRASTRUCTURE SERVICES SCENARIO IN INDIA

The urbanization process is set to continue across the world and as a result will lead to the stress of urban infrastructure facilities; there will be high demand for urban services in every corner of towns and cities in India. The main problems of urbanization are manifestation of lopsided urbanization, faulty urban planning, and urbanization with poor economic base without having functional category (Batra, 2009). Hence India's urbanization is followed by some basic problems in the field of (1) employment, (2) housing shortage, (3) slums and squatter settlements, (4) inadequate transport, (5) inadequate water supply and sanitation, (6) water pollution and air pollution and (7) inadequate provision for social infrastructure such as school, hospital, and so on. In such a situation, Urban Local Bodies (ULBs) could not cope up with the demand for present services (Shirish, S., et al., 2010). The present scenario of urban infrastructure in the areas of water supply, waste water management, storm water and drainage, solid waste management and housing of the urban poor are summarized as follows:

1.3.1 Water Supply Scenario in India

Safe drinking water is a basic need for all and a prime concern as per the Millennium Development Goal (MDG) by 2015 (Srila, G., et al., 2009). Indian cities and towns have increasing shortage of potable water mainly due to mounting demand and inadequate measure to meet the demand. This situation is due to increasing urban population, depleting of nearby water sources, water pollution, and inefficient use of water. There are instances of inefficient use of water, inefficient management of water supply system by various government agencies/Parastatals. Irregularity of water supply and poor performance is very common in cities and towns of India. Generally municipalities supply water for about 4 to 5 hours only daily. This is not matching with the benchmark (24X7 water supplies) of Indian Government Standard Norm (IGSN). The coverage of water supplied is 85 percent of urban population (CPHEEO, 2005).

The delivery of quality urban water is very low and insufficient and varies from one city to another. The average range of water supply is 37 to 298 Liter Per Capita per Day (LPCD) in Indian cities and towns. About 26 percent of urban households have being covered by pipe line connection with duration of 1 to 6 hours in a day and only 26 percent of it has been collected as revenues. While distributing the water, almost 70 percent of water is wasted due to lack of operation and maintenance (Anjal et al 2013). The physical losses (34 to 42 percent) occur due to leakages or overflow of water in the system. Reasons for leakages includes negligence by ULBs, poor quality of material or workmanship, ageing and corroded networks, leaking joint, lack of suitable appurtenance (pressure vessels, air valves, etc), uneven ground settlement and vehicular or other pressure on the networks. Administrative losses from theft of water or illegal registration connections, faulty meters, unrecorded supply due to the poor records, and billing errors as well as public stand post and use by charitable and religious institutions ranges from 12 to 18 percent (Kevin, 2000). According to the 54th round National Sample Survey (NSS), 70 percent of urban households are reported to be served by tap and 21 percent by Tube well or hand pump.

Urban Local Bodies (ULBs) are responsible for urban water supply and to deliver good quality of drinking water in Indian cities/towns. The government of India has adopted many schemes/programs to improve the water supply efficiently and sufficiently in urban areas. But in most of cities/towns, the schemes/programs are under progress and have poor performance. Large

metropolitan cities are yet to undertake basic reforms for improving the efficiency of water services provision and making it financially self sufficient. There are hardly any city/towns adopting any strategic planned, focus on demand management and improvement in services delivery efficiency.

1.3.2 Urban Waste Water Management in India

Over half of the world's hospital beds are occupied by people suffering from illnesses linked with contaminated water. The number of people who die due to diseases caused by polluted water is greater than the number of people who died due to all forms of violence including war. An estimated amount of about 90 percent of all wastewater in developing countries is discharged untreated directly into rivers, lakes or the oceans (UNEP, 2010). Generation and accumulation of domestic waste in fast growing human settlements is becoming a major issue in developing countries. The present waste management facilities are found to be haphazard and inadequate (Sameer et al, 2010). The waste water management practices are very important to fill the gap of water demand for various purposes such as agricultural purposes, and gardening. Increasingly untreated water (waste water from industrial, grey water from households etc) is discharged into ground water which pollutes water bodies in cities and towns (Rajive, 2011). There is a lack of management for waste water in urban areas.

The release of untreated wastewater has resulted in increased pollution and depletion of clean water resources. It is mainly caused by the untreated city sewage and industrial waste discharged into the rivers. The facilities to treat waste water are inadequate in most cities of India (AGR, 2011).

Discharge of waste water into water bodies both surface water and ground without untreated is common issue in Indian cities and towns. Out of the 38000 million liter per day was generated and could be able treated only 12000 million liter per day. This was a large gap between generation and treatment of waste water In Indian cities and towns (CPCB, 2009). Central Pollution Control Board (CPCB) carried out the study and depicted that there are 269 sewerage treatment plants (STPs) in India, of which 231 are operational, thus the existing treatment capacity is just 21 percent of the

present generation. The remaining untreated sewer is the main cause of pollution of river and lakes (Isher et al, 2011).

In the peri-urban areas waste water management practices are generally nil though the community needs collection and safe disposal of domestic waste and sludge. This lack of waste water management creates stagnant water in ponds with a foul smell which is very common in peri-urban areas (Jonathan, and Kevin, 2003). The 54thNational Sample Survey (NSS) reported that 26 percent of households had no latrine facility, 35 percent used septic tank and 22 percent used sewerage lines. About 43 percent of households in urban areas either had no latrines or no connection to a septic tank or sewerage. In urban areas sewerage connection varied from a low (48 percent) to a high (70 percent).

About 63 percent of the urban population has access to sewerage and sanitation facilities as on 31st March 2004. This includes both underground as well as sanitation through septic tanks. The access to underground sewerage facilities is very low, that is below 30 percent in many state viz. Rajasthan, Orissa, Chhattisgarh, Madhya Pradesh, Andhra Pradesh and West Bengal. Nearly 46 percent of urban households have water toilets, but only 36 percent of the urban households are connected to the public sewerage system (Planning Commission, 2008).

1.3.3 Urban Storm Water Drainages System in India

Storm water runoffs are not able to pond and infiltrate into underground water body due to the buildup of buildings and cemented pavement in the urban areas. It has also increased the surface runoff by creating more impervious surfaces such as pavement and buildings which do not allow percolation of the water down through the soil to the aquifer. Increased runoff reduces groundwater recharge, thus lowering the water table and creating water scarcity for people who depend on water wells which sometimes lead to droughts. Generally when runoff rate increases, it leads to exceeding capacity of downstream channels as a result of which floods occur over the floodplains (Needhidasan and Manoj, 2013).

Urban drainage interacts with the natural water system. There is often an influx of sewerage and solid waste in storm drains leading to pollution to receiving bodies. With increase in urbanization

and build up areas, there is high percentage of impervious surface that leads to increase in magnitude of storm water runoff and local flooding (Wankhade, 2013).

Stagnation of rain water in urban areas is very common in Indian cities and towns. Rain water accumulates at depressions in roads and channels or at times water drains out at a slow pace due to gentle slopes and lack of proper connectivity to storm water drains. As long as water remains on roads at the locations of under passes, road junctions and spots having poor camber, traffic is put to lot of inconvenience (Arun, 2012). The existing urban drainage system in the fast growing towns and cities are very complex, the sewerages gets mixed with storm water drains. This situation is a very common phenomenon in India (Joel, A., et al., 2007). Flooding due to lack of planning and understanding the storm water are common issues in urban areas. Therefore management of storm water is a very important component as the urban storm water could be potential sources by harvesting for further uses (IRDA, 2011). The permanent physical changes (building construction/ parking/paving and roof) in urban areas result in the changes in runoff patterns, frequency of flooding and create drainage problems in some locations (Jonathan, 2003). Most large cities in India are prone to flash floods e.g. Mumbai city has over hundred flood prone areas and has affected many people due haphazard construction and choked natural runoff (Kulshrestha, 2007).Water logging in slums is a common phenomenon either due to the absence of storm water management practice or inadequate of drainage system or lack of planning. As a result spreading of disease like malaria, filarial, dengue and annual recurrence of gastro-enteric diseases in cities is one of the critical situations in India (Neli, 2008).

1.3.4 Urban Solid Waste Management in India

The solid waste management practices in Indian cities and towns are very poor in terms of collection, transportation and disposal system. All cities in India do not have the same level of service for Solid Waste Management (SWM), some cities are neat and clean for example Surat and Chandigarh whereas some cities have very poor performance (MoUD, 2013). The Supreme Court has enforced the Municipal Solid Waste Management (MSWM) Rules 2000 for efficient collection and processing of the solid waste properly. But the implication of the enforcement is ineffective in most of the cities in India. Neither households nor municipalities in India practice segregation of biodegradable waste from the rest, and public awareness on the benefits of segregation is low. The

collection of the garbage from dustbins is infrequent; processing is not even done in most cities (Isher et al, 2011).

Coverage of municipal solid collection ranges from 70 percent to 90 percent in major metropolitan cities and less than 50 percent in smaller cities (in case of India), whereas in the Kunming (China) it is 100 percent, 95 percent in Belo Horizonte (Brazil), and 99 percent in Quezon city (the Philippines). As Chandigarh is one of the cities among the Indian cities which has performing better in term of planning and hence leading to an emerging bigger city (Marwaha, 2011). Less than 30 percent of solid waste is segregated and scientific disposal of waste is almost never practiced (UN Habitat, 2010). By 2047 solid waste generation in Indian cities will increase fivefold to touch 260 million tons per year, implying that the current solid waste generation is over 50 million tons per year. The Urban Local Bodies (ULBs), Non-Government Organization (NGOs), community-based organization and private companies are involved in the collection of solid waste. The city of Chandigarh is best example of efficient collection where almost 96.2 percent of the households is covered (Isher, 2011). However the collection of solid waste in Indian cities varies from one city to another. The practice of disposal in open dumping sites is highly dangerous and unethical. The poor management of solid waste has led to contamination of groundwater and surface water through leaching and pollution of air through unregulated burning of waste.

1.4 HOUSING FOR URBAN POOR IN INDIA

More than 50 percent of the world population lives in urban areas and an estimated number of around 1.06 million (32%) of urban dwellers live in slums and are expected to double in the next 30 years(Morakinyo et al, 2012). The United Nations global report (2003) reveals that that 924 million or 31.6 percent of the world's urban population lived in slums in 2001. The lack of water supply and sanitation services for the urban poor is an issue common to every city in developing countries (Chandra et al, 2013). Nearly one billion people were still using water from unimproved sources such as shallow wells, rivers, streams, ponds and drainage ditches with their attendant health and safety risks (Alok and Satish, 2005). The social life of the urban poor in the developing countries were quite varies in comparison to developed in terms of maternity, mortality, female literacy (Vijayan et al, 2013). In India, the population aged 60 and over constitutes about 7.4% of

the population of over a billion (Census of India, 2011). The care of elderly persons in developing countries rests entirely on family members (Rashmi et al, 2012).

According to National Sample Survey conducted in 2003, the estimated number of slums was 52,000 with 51% of the slums being notified slums in Indian cities and towns (Abir, Bandyopadhyay, and Vandana Agrawal, 2013). It is estimated that every seventh person living in the urban areas is a slum dweller (NSSO, 2003). The bulk of the urban poor are concentrated in urban slums or in squatters.

National average percent slum households of total urban households is 17.4% (Registrar General and Census Commissioner, 2011). The state wise percent slum household of total urban households is shown in Fig. 1.2. Andhra Pradesh, Madhya Pradesh and Chhattisgarh have highest percentages of slum households of total urban households ranging between 25.1% and 35.8%; while those of Maharashtra, Orissa, West Bengal and Sikkim range between 20.1% and 25%. Jammu and Kashmir, Uttarakhand, Haryana and Tamil Nadu have moderate percentages of slum households of total urban households ranging between 15.1% and 20%. Percentages of slum households of total urban households Punjab, Rajasthan, Uttar Pradesh, Nagaland, Mizoram, Tripura, and Karnataka range between 10.1% to 15%; while those of Himachal Pradesh, Gujarat, Bihar, Jharkhand, Assam, Arunachal Pradesh, Meghalaya, Goa, and Kerala range between 1.5% and 10%. Manipur is only state without any slum households.

The total slum population as per census 2011 was 65494604. In comparison among states/UTs Maharashtra state has shared highest slum population with 18.09 percent of the total slum population in India. In the states of Andhra Pradesh, West Bengal, Uttar Pradesh, Tamil Nadu, Madhya Pradesh has share above 10 percent of the slum population to total slum population in India. While Karnataka, Rajasthan, Chhattisgarh, Delhi, Gujarat, Haryana, Orissa, Bihar and Jammu and Kashmir states had shared above 1 percent to 5 percent of the slum population to the total slum population in India. The rest of states have shared below one percent of the slum population (Annexure III).

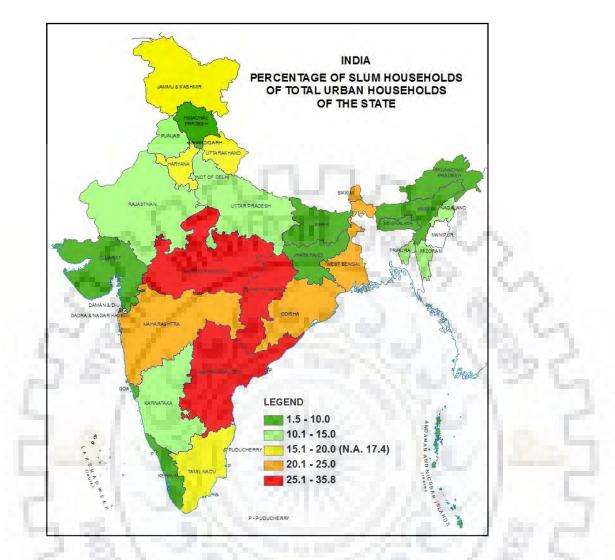


Fig. 1.2: State-wise Slum Households as percentage of Urban Households (Source: Census, 2011)

The urban poor face multiple deprivations – inadequate access to affordable housing, basic civic services like water, sanitation, drainage, solid waste management, roads, street lighting, health care, education and social security, and livelihood opportunities. The dimensions of urban poverty can be divided into three categories: (i) residential vulnerability (access to land, shelter, basic services); (ii) social vulnerability (deprivations related to factors like gender, age and social stratification, lack of social protection, inadequate voice and participation in governance) and (iii) occupational vulnerability (precarious livelihoods, dependence on informal sector for employment and earnings, lack of job security, poor working conditions, etc (Chandra and Sharma, 2011).

About 3 percent of the urban population does not have an exclusive room for living, while 32 percent live in one room house. About 29.4 percent of the urban population does not have access to tap water and 18.6 percent have no latrine facility within the house. 7.3 percent of urban populations still do not have access to electricity. With reference to assets, 13.3 percent of urban population does not have access to a television and 89.6 percent do not have access to a computer. 7 percent of the urban populations have no access to any asset such as radio, television, computer, telephone, bicycle, scooter or car (Census, 2011).

1.5 THE CONTEXT OF JNNURM

The JnNURM is for the first time in India, a comprehensive national level initiative carried out with huge budget for urban infrastructure development and housing for urban poor in 65 cities across the country. This programme attempted to build up and strengthen the institutions at Urban Local Body (ULB) level and to create self-sustaining line departments for better services to the urban population.

1.5.1 **Preamble of JnNURM**

Cities and Town have a vital role in India's socio-economic transformation and change. Host to about 30 percent of the country's population, they contribute 50-55 percent of the GDP (Sanjukta, 2012). At the same time, most cities and towns are severely stressed in terms of infrastructure and services availability, and their growth and development is constrained by indifferent implementation of the 74th Constitutional Amendment Act, 1992, and continuation of statutes, systems and procedures that impede the operation of land and housing markets. As this is incompatible with the country's socio-economic objectives, the Government of India launched JnNURM in December, 2005. The JnNURM aims to encourage cities to take initiative steps to bring about improvement in the existing service levels in a financially sustainable manner. The JnNURM consists of two sub-missions: the Urban Infrastructure Governance (UIG) and the Basic Services to the Urban Poor (BSUP). It believes that JnNURM would help to make efficient and equitable provision of urban services and for that, it is essential to create incentives and support urban reforms at state and city levels; develop appropriate enabling and regulatory mechanism; and integrate the poor with the services delivery system.

1.5.2 JnNURM Scheme Approaches

The approach of JnNURM is to make it a reform driven infrastructure improvement programme, to create economically productive, efficient, equitable and responsive cities. To bring about this urban transformation, active participation is sought from State Governments and ULBs of the mission cities to undertake infrastructure projects for improving urban environment quality and series of reforms to ensure sustainability of the infrastructure investment made under the Mission.

1.6 IDENTIFICATION OF THE RESEARCH WORK

The JnNURM has covered many aspects of urban infrastructure improvement such as water supply, waste water management, storm water and drainage, solid waste management, preservation of water body, other urban transport, parking, urban renewal, heritage development areas, Mass Rapid Transport System (MRTS), and roads/flyover/RoB. Maximum number of JnNURM cities have given priority to sectors of water supply, waste water management, solid waste management, and BSUP and implemented these sectors in maximum number of cities. In this context the research work for evaluation of JnNURM scheme is in areas of water supply, waste water management, solid waste management, and BSUP.

1.7 NEED FOR THE STUDY

The Government of India for the first time has funded to this scale for urban infrastructure development in India. Even by international standards, there is no match to the expense of this mission. Through a large number of urban infrastructure projects in 65 cities spread all over the country, it has created a unique opportunity for urban renewal on a large scale which has never been experienced before. JnNURM was launched in December 2005 and in the short span of seven years, more than 500 DPRs had been approved with an estimated expenditure of approximately Rs. 7269619.67 lakhs in 65 cities, out of which diverse urban infrastructure projects, have been completed or are in progress. National urban renewal programme of this magnitude makes it necessary to evaluate (i) the design and Implementation of JnNURM projects, (ii) performance and function of the completed JnNURM projects, (iii) impacts of JnNURM projects (Health, Environment and Social, and to review the implementation of the reforms of JnNURM in central, state and urban local levels and its implication for the improvement of services delivery.

The evaluation of the current scheme (JnNURM) of Indian Government flagship program is that investment in urban areas in the field of water supply, waste water management, storm water drainages, solid waste management and housing for urban poor should effectively get benefit out of these projects under such scheme. The policy designed and planning approaches by policy maker in regard to JnNURM needs to be checked to determine whether projects are running in a sustainable manner or not.

Based on the JnNURM progress report (2012) very few cities have achieved the target of implementation and procuring benefits out of these projects that too in some selected sector of urban infrastructure development projects. It was observed that thought the GoI offered equal opportunities to all JnNURM cities, they were unable to achieved equal development status. In this context, the evaluation of projects through various methods/techniques was felt necessary to find out the problems/issues in the implementation of projects and reforms under JnNURM.

1.8 AIM AND OBJECTIVES OF THE RESEARCH

Aim: To evaluate the urban renewal (infrastructure) projects implemented under JnNURM programme and draw useful inferences for sustainable urban development in India.

Objectives:

1. To make a comparative study of the status of reforms, compliances and other infrastructure project factors in all JnNURM cities and assess the performance levels achieved.

2. To analyze on a comparative basis the factors responsible for the successful completion of the select infrastructure projects in better performing cities.

3. To evaluate impacts of infrastructure development on the population of the select cities.

4. To assess the role of urban reform, implementation process and community participation in contributing to the success levels of implementation of projects in select cities.

5. To draw operational inferences from the detailed studies on the select cities and to evolve useful guidelines for urban infrastructure development.

6. To evolve policy recommendations for ensuring sustainable urban growth through implementation of urban infrastructure projects.

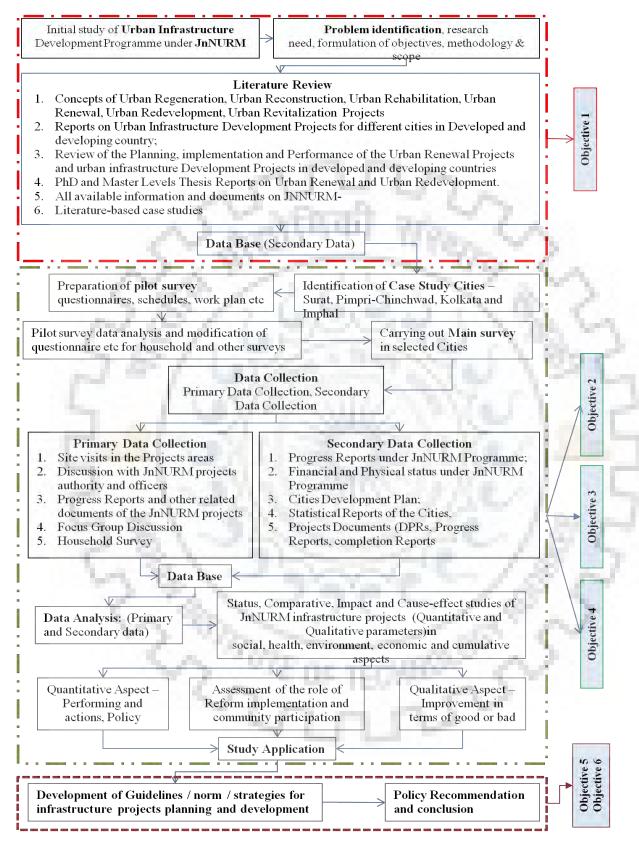


Fig. 1.3: Research Methodology

1.9 SCOPE

Scope of the research work pertains to water supply, sewerage, drainages, solid waste management and basic services to urban poor. The JnNURM has identified 65 cities for urban infrastructure improvement, detailed evaluation studies have been carried out for the cities of Surat, Pimpri Chinchwad (Pune) and Kolkata. The proposed research is mainly a field- oriented work involving a number of surveys in different cities and in the absence of multitude of relevant literature; the list of literature referred is limited.

1.10 RESEARCH METHODOLOGY

The research methodology is divided into mainly three parts as literature review, identification of case study cities, field study of data analysis, and formulation of guidelines and recommendation based on the finding of research work for urban infrastructure project planning and development in India. The detailed research methodology is shown in Fig. 1.3.

1.11 TOOLS AND TECHNIQUES EMPLOYED

The research techniques adopted for evaluation of JnNURM projects in the sectors of water supply, waste water management, storm water and drainage, solid waste management and BSUP projects were based on the data available on public domain (secondary data) which was collected from various sources of government department, other agencies and so on. Household surveys in benefited localities, field observations, photographic surveys, Focus Group Discussion (FGD) with projects beneficiaries, key interviews with implementing Agencies are some tools and techniques for data collection in the selected sectors (water supply, waste water management, storm water and drainage and solid waste management and BSUP projects) in selected cities. The software like GIS Arc, Auto CAD, and M.S. Excel etc. are used for analysis of both primary and secondary data.

1.12 ORGANIZATION OF THE THESIS

This thesis report is divided into seven chapters. The objective of **Chapter One** is to establish the content and problems for research work. It describes the urban infrastructure scenario in Indian context in the sectors of water supply, waste water management, storm water and drainage system, solid waste management, and housing for urban poor; and then the moves of GoI's latest urban

infrastructure improvement initiative. This chapter ends with a discussion of research aim, objectives, scope, adopted methodology and tools and techniques employed.

The intention of **Chapter Two** is to describe evolution of the concept of urban development through –Urban Renewal". The main concern was to understand the various concepts and approaches to Urban Renewal in developed and developing nations. Singapore being one of the best performing cities in the world, a case study of work efficiency and effective urban services delivery, has been carried out in the later part of this chapter. The study of Singapore city focuses only in selected urban sectors such as water supply, waste water management, storm water and drainage, solid waste management, and housing for urban poor.

Chapter Three includes brief introduction of JnNURM. It deals about the context of JnNURM and its objectives of urban infrastructure development in India. The reform initiated under JnNURM at state and city levels are describes. The institutional framework and expected outcome of JnNURM are also discussed in this chapter.

Chapter Four deals with the state level and city level comparative performance analysis with respect to reforms, projects implementation, financial and physical progress under JnNURM program. Level of e-governance implementation at city level has been assessed and effectiveness of these e-governance services is discussed in this chapter. An assessment of the status of DPRs is included in this chapter, to ascertain city wise performance in various sectors of urban infrastructure. Last part of this chapter deals with fund flow and physical status of the implemented UIG and BSUP projects.

Chapter Five reports the analysis of selected cities (Surat, Pimpri Chinchwad (Pune), and Kolkata) in the sectors of water supply, waste water management, storm water and drainage, and solid waste management under UIG sub-mission and housing for urban poor under BSUP sub-mission. This chapter describes the household survey and FGD technique used to evaluate whether completed projects – in sectors of water supply, waste water management, storm water and drainages, solid waste management and housing for urban poor – were benefiting the targeted beneficiaries or not. This chapter also reports special case study of Imphal city conducted as it performed very poor under JnNURM program, in term of implementation of both reforms and projects.

The **Six Chapter** deals with findings and discussion of JnNURM projects in selected cities in the sectors of water supply, waste water management, storm water and drainages, and solid waste management and housing for urban poor.

Chapter Seven summarizes conclusions of the research work and draws useful inference from better performing cities. In later part of this chapter policies and recommendation for better implementation of next phase of JnNURM have been suggested. Finally scope for further research has been identified.





URBAN RENEWAL

2.1 INTRODUCTION

This chapter deals with the concept of the urban improvement approaches i.e. urban regeneration, urban reconstruction, urban rehabilitation, urban renewal, urban redevelopment and urban revitalization. The comparative study of urban improvement approaches and their strategies, and focus areas have been discussed. Singapore being one of best performing cities for urban services in the world has been selected for details case study. The study of Singapore city focuses on the urban services such as water supply, waste water management, storm water and drainages and housing for urban poor.

2.2 URBAN IMPROVEMENT APPROACHES

Indian cities have been experiencing rapid urbanization since last two decades. The process of rapid urbanization is attributed to industrialization and intensive migration towards cities, which modified urban morphology and ultimately led to the housing shortage. Those people who were unable to buy a house initiated the process of illegal settlements. Modern architects and planners play a key role in the urban renewal projects intended to provide infrastructure to urban poor in a sustainable manner (Dobrivoje, 2006). A Sustainable Urban Livelihood (SUL) approach is one of the ways to improve the quality of life of the people living in urban areas especially of the urban poor. The main principle of urban improvement approach is making their livelihood less vulnerable to shocks and stress from natural disasters, illness or loss of job (John, et al., 2002).

At the end of the 1980, municipalities in developed countries had started Urban Renewal Projects (URPs) (Gulten, 2011). In the past 25 years, Urban Renewal (UR) have been discussed on the political agenda in most of the western European countries to address the urban issues which had been involve in obsolete or derelict urban fabric and impoverished population (CDIA, 2011). The urban renewal projects had been started in Israel which was focused on the social and physical

aspect (Carmon, 1989). In the latter part, revitalization of old city of Israel had been initiated by Israel government (Carmon, 1992). Post World War, developed and developing countries have responded to the need for city improvement, through urban regeneration, urban reconstruction, rehabilitation, urban renewal, urban redevelopment, and revitalization to shape better life in urban areas (Willem, 2008). The comparative views of the urban development approaches are discussed.

2.2.1 Urban Regeneration

The term –Urban Regeneration" introduced in the year 1950 was defined as –comprehensive and integrated vision and action which leads to the resolution of urban problems and which seeks to bring about a lasting improvement in the economic, physical, social and environment condition of an area that has been subject to change" (Robert and Syke, 2000).

2.2.2 Urban Reconstruction

Main concern of –Urban Reconstruction" was, meeting the needs of the present generation without compromising the ability of future generation to meet their own needs required balancing the interests of environment, social equity, and economy. It has to be seen as an integrated approach – environment, technical, social and institutional concerns are considered in each stage and for each activity of reconstruction not only in terms of house design and construction activities but also to ensure the best long-term result (Jurg, 2012).

2.2.3 Urban Rehabilitation

The term –Urban Rehabilitation" had started in the year 1960 and defines as a process that would reverse the risks of resettlement. A risk and reconstruction model of rehabilitation that would be marked by a series of transitions from: (i) landlessness to land-based resettlement, (ii) joblessness to re-employment; (iii) food insecurity to safe nutrition, (iv) homelessness to house reconstruction, (v) increased morbidity and mortality to improved health and wellbeing, and (vi) social disarticulation and deprivation of common property resources to community reconstruction and social inclusion (Christine, 2000).

2.2.4 Urban Renewal

The term –Urban Renewal" is defined as activity that unfolds in cycles of initiatives that play out twenty years. Thus, events predicted on set values and assumptions in one era may develop only slowly under another value set and come to fruition under yet, even as another constellation of planning values creates a different series of plans (Lewis Mumford, 1938).

2.2.5 Urban Redevelopment

Urban redevelopment has merged in recent year, as one of the key concerns in both theoretical and empirical-based of urban setting urban. This reflects a concomitant trend associated with urban studies more generally, towards specifying the economic, political, and cultural factors responsible for uneven metropolitan development. Indeed even a casual look at our metropolitan areas reveals that they are composed of many different cities and spatial form that divided according to different land uses as well as related to patterns of race and class (Kevin, 2001).

2.2.6 Urban Revitalization

Urban revitalization is a process that comprises a set of urban management strategies to facilitate economic, social, environmental, cultural, and historical (re) development of problematic, deprived and derelict urban areas. There are many aspects that comprises with urban revitalization such as social aspect, economic aspect, physical/environment aspect, health aspect, and historical/cultural aspect, (Balas, 2007).

2.3 HOLISTIC AND COMPARATIVE VIEW OF URBAN RENEWAL

The urban renewal has broad ideas and variety of scopes in order to improve the urban morphology. The policies/terminologies have been discussed on different sectors, and time to time. Urban regeneration focused on the socio-economic aspect whereas the urban reconstruction relates to the intervention of capital investment and positive impact on the quality of life (Cleff.T and Rodolph Cleff, 2001). The urban renewal covered all the aspects of physical renewal of urban area, environment renewal, economic renewal and social and cultural. The urban redevelopment focused more on the socio-economic, political and environment aspect to developed the urban health (Knoll.M and Rodulph Cleff, 2014), and urban revitalization focused on the physical revitalization,

economic, functional restructuring, functional diversification and function regeneration aspect. In the same way, there is requirement of fresh ideas into urban development planning prospect (Bhooshan, 1976). The holistic and comparative study of urban development approaches is shown in Table 2.1.

Terminology	Year of Introduction	Scope (Policy and Action)
Urban Reconstruction	1950	 An economic perspective focus on the market position and the value of the neighborhoods, will these be improved by intervention. A social perspective focusing on the level of social cohesive, social capital and residential stability in the neighborhoods. An environment perspective, focus on the energy efficiency and the use of material in restructuring strategies.
Urban Revitalization	1960	 1. Physical revitalization; 2. Economic revitalization; Functional restructuring: Functional diversification: Functional regeneration:
Urban Renewal	1970	 Physical renewal; Environment renewal; Economic renewal; Social renewal; and Cultural Renewal.
Urban Redevelopment	1980	 Socio-political; Economic and; Environmental
Urban Regeneration	1990's	 The following points are scopes: 1. Economic aspect; 2. Physical aspect; 3. Social aspect; and 4. Environment of the urban areas

Table 2.1:	Urban	Impro	vement	Appro	oaches
	100			- H.	See.

Initially, in 1970, urban renewal started demolition of old quarters to create Central Business Centre (CBC) in order to make city as strong economy. Consequently, the policies of the urban renewal had been keep on change over year for supplying the needs of the newly emerging cities such as new housing (1970-1980), improvement of economic condition (1980-1990), urban physical upgrading (1985-1990), adopted modern social policies stimulating participation (1990-1994), neighboring restructuring attract better life (1994—1998), creating opportunities in neighborhood (1998-2004), neighboring restructuring social mix (2004-2009), and neighborhood restructuring social mix, housing associate involvement (2007 onwards) (Igor et al, 2005). Various social and urban issues and their typical remedial actions taken up over the last 5 decades along with the policies are illustrated in Table 2.2.

Name of Policy	Period	Definition of Social Issues	Typical Policy actions	
Creating CBD	1970	None (strong urban economy)	Demolition of old quarters	
Urban renewal	1970-1980	Bad housing	New housing for neighborhood residents	
City renewal	1980-1990	Unemployment/strength of economy	Improvement of economic climate	
Multiple - problems	1985-1990	Disadvantaged in several respects	Moderate social policies no physical upgrading	
Social renewal	1990-1994	Lack of social cohesion	Modern social policies stimulating participation	
Big cities Policies I	1994-1998	Homogenous neighborhood	Neighborhood restructuring attract better-off	
Big cities Policies II	1998-2004	Housing career within neighborhood	Creating opportunities in the neighborhood	
Big cities Policies III	2004-2009	Ethnic concentrations/integration	Neighborhood restructuring, social mix	
Big cities Policies III+	From 2007	Ethnic and social integration	Neighborhood restructuring social mix, housing associate involvement	

Table 2.2 Urban Renewal Policies, Social Issues and Policy Action

Source: Mustard and Ostendorf, 2008

The strategies for urban renewal in developed and developing nations were adopted on different basis, for example the UK, adopted renewal policies based on urban landscape, revitalization of social and cultural dimension, renewal policies on physical, social, and economics dimensions, redevelopment of the community, and regeneration of holistic and integration (Knoll, et al, 2014).

United States adopted their strategies on historic preservation (focused on physical fabric), rehabilitation (social and physical), physical renewal (focused on demolition and construction) and redevelopment (economic oriented) whereas in India, urban renewal strategies is on the historical preservation (physical fabric) and creation of urban infrastructure and upgrading the existing system only. Reviving historical architecture through urban renewal projects for improvement of the urban areas is a strategy for urban development (Alok and Ashok, 2000). The overall comparison of the urban renewal strategies among the developed and developing nations is shown in Table 2.3.

Country	United Kingdom	United States	India	
	- 19 / 1 ver		Historical	
	Reconstruction: Focus on	Historic preservation:	Preservation: Physical	
	urban landscape	Physical Fabric	Fabric	
	Revitalization: Focus on	Rehabilitation: Social		
Strategy for Urban Renewal	social and cultural dimension	and Physical	L	
	Renewal: Physical. social and economic dimensions	Physical renewal:		
		Demolition and	Urban Renewal:	
		Construction	Physical infrastructure	
	Redevelopment: Community		T frystear fillrastructure	
	oriented	Redevelopment:	The set	
	Regeneration: Holistic and	Economic oriented	×18 C	
	integrated		18.7	

Table 2.3: Strategy of Urban Renewal in Developing and Developed Nations

Source: Preeti Onkar. Krishna Kumar Dhote, and Ashutosh Sharma, 2008

The major concerns for urban development are economic, social, physical and environment aspects. The stage of urban development since 1950 to till now has been changing according to requirement of the city through renewal of urban morphology. The transformation of old congested areas into spatially developed through a sustainable approach is required (Bharat and Sharma, 2002). The activities for urban development were being carried out on various issues / problems in urban areas. The chronological order for urban development is represented in Table 2.4.

D. B		Period					
Policy	1950	1960	1970	1980	1990	1900 to Now	
Major strategy and orientation	Reconstruction and extension of older areas of towns and cities often based on a Master Plan, suburban growth	Continuation with some early attempts of rehabilitation	Focus on institutional and neighborhood schemes in continuation to dvelopment of peripheries	Many major schemes development and redevelopment projects	Move towards a more comprehensive form of policy and practice more emphasis on integrated treatments	Focus urban living quality	
Key actors and stake holders	National and local government private sector developers	Move towards a greater balnce between public and private sectors	Growing role of private sectors and decentralization of local government	Emphasis on private sectors and special agencies growth of partnership	Devolution of power to the local authorities. Community empowerment	Public private partnership, government semi public	
Spatial acivities level	Local and site level	Regiuonal level and activities emerged	Local emphasis	Site level	Strategic persoective, growth of regional of regional activities	City and regional level	
Economic focus	Public sector investment with some private sector involvement	Private investment	Economic renewal Resources constraints in public sectors and growth of private investment	Private sectors dominant with selective public funds	Greater balance public, private and volundary funding	Private sector taxation	
Social context	Improving and housing and living standards	Social and welfare improvement	Community based action and greater empowerment	Community self help with very selective state support, high rise housing for displaced citizens became centers of social ills	Emphsis on the role community	Emergence of new social organization, community participation	
Physical context	Replacement of inner areas and peripheral development Geentrification in UK	Rehabilitation of existing areas	More extensive renewal of old urban areas	Major schemes or replacement and new development	Heritage and retention	Revitalization, comprehensive renewal	
Environment approach	Landscaping and some greenery	Selective improvements	Environmental improvement with some innovation	Growth of cncern for wider approach to environment	Introduction of broader idea of environment sustainability	Environment sustainability impact assessments.	

Table 2.4: Chronological Development of Urban Improvement Approaches

Sources: Preeti Onkar. Krishna Kumar Dhote, and Ashutosh Sharma, 2008

2.4 CASE STUDY: URBAN RENEWAL PROJECT IN SINGAPORE CITY

2.4.1 Introduction

Singapore was occupied by the Japan from February, 1942 to September1945. After Second World War, Singapore was reverted back to British rule. Singapore became a self-governing state in 1959. Singapore alongside the Federation of Malaya, Sarawak and British North Borneo (Sabah) formed Malaysia in 1963. In 1965, Singapore became an independent state. Since 1959 self-governance, the People's Action Party (PAP) had won control of the Parliament in every election (Law, 2009).

Singapore is an island located 1.5° N of the Equator, experiences a hot and wet climate, with an average annual precipitation about 2400 millimetres. The Singapore city has a geographical area of approximately 700 sq km (Rob, 2010). The location map of Singapore is representing in Fig. 2.1.

In mid-2008, the population of Singapore was 4.84 million, out of which 25% were foreigner Singapore is being a small city-state that has one of the highest



Fig. 2.1: Location Map of Singapore, Source: Google Map

population densities in the world. Singapore has undergone rapid urbanisation over the last few decades, with the population increasing from 1.6 million people in 1960 to 5.31 million people in 2012 (PUB, 2012).

2.4.2 Reasons for Urban Renewal

With post-war, population growth, substandard housing, hygiene problem, shortage of housing, demolition and reconstruction was clearly the general direction of urban development in the early years of Singapore.

The Urban Renewal Department (URD) was established in 1966 and initiated to design the policies for urban renewal in 1964 under the Housing and Development Board. In April 1974, the URD

was turned into an independent statutory body called Urban Redevelopment Authority (URA). The preservation of Singapore's historical and architectural heritage was first written into the objectives of the newly formed URA. However, the focus was clearly on the clearance of slums and the redevelopment of the central Singapore area in the early years of URA. In 1989, the URA merged with the Planning Department and Research & Statistic Unit of the Ministry of National Development. In the same year, with the enactment of the Planning Act, the URA officially became the national conservation and central planning authority (PUB, 2012).

2.4.3 Urban Services

2.4.3.1 Water Supply

About one billion people in the world lack access to potable water, mainly those living in the third world country (Monterey Starkey, 2012). Water has become an issue of national security for most countries of the world, Singapore being one of them. Singapore is being depended on import of water from Malaysia under long term agreement signed in 1961 and 1962 when Singapore was still a self-governing British colony. Under this agreement, Singapore imported water from Johor, Malaysia until the year2061. In order to reduce its dependence on external sources, this city-state has developed and implemented extremely efficient demand and supply management practices. Singapore has successfully managed to find the right balances between water quantity and water quality considerations; water supply and water demand management; public sector and private sector participation; efficiency and equity considerations; strategic national interest and economic efficiency; and strengthening internal capacities and reliance on external sources (Cecilia, 2006).

Singapore has developed a new plan for increasing water security and self-sufficiency during the post 2011-period, with increasingly more efficient water management, including the formulation and implementation of new water-related policies, heavy investments in desalination and extensive reuse of wastewater, and catchment management and other similar actions (Cecilia, 2006).

The Public Utilities Board (PUB) is responsible for development plan and implements a holistic policy, which included protection and expansion of water sources, storm water management, desalination, demand management, community-driven programs, catchment management,

outsourcing to private sector specific activities which are not within its core competence, and public education and awareness programs (Biswas and Cecilia, 2009).

The water supply in Singapore is considered as one of the best among the developed nation in terms of the water supply duration, coverage of water pipe line, water quality, etc. Some of the indicators for water supply services provided by public utility board are represented in Table 2.5.

Indicators	Performance		
Water Supply duration per day	24 Hours		
Access to drinking water	100% (Population)		
Access to modern sanitation	100% (Population)		
Waste water collection and secondary - treated	100% (Population)		
Drinking water quality (meeting WHO standard)	100% (Matching)		
Proportion of water consumption metered	100%		
Unaccounted for water	4.4%		
Domestic water consumption per capita per day	156 liters		
Number of accounts served per PUB employee	400		
Proportion of annual payroll spent on training	3.1%		
Operation ratio	0.86		
Revenue collection efficiency	99.8%		
Monthly bill collection efficiency (days of sales outstanding)	28		

Table 2.5 Water Supply Service Performance in Singapore

Source: Anad C., Kallidaikurichi S, and Cheon K T., 2012

The supply is also being increased through collection, treatment and reuse of wastewater. With a 100% sewer connection, all wastewater is collected and treated. Singapore is probably one of the very few countries where the water utility is reclaiming wastewater after secondary treatment by means of advanced dual-membrane and ultraviolet technologies (Cecilia, 2006).

In 1990, Unaccounted for Water (UFW) was 9.5% of the total water production. Even at this level, it would still be considered to be one of the best examples in the world. The UFW level of Singapore is now 4.4% which no other country can match (ADB, 2012). In comparison, England and Wales, the only region in the world which has privatized its use have managed to achieve more

than twice the level of Singapore. In most of Asian urban centers, UFW is range between 40 and 60% (Anand et al, 2012).

The water supply proejcts are more on the efficient collection of waste water and proper storage of storm water by developing catchment areas within city. Preservation of storm water is prime concerns of Singapore government in order to reduce imported water on the other hand and avoid mastage of rain water. To collect grey water from houses and proper treatment has been done for the purpose of industrial and others purposes. The



Fig. 2.2: NEWater's Location Map, Source: http://www.pub.gov.sg

best practices for Singapore city is treated water supplied to industrial and commercial customers who can better use NEWater's (Brand name given to reclaimed water produced by Singapore's Public Utilities Board) ultra-pure quality. Now, there are three plants producing NEWater (Fig. 2.2). PUB has recently awarded another PPP project to construct the country's largest NEWater factory at Ulu Pandam (Cecilia, 2006).

The attitute of Singapore government towards water demand and supply is comparative good in terms of transparency, and accountability to citizens. This is the only way to success in water supply projects in Singapore and a lesson to developing nation across world.

Securing a safe, secure and sustainable water supply is a key policy challenge for many countries. As a densely populated island that has historically suffered severe water shortages due to a lack of natural water supplies, the Singapore government has long recognized the importance of developing new sources of water and more efficient water catchment and treatment processes (Anand et al, 2012). In response to these challenges, the PUB, has implemented a range of policies that have successfully addressed Singapore's water problems and have been transformative in their scale.

The country's investment in innovative water Research and Development (R&D) across the entire water value chain, and the application and integration of these technologies into water management practices, have provided both supply- and demand-side policy innovations. These have enabled the

government to deliver inefficient, safe and sustainable water supply their projects will be sufficient to meet the population's growing demand for water in the future. The PUB predicts that by the time the current water agreement with Malaysia expires in 2061, Singapore will have achieved full water sufficiency (PUB, 2012).Singapore's significant investments in water R&D have also enabled Singapore to develop a world class innovation-driven water industry that is increasingly exporting innovative technologies and best practices in water management to the world, and contributing to the socio-economic prosperity of the country.

Singapore's position as a water-scare city state might be unique, its achievements in terms of innovative water policies offer lessons to countries seeking more effective and efficient water utilization. These lessons include that successful policy innovation occurs across all policy dimensions and is possible so long as the enabling conditions are in place. Firstly, the PUB adopted a whole of government approach in the design and implementation of Singapore's national water policy. It has also benefited from widespread political and public support that are critical for ensuring long-term policy success. It has worked closely with other government agencies to gain aagreement and



Fig. 2.3: Four Water Taps, Source: PUB, 2012

support for issues including establishing land use priorities(necessary to ensure improved water catchment capacity), as well as other programmes such as the –Four National Taps" (water from local catchment areas, imported water, reclaimed water known as NEWater and desalinated water) (Fig. 2.3).Singapore's national water policy has also benefited from the strong political will of the government to drive water policy, effective cross-sector and cross-agency coordination of water programmers Andrade activities, integrated water management strategies to reduce administrative barriers, and effective educational programmes to ensure public awareness and support of water policy initiatives (Celilia, 2006).

2.4.3.2 Waste Water Management

Singapore's first sewerage scheme started in 1910. The system then consisted of only networks of sewers and 3 pumping stations and a trickling filter plant to serve the central area of Singapore. An

intensive sewerage development programme began in the 1960's meet the demand of the rapid housing and industrialization programme. The country is now fully connected to sewer line to collect all waste water and constructed for separate drainage and sewerage system (PUB, 2012).

Used water is collected through a sewerage network of some 3300 km of sewers and 96 pumping stations with 180 km of pumping mains. Hundred percent of the population has modern sanitation and manages the water loop in an integrated manner. PUB collects every drop of water that is used. This used water is treated before it is discharged into the sea or used for recycling into **NEWater**, Singapore's own brand of reclaimed water (PUB, 2001).

As per the projects report of PUB, (2012) had report that the following activities for the waste water management in Singapore city.

Initiative Projects for waste water – PUB has also developed the Deep Tunnel Sewerage System (DTSS) to meet the Singapore needs for used water handling. The S\$ 3.65 billion DTSS is a cost-efficient solution to meet Singapore's long-term needs for used water collection, treatment, reclamation and disposal. It was conceived as a cost-effective and sustainable solution to meet Singapore's long term used needs.

Completed Project (DTSS) for Waste Water Management – The mammoth DTSS (phase 1 and 2) project consists of two large, deep tunnels crossing the island, two centralized water reclamation plants, deep sea outfall pipes and link sewer network (Fig 2.4).

The first phase of DTSS was completed in 2008 at a cost of SGD \$ 3.4 billion comprises a 48 km long deep sewer tunnel running from Kranji to Changi a centralized water reclamation plant at Changi, two 5 km long deep sea outfall pipes and 60 km of link sewers.



Fig. 2.4: Deep Tunnel Sewerage System, Source: PUB, 2012

The new plant was started in May, 2010 at

Changi of 50MGD. With this addition, coupled with the expansion of the existing three NEWater plants, NEWater now meets 30% of Singapore's total water demand.

The heart of DTSS phase 1, the Changi Water Reclamation Plant (Changi WRP) is capable of treating 800,000 cubic metres (176 million gallons) or 320 Olympic size swimming pools of used water a day to international standards. The treated used water is then discharged into the sea through deep sea outfall pipes or channeled to the Changi NEWater factory on the rooftop of the reclamation plant where it is further purified through advanced membrane technologies into NEWater, Singapore's own brand of reclaimed water.

In Progress Projects for Waste Water Management - Embarking onto the next phase of DTSS (DTSS phase-2): To ensure that there is sufficient NEWater to meet future demand, expansion of the used water system needs to keep pace with Singapore's continuing growth, PUB is planning to develop Phase 2 of the DTSS by 2022. DTSS Phase 2 will extend the deep tunnel system to cover the western part of Singapore, including the downtown area and major upcoming developments such as Tengah Town.

Similar to DTSS Phase 1, Phase 2 will comprise of four major components: deep sewer tunnels running from the city area to the west, a centralized water reclamation plant at **Tuas**, deep sea outfall pipes and a network of link sewers. Once Phase 2 is completed, the existing conventional WRPs at **Ulu**



Fig. 2.5: Phase I and II for Deep Tunnel Sewerage System Source: PUB, 2012

Pandan and Jurong, as well as intermediate pumping stations, will be progressively phased out and the land will be freed up for higher value development (Fig. 2.5).

Planning for Phase 2 of DTSS is in progress, beginning with the open pre-qualification exercise to pre-qualify interested consultancy firms with the relevant experience and capabilities to provide engineering services for Phase 2 of the Deep Tunnel Sewerage System on 15th March 2013.

The PUB has used the Public Private Partnership (PPP) model for DTSS project, in this process PUB has looking for companies with established track records in the design and implementation of large-scale used water treatment schemes, water recycling and tunneling works. Based on our experience in DTSS Phase 1, this mega project will integrate a wide range of expertise including areas such as used water treatment and recycling processes hydraulic modeling, geotechnical analysis, system automation and risk management. To meet the challenges in the future, we want to achieve a sustainable system that is cost, energy and land efficient," said Mr Yong Wei Hin, project director of DTSS Phase 2.

Significance of DTSS Project – "Used water superhighway for next 100 years" The Deep Tunnel Sewerage System (DTSS) is an efficient and cost-efficient solution to meet Singapore's long-term needs for used water collection, treatment, reclamation and disposal. Conceptualized and managed by PUB, it was conceived as a cost-effective and sustainable solution to meet Singapore's long-term used water needs.

The overall concept of the DTSS is to use deep tunnels to intercept the flows in existing gravity sewers, upstream of the pumping installations, and channel the flows by gravity to centralized treatment facilities strategically located at coastal areas. The used water is then treated and further purified into ultra-clean, high-grade reclaimed water called NEWater, or discharged to the sea through the outfalls.

The DTSS is a more cost-effective solution than renewing and expanding the existing used water infrastructure, and would free up land for other developments in Singapore. In the long term, it is envisaged that the integrated used water system will consist of three centralized WRPs: Changi WRP in the east, Kranji WRP in the north and Tuas WRP in the west to serve Singapore's used water needs.

The DTSS project of Singapore was crowned _Water Project of the Year' at the Global Water Awards 2009. The DTSS was selected as the water project with the most significant contribution to water technology and environmental protection. The annual Global Water Awards is widely recognized as one of the most prestigious symbols of achievement in the global water industry.

Benefits of DTSS Projects – Land saving - Compact DTSS optimizes land used water infrastructures. The phasing out of existing intermediate used water pumping stations and the conventional plants makes the previous occupied lands available for other higher value developments. Under DTSS Phase 1, the compact design of the Changi Water Reclamation Plant (Changi WRP) requires only one-third the land area of a conventional plant. There is also no need for a buffer zone, as the plant modules are fully covered. Additional land savings are also achieved by integrating Changi NEWater Factory on the rooftop of Changi WRP's Liquid Modules.

The implementation of the entire DTSS will result in a 50% reduction in land taken up by used water infrastructure once it is fully completed. Land used to site the WRPs and the accompanying pumping stations has shrunk from 300 ha in the 1990s to 190 ha with the completion of DTSS Phase 1. With Phase 2 in place, the land needed for the WRP and pumping stations will eventually be reduced to about 150 ha.

Environment Protection - With DTSS, the phasing out of intermediate pumping stations not only free up land for higher value development, it also enhances the reliability of the used water system by minimizing the risk of environmental contamination as many such existing stations lie within the clean water catchment areas.

Ensuring NEWater Sustainability -DTSS is an important component of Singapore's water management strategy as it allows every drop of used water to be collected, treated and further purified into NEWater, Singapore's own brand of reclaimed water. NEWater is the pillar of Singapore's water sustainability. Together with three other sources water from local catchments, imported water and desalinated water they form the Four National Taps, PUBs long-term water supply strategy to ensure a robust and sustainable supply of water for Singapore.

Singapore's largest NEWater plant to date is built on the rooftop of the Changi Water Reclamation Plant, the first of its kind in the world. Integrating the NEWater plant with the DTSS allows for efficient, large-scale water recycling, thus ensuring the sustainability of NEWater.

2.4.3.3 Storm Water and Drainage

Storms water come in the form of monsoon surge, Sumatra Squalls and sea breeze-induced thunderstorms. December is usually the wettest month of the year in Singapore. Singapore is

relatively flat, with pockets of low-lying areas located along the southern and eastern coastal fronts, and some further inland. These areas face higher flood risks, especially when heavy rains coincide with high tide (Chew, 2013). Urbanization has undoubtedly led to an increase in storm water runoff in Singapore. Therefore, a strong argument for introducing measures to mitigate the effects of such urbanization.

Over time, the development of high-density satellite towns, residential and commercial developments, has resulted in an increase in paved (impervious) areas and a reduction in green spaces. During a storm event, this results in an increase in peak flows where more runoff is generated and flows faster into the drainage system over a shorter period of time instead of being regulated by infiltration into the soil and through evaporation (Cecilia, 2006). These strategies have been effective in reducing the extent and duration of floods in Singapore such that floods experienced today mostly occur in a small locality and subside within an hour. The more vulnerable areas in Singapore city was identified in Map (Fig. 2.6).



Fig. 2.6: Flooded Areas in Singapore 1970, Source: PUB, 2012

Event of Flooding - In early days of Singapore city, floods were very common and widespread. Many of the flooding occurred in the city centre of the low laying areas and with several areas

being just above the high tide level (Fig. 2.7). Over the past 30 years, considerable effort has gone into reducing flood risk at these flood prone areas (PUB, 2012).

Flooding event on 16th June, 2010 occurred where some 100 mm of heavy and intense rainfall felt over the Stamford Canal Catchment



Fig. 2.7: Flooding in Singapore (2010), Source: PUB, 2012

from 9.00am to 11.00am in two consecutive bursts and exceeding the capacity of Stamford Canal, the major storm water drain serving the catchment (Law, 2012). This resulted in floods along Orchard Road, up to a depth of 300mm from Cuscaden Road to Cairnhill Road, and caused disruption to traffic and some damage to properties. The premises that were affected by flood waters entering their basements were mainly the older developments, namely, Lucky Plaza, Liat Towers, Delfi Orchard, Tong Building and the Supreme Hotel. Twenty one vehicles in the basements of Tong Building and Delfi Orchard, and 100 shops in the basement level of Lucky Plaza and Liat Towers were flooded. In addition some 20 cars and 7 buses stalled along Orchard Road due to the flood. Overall, floodwaters were mostly contained on the road, as the platform levels of most buildings in Orchard Road and the crest levels at entrances to MRT stations in the area were sufficiently high to prevent floodwater from entering the premises. Floodwaters also subsided within an hour. Aside from the Orchard Road areas, parts of the Bukit Timah catchment and the Eastern catchment also experienced localized flooding on that day (Koli ang Vijayan, 2003).

As per PUB Report (2001) had state that the PUB had a planned for the improvement of storm water and drainages in Singapore city. The Expert Panel on Drainage Design and Flood Protection

Measures was appointed by the Ministry of the Environment and Water Resources (MEWR) on 30 June 2011. The Panel consists of local and overseas experts from various disciplines spanning civil and hydraulic engineering, climate change, hydrology and flood management, and was tasked to review all flood protection/ risk management measures that will be implemented in Singapore over the next decade. The objectives of the Panel are (1) review of the Public Utility Board's (PUB) drainage planning assumptions and parameters, (2) identification of innovative and cost-effective solutions; and (3) improvements to ensure public resilience to floods.

Evidence Action by the Panel: To seek a better understanding of the 2010 and 2011 flood events, the Panel reviewed the following evidence, including results from additional studies requested by the Panel: (1) Flood investigation reports on the 16 June 2010 and 5 June 2011 floods; (2) PUB's drainage design approach and processes; (3) Marina Barrage design and operational approach; (4) Urbanization in the Stamford Catchment over the years; (5) Rainfall data and radar rainfall images for the two flood incidents; (6) Simulations of hydraulic profiles and canal flows for the two flood incidents; (7) Simulations of water levels for areas under the Marina Barrage's zone of influence and Orchard Road; (8) Simulations of water levels in Orchard Road pre- and post-road raising; and (9) Situation in Bukit Timah Catchment, and the alleviation measures in progress (PUB, 2012).

The Need for Holistic Storm Water Management - Based on analysis of rainfall data, frequency of high intensity event, climate change effects of sea level rise and increases in rainfall intensities make it necessary for drainage infrastructure to be upgraded and drainage requirements to be raised in order to protect from flood risks. However, widening drains to increase drainage capacity is challenging in land-scarce Singapore. Rapid urbanization over the last few decades due to population and economic growth has resulted in competing land uses and limited land available for expanding our drainage systems. A wider range of interventions is thus necessary to help Singapore secure a more adequate drainage system for the future. This includes implementing higher drainage design standards and holistic solutions, building new capabilities and working with stakeholders to improve preparedness. Recognizing that expanding canals and drains will not be sufficient, especially for areas that are more developed and have site constraints, PUB will go beyond implementing pathway solutions (e.g. drain capacity improvements, diversion canals, centralized detention tanks and ponds, etc.), to work with developers to put in place source

solutions (e.g. decentralized detention tanks and ponds, green roofs, rain gardens, porous pavements, etc.), to better manage storm water runoff, and receptor solutions (e.g. urban flood plains, raised platform levels, flood barriers, etc.), to protect developments from floods. By implementing a range of appropriate measures that covers every spectrum of the drainage system, flood risks can be more significantly reduced and effectively managed.

Benefit of the Holistic Approaches - The benefit of the holistic approaches of the storm water management are (1) Contributing to community safety and financial risk management by reducing the risk of urban flooding, (2) Providing social benefits and improved/enhanced liveability. Storm water detention and conveyance elements of high aesthetic value like green roofs, bio retention swales, rain gardens and constructed wetlands can be integrated within the development. Beyond slowing down runoff and improving storm water quality, these multi-functional spaces can also present recreational and educational opportunities by providing a fun and creative platform for people to interact and learn about water, (3) supporting environmental sustainability.

Renewal Project for Storm Water Drainage- Based on the PUB report, 2012, PUB has traditionally focused on drainage conveyance solutions – either through diversions, or deepening and widening of drains. Nonetheless, where appropriate, PUB has also implemented other interventions such as compensatory storages (e.g. storm water detention pond in Opera Estate) and road rising. However, so far, there is a lack of systematic evaluation of these interventions (e.g. impact of road raising on surface flows) using models.

Pathway Measures: Drainage Systems - Pathway measures are applied to the existing drainage system and consist of the following categories:

- Increasing conveyance capacity
- Flow transfer, from one part of the system to another
- Strategic storage

Increasing conveyance capacity is a measure that is well practiced in Singapore. By careful forward planning of drainage systems, PUB has wisely set aside land in the form of drainage reserves for future capacity enhancement and has protected this land from development. Thus key sections of the drainage network can be increased in capacity without the disruption that could be

expected in other cities. Nevertheless, increasing system capacity is still an expensive measure because upsizing of conduit dimensions would be difficult, costly and disruptive due to the unavailability of land in which to build. It may also transfer excess flow downstream where capacity has yet to be expanded, thus creating further flooding problems.

Identify and quantify the potential for strategic storage. PUB has already identified this as an important potential measure. Providing significant additional storage volume in Singapore will be difficult due to the scarcity and cost of suitable land, but has been successfully achieved in the Opera Estate area (through the use of underground storage pond in conjunction with a dual use sports field). Modeling will help to ensure the correct location and proper sizing of any proposed storage tanks (PUB, 2012).

Private Sector Participation Model - PUB encourages competitive involvement of the private sector in delivering its services. It adopts the -best sourcing" approach for procurement as part of its -Price-Minus" strategy to lower the cost of water supply through open competition. -Best sourcing" also helps PUB enhance production efficiency and improve service quality. In PUB, there is a Best Sourcing department, which undertakes the procurement task of the private sector's services for developing new and upgrading existing water, used water, and drainage infrastructure. The -Price-Minus" strategy, which PUB adopted since 2004, is not about cutting cost for the short term. It is about creating value and ensuring sustainability in Singapore's water resources in the most cost-effective manner. For instance, PUB outsourced some of its large infrastructure projects through public-private partnerships (PPPs). The Sing Spring Desalination Plant was PUB's first PPP project. Constructed at a cost of S\$200 million, it was developed under a design-build own-operate (DBOO) arrangement with a Singapore company, the Sing Spring Pte Ltd. This company designed and constructed the plant, and will own and operate it to supply desalinated water to PUB for 20 years. Similarly, the design, construction, operation, and maintenance of the Ulu Pandan and Changi NEWater plants were undertaken by the private sector, under DBOO agreements.

Process of Public private Partnership - This was also the chosen approach for Singapore's second desalination plant targeted to be completed in 2013. In these cases, local and international water companies were invited to submit bids in an open tender. The most competitive bid, which had to meet technical requirements and performance standards stipulated by PUB, was selected

among the bids received. The DBOO arrangements enabled PUB to leverage on the expertise of the private sector to keep production capacity at the leading edge and at low cost. The arrangements also enabled PUB to purchase of NEWater and desalinated water from the plant's operator at a competitive price, making it possible for PUB to levy a lower-than-expected water tariff (Anand et al, 2012).

Tools to Manage Storm Water - Rain water harvesting is possible to combine storm water detention with storm water collection. By ornamental ponds or ponds to collect rainwater for gardening and washing purposes is a best practice for storm water and drainages system.

Runoff that is collected using detention systems can be used for non potable uses. However, it is important to ensure that the storage tank capacity can accommodate volumes necessary for both retention purposes (i.e. for non-potable use) as well as detention purposes (i.e. temporary storage of runoff). The detention volume must be kept empty so that the system will be effective in reducing peak flows from the next storm event.

2.4.3.4 Solid Waste Management

All solid waste was disposed of by sanitary landfill in coastal swampy areas according to prior to 1979. As available landfill sites were limited and rapidly being depleted, other, more efficient disposal methods were needed in order to conserve the remaining landfill sites. Refuse incineration has introduced which reduces volume by as much as 90%, was found to be the most cost-effective method of waste disposal in Singapore.

Since 1979, Singapore has started to build incineration plants for the disposal of the country's refuse. There are currently four refuse incinerations plants in Singapore with a total capacity of incinerating 8,200 tones of refuse a day. These incineration plants are owned and operated by the government. The fourth incineration plant was commissioned in 2000 and has the latest technology in refuse incineration (Fig. 2.8). It has an incineration capacity of 3,000 tons of waste a day. Due to the constraint in land space on the mainland of Singapore, an offshore landfill was developed for the disposal of no incinerated waste and ashes from the incineration plants (Cheong, 2007).

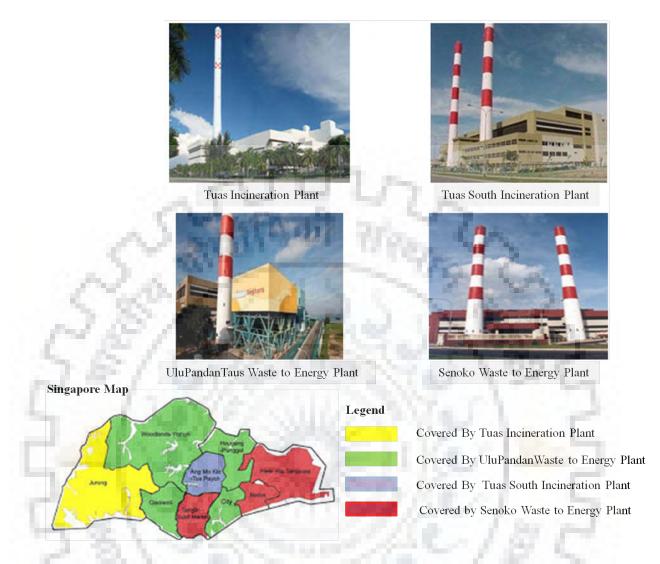


Fig. 2.8: Incineration Plant Coverage Areas in Singapore, Source: Based on PUB, 2012

The solid waste generation in Singapore is mainly categorized into three major categories (1) domestic refuse (solid waste generated by markets, food centers, households and commercial premises etc.), (2) industrial refuse (does not include hazardous and toxic waste which requires special treatment, handling and disposal), and (3) institutional solid waste i.e. solid waste from government offices,



Fig. 2.9: Segregation of Solid Waste at Source, Source: Biswas, A. K & Cecelia, 2009

schools, hospitals, recreational facilities etc (Chandrappa and Das, 2012) (Fig. 2.9).

National SWM Regulatory Framework (Legislation and Regulations): Licensing solid-waste collectors was introduced in 1989 as a means of regulating the waste-collection industry. Under the legislation, it is an offense for any person or company to collect or transport solid waste as a business without a solid-waste collector's license issued by the National Environment Agency (NEA). Any person who is found collecting solid waste as a business without the license is liable on conviction to a fine not exceeding SGD10,000 or to imprisonment for a term not exceeding 12 months, or to both (Cheong, 2007).

There are currently three classes of license, namely Class A, B, and C. Each class allows the licensed waste collector to collect respective types of solid waste. A solid-waste collector may apply to hold more than one class of license at any one time. Approval for the license depends on the applicant's having the proper vehicle and equipment to collect and transport that particular class of waste. Licensed waste collectors are required to comply with: the Environmental Public Health Act, the Environment Public Health (General Waste Collector) Regulations, and the Code of Practice for licensed general waste collectors. The types of waste corresponding to the three classes and the requisite vehicle type to be used for transporting the waste are elaborated in Table 2.6.

Class of License	Type of Waste	Types of Vehicle/Equipment	
Class A	Inorganic Waste i.e. construction debris, excavated earth, tree trunks, discarded furniture, appliances, wooden crates, pallets, and other bulky items destined for disposal	Skip container and prime movers, lorries with crane and pick-up, and lorries with tipper waste must be properly covered	
Class B	Organic waste i.e. food and other putrifiable waste from domestic, trade and industrial premises, markets, and food centers	Roll-off compactors and prime movies and refuse-compaction vehicle	
Class C	Sludge & Grease e.g. sludge from water treatment plants, grease interceptors, water-seal latrines, sewerage treatment plants, septic tanks, or other types of sewerage system, waste from sanitary conveniences in ships and aircrafts	Trucks with septic tanks	

Table 2.6: Types of Solid Waste Collection based on Type of Waste and Vehicles

Source: Cheong Hock Lai, 2007

As per PUB, (2009) had a statement for solid waste management practices in Singapore city as given below;

Key Elements of SWM: The overall generation of solid waste in Singapore was 1.300 tons per day in 1970 and 7800 tons in the year 2000 in Singapore. Solid waste is collected and disposed daily to prevent problems associated with the decomposition of organic waste. Waste collectors provide collection services to households, trade premises, commercial building, and industrial premises daily.

Collection: Prior to 1stApril 1996, the government was responsible for the collection of waste from households, trade, and institutional premises. The refuse-collection services for the domestic and trade sectors was privatized and taken over by **SEMAC Pte. Ltd. (now known as Semb-Waste Pte. Ltd.)**, the first appointed Public Waste Collector (PWC), on 1stApril 1996. The collection services for the domestic and trade sector was further privatized from 1999. The island was divided into nine geographical sectors and prequalified companies were invited to participate and compete for the licenses to provide the waste-collection services. The public waste collector licenses in the nine sectors were tendered out progressively. Successful bidders were appointed as PWC at their respective sectors for a five-year license period.

Refuse Collection Fees: The refuse-collection fees are determined via a tendering system. With the privatization of refuse collection for domestic and trade premises, fees levied by the appointed public-waste collectors are based on the tendered rates. The rates are determined by market conditions and they vary from one sector to another.

The premises are classified into domestic and trade premises in the tender. The contractors are expected to tender the waste charges for each of these categories.

Domestic Premises: Domestic premises are housing units, i.e., flats (indirect collection) and landed property (direct collection). There is one fixed, monthly rate per residential premise. The collection fee is SGD6–9 for indirect collection and SGD18–25 for direct collection.

Direct Collection: This method involves the removal of refuse directly from individual domestic premises in landed private housing estates and individual trade premises such as shops and houses.

A refuse truck with one or two collection crew members moves from door to door to collect the refuse placed outside the premises. The operation is labor intensive and time consuming. It is therefore a more costly collection operation.

Indirect Collection: This method involves the collection of refuse from designated centralized collection points such as bin centers and centralized refuse chutes where large amounts of refuse are transferred and stored in bulk containers or compactors. Each bin center usually serves a sector comprising domestic high-rise apartment blocks either in public housing estates or private condominiums and may include shopping and commercial complexes, market, and food centers.

Trade Premises: The fee structure for trade premises is dependent on the volume of waste. The PWC regularly assesses the average waste generated by individual trade premises and accordingly bills. Several waste-output categories are specified in the tender. For special removal services of items such as bulky waste and excessive garden waste, the occupier must make special arrangement with a licensed waste collector. A separate fee is chargeable for the service.

Pneumatic Refuse Transport System: In this system, refuse is transported through underground pipe networks by vacuum suction to a central collection station where it is compacted and stored in containers, similar to bin centers. However, this is much more productive and hygienic as there is no manual handling and transfer of the refuse. There are currently pneumatic systems installed in some hospitals, food industry locations, and private condominiums. Owing to its high cost of installation, operation, and maintenance, the system has yet to be adopted on a larger scale despite its clean and quiet operation and higher productivity.

Disposal: There are two methods of disposing of waste in Singapore, incineration and land filling. Refuse incineration, which offers a high volume reduction of as much as 90%, was found to be the most effective method of disposal as Singapore is a land-scarce country. Moreover, the waste heat produced can be recovered for power generation. Ferrous scrap metal is also recovered from the incineration residues for recycling. Today, all incinerable wastes are burned in the incineration plants while only non incinerable refuse and ashes from the incineration process are disposed of at the offshore landfill. The incineration plants were also designed as waste to-energy plants. Electricity is generated for its own consumption and excess power is sold to the electrical grid. Ferrous scrap metal is also recovered from the incinerated residue for reuse.

Refuse Incineration Plants: There are four refuse incineration plants in Singapore with a total incineration capacity of 8,200 tons per day of waste. The salient details of the incineration plants are shown in Table 2.7 as well as the location of the refuse disposal facilities.

Singapore has 4 waste-to-energy incineration plants and 90% of the waste collected is sent to these plants for incineration (Table 2.7). The remaining 10% non-incinerable waste is sent to the landfill. There is only one landfill in Singapore and it is an offshore landfill, constructed at a cost of S\$610million by joining 2 small islands with earth/rock bunds lined with impermeable membrane. The 4 incineration plants and the offshore landfill were constructed by the government and operated by the National Environment Agency. The incineration plants are fitted with advanced pollution control equipment. At these plants, energy is recovered to generate electricity. Scrap iron is also recovered. Although incineration offers the advantage of high volume reduction and helps to conserve landfill space; it is not adequate if more waste is generated each year. This would then put additional demand to build more incineration plants and landfills. Waste collection is mechanized using rear end loaders and compactors. Some private developers adopted the pneumatic refuse conveyance system for the collection of refuse. Singapore adopted waste-to-energy incineration for the disposal of its waste with the belief that incineration is the most cost effective method of waste disposal reducing the volume of waste by 90%. Heat from the combustion of refuse is used to generate electricity while ferrous metal is recovered for recycling.

Incineration Plants in Singapore	Incineration Capacity (tons/day)	Capacity Cost (SGD million)	Year Commissioned
Ulu Pandan Incineration Plant	1100	130	1979
Tuas Incineration Plant	1700	200	1986
Senoko Incineration Plant	2400	560	1992
Tuas South Incineration Plant	3000	890	2000

Table 2.7: Incineration Plants in Singapore

Source: Cheong Hock Lai, 2007

Strategies for Solid Waste Management in Singapore are

- Towards Zero Landfill
- Towards Zero Waste
- Incineration
- Recycling
- Reuse
- Waste Minimization

The National Survey conducted in 2001 for participation of public in Singapore city, showed that 80% of the respondents were aware of waste minimization and recycling. From actual statistics collected, 63% of residents participate in recycling. Except for condominiums and private apartment estates, all households are provided with recycling bags or bins to store their recyclables for door to-door fortnightly collections (UNEP, 2010).

Collections are done by private agencies appointed by government through public tenders. The recyclables are brought to sorting facilities and then sent to recycling plants. There are four existing public waste collectors appointed by the National Environment Agency (NEA) for the provision of waste collection services for domestic and trade premises and about 340 licensed are given for waste collectors in the country (Law, 2010).

All incinerable waste is incinerated in any of the four waste-to-energy plants (IPs). The nonincinerable waste and ash from the IPs are disposed of at the Semakau Landfill. The IPs and the landfill are owned by the Government and managed by the NEA.

In Singapore, about 3,800 recycle bins have been placed at public with human traffic to support the National Recycle Program. Such places includes locations outside several mass rapid transit stations, food courts and food centers, bus interchanges, airport, pedestrian malls, etc (UPB, 2009).

2.4.4 Housing for Urban Poor

Singapore is highly successful in the development of public housing program, which has enabled house ownership for 85% of the total population. It has been an important aspect of its planned

urbanization strategy for economic development. This development agenda necessitated the redevelopment of the central areas where in 1960s some two thirds of the populations were concentrated. The housing conditions then were the same as those in today's poor urban neighborhoods (Scott, 1999).

In Singapore, 130,000 people live in squalid and insanitary *attap kampongs* throughout the municipal areas. They have standpipe water and the most primitive sanitation. It is a physical impossibility to eject these people; they have nowhere else to go. Although the municipality does excellent work in trying to keep these areas properly drained and free from disease, nevertheless they constitute a menace to the general health of the whole city. Singapore squatters demand fantastic prices for possession; a parcel of land free from squatters is three times as expensive as land that is squatter-occupied (Bhooshan, 1976).

Public housing estates were first developed in and around the fringes of the central area. These not only reduced the dislocation of the households being resettled but also obviated the necessity for the public housing authority to provide an exhaustive list of estate facilities to meet everyday needs of the people being resettled. Many resettlement programs have failed because of the virtual banishment of the low-income households to distant locations often outside of the city altogether.

Only incrementally did the public housing authority develop housing estates and new towns further away from the city center. The first new town developed was located some 6 to 8 km away. To compensate for the longer distance between their new homes and the city center, this new town was planned with a full range of neighborhood facilities and services, including public bus transport. Furthermore, the new town was located along highways connecting the town center to the city, thus facilitating relatively convenient and fast transportation to workplaces.

In the late 1960s a financing scheme was introduced to enable households to buy public housing units through the use of a part of the money in their retirement savings fund—Central Provident Fund. The payment scheme between state and home buyers ensured financing for the housing program. In the beginning, the homes built were small (Chandra et al., 2011). The general expectation was that families would move to bigger apartment units once their incomes improved either from wage increases or when the children grew up and were able to complement their

parent's incomes. So as illustrated in Table 2.8. The proportion of residents living in smaller one and two-room apartments declined to 5% in 2000 whereas that living in the larger four- and five room apartments has increased to more than half among public housing residents (Bhooshan, 1990).

Anartmont Types	Year		
Apartment Types	1985, (%)	1990, (%)	2000, (%)
1 and 2 room	19.4	8.2	5.0
3 room	47.5	35.4	25.7
4 room	24.0	27.4	33.2
5 room, executive, maisonette, and large units	9.0	13.0	23.7

Table 2.8: Housing trends Among Public Housing Residents in Singapore

Source: GiokL. O and Kai H P, 2007

Public housing apartments have been allocated to applicants on a first come, first served basis. Furthermore, public housing estates in Singapore have been equitably developed throughout the city-state providing location choices. For the urban poor, transport, apart from housing, usually constitutes the major household expense item.

All the public housing estates are connected to modern sanitation and sewerage treatment works. In addition, there is piped potable water supply and electricity. A solid waste management system was also provided and put in place. Hence, the public housing program was effective in breaking the vicious cycle of the lack of provision of environmental and health infrastructure, which has led to highly unhealthy and socially vulnerable conditions in slum and squatter settlements.

In 2007, 81% of the Singapore resident populations were living in public housing managed by the Housing and Development Board (HDB). While 95% of the public housing units were owned by the residents, 79% of the resident population lived in self-owned public housing and only 2% of the Singapore resident populations were tenants in public housing. In comparison, 18% of the Hong Kong residents were living in self-owned subsidized housing (provided by Housing Authority and Housing Society), and 31% were living in public rental housing (GiK and Kai, 2007).

The private housing stock of Singapore was relatively small constituting 21% of the total housing stock in terms of number of housing units. Condominium was the most common form of private housing constituting about 46% of the private housing stock. Apartments constituted only a quarter of the private housing stock. Condominium and apartments in Singapore were relatively new and their building started in the late 1970's.

The provision of mass, affordable public housing has improved living standards for a large number of Singaporeans. The main vehicle for implementing the public housing policy is the Housing and Development Board (HDB). In 1997, 85% of the population owned or lived in a HDB-developed flat. The Singapore model has been widely hailed as a success and is often studied by other countries which have yet to solve the housing problems of their urban population (HDB, 1997).

The rapid growth of Singapore Island at the turn of the century produced slums in the central city area. In 1918, the Colonial Administration set up a Housing Commission to study the housing problem in the central area. The results of the study led to the setting up of the Singapore Improvement Trust (SIT) in 1927 with the mandate of housing the homeless. It was empowered to plan roads, regulate sanitary conditions of buildings and draw up schemes for land acquisition. The SIT was, however, not given the authority to carryout large-scale housing construction. As a result, during its 32 years in existence, it only completed 23,000 units of flats. In 1947, when the Housing Committee was set up, it produced some shocking findings. 72% of the population or 680,000 people lived within the central city area. About a third of the populations were living within an area of 4 square kilometers. Urban slums burgeoned, breeding disease, encouraging crime and posing fire hazards (Bharat, 2003).

The Land Acquisition Ordinance which was passed in 1920 was amended in 1946 and 1955 to give the government powers to acquire more private land for comprehensive new-town development and to seek price stabilization. However, the powers granted were limited and the process was cumbersome and slow. The SIT had only been given building authority in 1932 and managed to construct 20,907 units between 1947 and its demise in 1959. Its construction rate by then was one new flat per year per 150 families. By 1959, the SIT had only managed to house a meager 8.8% of Singapore's 1.6 million people (Bharat, 1995).

Singapore also faces an extreme shortage of land. Its total land area is currently approximately 640 square kilometers. The population of Singapore was 3.02 million in 1990, and has been increasing at an average of 1.7% annually since 1967. Population density is amongst the highest in Asia, second only to Hong Kong. In 1990, population density was approximately 5,000 people per square kilometer. Nearly half of the available land in Singapore is already built up, while considerable proportion consists of land designated as water catchment areas, forest reserves and for military establishments, which can never be put to economic use (Carmon, 2000).

That Singapore is a unique economic and housing success story is an understatement. It seems to be the rare case where a centrally managed economy has thrived. Despite the country's one party rule, Transparency International ranks it as the fourth least corrupt country in the world. Perhaps Singapore cannot teach us many lessons about housing development elsewhere, but it can teach some many of which the Chinese have learned. Public ownership of land is pervasive in Singapore. According to Chan (2008), around 85 percent of households live in housing units built on government owned land. Most households own their units, and the units are traded actively in the secondary market. The quality of housing in Singapore is generally good. Much like Hong Kong, Singapore developed a substantial amount of its housing through government agencies. The transformation of the housing stock was remarkable: in 1965, more than 160,000 people lived in squatter settlements in Chinatown, an area with less than one square mile of land.Within20 years; Singapore became one of the most livable cities in the world (Richard, 2014).

Singapore had a model of doing everything through the public sector. The Housing and Development Board of Singapore was the key agency in addressing the issues. The point that went in favor of a totally public sector based model of Singapore is that in Singapore all land belongs to the government. The HDB had constructed high rise residential building for various income groups. Today 90 percent of the Singapore owns a house for them and this includes the urban poor. Land was a scare resource and hence the decision to go vertical buildings, creation of an effective public transport system was also taken care of simultaneously.

Lessons from Singapore for India: Singapore obviously had the advantage of the land being in the complete domain of the government, which is not the case in India. Hence a total public sector based housing policy is not possible for Indian cities. So a combination of public, private and PPP

model is the right solution in the Indian context. However there is one thing that India will have to emulate Singapore that is in going vertical. The building byelaws in most of the Indian cities are very conservative in going vertical. As a result there is lot pressure on land to take care of the housing needs. This also results in skyrocketing of prices of the land and constructed flats. If the building byelaws are suitably amended to give way for high rise buildings then it will somehow reduce the price of the houses and make it more affordable. However this relaxation should be given for only LIG and EWS houses. The prevention of creation of future slums is also essential and for this purpose the existing public lands should be utilized for some useful purpose.

2.4.5 Redevelopment in Singapore

Redevelopment work is focused on the old building. Basically measures used by Singapore Government in facilitating redevelopment in the private housing, revitalization of the old areas shopping centers. The conservation of historical building by monument board established in 1971 under the Preservation of Monuments Act enacted on 29 January 1971. At present, it operates under the Ministry of Information, Communications and Arts (MICA). Its major



Fig. 2.10: Conservation of Chinatown

objective is to preserve monuments and related data of historic, traditional, archaeological, and architectural or artistic interests. It also seeks to protect and augment the amenities of monuments, as well as to stimulate public interest and support in the preservation of monuments (Law, 2009).

2.4.6 Economic Sustainability

Singapore being one of the fastest growing regions in the South Asia creates many economic development opportunities. The Singapore government policy helps to maintain the economic sustainability so as to improve the living quality of Singapore city. Since independence, Singapore has created many measures to reduce unemployment and raise the living wages. Singapore policy has witnessed an improvement through successful investment in education, healthcare and physical

infrastructure comprising of public housing, transportation and telecommunications networks. The average economic growth achieved is 8% per annum along with capability for building nation's reserves (ACCA, 2012).

The driving factors for Singapore economic success worth mentioning are business – friendly environment, openness to foreign investment and access by businesses to a competent works force. Singaporean enjoys a diversity of jobs through participation of foreign and local enterprises. The economic structure of Singapore compare to Hong Kong is shown in Table 2.9.

Table 2.9: Comparative Economic Structure of Singapore and Hong Kong

Sl. No	Economic Service	Unit in	Singapore	Hong Kong
1	Service (excluding FI)	In percentage	60	76
2	Finance and Insurance	In percentage	13	16
3	Manufacturing	In percentage	22	2
4	Construction	In percentage	6	6
	Total		100	100

Source: MTI, 2012

As on 2011, the contribution of foreign workers to Singapore economy is divided into 5 breakups such as manufacturing, construction, health and social services, services excluding health and social. The detail of the breakups in service sector is given in Table 2.10.

Table 2.10: Service Sector in Singapore

Sl. No	Services Sector	Numbers of population	In %
1	Services excluding Health and Social Services	407,500	41
2	Construction	292,500	29
3	Manufacturing	268,000	27
4	Health and Social Services	19,500	2
5	Other	4,100	0.4
	Total	991600	100

Source: MTI, 2012

The economy of Singapore is projected to be influenced by both internal and external factors in the coming decades. The city will be benefited externally from a more economically vibrant Asia. Internally the Singaporean work force will age and shrink even though they become highly educated. Moreover other natural constraints like land and energy will also limit the sustainable growth of the city economy. Singapore city has been enjoying the opportunities and benefits of its economic growth for most of the time since independence. A favorable environment and significant social investments – particularly in the area of education – have allowed Singapore to enjoy high rate of employment and wage growth since post – Independence period. The growth of the city as a global city in the hearth of the Asia is expected to boom up in the coming years and even exceed than that those in developed economies. The Asian Development Bank has projected that Asia will account for half of the world's output by 2050 (Chetan, 2009). Singapore is one of the few English – speaking cities in the heart of Asia with a highly educated works force, high levels of connectivity, reliable public services, and a stable government. Singapore has close to emerging markets in Asia which have growing middle class populations and an increasing demand for sophisticated manufacturing goods and services. Singapore is well- placed to act as node for key decision makers of global companies to manage their businesses in the growing Asia market, and as a spring - board for Asian companies seeking to expand into the global market. Many global companies, such as Levi Strauss & Co., already recognize Singapore's value proposition and have established their Asia-Pacific headquarters in Singapore. Our local businesses can similarly leverage on strengths and expand beyond the domestic market to tap into the growth of emerging Asia economies. Singapore can also continue to deepen the nation current areas of expertise in high value and complex manufacturing, as well as high end services in order to ride on Asia's growth. The challenge imposed by the demography of a nation requires that certain difficult choices have to be made in time on as to how our economy will grow in the years to come (Essa et al, 2013).

Singapore economy being a small open economy must consider different aspects as to meet its demographic challenges and continues to provide opportunities to Singapore in a sustainable manner over the long run. In case of no easy solutions, any response is likely to rely on three broad approaches: restructuring the economy to push for productivities –driven growth; encouraging more residents (including women and older workers) to join and stay in the workforce; and

carefully calibrating nation intake of immigrants and foreign manpower. Besides, infrastructure development in the field of housing and transport must also keep pace with economic and population growth, so that Singaporeans can continue to enjoy a good quality of life (Leo, 2014).

If Singapore as a society makes the right choice, city will be able to put the economy on a sustainable growth path over the longer term. This will ensure that all Singaporeans, regardless of their skills and background, can continue to have access to good job opportunities, rising real wage and a higher quality of life in the future.

2.4.7 Lessons Learned

One of the most impressive parts of the study on urban renewal in Singapore is the institutional set-up and the overall planning in urban redevelopment. Singapore has developed from a water scarce developing nation to a world leader in the field of water management in a short period of three decades. The credit goes to the proper governance of water supply and waste water management system in Singapore, its transparency and accountability. Strong anti-corruption measures are implemented for all city development work. And people of Singapore do not use water recklessly. The quantity of water used by every household is properly monitored using water meters. This is also in the case of sewerage, storm water and solid waste management in Singapore. Public Utilities Board and Ministry of Environment and Water Resources and Housing and Development Board are delivering services efficiently and effective with commitment for welfare of citizen. In last three decade, Singapore has developed very rapidly in term of urban infrastructure development.

In India, the concerned departments for development work are not functioning efficiently and honestly crippled by corruption and irresponsibility of authorities. There is a lack in public awareness about proper utilization of the resource and facilities. As result of which India has very low performance in the field of urban infrastructure (water supply, waste water management, storm water and drainage and solid waste management). So, Indian cities need to adopt better systems like that of Singapore.

2.5 SUMMARY

Post world war, urban development had been approaches through various – urban regeneration, urban reconstruction, urban rehabilitation, urban renewal, urban redevelopment and revitalization for improvement of urban in developed and developing nations. Urban renewal focuses mainly on the housing for urban poor after war had occurred in developed contries.

Singapore is one of the best cities among the developed and developing nations in term of urban infrastructure development in the last two decade in the sectors of water supply, waste water management, storm water and drainage, solid waste management and housing for urban poor. But, Singapore city has not done renewal newal project. City has focus on the creation of urban infrastructure facilities. There was no research on evaluation of urban renewal project. It is a gap of the research for the urban renewal project evaluation in the sectors of water supply, waste water management, storm water and drainage, solid waste management and housing for urban poor.





INTRODUCTION OF JNNURM

3.1 INTRODUCTION

The urban renewal Projects under JnNURM scheme in India for improvement of urban services have been described in this chapter. The Jawaharlal Nehru National Urban Renewal Mission (JnNURM) is a massive city-modernization scheme launched by Government of India under Ministry of Urban Development, Government of India. It envisages at total investment of over \$ 20 billion over seven years. Name after Jawaharlal Nehru, the first prime minister of India, the scheme was officially inaugurated by Prime Minister Manmohan Sing on 3rd December 2005 as a program meant to improve the quality of life and infrastructure in the 65 cities. It was launched in 2005 for a seven year period (up to march 2012) to encourage cities to initiated step for bringing phased improvements of their services levels. The government had extended the tenure of the mission of two years, i. e from April 2012 to March 31, 2014 (JnNURM Documented, 2008).

The JnNURM is huge mission which relates primary to development in the context of urban conglomerates focusing to the Indian cities. The JnNURM aims at creating _conomically productive, efficient, equitable and responsive cities by a strategy of upgrading the social and economic infrastructure in cities, provision of Basic Services to Urban Poor (BSUP) and wide-ranging urban sector reforms to strengthen municipal governance in accordance with the 74th Constitutional Amendment Act, 1992.

India reached a population of 1210.2 million with approximately 31.16 per cent shared urban population as per Census, 2011. As a result of the liberalization policies adopted by the Government of India is expected to increase the share of the urban population may increase to about 40 per cent of total population by the year 2021 (Bharat, 1993). It is estimated that by the year 2011, urban areas would contribute about50-60 per cent of gross domestic product (GDP) (Marwaha, 2010). However, this higher productivity is contingent upon the availability and quality

of infrastructure services. Urban economic activities are dependent on infrastructure, such as power, telecom, roads, water supply and mass transportation, coupled with civic infrastructure, such as sanitation and solid waste management. In this context, The JnNURM was launched on 3rd December, 2005 with the primary objectives of creating economically productive, efficient, equitable and responsive cities in the country. It is the largest ever national urban initiative and envisages central government support of Rs. 50,000 Core over seven year period. JnNURM includes two sub-mission namely; (1) Urban Infrastructure Governance (UIG), and (2) Basic Service to Urban Poor (BSUP) (MoUD, 2005).

The mission of the JnNURM scheme had been launched by government of India to renewal of urban infrastructure facilities as well as the housing for urban poor. It was first time in the history with such a huge scale of budget over seven years to cope up the urban infrastructure improvement in 65 cities in India. This scheme has been taken care by two ministries namely, Ministry of Urban Development (MoUD) for UIG, and Ministry of Housing and Urban Poverty Alleviation (MoHUPA) for BSUP.

The mission statement of Indian government under JnNURM scheme is to encourage reforms and track planned development of identified cities. Focus is to be on urban infrastructure and service delivery mechanism, community participation, and accountability of ULBs/Parastatal agencies towards citizen.

3.2 JNNURM OBJECTIVES

The objectives of JnNURM which had been identified by government of India are given below;

- 1. Established of linkages between asset-creation and asset-management through a slew of reforms for long-term project sustainability;
- 2. Ensuring adequate funds to meet the deficiencies in urban infrastructure services;
- 3. Planned development of identified cities including peri-urban, outgrowth and urban corridor leading to dispersed urbanization;
- Scale-up delivery of civic amenities and provision of utilities with emphasis on universal access to urban poor;
- 5. Special focus on urban renewal programme for the old areas to reduce congestion; and

6. Provision of basic services to urban poor including security of tenure at affordable process, improved housing, water supply and sanitation, and ensuring delivery of other existing universal services of the government for education, health and social security.

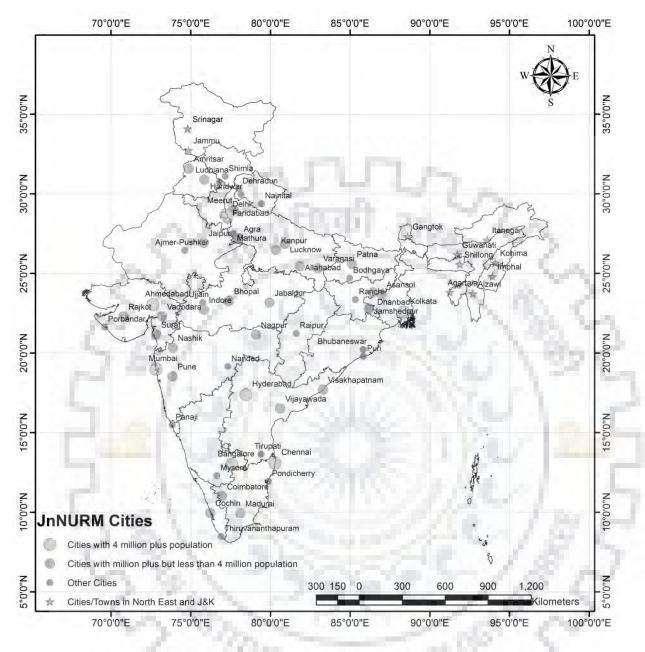
3.3 IDENTIFIED CITIES UNDER JNNURM

The Government of India (GoI) had identified 65 cities across the country as per census 2001. The JnNURM cities had been divided into three categories based on the size of city population. The first category includes cities includes Delhi, Mumbai, Ahmadabad, Bangalore, Chennai, Kolkata and Hyderabad cities which had a population of more 4 million plus.

The second category cities which had a population of 1 million to 4 million such as Patna, Faridabad, Bhopal, Ludhiana, Jaipur, Lucknow, Madurai, Nashik, Pimpri Chinchwad (Pune), Cochin, Varanasi, Agra, Amritsar, Vishakhapatnam, Vadodara, Surat, Kanpur, Nagpur, Coimbatore, Meerut, Jabalpur, Asansol, Allahabad, Vijayawada, Rajkot, Dhanbad and Indore.

The third category cities had a population of below 1 million namely; Guwahati, Itanagar, Jammu, Rajkot, Panaji, Shimla, Ranchi, Thiruvananthapuram, Imphal, Shillong, Aizawl, Kohima, Bhubaneshwar, Gangtok, Agartala, Dehradun, Bodhgaya, Ujjain, Puri, Ajmer-Pushkar, Nainital, Mysore, Pondicherry, Chandigarh, Srinagar, Mathura, Haridwar, and Nanded.

Based on the census 2011, there are 20 cities which had a population of more than 4 million, 34 cities (ranging from 1 to 4 million), and 11 cities in north east states and Jammu and Kashmir cities. Among north east cities, Gangtok and Itanagar cities were having less than 1 million and rest were between above 1 to 16 million populations (Annexure IV). As per 2011 census, the identified JnNURM cities are represented in Fig. 3.1.





3.4. SCOPE OF URBAN RENEWAL UNDER THE JNNURM

The scope of JnNURM scheme mainly comprises of two sub-missions namely; Urban Infrastructure Governance (UIG) covering the sectors of water supply, waste water management, storm water and drainage, preservation of water bodies, solid waste management, other urban transport, parking, MRTS, RoB/Roads, urban renewal, and development of heritage areas. The Basic Services to Urban Poor (BSUP) was other sub-mission and focused on the housing for urban

poor with a view to providing basic services utilities to the urban poor (Mahavir and Maqbool, 2010).

As per the academic exercise and researcher finding the urban renewal project under JnNURM is slightly different the nature of works from developed nations. The developed nation had been working on the social development, economics development, and housing for urban poor under renewal projects whereas, JnNURM was more on the creation of physical infrastructure to meet the demand due to urbanization. In this context, JnNURM projects were being implemented maximum number in water supply, waste water management, storm water and drainages, and solid waste management under UIG sub-mission, and housing projects for urban poor under BSUP sub-mission.

Maximum number of cities were giving priority to water supply projects and maximum number of DPRs implemented for construction of Water Treatment Plants (WTPs), construction of Over Head tanks (OHTs) laying the pipe lines, upgrading the existing pumping stations, etc. The second priority were waste water management projects, and implemented DPRs for construction of Sewerage Treatment Plants (STPs), laying sewer lines, construction of pumping stations, etc. Third priority were on storm water and drainage sector projects, and implemented DPRs for construction of pucca drains along the roads networks within city limit only. The fourth was solid waste management sector projects, and implemented DPRs for buying of equipments, storage and transportation, and construction of the transition station and landfill side whereas in the other sectors of DPRs had been approved under UIG in least numbers of projects sanction as on 2012 (JnNURM Project Status, 2012).

Approved and sanction DPRs under BSUP projects were on relocation, redevelopment, group housing, and in-situ projects for urban poor/slum across the country. All JnNURM cities had approached on different way of urban poor/slums dwellers.

3.5 JNNURM REFORMS AT STATE AND CITY LEVELS

The main trust of reforms under JnNURM scheme was ensuring of the strengthen governance at ULBs and better delivery of city services effectively and efficiently at post projects stages. The reforms were required in order to make ULBs becomes self financial sound and undertaking

JnNURM projects. The requirement of reforms by government of India had classified into two – mandatory reforms (at state and ULBs level) and optional reforms (at ULBs levels). The existing machinery of governing system and functioning is significant for delivering urban services. In this context, the strategy for urban renewal is basic need - evaluation of the development policy instrument (Dobrivoje, 2004).

The mandatory reforms at state level are namely (MoUD, 2005);

- 1. Repeal of Urban Land Ceiling Regulation Act,
- 2. 74th Constitutional Amendment Act (Constitution of District Planning Committee),
- 3. Enactment of Public Disclosure Law,
- 4. Stamp duty rationalization to 5%,
- 5. Enactment of Community Participation Law,
- 6. Enactment of Water Supply and Sanitation,
- 7. Transfer of City Planning Functions,
- 8. Reforms in Rent Control,
- 9. 74th Constitutional Amendment Act (Transfer of 12 Sch. Function) and
- 10. 74th Constitutional Amendment Act (Constitutional of Metropolitan Committee).

All components of reforms at state level are equally important however, 74th Constitutional Amendment Act (CAA) is for strengthening the urban local body functioning, responsibility and task of decentralization in a hierarchy system (Sivarramakrishnan, 2010). The mandatory reforms at ULBs level are given below;

- 1. Internal earmarking of funds for urban poor,
- 2. Shift to accrual based double entry accounting,
- 3. Property tax (85% coverage),
- 4. E-governance set up,
- 5. Property tax (90% collection efficiency),
- 6. The 100% cost recovery (water supply),
- 7. Provision of basic services to urban poor and
- 8. The 100% cost recovery (solid waste).

The components of mandatory reforms at state and ULBs level were equally important as far good governance is concern to delivery urban services.

The components of option reforms under JnNURM are eight. The components of optional reforms are given below (MoUD, 2005);

- 1. Encourage Public Private Partnership,
- 2. Revision of Building Bye Laws Streaming the Approval Process,
- 3. Introduction of Computerized Process of Registration of Land and Property,
- 4. Earmarking 20-25% Development Land in all Housing Projects for Economical Weaker Section (EWS) and Lower Income Group (LIG),
- Simplification of Legal and Procedural Framework for Conversion of Agricultural Land for Non-Agricultural Purpose,
- 6. Bye Laws on Reuse of Recycle Water,
- 7. Administrative Reform,
- 8. Structure Reform and
- 9. Introduction of Property Title Certificate System.

3.6 FUNDING PATTERN

As per Indian government had a designed the patterns of funding was based on the size of city as per census 2001. The bigger city (more than 4 million populations) had shared 35 percent from central, 15 percent from state and 50 percent from Urban Local Bodies (ULBs). The second category (1 to 4 million populations) had shared 50 percent from central, 20 percent from state and 30 percent from ULBs. The third category (rest of cities except Jammu and Kashmir cities and north east states cities) had shared 80 percent from central and 20 percent from state whereas cities in north east states and Jammu and Kashmir were funded 90 percent from the central government and 10 percent from the state government.

The National Steering Group (NSG) was apex body of the JnNURM mission. The policy guideline was instructed by NSG to ULBs level through state government level (state level steering committee). In the same way project proposal will come from the ULBs level to National level (Central Sanction and Monitoring Committee). The project proposal flow is shown in Fig. 3.2.

Minister of Urban Development was chairman for UIG sub-mission and Minister of Ministry of Housing and Urban Poverty Alleviation (MoHUPA) was chairman for BSUP sub-mission. Each secretary of Ministries was co-chairman in the respect sub-mission. The secretaries of Ministry of Finance (Department of Expenditure) and secretary of Planning Commission (PC) were executive members.

The DPRs proposal will born from the ULBs and reviews will be done by state level steering committee and finally submit to central sanction and monitoring committee for further approval of projects. The Sanction and Disbursement of Funds for UIG projects will soft loan and grant cum loan at installment basis in four stages whichever the projects approved. In the same way, BSUP project will do. The release of project cost will be done in four installment basis, releasing 25 percent of project cost in each installment.

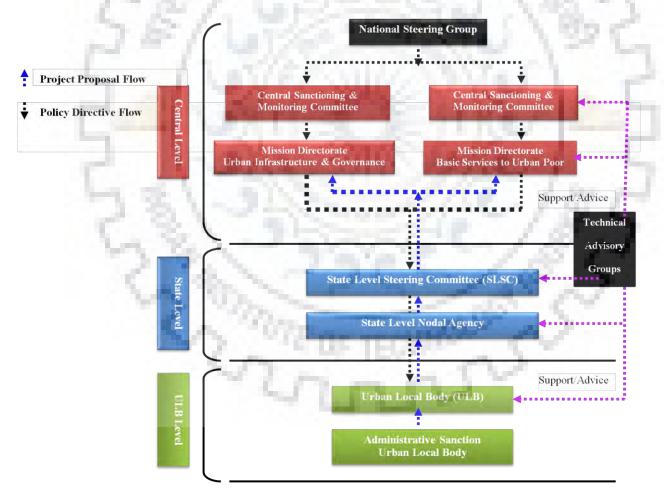
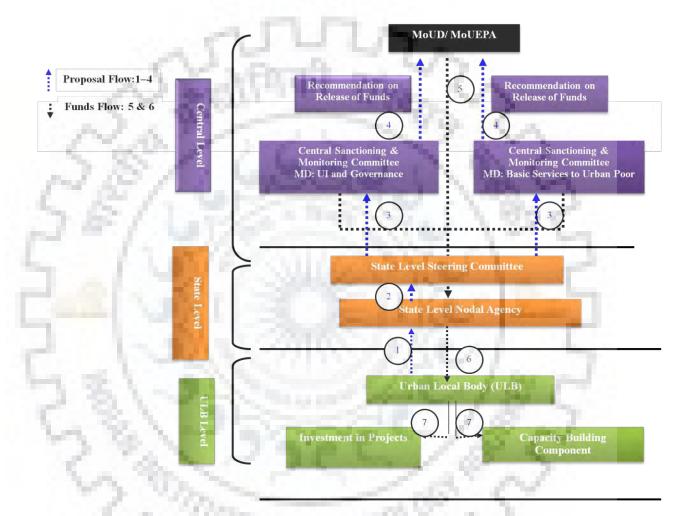
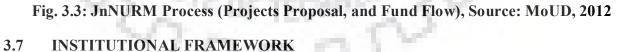


Fig. 3.2: JnNURM Process (Project Proposal, and Policy Directive Flow), Source: MoUD, 2012

The projects proposal comes from the ULBs Level and review by state government. The approved DPR by state government is sent to the central sanction and monitoring committee for further approval. Once the DPR is approved, fund will flow from the central level to ULB level through state level nodal agency. The flow chart of project proposal, sanction and fund flow is shown in Fig. 3.3.





The Institutional arrangement for JnNURM scheme consist of 4 stages of hierarchy – central level (apex body), state level (middle body), and ULB (lowest level). The roles and function of each level vary as the central level is for making policies and monitoring, state level for reviewing DPRs and coordination between central and ULB whereas ULBs has role for project proposal.

There is another additional group known as National Technical Advisory Group (NTAG), which helps in DPR preparation at ULBs and sharing the knowledge for technical skill (Grant Thornton., 2011). The institutional framework is shown in Fig. 3.4.

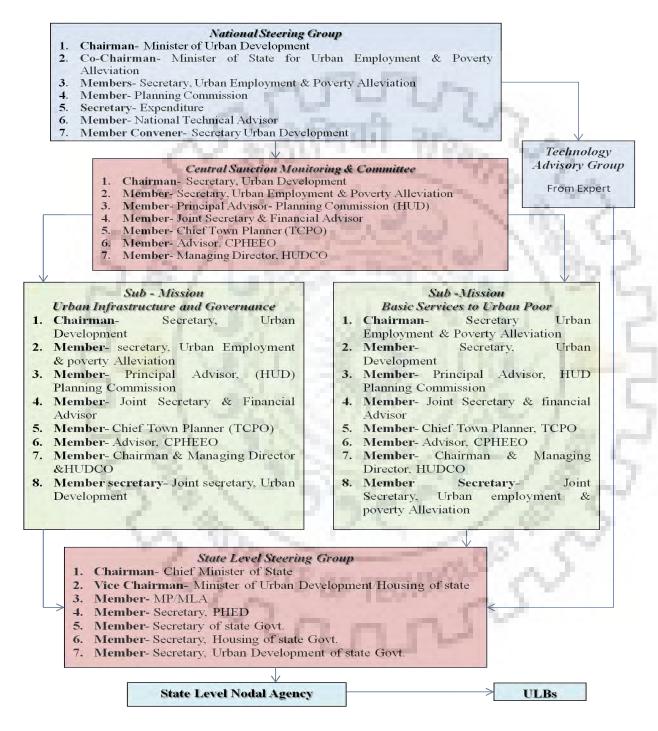


Fig.3.4: Institutional Analysis for JnNURM Policy Monitoring, Source: Based on MoUD,

Technical Advisory Group (TAG) has been a part of the JnNURM as advisory body. This advisory body is taking care of the DPRs preparation guidelines, supporting the technical aspects of the projects preparation stage etc. for both the sub mission (UIG and BSUP). As per the JnNURM notification, 2005 TAG has a roles and advising to the National Steering Group (NSG), and ULBs level (Marwaha, 2009).

The main duties of TAG is to engagement in the networks with technical staffs of implementing agencies at national level, regional, and local levels to bring about the idea of transparency, accountability and participation in the mission; to create more stakeholders involvement in the JnNURM activities through city interactions; and monitoring of JnNURM reforms conditions; specially those related to transparency and participation (i.e. implementation of 74th CAA, Community Participation & Public Disclosure laws) (Alok and Satish, 2008)...

The City Volunteer Technical Corps (CVTC) and City Advisory Group (CTAG) have been envisaged as an integrated part of programme implemented at the city level with autonomy in offering advices to JnNURM related activities. CVTC and CTAG are to be constituted by each city corporation as formal structure with the guidance of NTAG common for both the sub mission under MoUD and MHUPA. The role of the CVTC and CTAG in the overall scheme of JnNURM includes;

- 1. Advice to city governance and management team on enlisting community participation in services delivery;
- 2. Building poverty reduction progarm;
- Ensuring transparency and accountability to citizens in programme implementation under JnNURM scheme;
- 4. Help enlist involvement of citizens at grass root level through ward committee, area Sabhas, and volunteer technical corps;
- To help implement commitment of the state government under Community Participation Law

3.8 EXPECTED OUT COMES OF JNNURM

On completion of the JnNURM scheme, the following expected at ULBs and parastatal agencies will be able achieved as given below;

- 1. Modern and transparency budgeting, accounting, financial management system, designed and adopted for all urban services and governing functions;
- 2. City-wide frameworks for planning and governing will be established and become operational;
- 3. All urban residents will be able to obtained access to a basic level of urban services;
- 4. Financially self-sustaining agencies for urban governing and services delivery will established through reforms to major revenues instructions;
- 5. Local services and governance will be conducted in a manner that is transparent and accountable to citizens; and
- **6.** E-governance application will be introduced in core functions of ULBs/Parastatal resulting in reduced cost and time of services delivery processes.

3.9 SUMMARY

The urban renewal had started at post world war to improve the physical and social of the degraded urban features. The urban renewal and JnNURM are similarity in terms of urban development. The types of urban development have looking in many aspects such as socio-economic, urban environment, reconstruction of old building, revitalization of the historical building and so no. The exact term of the urban infrastructure under JnNURM was rejuvenation of the urban areas and literally the reborn of the urban infrastructure facilities. There were many approaches of the urban renewal – urban regeneration, urban reconstruction, urban rehabilitation, urban redevelopment, and urban revitalization.

The comparative analysis of the urban renewal views among developed and developing nations has keeps different views and focuses are different angle /aspect / areas. Urban renewal had focus on reconstruction of urban landscape, social and cultural dimension and improvement of the historical buildings in developed countries while in India, the renewal focus on the urban physical infrastructure facilities and preservation of historical areas.

Singapore city is one best city in world in terms of the urban infrastructure services efficient and affected implementation of the urban renewal projects mainly in the areas of water supply, waste water management and solid waste management and housing for urban poor. The urban services benchmarks in Singapore are incomparable to the developing nations. The services are highly qualified and delivery the services in a satisfaction level by consumer in the city. As compared to Singapore city, India has to learn for planning aspect as well as the governing system; urban renewal projects had implement in effect manner and how it had success the projects for better life quality in urban areas.

In the same process, urban infrastructure improvement is required in India. Therefore, government of India had launched the JnNURM to address the urban issues in 65 cities in sector of water supply, waste water management, storm water and drainage, solid waste management, preservation of water body, other urban transport, MRTS, Roads/flyover/RoBs, urban renewal, parking, and development of historical areas under UIG sub-mission and housing for urban poor under BSUP sub-mission, JnNURM.





COMPARATIVE ANALYSIS OF JnNURM AT STATE AND CITY LEVEL

4.1 GENERAL

This chapter deals with comparative analysis of reforms under JnNURM scheme to understand how the Government of India has designed and adopted policies since post independence in order to improve urban services in India. The comparative study of UIG and BSUP projects implementation is also discussed in the chapter. In the later part of this chapter the performance of UIG sub-mission in the eleven sectors of water supply, waste water management, storm water and drainages, preservation of water body, other urban transport, Roads/Flyover/RoBs, MRTS, Parking, solid waste management, urban renewal, and development of heritage areas, and housing for urban poor under the BSUP sub-mission of JnNURM at city and state levels has also been analyzed.

4.2 CONCEPT OF URBAN GOVERNANCE

The concept of good governance is not a new topic; rather it is as old as human civilization itself. -Governance" simply means the process of decision making and by which decisions are either implemented or not implemented (Rachel, 2012). Good governance comprises of the mechanisms, processes and institutions through which citizens and groups articulate their interests, exercise their legal rights, meet their obligations and mediate their differences (ASCI, 2011). Good governance as necessity to nation's economic growth is largely linked with urban centers contributing 70 percent of Gross Domestic Product (GDP) by 2030 and creating new job (Shirish Sankhe et al., 2010). Therefore urban governance has the responsibility to deliver better services in order to sustain the economic growth.

The mandatory characteristics of good governance include participation, rule of law, transparency, responsiveness, consensus, equity and inclusiveness, effectiveness and efficiency, accountability, and so on (ASCI, 2011). The qualities of good urban governance are summarized as follows:

- Good urban governance is an efficient and effective response to urban problems by accounting local government working in partnership with civil society.
- Good urban governance is a process by which the lives in the city can be improved.
- Good urban governance is a process for efficient and effective way of running the city.
- Good urban governance aims to promote civil society participation in the city management along with municipal institutions.
- Good urban governance is an inclusive process to achieve a quality of life as desired by the citizen, particularly the poor.

It is not necessary to address all urban problems (ills and controversies) by good urban governance. It is closely linked to citizen welfare and enables the community to access the benefits of urban citizenship including adequate shelter, security of tenure, safe water, sanitation, a clean environment, health, education and nutrition, employment and public safety and mobility. In the same line, JnNURM has focused on good governance at ULBs level by achieving series of reforms.

4.3 **REFORMS UNDER JNNURM SCHEME**

The gap in the urban services has been significantly increased over last few decades. Hence innovative methods for alternative institutional arrangements, new patterns of financial inputs covering market borrowings, Public Private Partnership (PPP) and Community Participation (CP), policies, and reforms at ULBs are required to deliver better services (Pandey, 2012). The JnNURM scheme of the Government of India aims to strengthen all the services mentioned above at the level of ULBs.

The JnNURM Reform at city level for improvement of urban services is not new in India. During the last two decades, numerous reforms had been implemented for urban development. The enactment of the 74th Constitutional Amendment Act is itself a major reform to strengthen urban administration and to decentralize powers and functions to the third tier of government (NIUA, 2009). Synchronous with 74th CAA, there are three reforms under JnNURM – (1) mandatory reforms at state level (2) reforms at the level of ULBs and (3) optional reforms.

The reforms at state level are namely implementations of (1) 74th Constitution Amendment Act (CAA) (transfer of 12th scheduled functions), (2) 74th CAA (Constitution of District Planning Committee (DPC)) and (3) 74th CAA (Constitution of Metropolitan Planning Committee (MPC)), (4) transfer of city planning function, (5) transfer of water supply and sanitation, (6) reform in rent control, (7) stamp duty rationalization, (8) repeal of Urban Land Ceiling Regulation Act (ULCRA), (9) enactment of community participation law, and (10) enactment of public disclosure law. Among these reforms the 74th CAA primarily strengthens the urban local body functioning, responsibility and task of decentralization in a hierarchical system (Sivarramakrishnan, 2010).

The mandatory reforms at ULBs level are namely; (i) internal earmarking of funds for urban poor, (ii) shift to accrual based double entry accounting, (iii) property tax (85% coverage), (iv) egovernance set up, (v) property tax (90% collection efficiency), (vi) 100% cost recovery (water supply), (vii) provision of basic services to urban poor and (viii) 100% cost recovery (solid waste). The reforms at ULBs are to improve services and making it financially self sufficient.

Lastly, optional reforms consist of (1)introduction of property title certificate system, (2) revision of building bye-laws such as -streaming the approval process, (3) revision of building byelaws and mandatory rainwater harvesting in all buildings, (4) earmarking 20-25% developed land in all housing projects for economically weaker section (EWS) and low income group (LIG), (5) simplification of legal and procedural framework for conversion of agricultural land for non-agricultural purpose, (6) introduction of computerized process of registration of land and property, (7) byelaw on use of recycled water, (8) administrative reforms, (9) structure reforms and(10) encouraging public private partnership.

The expected outcomes from these reforms are as follows: 1. Universal access to a minimum level of services, 2. Establishment of city wide frameworks for planning and governance; 3. Modern accounting and financial management systems at the municipal level; 4. Achievement of financial sustainability for municipal and other service delivery institutions; 5. Introduction of e-governance in core areas of municipal governance; 6. Implementing transparent and accountable urban service delivery. Thus the cities have given their commitment to implementing these reforms in order to receive JnNURM funds for urban infrastructure development.

4.3.1 State Level Reforms under JnNURM Scheme

The series of JnNURM reforms at state level were focused on the different angles such as -devolution of power to ULBs, institutional coordination, financial sustainability, encourage participation, equity,, transparency and accountability, efficiency enactment, and land market production. Some important aspects of these mandatory reforms are discussed below.

The JnNURM reforms components and their objectives under JnNURM are –implementing of 74th CAA", –functions of city planning to be transferred to cities themselves", and –the function of maintaining water supply and sanitation to be transferred to cities" which comes under the umbrella term of –Devolution of Power to the ULBs from the state government".

Implementation of 74th CAA (constitutionals of DPC and MPC) comes under Institutional Coordination reform.

-Financial sustainability" reforms cover the shifting double entry in Municipal Corporation Accounting, Property Tax coverage (85%), Property Tax collection efficiency (90%) and User charge to be 100% cost recovery for O&M in solid waste management.

E-governance is to be set up, enactment of public disclosure law and community participation law come under reforms for encouraging participation.

Internal earmarking for basic services for urban poor and earmarking 20-25% developed land in all housing projects for EWS and LIG come under reforms for equity.

Revision of building by laws-streamlining the approval process, simplification of legal and procedural framework for conversion of agricultural land for non-agricultural purpose, introduction of computerization process of land & property registration and introduction of property title certificate system in ULBs come under transparency and accountability reforms.

Administrative reforms, structural reforms, environmental sustainability, rainwater harvesting in all building through building byelaws and byelaws on reuse of recycle water come under the reform for efficiency enactment.

Rationalization of stamp duty @ 5% and repeal of urban land ceiling and regulation act (ULCRA) are come under the reforms for land market production. The JnNURM reforms indicators and their objectives are shown in Table 4.1.

Indicator of Reforms	Objectives
	Powers to the ULBs from the state government
Implementation of 74 th Constitutional Amendment	To ensure meaningful association and engagement of the ULBs in planning and service delivery
City Planning functions to be transferred to cities	To assign the ULBs with city planning functions
Water and sanitation functions to be transferred to cities	To assign all civil services to the ULBs for creating the accountability of the civic service delivery
14 00 1 1 1	Institutional Co-ordination
Implementing of 74 th Constitutional Amendment Act (CAA) – Constitution of DPC	To ensure meaningful association and engagement of the ULBs in planning and service delivery
Implementing of 74 th Constitutional Amendment Act (CAA) – Constitution of MPC	To ensure meaningful association and engagement of the ULBs in planning and service delivery
	Financial Sustainability
Shift Double Entry Municipal Corporation Accounting	-Better Financial statement/ financial accountability -Transparency -Increasing self-reliance
Property tax coverage-85%	-To establish a simple transparent, non-discretionary & equitable property tax regime -Encourage voluntary tax compliance
Property tax collection efficiency – 90%	-Increasing tax collection -Increasing self-reliance in finance
User charges to be 100% cost recovery for O&M in solid waste management	Securing effective linkages between asset creation and asset maintenance ultimately leading to self-sustaining delivery of urban services
1	Encouraging Participation
E-Governance to be set-up	Having a transparent administration, quick service delivery, effective MS, and general improvement in the services delivery link
Enactment of Public disclosure law	Ensuring that municipalities and Parastatal agencies publish various information about their function on a period basis. Such information includes but is not limited to statutorily audit annual statements of performance covering operating and financial parameters and there are service levels for various services rendered by them.
Community participation law	Ensuring citizen participation as well as introducing the concept of the Area Sabha in urban areas for involving citizen in municipal function e.g. setting priorities, budgeting provision, etc
	Equity

Table 4.1: O	bjectives of Reforms under JnNURM
forms	Objectives

Internal earmarking for basic services for urban poor	Providing security of tenure at affordable process, improved housing, water supply and sanitation to ensure services to the urban poor
Earmarking 20-25% developed land in all housing projects for EWS & LIG	Ensuring housing of the low income groups
,	Fransparency and accountability
Revision of building bye-laws – streaming the Approval process	To reduce the transition costs and to make municipal government more transparent and accountable
Simplification of legal and procedural framework for conversion of agricultural and for non-agriculture purpose	For increasing the transparency of the process and increasing new land supply for urbanization.
Introduction of computerization process of land & property registration	For increasing transparency in land market transactions
Introduction of property Title Certificate System in ULBs	For clearing land titles for land market operation as well as transparency
54 35 /	Efficiency Enactment
Administrative reforms	Increasing staff, capacity building
Structural reforms	Effective Management in Governing System
	Environment sustainability
Raining water harvesting in all buildings – Revision of building byelaws	For water conservation in the time of increasing urbanization and decreasing fresh water supplies
Byelaws on reuse of recycled water	For water conservation in the times of increasing urbanization and decreasing fresh water supplies
	Land market promotion
Rationalization of stamp duty to 5%	To create a system that balances the rights and obligations of landlords and tenants to create new housing stock and promote robust rental housing market for all income categories
Repeal of urban land ceiling & regulation Act (ULCRA)	Increasing the supply of land in the market, removing the inefficiencies and in the establishment of an efficient land market.

Source: Darshini Mahadevia and Abhijit Datey, 2012

The paradox of the 74th Constitution Amendment Act, 1992 was meant for decentralization system. Unfortunately state governments are not able to arrange the power and functions system as per 74th CAA, 1992 (overlap function and power). The union government has made a framework of administrative functioning in a proper hierarchy with respective function. Regarding 74th CAA in pre JnNURM schemes, the states of Karnataka, Kerala, Maharashtra, Uttar Pradesh and West Bengal were the best performers. The states of Madhya Pradesh, Rajasthan, Tamil Nadu, Haryana, Andhra Pradesh and Gujarat had implemented 6 to 8 components among the various components such as Municipal Corporation, Municipal Council, Nagar Panchayat, Ward Committees, Financial

Commissions, District Planning Committees (DPC) and Metropolitan Planning Committees (MPC). The comparative picture of implemented status of pre JnNURM scheme state wise is shown in Table 4.2

Sl. No.	State	Legislation	Municipal Corporations	Municipal Councils	Nagar Panchayat	Wards Committees	Finance Commissions	Election Commissions	DPCs	MPCs	Total Achieved
1	Karnataka	1994									9
2	Kerala	1994									9
3	Maharashtra	1994									9
4	Uttar Pradesh	1994									9
5	West Bengal	1994									9
5	Madhya Pradesh	1994									8
7	Rajasthan	1994									8
8	Tamil Nadu	1994									8
9	Haryana	1994									7
10	Andhra Pradesh	1994									6
11	Gujarat	1993									6
12	Orissa										4
13	Punjab	1994		*							3
14	Himachal Pradesh	1000									2
15	Assam										1
16	Bihar										1
17	Goa	1994	1000								1
18	Jammu & Kashmir	2001									0
19	Mizoram										0
20	Nagaland										0
21	Meghalaya	1000									0
22	Arunachal Pradesh										0
23	Lakshadweep										0
24	Dadra and Nagar										0
25	Manipur										0
26	Andaman & Nicobar										0
	Total Achieved		12	13	12	8	15	14	8	7	
Legend	Reform implemented	Reforms	s not Imp	lemen	ted		Dat	a Not .	Availa	ble	

Table 4.2: Implementation Status of 74th Constitution Amendment Act

Source: Analysis Based on NIUA, 2005, (* Determined by the state government)

Some state governments are still holding the power and function which were supposed to be given to municipalities (Areeba, 2004). The 74th CCA is designed to promote self-governance through statutory recognition of the local bodies with respective functions is shown in Table 4.2 (Craig, 2003). In order to implement the program and projects effectively and efficiently under various schemes of Indian government which was planned of the five year plan, the following indicators; (1) institutions of self governance, (2) ward committees, (3) District Planning Committees, (4) State Finance Commission, and State Election Commission were very important aspects. These aspects were detailed out and the purposes of the reforms indicators are summarized as given in Table 4.3.

Indicator	Functions
Institutions of Self Governance	Municipalities are visualized as _institutions of self-government', with the capability to prepare _plans for economic development and social justice'. They would functions pertaining to the XII Schedule and additional ones entrusted by the State Government. The XII Schedule is an illustrative list and not a directive one
Ward Committees	It is mandatory for Corporations to constitute Ward Committees. These would include representation from women, citizens' groups, SC/ STs etc. in cities with a population of over 0.3 million. For lower level of Urban Local Bodies (ULBs), the State government can decide. The Wards Committee is to bring governance closer to the people and could be empowered to carry out the responsibilities of the ULB including those of the XII Schedule.
District Planning Committees	To effect spatial and economic development, and also rural and urban planning, the act advises the constitution of District Planning Committees (DPC) and Metropolitan Planning Committees (MPCs) with majority representation of elected local representatives.
State Finance Commission:	To ensure financial stability of ULBs, the act mandates the constitution of a State Finance Commission (SFCs) every five years. This would review the financial position of rural and urban bodies and recommend devolution of taxes, charges, fees, tolls, duties, shared revenues mid inter-governmental transfers to municipalities and other measures. Based upon the recommendations of State Finance Commission, the Central Finance Commission is expected to suggest measures for augmenting the consolidated funds in a State, for supplementing the resources of municipalities.
State Election Commission	To ensure a democratic process, the act mandates the creation of State Election Commissions (SECs). This would oversee, direct, and control the preparation of electoral rolls and conduct elections to rural and urban bodies. Another key task of the SECs is to ensure that election to municipalities dissolved by the State government, be held within 6 months of the dissolution.

Table 4.3: Purposes of the Reforms Indicators

Source: Craig Johnson, 2003

As per Craig Johnson (2003), the research paper discussed polices for decentralization system in India. The following points were discussed over years which were aiming to improve the administrative reform at state as well as grass root levels as summarized below;

The milestone of Indian decentralization over years was to create sustainable management of administration of governing bodies in a hierarchical system. The resolution on local Self Government had started in 1882 and consequently the Royal Commission on Decentralization was introduced in the year 1907. Constitutional debates between Gandhi and Ambedkar on Gram Swaraj, self rule were witnessed in 1948. Later many committees were set up such as Balwant Rai Mehta Commission to implement the Panchayat structure at district and block (Samithi) levels. Another such committee was the K. Santhanam Committee which recommended limited revenue raising power for Panchayat and the establishment of state Panchayat Raj finance corporations in 1963. The Asoka Mehta Committee was appointed in 1977 to address the weakness of Panchayat Raj Institutes (PRIs) and concluded in its report in 1978 that a resident bureaucracy, lack of political will, ambiguity about the role of PRIs, and elite capture of power had undermined previous attempts at decentralization., The committee recommended that the district should serve as the administrative unit in the PRI structure. Based on these recommendations, Karnataka, Andhra Pradesh and West Bengal passed new legislation to strengthen PRIs G.V.K. Rao Committee was appointed in 1985 to address weaknesses of PRIs, it recommended that the block development officer should assume broad powers for planning, implementing and monitoring rural development programmes) The L. M. Singvhi Committee (1986) recommended that local selfgovernment should be constitutionally enshrined, and that the Gram Sabha (village assembly) should be the basis of decentralized democracy in India The 73rd Amendment to the Indian Constitution granted PRIAs at district, block and village levels constitutional status. The Gram Sabha is recognized as a formal democratic body at the village level. The 74th amendment granted constitutional status to Municipal bodies soon after in the year1993 and through the Adivasi Act of 1996 power of self-government was extended to tribal communities living in Fifth Schedule areas (Craig, 2003).

4.3.2 Urban Local Bodies Level Reforms under the JnNURM Scheme

Mandatory reforms at ULBs were made to improve services and making it financially self sufficient. The components of mandatory reforms which were identified by ministry of urban development (2005) under JnNURM scheme are summarized below:

- (1) Internal Earmarking of Fund for Services to Urban Poor: Internal earmarking refers to the amount of funds that would be utilized for provision of housing and basic services for urban poor. The sectors covered under Jawaharlal Nehru National Urban Renewal Mission (JnNURM) are water supply, sanitation, housing and universal services of the government for education, health and social security.
- (2) *Municipal Accounting*: Municipal accounting reform focuses on better financial management, transparency and self reliance for local bodies. The aims of the reform includes increasing access to resources for urban services, improvement in financial management, accountability, transparency of management improved and accurate costing for all urban civic services, better control and utilization of assets, publishing of audited statement on a timely basis and better management of resources and risks.
- (3) **Property Tax:** The property tax was one of the most important sources for revenue generation at the municipal level and this reform is mainly for the improvement of municipal financial status. The main feature of the reform is proper mapping of properties using GIS system in order to collect all the property tax coming under Municipal administrative boundary at least 85% of demand (Sharma and Chakraboty, 2012).
- (4) E-Governance: It was a system that provides information and communication technology (ITC) based governance to the common people to improve efficiency, transparency and accountability of all governmental institutions. The aim of e-governance is to enhance the access to and delivery of government services or bring about improvements in government operation that may include effectiveness, efficiency, service quality, or transformation. The main purpose for implementing e-governance in municipalities were: (i) To improve quality of internal local government operations and management information system to support and stimulate good governance, (ii) To improve efficiency and effectiveness in interaction between local government and its citizens and other stakeholders, (iii) To bring

about transparency and accountability in urban local body operations, and (iv) To help improve the reach of delivery of services to citizen.

- (5) Provision of Basic Service to Urban Poor: The purpose of this reform is to provide affordable housing and infrastructure services to urban poor. The outcome of this are (i) urban poor will have access to the basic municipal services such as water supply, toilets, waste water drainage, solid waste management, power, roads, transportation and so on (ii) sustainable improvement in the lives of the slums dwellers through the inclusive plan of the cities and towns and (iii) access to affordable housing for urban poor with better services and other social infrastructural facilities such as education, health and so on.
- (6) Cost Recovery: The Municipality would be responsible for recovering the financial loss / shortages and it was a mandatory reform under JnNURM scheme to improve the financial health of ULBs and provide better services. The purpose of this reform are (i) establishing linkages between asset creation and asset management through a series of reforms and (ii) ensuring adequate funds for assuring efficiency in urban infrastructure services.

4.3.3 Optional Reforms under JnNURM Scheme

The description of the optional reforms under JnNURM at city level which was documents by ministry of urban development (2005) was to encourage the ULBs for better urban services. The components of optional reforms at ULBs are summarized as given below;

- (1) *Introduction of property title certificate system:* Various experts and committees have enumerated the adverse effects of the manual system of land and property registration on the economy; while emphasizing the need to replace it by a computerised system (Manasi, 2013). The JnNURM recognized the adverse effects of the manual system of registration and suggested the adoption of computerisation of the process of land and property registration, to help develop a healthy real estate market, provide fillip to the growth of the economy, and reduce the size of the black money and delay in transaction. It was also expects that this would lead to increase in state revenues.
- (2) Revision of building bye-laws streaming the approval process: The objectives of simplifying the building rule are to (i) make the building provision development oriented with minimal parameters but at the same time safeguarding public good and concerns, (ii)

strengthen the building control and enforcement mechanism, (iii) encourage gated and other development (row housing, enclaves, group housing etc) so as to inspire housing activities with quality infrastructure and facilities (Gurumukhi, 2004).

- (3) *Revision of building byelaw-mandatory rainwater harvesting in all buildings:* With increasing population in urban areas the municipal bodies and other public agencies are increasingly finding it difficult to supply water in adequate quantities to citizens. Often citizens use private tube wells to supplement the municipal supply for their daily needs (MoURD, 2011). The rain water harvesting is an important element of reform under JnNURM. The objective of making rainwater harvesting mandatory in all building is to recharge underground water table and augment overall water availability. This measure will ensure that the rain falling on all building is tapped and directed to recharge ground water aquifers or stored for direct consumption /use by occupant of buildings.
- (4) Earmarking 20-25% developed land in all housing projects for economically weaker section (EWS) and low income group (LIG): According to the Technical group constuituted for estimating housing shortage for the 11th Five Year Plan, 99 % of deficit was in EWS and LIG group. Hence an optional reform to -earmark 20-25% land in all housing projects for EWS and LIG was included in the JnNURM (NIUA, 2009).
- (5) Simplification of legal and procedural framework for conversion of agricultural land for non-agricultural purpose: Reforms for simplification of legal and procedural framework for conversion of agricultural land should not be seen in isolation but as part of the overall package of reforms in land and property markets. Simplification of conversion process will impact and be impacted by few other reforms which are also considered under JnNURM. Other reforms linked with this are: Rationalization of Stamp Duty, Property Tax reforms, Property Title Certification, Earmarking of Land for Poor, Computerized Registration of Properties and Integration of city planning and delivery functions with ULBs. They are either impacted by these other reforms, or will in turn impact them. Improved registration and title system will simplify the process of verification of ownership in course of granting land-use conversions. Enhanced land supply will ease land availability for housing the poor. Stamp Duty yield from transactions on non-agricultural land, and property tax on non-agricultural land should fetch higher revenues to Government. Improved city planning will provide clarity on intended land-use and make the grant of land-use conversions a

transparent and rational process. The outcome of these reforms will contribute to the improvement of land and property market in urban areas such as (i) making more land stock available for urban development, (ii) evolution of planned urban form, (iii) free, non-speculative and transparent land markets, (iv) build in mechanisms for compensating – loss in value due to declared land use (MoUD, 2011).

- (6) Introduction of computerized process of registration of land and property: The aim of this reform at computerization of the process of registration of land and property was to deliver efficient, reliable, speedy and transparent service to citizens. The state/cities are therefore required to undertake steps to introduce computerized process of registration to bring in an efficient real estate market where transaction, that is sale and purchase of properties can take place smoothly without any barriers and in a transparent manner. The expected outcomes of this reforms are: (i) demystifiying the registration process; (ii) introduction of a transparent system of valuation of properties which is easily accessible to the citizens (iii) bring in speed, efficiency, consistency and reliability; (iv) replacing the manual system of copying and filling of documents with a sophisticated document management system that uses imaging technology; (v) replacing the manual system of indexing, accounting and reporting; (vi) introduction of electronic search of property (encumbrance certificate); (vii) introduction of electronic document writing; and (viii) substantial improvement in the citizen interface (MoUD, 2011).
- (7) *Byelaw on reuse of recycled water:* This reform was to meet the water demand for growing population and to provide protection against droughts; local governments must make the most efficient use of their water resources. Water recycling and reuse offer cost-effective and ecologically beneficial solutions. Water reuse involves using domestic waste from bathroom, kitchen, clothes washing and toilets a second time around, for an appropriate purpose after primary, secondary or tertiary treatment. This could be at an individual property level or at group housing level like apartment complexes or community level. This reform benefited by adoption of water reuse reform, ULBs can ensure adequate and reliable water supply for growing communities and thereby improving service delivery (MoUD, 2011).
- (8) *Administrative system:* The administration reforms at ULBs were an important element in all the realm of public administration. For an urban citizen administration of local

governance (ULBs) impact their lives far more than any other tier of government. Therefore reforms in the administration of institution of urban local bodies potentially have a significant positive impact on the quality of governance, services delivery and overall quality of life in urban areas. This reform seeks to focus on issues related to people and system / processes. Reforms in structural issues of institutions of local government were dealt with in a separate reform element that is structural reform. A separate primer on Structure Reform covers that area (Rumi, 2007).

- (9) Structural reforms and encouraging public private partnership: Structural reforms in the structure of governance are critical for achieving better urban governance. Decentralization and devolution were key attributes of structural changes. Devolution of funds, functions and functionaries were three key elements in decentralization within the structure of governance. Significant structural reform was addressed in two mandatory reforms under JnNURM, and they were the following: (i) Implementation of 74th Constitutional Amendment Act, (ii) Adoption of the Community Participation Law, and requiring constitution of Area Subhas as the third tier of urban governance within a city. Beyond these two areas JnNURM envisages certain structure that aim at making the institutions of urban management at both the state and city levels more effective. Administrative reforms and Structural Reforms must go hand in hand. Changes in system and processes must be followed by changes in structure aligned to the processes, and vice versa (Grant, 2011).
- (10) Structure Reform: The structure reforms are an optional reform at city level and it consists of mainly two elements which help in the better urban governance (decentralization and devolution are key attribute of structure changes). The two elements are (1) Implementation of 74th Constitutional Amendment Act, and (2) Adoption of the community participation law, requiring constitution of Area Sabhas as the third tier of urban governance within a city. The two elements of structure reform had discussed in the above para (MoUD, 2011).

4.4 COMPARATIVE ANALYSIS OF JNNURM REFORMS

4.4.1 JnNURM Mandatory Reform at State Level

There are ten components of reforms at state level which have been discussed in the above paragraphs. In comparison of 10 components of mandatory reforms at states level, -repeal of urban

land ceiling and regulation act" ranks highest as it is being implemented in 30 out of 31 states/UTs in India. The -74th CAA (Constitution of DPC)" had been implemented in 27 states and same as the component of -enactment of public disclosure law". The -stamp duty rationalization to 5%" is implemented in 26 states. -Transfer of water supply and sanitation function" has been implemented in 20 states, -transfer of city planning functions" has been implemented in 19 states, -reforms in rent control" has been implemented in 18 states, -74th CAA (Transfer of 12 Sch. Function)" is implemented in 17 states and -74th CAA (constitutional of MPC)" has been implemented only in 9 states. The component of MPC reform is applicable only in the states which have cities with population more than 10 million. The achievement of 10 mandatory reforms components by number of states and as percentage of total is shown in Table 4.4.

Sl. No	Reform Component Code	Name of Reforms Component	No. of States Achieved out of 31 states	Percentage of States Achieved Reforms
1	SLM01	Repeal of ULCRA	30	96.77
2	SLM02	74th CAA (Constitution of DPC)	27	87.09
3	SLM03	Enactment of Public Disclosure Law	27	87.09
4	SLM04	Stamp duty rationalization to 5%	26	83.87
5	SLM05	Enactment of Community Participation Law	23	74.19
6	SLM06	Transfer of Water Supply & Sanitation	20	64.51
7	SLM07	Transfer of City Planning Functions	19	61.29
8	SLM08	Reform in Rent Control	18	58.06
9	SLM09	74th CAA (Transfer of 12 Sch. Function)	17	54.83
10	SLM10	74th CAA (Constitutional of MPC)	9	29.03

Table 4.4: Component wise Performance of State Level Mandatory Reforms

Analysis Based on JnNURM Reforms Status, 2012

In comparison among the states, Gujarat and Tamil Nadu have achieved all the components of reforms, while Nagaland, Goa and Jammu and Kashmir states had performed very poor. The performance of state level reforms has been evaluated and illustrated along with their progress as shown in Table 4.5 and Fig. 4.1. The evaluation has been done by grading particular component with a score of 10. Based on the score of states they are classified into categories as A+, A, B+, B, C+, C, and D shown in Table 4.6.

Sl. No	State	Population (2011 Census)	SLM01	SLM01	SLM01	SLM01	SLM01	SLM01	SLM01	SLM01	SLM01	SLM01	No. of Reforms Achieved (A)	Score Marks $(A \times 10)$	Maximum Score
1	Gujarat	6,03,83,628											10	100	100
2	Tamil Nadu	7,21,38,958											10	100	100
3	Andhra Pradesh	8,46,65,533											9	90	100
4	Chhattisgarh	10,54,686											9	90	100
5	Himachal Pradesh	68,56,509											9	90	100
6	Jharkhand	3,29,66,238											9	90	100
7	Karnataka	6,11,30,704											9	90	100
8	Madhya Pradesh	7,25,97,565											9	90	100
9	Maharashtra	11,23,72,972											9	90	100
10	Orissa	4,19,47,358											9	90	100
11	Tripura	36,71,032											9	90	100
12	Uttar Pradesh	19,95,81,477											9	90	100
13	Haryana	2,53,53,081											8	80	100
14	Rajasthan	6,86,21,012											8	80	100
15	West Bengal	9,13,47,736											8	80	100
16	Assam	3,11,69,272											7	70	100
17	Kerala	3,33,87,677											7	70	100
18	Meghalaya	29,64,007								CT.			6	60	100
19	Mizoram	10,91,014											6	60	100
20	Pondicherry	12,44,464											6	60	100
21	Punjab	2,77,04,236											6	60	100
22	Sikkim	6,07,688											6	60	100
23	Bihar	10,38,04,637											5	50	100
24	Chandigarh	2,55,40,196											5	50	100
25	Manipur	27,21,756											5	50	100
26	Uttarakhand	1,01,16,752											5	50	100
27	Arunachal Pradesh	13,82,611											4	40	100
28	Delhi	1,67,53,235											4	40	100
29	Nagaland	19,80,602	- <u>.</u>										4	40	100
30	Goa	14,57,723											3	30	100
31	Jammu & Kashmir	1,25,48,926											3	30	100
Total A	chieved	1,21,01,93,422	30	27	27	26	23	20	19	18	17	9			
Legend Reformed Not Reform Not Applicable															

Table 4.5: State wise Performance of State Level Mandatory Reforms

Category wise representation of the states and Union territories according to their performance in achievement of the components of the reforms is shown in Table 4.6. In group A+ consist of two states, A group consist of 10 states, B+ group consist of 3 states, C+ group consist of 5 states, C group consist of 4 states, and D group consist of 5 states. Group A+ includes states of Gujarat, and Tamil Nadu, group A includes states of Andhra Pradesh, Chhattisgarh, Himachal Pradesh, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Tripura, and Uttar Pradesh, group

Source: Analysis Based on JnNURM Reform Status, 2012

+B includes the states of Haryana, Rajasthan, West and Bengal. Group B includes the states of Assam, and Kerala, group C+ includes states of Meghalaya, Mizoram, Pondicherry, Punjab, and Sikkim, while Bihar, Chandigarh, Manipur, and Uttarakhand come under group C and lastly group D includes states of Arunachal Pradesh, Delhi, Nagaland, Goa and Jammu and Kashmir. The grading of state level mandatory reform performance is represented on map in Fig. 4.1.

Grade	Maximum Score	Score Marks (in Percentage)	Number of States	Name of State
A+	100	91 - 100	2	Gujarat and Tamil Nadu
A	100	81-90	10	Andhra Pradesh, Chhattisgarh, Himachal Pradesh, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Tripura and Uttar Pradesh
B+	100	71-80	3	Haryana, Rajasthan and West Bengal
В	100	61-70	2	Assam and Kerala
C+	100	51-60	5	Meghalaya Mizoram, Pondicherry, Punjab and Sikkim
С	100	41-50	4	Bihar, C <mark>handigarh</mark> , Manipur and Uttarakhand
D	100	Below 41	5	Arunachal Pradesh Delhi Nagaland, Goa, and Jammu and Kashmir
	Tota	1	31	

Table 4.6: Grading of State Level Mandatory Reforms

Analysis Based on JnNURM Reforms Status, 2012

~

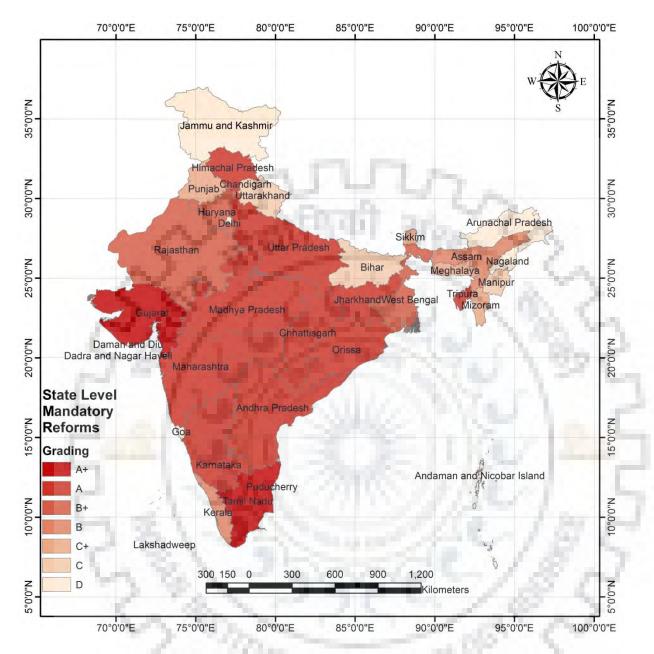


Fig. 4.1: State Level Mandatory Reforms Performance (Based on JnNURM Reforms Status, 2012)

4.4.2 JnNURM Mandatory Reforms at City Level

The JnNURM had different level of achievement in terms of mandatory reforms at city level. In component wise performance comparison of the city level mandatory reforms, -internal earmarking of fund for urban poor" stood highest in terms of achievement made by the cities; i.e. 63 out of 65 cities have achieved this reform. The other components such as -shifting to account

based double entry accounting" has been achieved in 65 cities, property tax coverage has been achieved in 40 cities, e-governance set up achieved in 37 cities, property tax collection at least 90% collection efficiency achieved in 31 cities, 100% cost recovery for water supply achieved in 23 cities. The provision of basic service to urban poor has been achieved in 14 cities while -+00 percent cost recovery" for solid waste management has been achieved only in 11 cities. The percentage of the achievement of each component in cities wise is shown in Table 4.7.

SI. No	Reform Component Code	Name of Components Reforms	No. of Cities Achieved out of 65 cities	Percentage of Reforms to Total Cities
1	CLM01	Internal Earmarking of Funds for Urban Poor	63	96.92
2	CLM02	Shifting to Account Based Double Entry Accounting	54	83.07
3	CLM03	Property Tax (85% coverage)	40	61.53
4	CLM04	E-Governance set up	37	56.92
5	CLM05	Property Tax (90% Collection efficiency)	31	47.69
6	CLM06	100% cost recovery (water supply)	23	35.38
7	CLM07	Provision Of Basic Service To Urban Poor	14	21.53
8	CLM08	100% cost recovery (solid waste)	11	16.92

Table 4.7: Component wise Performance of City Level Mandatory Reforms

CONTRACTOR DURING

Analysis Based on JnNURM Reforms Status, 2012

The city wise performance of city level mandatory reform is shown in Table 4.8. In comparison of the mandatory reforms among the cities of Vishakhapatnam, Surat, Vadodara, Indore, and Pimpri Chinchwad (Pune) have achieved 100 percent in reform implementation (i.e. 8 out of 8 reform components have been implemented in these cities). Cities of Hyderabad, Ahmadabad, Mumbai, and Chennai have implemented 7 reform components. Rajkot, Bangalore, Bhopal, Nashik, Shillong, Coimbatore, Madurai, Agra, Allahabad, Kanpur, Lucknow, Mathura, and Varanasi have implemented 6 reform components. Vijayawada, Tirupati, Raipur, Kochi, Thiruvananthapuram, Mysore, Jabalpur, Nagpur, Nanded, Bhubaneshwar, Puri, Jaipur, Ajmer, Gangtok, Agartala, Nainital and Meerut have implemented 5 reform components. Cities of Delhi, Asansol, and Kolkata have implemented 4 reform components, while cities of Guwahati, Faridabad, Jammu, Srinagar, and Aizawl have implemented 3 reform components. Cities of Itanagar, Bodhgaya,

Porbandar, Shimla, Ujjain, Imphal, Kohima, Pondicherry, Amritsar, Ludhiana, Dehradun, and Haridwar have implemented 2 reform components. Cities of Patna, Dhanbad, Jamshedpur, and Ranchi have implemented 1 reform component, while Panaji is the only city which has not implemented even a single reform component yet. The cities of Vishakhapatnam, Surat, Vadodara and Pimpri Chinchwad (Pune) are the most advanced cities in terms of the implementation of reforms. Half of the JnNURM cities are very poor in terms of the reforms implementation target. The cities of Ranchi and Panaji are among poorest performers as per reforms status 2012 (Table 4.8).

Sl. No	City	CLM01	CLM02	CLM03	CLM04	CLM05	CLM06	CLM07	CLM08	Components Achieved (A)	Score Marks (A × 12.5)	Maximum Score Marks
1	Vishakhapatnam									8	100	100
2	Surat									8	100	100
3	Vadodara									8	100	100
4	Indore									8	100	100
5	Pimpri Chinchwad (Pune)									8	100	100
6	Hyderabad									7	87.50	100
7	Ahmadabad									7	87.50	100
8	Greater Mumbai									7	87.50	100
9	Chennai									7	87.50	100
10	Rajkot									6	75.00	100
11	Bangalore									6	75.00	100
12	Bhopal									6	75.00	100
13	Nashik									6	75.00	_100
14	Shillong									6	75.00	100
15	Coimbatore									6	75.00	100
16	Madurai									6	75.00	100
17	Agra									6	75.00	100
18	Allahabad									6	75.00	100
19	Kanpur									6	75.00	100
20	Lucknow									6	75.00	100
21	Mathura									6	75.00	100
22	Varanasi									6	75.00	100
23	Vijayawada									5	62.50	100
24	Tirupati									5	62.50	100
25	Raipur									5	62.50	100
26	Kochi									5	62.50	100
27	Thiruvananthapuram									5	62.50	100
28	Mysore									5	62.50	100
29	Jabalpur									5	62.50	100
30	Nagpur									5	62.50	100
31	Nanded									5	62.50	100
32	Bhubaneshwar									5	62.50	100
33	Puri									5	62.50	100
34	Jaipur									5	62.50	100
35	Ajmer									5	62.50	100
36	Gangtok									5	62.50	100
37	Agartala									5	62.50	100

Table 4.8: City wise Performance of City Level Mandatory Reforms

Sl. No	City	CLM01	CLM02	CLM03	CLM04	CLM05	CLM06	CLM07	CLM08	Components Achieved (A)	Score Marks (A × 12.5)	Maximum Score Marks
38	Nainital									5	62.50	100
39	Meerut									5	62.50	100
40	Delhi									4	50.00	100
41	Asansol									4	50.00	100
42	Kolkata									4	50.00	100
43	Guwahati										37.50	100
44	Faridabad										37.50	100
45	Jammu										37.50	100
46	Srinagar										37.50	100
47	Aizawl										73.50	100
48	Itanagar									2	25.00	100
49	Bodhgaya									2	25.00	100
50	Chandigarh									2	25.00	100
51	Porbandar									2	25.00	100
52	Shimla									2	25.00	100
53	Ujjain									2	25.00	100
54	Imphal									2	25.00	100
55	Kohima									2	25.00	100
56	Pondicherry									2	25.00	100
57	Amritsar									2	25.00	100
58	Ludhiana									2	25.00	100
59	Dehradun									2	25.00	100
60	Haridwar									2	25.00	100
61	Patna									1	12.50	100
62	Dhanbad									1	12.50	100
63	Jamshedpur									1	12.50	100
64	Ranchi									1	12.50	100
65	Panaji									0	00.00	100
	Total Achieved	63	53	40	37	31	23	14	11	1.5		
Legend												L
	Reformed	100		ľ	Not Refor	m						

Source: Analysis Based on JnNURM Reform Status, 2012

Based on the performance of city level mandatory reforms among the JnNURM cities, they have been classified into seven categories namely; A+, A, B+, B, C+, C and D. The cities scoring 91 to 100 marks (in percentage) are categorised with A+ grade, A grade is for cities scoring 81 to 90 marks, B+ grade is for cities scoring 71 to 80 marks, B grade is for cities scoring between 61 to 70 marks, C+ grade is for cities scoring 51 to 60 marks, C grade is for cities scoring 41 to 50 marks, and D grade is for cities scoring marks below 40 (in percentage). The overall number of cities categorised in different grades of performance is shown in Table 4.9. The Fig. 4.2 is showing the map of grading of cities as per city level mandatory reforms performance.

Grade	Maximum Score	Number of Cities	
A+	100	91 – 100	5
А	100	81-90	4
B+	100	71-80	13
В	100	61-70	17
C+	100	51-60	3
С	100	41-50	5
D	100	Below 41	18
	Total		65

Table 4.9: Grading of City Level Mandatory Reforms

Analysis Based on JnNURM Reforms Status, 2012,

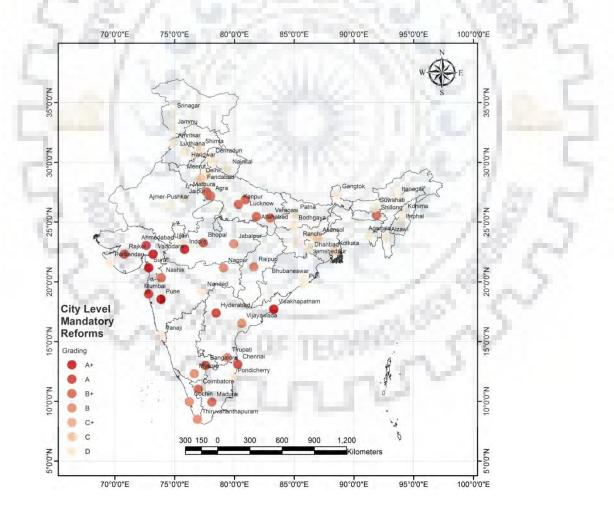


Fig. 4.2: Grading of Cities as per City Level Mandatory Reforms Performance

4.4.3 JnNURM Optional Reforms at City Level

Optional reforms under JnNURM are very much important at city level to build a Smart City by developing of the components like, accountability to the citizen, followed rule and regulation, proper set of administrative structure and more focused on housing for urban poor and so on. Comparison of the 10 components of optional reforms at city level has been represented in Table 4.10. Reform components namely, -encourage public private partnership" and -revision of building bye laws - mandatory rainwater harvesting in all buildings" have been implemented in 63 out of 65 cities (highest percentage 96.92%). -Revision of building bye laws - streamlining the approval process" has been implemented in 59 cities (i.e. 90.76% cities); -introduction of computerized process of registration of land and property" has been implemented in 55 cities (i.e. 84.61% cities), -earmarking 20-25 percent development land for EWS/LIG in all housing projects" is implemented in 54 cities (i.e. 83.07% cities). -Simplification of legal and procedural framework for conversion of agricultural land for non-agricultural purpose" has been implemented in 52 cities (i.e. 80.00% cities). -Byelaws on reuse of recycled water" has been implemented in 51 cities (i.e. 78.46% cities). Reform component -Administrative reforms and structural reforms" is implemented in 40 cities (i.e. 61.53% cities), while component -introduction of property title certificate system" has not been implemented in any JnNURM city.

Sl. No	Reform Component Code	Name of Components Reforms	No. of city Achieved	Percentage of Reforms to Total Cities
1	CLP01	Encourage of Public Private Partnership	63	96.92
2	CLP02	Revision of Building Bye Laws- Mandatory Rainwater Harvesting in All Building	63	96.92
3	CLP03	Revision of Building Bye Laws-Streaming the Approval Process	59	90.76
4	CLP04	Introduction of Computerized process of registration of Land and Property	55	84.61
5	CLP05	Earmarking 20-25% developed land for EWS/LIG in all Housing projects	54	83.07
6	CLP06	Simplification of Legal and Procedural framework for conversion of agricultural land for non-agricultural purpose	52	80.00
7	CLP07	Byelaws on Reuse of Recycled Water	51	78.46
8	CLP08	Administrative Reforms	40	61.53
9	CLP09	Structure Reforms	40	61.53
10	CLP10	Introduction of Property Title Certificate System	0	0

 Table 4.10: Component wise Performance of City Level Optional Reforms

Analysis Based on JnNURM Reform Status, 2012

The city wise performance of city level optional reforms is shown in Table 4.11. Cities of Kolkata, Asansol, Mumbai, Pimpri Chinchwad (Pune), Nashik, Nanded, Hyderabad, Tirupati, Vishakhapatnam, Vijayawada, Ahmadabad, Surat, Vadodara, Rajkot, Porbandar, Allahabad, Kanpur, Lucknow, Varanasi, Meerut, Mathura, Agra, and Raipur have implemented 9 reforms out of 10 reforms. Cities of Nagpur, Bangalore, Mysore, Indore, Bhopal, Jabalpur, Ujjain, Chennai, Coimbatore, Madurai, Ludhiana, Guwahati, Puri, Bhubaneshwar, and Shimla have implemented 8 reforms, whereas cities of Delhi, Jaipur, Ajmer, Thiruvananthapuram, Kochi, Amritsar, Agartala, and Shillong have implemented 7 components of reforms. Cities of Jamshedpur, Dhanbad, Ranchi, Chandigarh, Nainital, Dehradun, Haridwar, Aizawl, Gangtok, and Itanagar have implemented 5 components of reforms. Cities of Bodhgaya and Faridabad have implemented 4 components of reforms and cities of Patna, Pondicherry, and Imphal have implemented 3 components of reforms. Lastly city of Kohima has implemented 2 components of reforms.

SI. No	City	CLP01	CLP02	CLP03	CLP04	CLP05	CLP06	CLP07	CLP08	CLP09	CLP10	No. of Reforms Achieved (A)	Score Marks (A × 10)	Maximum Score
1	Kolkata											9	90	100
2	Asansol											9	90	100
3	Greater Mumbai	_										9	90	100
4	Pimpri Chinchwad (Pune)											9	90	100
5	Nashik											9	90	100
6	Nanded											9	90	100
7	Hyderabad											9	90	100
8	Tirupati											9	90	100
9	Vishakhapatnam	- 31										9	-90	100
10	Vijayawada											9	90	100
11	Ahmadabad											9	90	100
12	Surat											9	90	100
13	Vadodara											9	90	100
14	Rajkot											9	90	100
15	Porbandar											9	90	100
16	Allahabad											9	90	100
17	Kanpur											9	90	100
18	Lucknow											9	90	100
19	Varanasi											9	90	100
20	Meerut											9	90	100
21	Mathura											9	90	100
22	Agra											9	90	100
23	Raipur											9	90	100
24	Nagpur											8	80	100
25	Bangalore											8	80	100

Table 4.11: City wise Performance of City Level Optional Reforms

SI. No	City	CLP01	CLP02	CLP03	CLP04	CLP05	CLP06	CLP07	CLP08	CLP09	CLP10	No. of Reforms Achieved (A)	Score Marks $(A \times 10)$	Maximum Score
26	Mysore											8	80	100
27	Indore											8	80	100
28	Bhopal											8	80	100
29	Jabalpur											8	80	100
30	Ujjain											8	80	100
31	Chennai											8	80	100
32	Coimbatore											8	80	100
33	Madurai											8	80	100
34	Ludhiana											8	80	100
35	Guwahati											8	80	100
36	Puri											8	80	100
37	Bhubaneshwar											8	80	100
38	Shimla											8	80	100
39	Delhi											7	70	100
40	Jaipur											7	70	100
41	Ajmer											7	70	100
42	Thiruvananthapuram											7	70	100
43	Kochi											7	70	100
44	Amritsar											7	70	100
45	Agartala											7	70	100
46	Shillong											7	70	100
47	Jamshedpur											6	60	100
48	Dhanbad			_								6	60	100
49	Ranchi											6	60	100
50	Chandigarh											6	60	100
51	Nainital											6	60	100
52	Dehradun											6	60	100 100
53	Haridwar											6	60	
54 55	Aizawl											6	60	100
	Gangtok											6	60 60	100 100
56 57	Itana gar											6 5	50	100
58	Srinagar Jammu											5	50	100
58 59	Panaji											5	50	100
60	Bodhgaya											4	40	100
61	Faridabad											4	40	100
62	Patna											3	30	100
63	Pondicherry											3	30	100
64	Imphal											3	30	100
65	Kohima											2	20	100
00	Total Achieved	63	63	59	55	54	52	51	40	40	0	-	20	100
Legend	rour romevou	1 00	05		55	57	52		10	10	5			

Source: Analysis Based on Reforms Status, 2012

Based on the performance of the JnNURM cities for the optional reforms in 65 cities, even a single city could be catagorised as A+ grade. Twentythree cities were catagorised with A grade, and 15 cities were catagorised in B+ grade, while 8 cities are in B grade, 10 cities in C+ grade, 03 cities in C grade, and 06 cities in D grade. The grading of cities as per performance in city level optional reforms is shown in Table 4.12 and map in Fig. 4.3.

Grade	Maximum Score	Score Marks (in Percentage)	Number of Cities
+A	100	91 - 100	00
Α	100	81-90	23
B+	100	71-80	15
В	100	61-70	08
C+	100	51-60	10
С	100	41-50	03
D	100	Below 41	06
	Total	mark the	65

Analysis Based on JnNURM Reforms Status, 2012

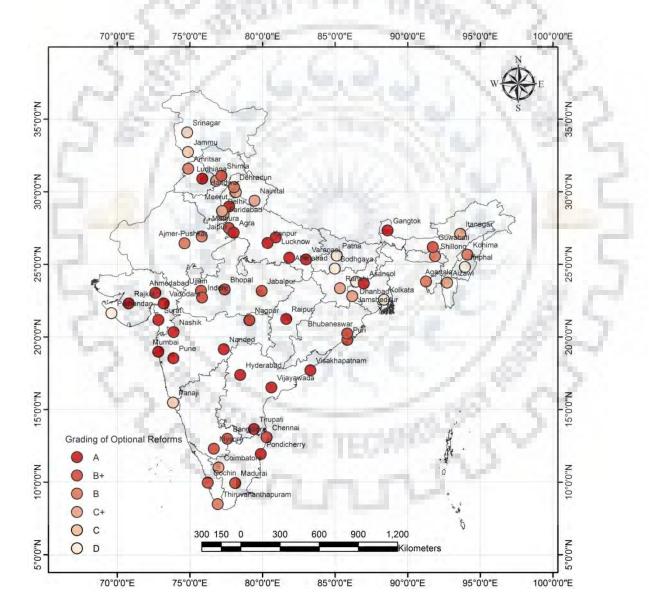


Fig. 4.3: Grading of Cities as per City Level Optional Reforms Performance

Based on the performance of the mandatory reforms and optional reforms at city level, optional had achieved at maximum number of cities. However administrative reform and structure reform were implemented only 40 cites (approximately 60% of the total cities achieved). These reforms are very important needed to give more priority. These reforms would make foundation of the ULBs strong and strengthening to deliver the better services.

4.5 E-GOVERNANCE PERFORMANCE

Setting up of E-governance facilities was one of the elements of mandatory reforms at city level under the JnNURM. As per 2012 reforms status most cities had shown very poor performance in the setting up of e-governance facilites. As many as 36 cities did not implement e-governance within targeted time. Only 25 cities had claimed the official status of _e-governance implemented'. On cross verification it was found that among these 25 cities only few had fully functional e-governance services implemented as per official target, while rest of the cities were partially functional on e-governance services as shown in Table 4.14, and Fig. 4.4. Verification of e-governance status through internet was carriedout till December 04, 2012, by checking the websites of Urban Local Bodies. It was found that 15 cities had not even created home pages till the time of verification.

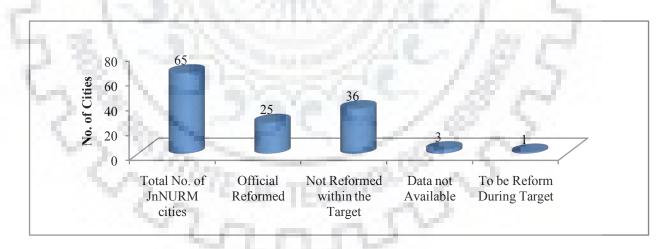


Fig. 4.4: E-Governance Progress as on 2012, Based on the reforms status, 2012

Based on the information availabile on websites, the performance of e-governance at city level has been examined on eleven indicators (services provided), namely –department information (01), m-governance (02), complaint (03), online payment for municipal uses (04), property tax (05), birth

certificate (06), death certificate (07), budget (08), tender (09), press release (10), and recruitment (11). Looking into these 11 indicators, Mumbai, Kolkata, Delhi, Chennai and Surat are best performing cities in terms of e-governance (as the services were fully functional) whereas the cities of Kochi, Jamshedpur, Pondicherry, Nanded, Bodhgaya, Mathura, Shillong, Imphal, Aizawl, Haridwar, Puri, Kohima, Itanagar, Gangtok, Porbandar have not even created the home page to access the information of the cities (Table 4.13).

			10	0	w,		Ľ,	U.	i.			E- (Gove	ernai	nce setu	
SI. No.	City	Target Year since 2006	Official Reform status	01	02	03	04	05	06	07	08	09	10	11	No. of services provided (/11)	Source available (Accessed on 4th Dec, 2012)
1	Mumbai	3													10	http://www.mcgm.gov.in/
2	Kolkata	-													10	https://www.kmcgov.in/KMCPortal/HomeActi on.do
3	Delhi	5													10	http://www.ndmc.gov.in/home/default.aspx
4	Chennai	3													10	http://www.chennaicorporation.gov.in/
5	Surat	4													10	http://www.suratmunicipal.gov.in/Default.asp
6	Rajkot	2													10	http://www.rmc.gov.in/jnnurm_contact.php
7	Bangalore	4													7	http://bbmp.gov.in/
8	Pimpri Chinchwad (Pune)	3													7	http://www.punecorporation.org/pmcwebn/ind ex.aspx
9	Nagpur	3													7	http://nmc.org.in/
10	Patna	3													7	https://www.patnanagarnigam.org/ContentPag es/PMC Home.aspx
11	Indore	7													7	http://www.imcindore.org/
12	Coimbatore														7	https://www.ccmc.gov.in/ccmc/
13	Nashik	- 1													7	http://www.nashikcorporation.gov.in/
14	Varanasi	3													7	http://www.nnvns.org/
15	Madurai	3									Γ,				7	http://203.101.40.168/newmducorp/
16	Faridabad	7													7	http://www.mcfbd.org/
17	Vijayawada	-													7	http://www.ourvmc.org/
18	Ranchi	5													7	http://www.ranchimunicipal.com/
19	Agra	3													6	http://www.nagarnigamagra.com/
20	Jabalpur	2													6	http://www.jmcjabalpur.org/
21	Asansol	-													6	http://asansolmunicipalcorporation.org/
22	Mysore	4													6	http://www.mysorecity.gov.in/
23	Ajmer	3													6	http://ajmermc.org/
24	Ahmadabad	3													5	http://www.egovamc.com/

Table 4.13: E-Governance Performance in JnNURM Cities

- S. C. STERRE BALL & F

.

												E- (Gove	erna	nce setuj	p
Sl. No.	City	Target Year since 2006	Official Reform status	01	02	03	04	05	06	07	08	09	10	11	No. of services provided (/11)	Source available (Accessed on 4th Dec, 2012)
25	Ludhiana	5													5	http://mcludhiana.com/
26	Jammu	5													5	http://www.jmc.nic.in/
27	Hyderabad	2													4	http://www.ghmc.gov.in/v
28	Jaipur	3													4	http://oswal.selfip.com/jaipurweb/
29	Vishakhapatna m	2													4	http://www.gvmc.gov.in/
30	Kanpur	3													3	http://kmc.up.nic.in/
31	Bhopal	-													3	http://bhopalmunicipal.com/
32	Meerut	3													3	http://meerutnagarnigam.in/english/default.ht <u>m</u>
33	Dhanbad	5													3	http://www.mcdhanbad.com/home/
34	Amritsar	4													3	http://www.amritsarcorp.com/
35	Thiruvanantha puram	5													3	http://municipality.tn.gov.in/tiruvallur/
36	Chandigarh	4													3	http://mcchandigarh.gov.in/
37	Lucknow	3													2	http://lmc.up.nic.in/
38	Vadodara	4													2	http://www.vmcegov.com/index_temp.aspx
39	Allahabad	3													2	http://allahabadnagarnigam.in/english/about_n agarnigam_allahabad.htm
40	Srinagar	5													2	http://smcsite.org/
41	Bhubaneshwar	3													2	http://bmc.gov.in/
42	Dehradun	4	52												2	http://www.nagarnigamdehradun.com/aboutD un.aspx
43	Agartala	3													2	http://agartalacity.nic.in/
44	Guwahati	6													1	http://gmcportal.in:8080/GMCPortal/
45	Raipur	1													1	http://www.nagarnigamraipur.com/
46	Ujjain	6													1	http://nagarnigamujjain.org/en/
47	Tirupati	6													- 1	http://www.tirupaticorporation.org.in/
48	Nainital	5													1	http://www.nagarnainital.com/
49	Shimla	3													1	http://www.shimlamc.gov.in/
50	Panaji	-													1	http://www.ccpgoa.com/home
	Total Implemented	١C,		29	3	28	10	22	25	24	22	42	22	14		
Leg	end															
						Not							11		vices Pro	
						ormeo ificat			-						0 Servic	8
						med									4 Servic	5
				n		ata n			-	~ ~			N		vices Pro	

Source: Analysis Based on Reform Status, 2012 and Municipal Web site, 2012

4.6 COMPARATIVE ANALYSIS OF FUND FLOW UNDER UIG

4.6.1 UIG Fund Flow at State Level

Fund Allocation under UIG in JnNURM Cities: The total amount of project investment under Urban Infrastructure Governance (UIG) sub-mission under JnNURM was approximately Rs. 7269619.67 lakhs with an approved of total 559 projects as on 2012 in 65 cities in India. This total amount of fund covers 11 sectors of which water supply sector has the maximum fund allocation with an amount of Rs. 3152591.63 lakhs. Ironically the least amount of fund has been allocated to the sector of preservation of water bodies which actually should have been given equal importance as all other sectors, considering the level of pollution of and threat to the urban waterbodies. The sector has second highest investment (Rs. 1438590.95 lakhs), roads/flyover/RoB sector (Rs. 878564.04 lakhs), storm water and drains sector (Rs. 840476.94 lakhs), MRTS sector (Rs. 521159.9 lakhs), waste management sector (Rs. 208624.65 lakhs), parking sector (Rs. 84042.43 lakhs), other urban transport sector (Rs. 14332.52 lakhs), and least investment has been in the sector of preservation of water body with an amount of Rs. 11670.54 lakhs.

Sl	Name of the Sector	Amount of funds allocated (Rs. in Lakhs)
No.	Ivalle of the Sector	Amount of funds anocated (Rs. in Lakits)
1	Water Supply	3152591.63
2	Waste Water Management sector	1438590.95
3	Roads/Flyovers/RoB sector	878564.04
4	Storm Water and Drains Management sector	840476.94
5	MRTS sector	51159.9
6	Waste Management sector	208624.65
7	Parking sector	86042.43
8	Other Urban Transport sector	73337.3
9	Urban Renewal sector	44228.77
10	Heritage Development Area sector	14332.52
11	Preservation of Water Body	11670.54
	Total	7269619.67

Table 4.14: Investment and Allocation of Funds in Different Infrastructure Sectors

Based on JnNURM Projects Status, 2012

Percentage wise, the maximum coverage of fund allocation has been in the water supply sector (43.37%), waste water management sector (19.79%), roads/flyover/RoBs sector (12.09%), drainages and storm water drains sector (11.56%), MRTS (7.17%), solid waste management sector (2.87%), parking sector (1.18%), other urban transport sector (1.01%), urban renewal sector (0.61%), development of heritage sector (0.20%) and least allocation of money is in the sector of preservation of water body (0.16%). Fig. 4.5 shows the fund allocation under UIG in eleven sectors percentage wise.

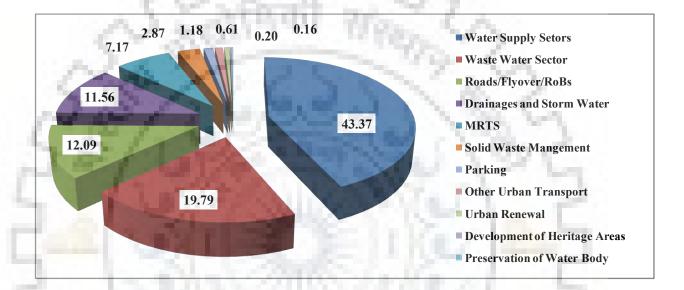


Fig. 4.5: Fund Allocation under UIG in eleven sectors percentage wise, Analysis Based on JnNURM Projects Status, 2012

Fund Allocation in Major Sectors under UIG: The eleven sectors of UIG sub-mission can be categorized into five major sectors on the basis of the characteristic they share. They are as follows: (1) water sector (water related projects includes water supply, waste water management, drainages and storm water drainages, and preservation of water body), (2) urban transport (related to urban transport includes other urban transport, Roads/Flyover/RoBs, MRTS, and Parking), (3) solid waste management, (4) urban renewal (related to revitalization of old areas), and (5) heritage development (related to regeneration of historical building). The water sector has been investing 74.88% of funds. The next highest investment has been observed in the urban transport sector that amounts to 21.45%, followed by solid waste with 2.87%, urban renewal with 0.61% and heritage development has the lowest investment at 0.20%. These five major sectors are equally important to

cope up with the demand of urban infrastructure facilities. The comparative picture of various urban infrastructure sectors is represented in Table 4.15.

Sl. No.	Major Sector	Projects Component	Projects Cost (in Lakhs)	% of Fund Allocation	% of Fund Allocation (Total)
		Water Supply Sector	3152591.63	43.37	
		Waste Water Sector	1438590.95	19.79	
1	Water Sector	Drainages and Storm Water	840476.94	11.56	74.88
	100	Preservation of Water Body	11670.54	0.16	5
	Urban	Other Urban Transport	73337.3	1.01	1. C.
2	Transport	Roads/Flyover/RoBs	878564.04	12.09	21.45
	Sector	MRTS	521159.9	7.17	100 0
	1.1.1	Parking	86042.43	1.18	
3	Solid Waste	Solid Waste Management	208624.65	2.87	2.87
4	Urban Renewal Sector	Urban Renewal	44228.77	0.61	0.61
5	Heritage Development	Development of Heritage Areas	14332.52	0.2	0.20
		Total	7269619.67	100	100

 Table 4.15: UIG Fund Allocation in Sector Wise as on 2012

Analysis Based on JnNURM projects Status, 2012

Comparative Analysis of UIG Projects Investment in 31 States/UTs: In comparison of all states in India for fund distribution under UIG sub-mission, West Bengal has maximum amount of fund allocation (Rs 1801150.80lakhs), Maharashtra (Rs 1138801.40 lakhs), Delhi (Rs. 694371.00 lakhs), Gujarat (Rs. 542065.71 lakhs), Uttar Pradesh (Rs. 536361.94 lakhs), Tamil Nadu (Rs. 530127.68), Andhra Pradesh (Rs. 494464.50 lakhs), Karnataka (Rs. 356903.43 lakhs), Madhya Pradesh (Rs. 245921.54 lakhs), Rajasthan (Rs. 122773.07 lakhs), Kerala (Rs. 99789.00 lakhs), Orissa (Rs. 81197.66 lakhs), Jharkhand (Rs. 79485.72 lakhs), Punjab (Rs. 72539.00 lakhs), Bihar (Rs. 71181.27 lakhs), Haryana (Rs. 69481.12 lakhs), Jammu and Kashmir (Rs. 30364.00 lakhs), Uttarakhand (Rs. 40256.22 lakhs), Assam(Rs. 31610.71 lakhs), Chandigarh (Rs. 19119.60 lakhs), Pondicherry (Rs. 25306 lakhs), Meghalaya (Rs. 21795.72 lakhs), Chandigarh (Rs. 19119.60 lakhs),

Arunachal Pradesh (Rs. 18048.2 lakhs), Tripura (Rs. 18047 lakhs), Himachal Pradesh (Rs. 16373.68 lakhs), Manipur (Rs. 15395.66 lakhs), Mizoram (Rs. 12772.16 lakhs), Nagaland (Rs. 11594.13 lakhs), Sikkim (Rs. 9653.67 lakhs), and Goa has least investment Rs. 7484.08 lakhs. The comparative fund distribution under UIG sub-mission in 31 states/UTs is shown in Table 4.16.

SI. No	State	Total (in lakhs)	Percentage of Fund Allocation to total investment in 31 states/UTs	No. of Cities
1	West Bengal	1801150.78	24.78	2
2	Maharashtra	1138801.39	15.67	5
3	Delhi	694371.00	9.55	1
4	Gujarat	542065.71	7.46	5
5	Uttar Pradesh	536361.94	7.38	7
6	Tamil Nadu	530127.68	7.29	3
7	Andhra Pradesh	494464.50	6.80	4
8	Karnataka	356903.43	4.91	2
9	Madhya Pradesh	245921.54	3.38	4
10	Rajasthan	122773.07	1.69	2
11	Kerala	99789.00	1.37	2
12	Orissa	81197.66	1.12	2
13	Jharkhand	79485.72	1.09	3
14	Punjab	72539.00	1.00	2
15	Bihar	71181.27	0.98	2
16	Haryana	69481.12	0.96	1
17	Jammu and Kashmir	55184.03	0.76	2
18	Uttarakhand	40256.22	0.55	3
19	Assam	31610.71	0.43	1
20	Chhattisgarh	30364.00	0.42	1
21	Pondicherry	25306.00	0.35	1
22	Meghalaya	21795.72	0.30	1
23	Chandigarh	19119.60	0.26	1
24	Arunachal Pradesh	18048.20	0.25	1
25	Tripura	18047.00	0.25	1
26	Himachal Pradesh	16373.68	0.23	1
27	Manipur	15395.66	0.21	1
28	Mizoram	12772.16	0.18	1
39	Nagaland	11594.13	0.16	1
30	Sikkim	9653.67	0.13	1
31	Goa	7484.08	0.01	1
		7269619.67	100.00	65

Table 4.16: UIG Fund Allocation in State Wise as on 2012

Analysis Based on JnNURM Projects Status, 2012

4.6.2 UIG Fund Flow at City Level

Comparative analysis of UIG Projects investment in 65 cities: In comparison of the JnNURM cities, Kolkata had the highest investment that was 23.77% and the next city in terms of maximum fund allocation was Delhi (9.55%) and lowest fund allocation is for the cities of Nainital with 00.06% and Jamshedpur with 00.05%. Out of the total investment of Rs. 7269619.67 lakh, the cities of Kolkata, Delhi, and Mumbai have invested more than Rs. 500000 lakhs respectively. The cities of Chennai, Pimpri Chinchwad (Pune), Bangalore, Hyderabad, Ahmadabad, Surat, Lucknow, Vishakhapatnam, Nagpur, and Bhopal were investing between Rs. 100000 lakhs to Rs. 500000 lakhs, and Mysore, Varanasi, Coimbatore, Madurai, Indore, Nashik, Vijayawada, Vadodara, Asansol, Jaipur, Faridabad, Nanded, Allahabad, Patna, Bhubaneshwar, Ajmer-Pushkar, Kochi had been invested between Rs. 500000 lakhs to 5000000 lakhs and rest city had been invested below Rs. 500000 lakhs. The city level fund flow under UIG sub-mission and the shared of budget distribution is represented in Table 4.17.

Sl. No	State	City	Total (in lakhs)	% of Fund Allocation in City wise
1	West Bengal	Kolkata	1728201.07	23.77
2	Delhi	Delhi	694371.00	9.55
3	Maharashtra	Mumbai	520673.38	7.16
4	Tamil Nadu	Chennai	358543.57	4.93
5	Maharashtra	Pimpri Chinchwad (Pune)	319278.20	4.39
6	Karnataka	Bangalore	258571.44	3.56
7	Andhra Pradesh	Hyderabad	252787.00	3.48
8	Gujarat	Ahmadabad	239038.01	3.29
9	Gujarat	Surat	163424.42	2.25
10	Uttar Pradesh	Lucknow	161612.97	2.22
11	Andhra Pradesh	Vishakhapatnam	155370.48	2.14
12	Maharashtra	Nagpur	149969.21	2.06
13	Uttar Pradesh	Kanpur	120422.27	1.66
14	Madhya Pradesh	Bhopal	104042.11	1.43
15	Karnataka	Mysore	98331.99	1.35
16	Uttar Pradesh	Varanasi	95569.73	1.31
17	Tamil Nadu	Coimbatore	87295.54	1.20
18	Tamil Nadu	Madurai	84288.57	1.16
19	Madhya Pradesh	Indore	81516.99	1.12
20	Maharashtra	Nashik	79916.15	1.10
21	Andhra Pradesh	Vijayawada	77809.02	1.07
22	Gujarat	Vadodara	76144.73	1.05

Table 4.17: UIG Fund Distribution in 65 cities

Sl. No	State	City	Total (in lakhs)	% of Fund Allocation in City wise
23	West Bengal	Asansol	72949.71	1.00
24	Rajasthan	Jaipur	72208.27	0.99
25	Haryana	Faridabad	69481.12	0.96
26	Maharashtra	Nanded	68964.45	0.95
27	Uttar Pradesh	Allahabad	61751.71	0.85
28	Bihar	Patna	58231.21	0.8
29	Orissa	Bhubaneshwar	57325.66	0.79
30	Rajasthan	Ajmer-Pushkar	50564.80	0.7
31	Kerala	Kochi	50922.00	0.7
32	Gujarat	Rajkot	49646.86	0.68
33	Madhya Pradesh	Jabalpur	48937.00	0.67
34	Kerala	Thiruvananthapuram	48867.00	0.67
35	Punjab	Amritsar	48400.00	0.67
36	Uttar Pradesh	Meerut	48149.40	0.66
37	Jharkhand	Dhanbad	42170.90	0.58
38	Jammu and Kashmir	Srinagar	40229.00	0.55
39	Jharkhand	Ranchi	33978.58	0.47
40	Uttar Pradesh	Agra	33108.49	0.46
41	Assam	Guwahati	31610.71	0.43
42	Chhattisgarh	Raipur	30364.00	0.42
43	Pondicherry	Pondicherry	25306.00	0.35
44	Orissa	Puri	23872.00	0.33
45	Punjab	Ludhiana	24139.00	0.33
46	Uttarakhand	Dehradun	23968.61	0.33
47	Meghalaya	Shillong	21795.72	0.3
48	Chandigarh	Chandigarh	19119.60	0.26
49	Arunachal Pradesh	Itanagar	18048.20	0.25
50	Tripura	Agartala	18047.00	0.25
51	Himachal Pradesh	Shimla	16373.68	0.23
52	Uttar Pradesh	Mathura	15747.37	0.22
53	Jammu and Kashmir	Jammu	14955.03	0.21
54	Manipur	Imphal	15395.66	0.21
55	Gujarat	Porbandar	13811.69	0.19
56	Bihar	Bodhgaya	12950.06	0.18
57	Mizoram	Aizawl	12772.16	0.18
58	Madhya Pradesh	Ujjain	11425.44	0.16
59	Uttarakhand	Haridwar	11667.34	0.16
60	Nagaland	Kohima	11594.13	0.16
61	Sikkim	Gangtok	9653.67	0.13
62	Andhra Pradesh	Tirupati	8498.00	0.12
63	Goa	Panaji	7484.08	0.1
64	Uttarakhand	Nainital	4620.27	0.06
65	Jharkhand	Jamshedpur	3336.24	0.05
		Total	7269619.67	100

Analysis Based on JnNURM projects Status, 2012

Per Capita Investment under UIG Sub-Mission: The per capita investment of UIG sub-mission in 65 cities has been classified into six categories – (1) category A (Rs. 50001 to 82261), (2) category B (Rs. 20001 to 50000), category C (Rs. 11001 to 20000), category D (Rs. 5001 to 11000), category E (Rs. 1001 to 5000), and last category (Rs. less than 1000).

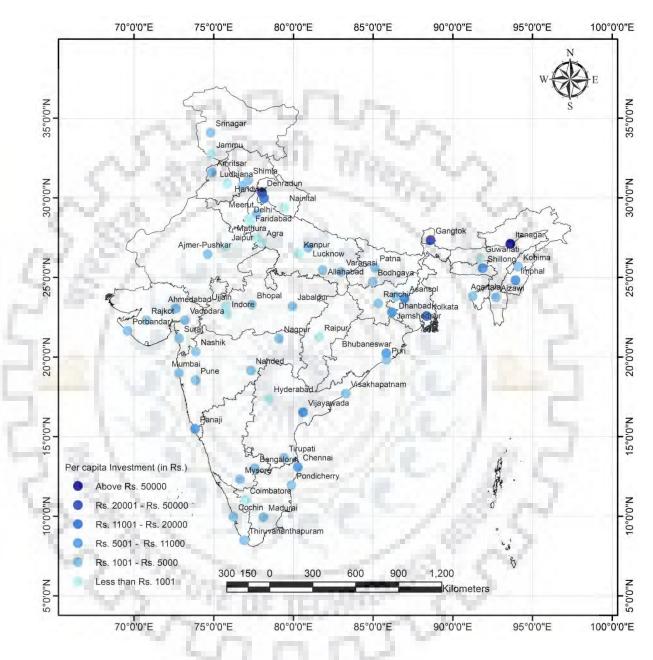
The cities with highest per capita investment (Above Rs. 50,000) which comes under A category are Itanagar, and Dehradun, while Gangtok city was the only city cominh under category B (per capita investment ranging between Rs. 20,001 to Rs. 50,000). The cities of Haridwar and Kolkata come under category C with a range of Rs. 11,001 to Rs. 20,000. Jamshedpur, Imphal, Chennai, Panaji, Bhubaneswar, Shillong, Asansol, and Vijayawada were in D category (Rs. 5,001 – Rs. 11,000) while the cities of Agartala, Bhopal, Kohima, Porbandar, Cochin, Vishakhapatnam, Lucknow, Pimpri Chinchwad (Pune), Ahmadabad, Mysore, Nagpur, Srinagar, Aizawl, Jabalpur, Mumbai, Madurai, Bodhgaya, Bangalore, Surat, Varanasi, Dhanbad, Nanded, Shimla, Ajmer-Pushkar, Amritsar, Vadodara, Chandigarh, Tirupati,, Thiruvananthapuram, Pondicherry, Puri, Meerut, Nashik, Rajkot, Ranchi, Allahabad, and Patna come under category E with a range of Rs. 1,001 to Rs. 5,000, and remaining JnNURM cities were in F category with percapita investment less than Rs. 1,000 (Fig. 4.6). Table 4.18 is showing the number of cities and the per capita range (Annexure-VI).

Category	No. of City	Percentage of city share to Total JnNURM cities	Per capita Ranges (in Rs.)
Α	2	3.07	Above Rs. 50,000
В	1.00	1.85	Rs. 20,001 – 50,000
С	2	3.07	Rs. 11,001 – 20,000
D	8	12.31	Rs. 5,001 – 11,000
Е	37	56.92	Rs. 1,001 – 5,000
F	15	23.08	Less than Rs. 1,001
Total	65	100.00	

Table 4.18: No. of cities under different category of Per Capita

Analysis Based on JnNURM Projects Status, 2012

The maximum numbers of the JnNURM cities were in the range E category for per capita investment under UIG sub-mission. The highest per capita were only two cities whereas the lowest



per capita was in 15 cities. The detail of per capita of the 65 cities across the country was representing in Fig. 4.6.

Fig. 4.6: Category of Per Capita Investment at City Level under UIG (after MoUD, 2012b)

Further, the appraisal of UIG projects (UIG Project Status, 2012) in 65 cities revels that, out of 65 cities, 54 cities have covered water supply projects, 47 cities covered waste water management projects, 40 cities have covered solid waste management projects, and 32 cities have covered storm

water and drainages management. The rest of urban infrastructure sectors such as roads/flyover/RoBs, MRTS, urban renewal, other urban transport, development of heritage, preservation of water body and parking had been covered by less than 50 percent of total JnNURM city in the respective sector. There were a lesser number of cities which have been covering projects such as parking, preservation of water body, development of heritage areas, other urban transport, urban renewal and so on as shown in Table 4.19.

Sl. No.	Project Sector	No. of Cities Covered	Cities not covered
1	Water Supply	54	11
2	Waste Water Management	47	18
3	Solid Waste Management	40	25
4	Storm Water and Drainage	32	33
5	Roads/Flyovers/RoBs	24	41
6	MRTS	10	56
7	Urban Renewal	8	57
8	Other Urban Transport	7	59
9	Development of Heritage	5	60
10	Preservation of water Body	4	61
11	Parking	3	62

 Table 4.19: City Coverage under UIG Project Sectors

Analysis Based on JnNURM Projects Status, 2012

As far as city wise investment under UIG sub-mission investment was concerned, the highest investments (above Rs. 100000 lakhs) have been done in 14 cities. The cities in accordance of their rank in terms of investment made are namely Kolkata, Delhi, Mumbai, Chennai, Pimpri Chinchwad (Pune), Bangalore, Hyderabad, Ahmadabad, Surat, Lucknow, Vishakhapatnam, Nagpur, Kanpur and Bhopal. The second highest investment ranging from Rs. 50000-100000 lakhs includes 17 cities which are Mysore, Varanasi, Coimbatore, Madurai, Indore, Nashik, Vijayawada, Vadodara, Asansol, Jaipur, Faridabad, Nanded, Allahabad, Patna, Bhubaneshwar, Kochi and Ajmer-Pushkar. The third highest investment ranging from Rs. 10000-50000 lakhs includes 29 cities namely Rajkot, Jabalpur, Thiruvananthapuram, Amritsar, Meerut, Dhanbad, Srinagar, Ranchi, Agra, Guwahati, Raipur, Pondicherry, Ludhiana, Dehradun, Puri, Shillong, Chandigarh, Itanagar, Agartala, Shimla, Mathura, Imphal, Jammu, Porbandar, Bodhgaya, Aizawl,

Haridwar, and Kohima. The least amount of investment which is less than Rs. 10000 lakhs has been made in 5 cities namely Gangtok, Tirupati, Panaji, Nainital and Jamshedpur. The classification of cities as per the amount of investments during the period of JnNURM scheme is shown in Table 4.20.

Sl. No	No. of Cities	Percentage of City	Investment Ranges (Rs. in lakhs)
1	14	21.54	Above Rs. 100000
2	17	26.15	Rs. 50000-100000
3	29	44.62	Rs. 10000-50000
4	5	7.69	Below Rs. 10000
Total	65	100	

 Table 4.20: JnNURM Cities Investment Classification

Analysis Based on JnNURM Projects Status, 2012

4.7 COMPARATIVE ANALYSIS OF FUND FLOW UNDER BSUP

4.7.1 BSUP Fund Flow at State Level

In terms of investment under BSUP in 31 states, Maharashtra has the highest investment (Rs. 7009.28 Crore) followed by West Bengal (Rs. 4003.38 Crore), Andhra Pradesh (Rs. 3415.49 Crore), Delhi (Rs. 3257.72 Crore), Uttar Pradesh (Rs 2353.81 Crore), Tamil Nadu (Rs. 2327.32 Crore), and Gujarat (Rs. 1723.76 Crore). The states of Karnataka, Bihar, Chandigarh, Jharkhand, Rajasthan, Chhattisgarh, Kerala, Jammu and Kashmir, Pondicherry, Nagaland, and Assam had invested between 1000 lakhs Crore to 100 lakhs Crore whereas the rest of 12 states had invested below 100 lakhs Crore. The details of the highest investment states and second highest investment states are shown in Fig. 4.7.

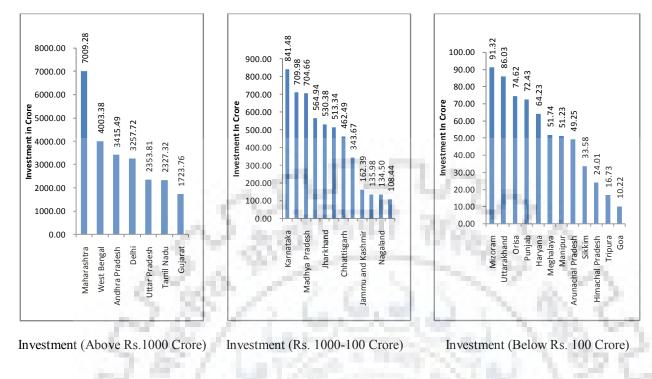


Fig. 4.7: Variation of BSUP Investment in India

India has been classified into six regions namely (1) north east, (2) hilly states, (3) western states, (4) central east, (5) south India, (6) north Indian state; for comparative analysis of per unit cost of dwelling unit as shown in Fig. 4.7. In north east region highest cost per dwelling unit (Rs. 8.3 lakhs) is in Mizoram and lowest (Rs. 1.3 lakhs) is in Sikkim; while in hilly states region, Uttarakhand and Jammu and Kashmir has the highest cost/DU (Rs. 4.7 lakhs) and lowest cost/DU (Rs. 2.4 lakhs) respectively. In case of western states region, Goa and Gujarat states have highest cost/DU (Rs. 6.5 lakhs) and lowest cost/DU (Rs. 1.6 lakhs) respectively. In the central east region, Bihar state has highest cost/DU (Rs. 3.1 lakhs) and lowest cost/DU (Rs. 4.5 lakhs) is in Chhattisgarh and for south India region Pondicherry has highest cost/DU (Rs. 4.5 lakhs) and Kerala has lowest cost/DU (Rs. 1.4 lakhs). In north Indian states, the highest cost per dwelling unit was Rs. 4.3 lakh in Delhi and lowest was in the Punjab (Rs. 1.4 lakhs) respectively.

Three main strategies available for implementing slum development projects under BSUP were: (1) redevelopment of slums, (2) relocation of slum dwellers, and (3) In-situ projects. The implementation strategy would vary from project to project and hence the investment of per dwelling unit had varied from one project to another. The region wise comparative analysis of

targeted dwelling units and cost per dwelling unit under BSUP projects in 31 states is illustrated in Table 4.21. The average cost per dwelling unit is Rs. 3.5 lakh.

Sl No.	State Name	No. of Approved Projects	Total Project Cost Approved in Core Rs.	Total No. of Targeted DUs	Cost Per DU in Lakh Rs.
		Nort	th East Region		
1	Mizoram	4	91.32	1096	8.3
2	Meghalaya	3	51.74	768	6.7
3	Tripura	1	16.73	256	6.6
4	Arunachal Pradesh	2	49.25	852	5.7
5	Assam	2	108.44	2260	4.7
6	Manipur	1	51.23	1250	4
7	Nagaland	1	134.5	3504	3.8
8	Sikkim	3	33.58	254	1.3
100	1 10 1	Hill	y Region State		
1	Uttarakhand	12	86.03	1799	4.7
2	Himachal Pradesh	2	24.01	636	3.7
3	Jammu & Kashmir	5	162.39	6677	2.4
		Weste	ern Region State	100 B	
1	Goa	1	10.22	155	6.5
2	Maharashtra	63	7009.28	186745	3.7
3	Rajasthan	4	513.34	23151	2.2
4	Gujarat	22	1723.76	105312	1.6
		C	Central East		
1	Bihar	18	709.98	22372	3.1
2	Jharkhand	14	530.38	16724	3.1
3	Orissa	6	74.62	2508	2.9
4	West Bengal	102	4003.38	155353	2.5
5	Madhya Pradesh	22	704.66	41446	1.7
6	Chhattisgarh	6	462.49	30000	1.5
1.1	C 7.6 N	South	ern Region State	100 N	
1	Pondicherry	3	135.98	2964	4.5
2	Karnataka	18	841.48	28118	2.9
3	Andhra Pradesh	37	3415.49	127592	2.6
4	Tamil Nadu	51	2327.32	91318	2.5
5	Kerala	7	343.67	23577	1.4
		Nor	thern Region		
1	Delhi	17	3257.72	74312	4.3
2	Uttar Pradesh	68	2353.81	68216	3.4
3	Chandigarh	2	564.94	25728	2.1
4	Haryana	2	64.23	3248	1.9
5	Punjab	2	72.43	5152	1.4
	Total	501	29928.4	1053343	3.5 Avg. Cost

Table 4.21: States/UT wise Targeted DUs and Cost per DU under BSUP

Source: Analysis Based on BSUP Projects Status, 2011

4.7.2 BSUP Fund flow at City Level

Under BSUP sub-mission of JnNURM, houses were not provided free of cost to the beneficiaries by Government of India. Generally beneficiaries shared 12% cost of the dwelling unit. In case of the benefecieries belonged to SC/ST/OBC/PH catagory, they shared 10% of the cost of dwelling unit. Funds for BSUP projects were released as far as possible in four installments, as Additional Central Assistance (100% grant in respect of central share) to the state government or its designated state level agencies. The first installment would be released on signing of the memorandum of agreement by the state government /ULB/Parastatal agency for implementing JnNURM projects. The balance amount of assistance would be released as far as possible in three installments upon receipt of utilization certificate to the extent of 70 percent of the central fund and also that of the state/ULB/Parastatal share and subject to achievement of milestones agreed for implementing of mandatory and optional reforms at state and ULB level as envisaged in the memorandum of agreement. The share of project cost among the central, state and ULBs was dependent on the size of the city. The cities having more than 1 million of population as per 2001 census identified by Ministry of Urban Development were to shared 50 percent cost from the central and 50 percent from the state while other cities apart from the north east cities and Jammu and Kashmir cities were to shared 80 percent cost from the central and 20 percent from the state. The special case cities such as north east cities and Jammu and Kashmir cities were to share 90 percent cost from the central and 10 percent from the state. The funding pattern for BSUP project in 65 cities is shown Table 4.22.

Sl No.	Group of City	Total No. of Cities	Central Share	State/ULB/Parastatal share, including Beneficiary contribution
1	Cities with 4 million plus population	7	50%	50%
2	Cities with million plus but less than 4 million population	28	50%	50%
3	Other cities	22	80%	20%
4	Cities/Towns in North East and J& K, India	8	90%	10%
	Total	65		

Table 4.22: BSUP Projects Funding Pattern

Source: MoHUPA, 2009

The BSUP Projects Distribution: Kolkata city had maximum number of dwelling units targeted under 91 projects with an investment of Rs. 3382.52 Crore, Hyderabad (78746 dwelling units with an investment of Rs. 1884.95 Crore), Delhi (74312 dwelling units with an investment Rs. 3257.72 Crore), Mumbai (70602 dwelling units with an investment of Rs. 3061.39 Crore), Pimpri Chinchwad (Pune) (57650 dwelling units with an investment of Rs. 1761.62 Crore) and Surat (468566 dwelling units with an investment of Rs. 699.30 Crore). These cities had the highest targeted dwellings units which have been represented in Fig. 4.8.

Among the JnNURM cities, Itanagar city was targeted 852 dwelling units with an investment of Rs. 49.25 Crore while Shillong (768 dwelling units with an investment of Rs. 51.74 Crore), Shimla (636 dwelling units with an investment of Rs. 24.01 Crore), Puri (355 dwelling units with an investment of Rs 11.02 Crore), Nainital (341 dwelling units with an investment of Rs. 19.79 Crore), Amritsar (320 dwelling units with an investment of Rs. 5.79 Crore), Agartala (256 dwelling units with an investment of Rs. 16.73 Crore), Gangtok (254 dwelling units with an investment of Rs. 33.58 Crore), Panaji (155 dwelling units with an investment of Rs. 10.22 Crore), and Haridwar (96 dwelling units with an investment of Rs. 3.62 Crore) are targeted houses for urban poor (Fig. 4.9). The remaining cities had being targeted between 10390 to 46856 dwelling units.

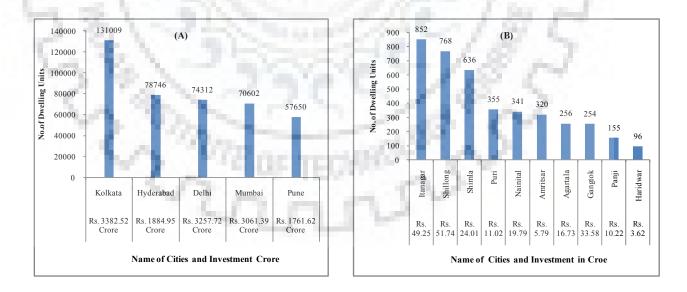


Fig. 4.8: Highest Targeted Dwelling Units at City Level

Fig. 4.9: Lowest Targeted Dwelling Units at City Level

In comparison among the mega cities for BSUP projects distribution, Kolkata had implemented highest and the lowest was in Bangalore. The total approved cost in the mega cities was Rs. 14066.69 Crore and targeted total Dwelling Units (DUs) was 445080. The details of the DPRs approved, total cost of each cities, targeted DUs and cost per dwelling unit is represented in Annexure VII. The average of dwelling units in the mega cites was Rs. 3 lakhs.

The cities which had a population below 4 million and above 1 million as per census 2001 category had invested Rs. 11678.61 Crore with a targeted dwelling units of 457745. In comparison among 28 cities in this category, Pimpri Chinchwad (Pune) city had maximum number of projects (19 DPRs with an investment of Rs. 1761.62 Crore for a target of 57650 DUs) and next was Coimbatore city (17 DPRs with an investment of Rs. 574.80 Crore for a target of 27637 DUs) where as the lowest number of projects were implemented in Amritsar and Ludhiana (1 DPR in each city). The cities of Surat, Madurai, Vishakhapatnam, Vijayawada, Asansol, Bhopal and Patna had targeted between 20,000 and 50,000 DUs; whereas Jaipur, Vadodara, Agra, Nagpur, Nashik, Kanpur, Lucknow, Meerut and Cochin had targeted between 10000 and 20000 DUs. The remaining cities in the category had targeted less than 10000 DUs. The average cost per DU was Rs. 2.25 lakh. The details of projects distribution namely, approved cost, targeted dwellings units and cost per dwelling unit is represented in Annexure VII.

The 22 cities which had a population of less than 1 million excluding the north east cities and Jammu and Kashmir cities had targeted 140278 DUs with an investment of Rs. 3646.31 Crore. Cities of Raipur, Nanded and Chandigarh had targeted above 25000 DUs under BSUP projects while the cities of Thiruvananthapuram, Ranchi, Mysore, Ajmer-Pushkar and Srinagar had targeted between 5000 to 15000 DUs. Cities of Mathura, Pondicherry, Bhubaneshwar, Bodhgaya, Jammu, Dehradun, and Ujjain had targeted between 1000 to 5000 DUs and rest of the cities in this category had targeted less than 1000 DUs. The average cost of DU was Rs. 2.5 lakhs (Annexure –VII).

The cities of North East region of India have been performing very poor in comparison with other JnNURM cities. The total investment in the cities of North East cities, and Jammu and Srinagar cities was Rs. 699.18 Crore. Srinagar has targeted 5222 Dwellings Units (DUs) with an investment of Rs. 113.3 Crore, Kohima has targeted 3504 DUs with an investment of Rs. 134.5 Crore, Guwahati targeted 2260 DUs with an investment of 108.44 Crore, Jammu targeted 1455 DUs with

an investment of Rs. 49.09 Crore, Imphal targeted 1250 DUs with an investment of Rs. Rs. 51.23 Crore, Aizawl targeted 1096 DUs with an investment of Rs. 91.32 Crore, Itanagar targeted 852 DUs with an investment of Rs. 49.25 Crore, Shillong targeted 768 DUs with an investment of Rs. 51.74 Crore, Agartala targeted 256 DUs with an investment of Rs. 16.73 Crore, and Gangtok which has targeted 254 DUs with an investment of Rs. 33.58 Crore has the least investment. The details of the projects among this category are represented in Annexure VII.

4.8 DPR PREPARATION AND PROPOSALS

The basic thrust of the JnNURM mission was a project driven Detailed Projects Report (DPR). The preparation of DPRs at the city level is through the following stages with their objectives;

- Every city was expected to formulate a City Development Plan (CDP) integrated land use services, urban transport and environment management. The CDP has to provide an urban perspective framework for a period of 20-25 years (with 5 year updates) indicating policies, programs and strategies of meeting fund requirements to be prepared by every identified city.
- 2. Cities/Urban Agglomerations/Parastatals were required to prepare Detailed Project Reports (DPR) for undertaking projects under identified areas on the basis of CDP. In order to seek JnNURM assistance, projects need to be developed in such a manner (optimization of the life-cycle cost over the planning horizon of the project could be ensured and demonstrated). A revolving fund was to be created to meet the Operation and Maintenance (O&M) requirements of assets created over the planning horizon.
- 3. Private Sector Participation in development, management and financing of urban infrastructure was also envisaged.
- 4. The central and state Government were required to release funds directly as grants-in aid to the state level nodal agency (SLNA) designated by the state. The funds for identified projects across cities were to be disbursed to the Urban Local Bodies (ULBs)/Parastatal agency through the designed SLNA as soft loan or grant-cum-loan or grant. The SLNA / ULBs in turn could leverage additional resources from other sources like financial instructions / private / capital market.

Role of Central Government: Overall guidance and supervision of JnNURM mechanism is by a National Steering Group (NSG), chaired by the Ministry of Urban Development and co-chaired by Ministry of the State for Housing and Urban Poverty Alleviation. Other members in the NSG are two Secretaries of the respective ministries i.e. MoUD and MoHUPA and coordinating arm of the Government of India to provide policy oversight and evolve policies to facilitate the achievements of JnNURM objectives. It sets policies for implementation, monitoring and reviews progress, and suggests corrective actions where necessary. The process of JnNURM for projects proposal and policy directive flow had been discussed in chapter three (Fig. 3.2 and 3.3).

There are two Central Sanctioning and Monitoring Committees (CSMCs) headed by respective secretaries of MoUD and MoHUPA, for UIG and BSUP sub-mission respectively entrusted with sanction, approval and monitoring of the projects and associated reforms.

Role of State Governments: As the State Level Steering Committee (SLSC) as well as state level nodal agency was to be set up. The role of the SLSC was to screen and prioritize the identified projects and recommend to the CSMC concerned for UIG and BSUP for sanction of the project. The process of DPRs proposal and sanction DPRs was shown in Fig. 3.2.

4.9 COMPARATIVE ANALYSIS OF PROJECTS IMPLEMENTING UNDER UIG

4.9.1 UIG Project Implementation at State Level

Among the 31 states and UTs in India, Maharashtra had received 174 DPRs and approved 80 DPRs (projects), Gujarat (112 DPRs received and approved 72), and West Bengal (95 DRPs received and approved 71),

The state of Andhra Pradesh had received 125 DRPs and approved 52, Tamil Nadu (69 DPRs received and 48 approved), Karnataka (76 DPRs received and approved 47), Uttar Pradesh (59 DPRs received and approved 33), Delhi (70 DPRs received and approved 28), Madhya Pradesh (48 DPRs received and approved 23), Uttarakhand (23 DPRs received and approved14), Rajasthan (18 DPRs received and approved 13), Kerala (23 DPRs received and 11 DPRs approved). The state level DPR proposals, received and approved are represented in Table 4.23.

All states in India had proposed the projects under UIG sub-mission, JnNURM for improvement of the urban infrastructure. However, the approved projects numbers had varied from one state to another as shown in Table 4.23. It reveals that the Detailed Project Report (DPR) made by the ULBs/Parastatal was not same in term of quality and quantity. As a result, the central government had approved based on the criterion for DRP preparation fromulated by central government. The different sectors of urban infrastructure required to be fulfilled in DPR are; (1) sector background context and broad projects rationale, (2) projects definition, concept and scope, (3) projects cost, (4) project institutional framework, (5) project financial structure, (6) projects phasing, (7) projects operation and maintenance, (8) projects financial viability/sustainability, and (9) project benefits assessments (MoUD, 2005).

Sl. No	Name of State	Number of DPR Received	Number of DPRs Sanctioned	Percentage of DPRs Approved to Total DPRs
1	Maharashtra	174	80	14.31
2	Gujarat	112	72	12.88
3	West Bengal	95	71	12.70
4	Andhra Pradesh	125	52	9.30
5	Tamil Nadu	69	48	8.59
6	Karnataka	76	47	8.41
7	Uttar Pradesh	59	33	5.90
8	Delhi	70	28	5.01
9	Madhya Pradesh	48	23	4.11
10	Uttarakhand	23	14	2.50
11	Rajasthan	18	13	2.33
12	Kerala	23	11	1.97
13	Bihar	21	8	1.43
14	Punjab	24	6	1.07
15	Orissa	15	5	0.89
16	Jharkhand	10	5	0.89
17	Jammu and Kashmir	9	5	0.89
18	Himachal Pradesh	8	5	0.89
19	Mizoram	10	4	0.72
20	Haryana	8	4	0.72
21	Nagaland	21	3	0.54
22	Arunachal Pradesh	15	3	0.54
23	Manipur	6	3	0.54
24	Chandigarh	4	3	0.54
25	Assam	10	2	0.36
26	Sikkim	9	2	0.36
27	Goa	7	2	0.36
28	Pondicherry	6	2	0.36
29	Tripura	5	2	0.36
30	Meghalaya	4	2	0.36
31	Chhattisgarh	9	1	0.18
	Total	1093	559	100.00

Table 4.23: State Level DPRs Received and Approved

Analysis Based on JnNURM projects Status, 2012

4.9.2 UIG Project Implementation at City Level

The total numbers of projects implemented under UIG mission were 599 as on 2012. The projects are distributed in 65 cities in eleven sectors: water supply (159 projects), waste water management (112 projects), storm water and drainage (73 projects), preservation of water body (4 projects), solid waste management (45 projects), other urban transport (17 projects), roads/flyover/RoBs (106 projects), MRTS (21 projects), Parking (5 projects), Urban Renewal (11 projects), development of heritage areas (7 projects). The maximum number of 60 projects have been implemented in Kolkata city with maximum of these projects in water supply sector (24 projects), followed by storm water and drainage sector (12 projects). The sectors of water supply and storm water drainage together had reached highest number in the Kolkata city among the JnNURM cities.

Various JnNURM cities had focused on various sectors of urban infrastructure development under UIG sub-mission. In comparison among JnNURM cities, one city is different from another city in terms of the city character and nature and even size of the city. In this context, different cities had required different sector of urban infrastructure development in their respective city. In the case of -preservation of water body sector" the cities of Vadodara, Jaipur, Nashik and Imphal cities have executed one project each. Similarly, solid waste management sector was required in all JnNURM cities and hence executed in maximum numbers of cities.

Projects in _Oher Urban Transport' sector of urban transport system had been implemented only in seven cities (Kolkata, Bangalore, Delhi, Greater Mumbai, Hyderabad, Mysore and Itanagar). The city of Bangalore had maximum number of projects (9 projects) followed by Mysore and Kolkata (2 projects each). The remaining four cities had one project each. In _Roads / Flyovers / RoB' sector, 4 cities had executed projects namely; Delhi 19 projects, Bangalore (14 projects implemented), Kolkata (14 projects implemented), and Ahmadabad (10 projects implemented). Twenty one projects had been implemented in MRTS sector in 9 cities namely, Pimpri Chinchwad (Pune), Ahmadabad, Jaipur, Surat, Kolkata, Vishakhapatnam, Vijayawada, Bhopal, and Rajkot. Pimpri Chinchwad (Pune) city had implemented 3 projects each, Indore implemented 2 projects and remaining cities of Surat, Kolkata, Vishakhapatnam, Vijayawada, Bhopal and Rajkot implemented

one project each. This was a fact that growing cities need a lot of urban infrastructure development and management of urban transport system. Therefore, the urban transport sectors were mainly focused in the growing cities and metropolitan cities only whereas the smaller and medium towns focused on the water supply and waste water management and storm water and drainage sectors. In fact, parking was another issue in the fast growing cities and parking projects were executed in cities of Delhi (3 projects), Indore (1 project) and Kohima (1 project).

In case of urban renewal sector under UIG sub-mission, eight cities have executed projects. Cities of Hyderabad, Jaipur and Bhopal had two projects each, and remaining five cities of Kolkata, Delhi, Kochi, Ajmer and Bhubaneswar had implemented one project each.

In heritage development sector, cities of Chennai, Ahmadabad, Nanded, Mysore, Nainital, Ujjain and Panaji had implemented one project each, while remaining cities have not implemented any project. This reflects the fact that the requirment of infrastructure was different from one city to another.

Component wise distribution of number of UIG Projects: In comparison with major sectors - water sector had shared 62.08 percent, the urban transport sector (26.65%), solid waste management (8.05%), urban renewal (1.97%) and least was in the heritage development (1.25%). In comparison of the all project componets, _water supply' shared maximum number of projects (28.26%), _waste water management' share 20.04% projects, _Roads/Flyover/RoB' shared 18% projects, _storm water and drainage' shared 13.06% projects, _solid waste management' shared 8.05% projects, _MRTS' shared 3.76% projects, _other urban transport' shared 3.04% projects, _urban renewal' shared 1.97% projects, _development of heritage areas' shared 1.25% projects, _parking' shared 0.89% projects, and least no. of projects were shared by _preservation of water body'(0.72%). The number of UIG projects and their distribution is shown percentage wise in Table 4.24.

Major Sector	Projects Component	No. of Projects	% of Project Distribution	% of Major Sector		
	Water Supply	158	28.26			
Waster Sector	Waste Water Management	112	112 20.04			
waster Sector	Storm Water and Drains	73	13.06	62.08		
	Preservation of Water Body	$\begin{array}{c c c c c c c c c c c c c c c c c c c $				
	Roads/Flyover/RoB	106	18.96			
Urban Transport Sastar	MRTS	21	3.76	26.65		
Urban Transport Sector	Other Urban Transport	17	3.04	20.03		
	Parking	te Water Management112rm Water and Drains73ervation of Water Body4Roads/Flyover/RoB106MRTS21her Urban Transport17Parking5d Waste Management45Urban Renewal11	-0.89			
Solid Waste Management	Solid Waste Management	45	8.05	8.05		
Urban Renewal	Urban Renewal	11	1.97	1.97		
Heritage Development	Development of Heritage Areas	7	1.25	1.25		
	Total	559	100	100		

Table 4.24: Number of JnNURM Project Sectors as on 2012

Analysis Based on JnNURM Projects Status, 2012

JnNURM City wise distribution of number of UIG Projects: In 65 cities all cities had different levels of DPRs implementation under Urban Infrastructure Governance (UIG). Among cities with 4 million plus population (Mega cities), Kolkata city covers eight out of eleven project components under UIG sub-mission of JnNURM. Chennai covers five out of eleven components, Bangalore five components; cities of Delhi, Mumbai Ahmedabad and Hydrabad cover six project components each. Most mega cities had very limited sectors of urban infrastructure development unlike Hydarbad which had implemented UIG projects mainly in water supply sector, waste water management, storm water and drainage, and solid waste management (Table 4.25).

Among cities with population between 1 to 4 million (Big cities), Surat city covers six out of eleven project components under Urban Infrastructure Governance (UIG), while Pimpri Chinchwad (Pune) covers 6 project components. In the remaining small and medium towns very few sectors of urban infrastructure development had been implemented with less number of DPRs. In case of cities from North East India too, less number of projects have been implemented in limited variety of project componets. The numbers of various project components implemented under UIG sub-mission in 65 cities of JnNURM are shown in Table 4.25.

			Eleven Sectors of Urban Infrastructure											
			1	2	3	4	5	6	7	8	9	10	11	cts
SI. No	State	City	Water Supply	Waste Water Management	Storm Water and Drains	Preservation of Water Body	Solid Waste Management	Other Urban Transport	Roads/Flyover/ RoB	MRTS	Parking	Urban Renewal	Development of Heritage Areas	Total No. of Projects
1	West Bengal	Kolkata	24	4	12	0	2	2	14	1	0	1	0	60
2	Karnataka	Bangalore	2	6	7	0	0	9	14	0	0	0	0	38
3	Tamil Nadu	Chennai	13	12	4	0	2	0	3	0	0	0	1	35
4	Delhi	Delhi	0	3	1	0	0	1	19	0	3	1	0	28
5	Maharashtra	Greater Mumbai	8	9	4	0	2	1	2	0	0	0	0	26
6	Gujarat	Ahmadabad	1	6	4	0	1	0	10	3	0	0	1	26
7	Gujarat	Surat	5	9	3	0	1	0	6	-1	0	0	0	25
8	Andhra Pradesh	Hyderabad	8	3	5	0	0	1	3	0	0	2	0	22
9	Maharashtra	Pimpri Chinchwad (Pune)	2	2	5	0	1	0	3	7	0	0	0	20
10	Maharashtra	Nagpur	11	1	0	0	0	0	5	0	0	0	0	17
11	Andhra Pradesh	Vishakhapatnam	8	2	3	0	0	0	0	1	0	0	0	14
12	Gujarat	Vadodara	4	2	1	1	1	0	4	0	0	0	0	13
_13	Andhra Pradesh	Vijayawada	2	4	3	0	1	0	2	1	0	0	0	13
14	West Bengal	Asansol	6	1	0	0	1	0	3	0	0	0	0	11
15	Maharashtra	Nanded	2	4	1	0	0	0	3	_0	0	0	1	11
16	Madhya Pradesh	Indore	1	1	0	0	1	0	4	2	1	0	0	10
17	Rajasthan	Jaipur	0	2	0	1	1	0	0	3	0	2	0	9
18	Karnataka	Mysore	3	0	1	0	1	2	1	0	0	0	1	9
19	Tamil Nadu	Madurai	5	1	1	0	1	0	0	0	0	0	0	8
20	Uttar Pradesh	Lucknow	2	3	1	0	1	0	0	0	0	0	0	7
21	Madhya Pradesh	Bhopal	3	0	1	0	0	0	0	1	0	2	0	7
22	Uttar Pradesh	Kanpur	2	3	- 0	0	1	0	0	0	0	0	0	6
23	Kerala	Kochi	1	1	1	0	1	0	1	0	0	1	0	6
24	Bihar	Patna	4	0	0	0	2	0	0	0	0	0	0	6
25	Maharashtra	Nashik	1	2	1	1	1	0	0	0	0	0	0	6
26	Uttar Pradesh	Varanasi	3	1	1	0	1	0	0	0	0	0	0	6
27	Gujarat	Rajkot	1	1	1	0	1	0	1	1	0	0	0	6
28	Tamil Nadu	Coimbatore	2	1	1	0	1	0	0	0	0	0	0	5
29	Kerala	Thiruvananthapuram	1	2	1	0	1	0	0	0	0	0	0	5
30	Punjab	Amritsar	2	1	0	0	1	0	1	0	0	0	0	5
31	Uttarakhand	Dehradun	1	2	0	0	1	0	1	0	0	0	0	5
32	Uttarakhand	Haridwar	1	2	0	0	1	0	1	0	0	0	0	5
33 34	Himachal Pradesh	Shimla	1	1 2	0	0	2	0	1	0	0	0	0	5
	Uttar Pradesh	Agra	1		0					0	0	-	-	4
35 36	Haryana Madhya Pradesh	Faridabad	1	1 2	1	0	1	0	0	0	0	0	0	4
36	Uttar Pradesh	Jabalpur Allahabad	2	1	0	0	1	0	0	0	0	0	0	4
38	Uttarakhand	Nainital	1	1	0	0	1	0	0	0	0	0	1	4
39	Rajasthan	Ajmer	2	1	0	0	0	0	0	0	0	1	0	4
40	Mizoram	Ajmer	1	0	0	0	0	0	3	0	0	0	0	4
40	Uttar Pradesh	Meerut	1	1	0	0	1	0	0	0	0	0	0	3
42	Jammu & Kashmir	Srinagar	2	1	0	0	0	0	0	0	0	0	0	3
43	Chandigarh	Chandigarh	3	0	0	0	0	0	0	0	0	0	0	3
44	Orissa	Bhubaneshwar	0	1	1	0	0	0	0	0	0	1	0	3
45	Andhra Pradesh	Tirupati	0	0	2	0	1	0	0	0	0	0	0	3
46	Uttar Pradesh	Mathura	0	1	1	0	1	0	0	0	0	0	0	3
47	Manipur	Imphal	0	0	1	1	1	0	0	0	0	0	0	3
48	Nagaland	Kohima	0	0	1	0	0	0	1	0	1	0	0	3
49	Arunachal Pradesh	Itanagar	1	0	0	0	1	1	0	0	0	0	0	3
50	Jharkhand	Dhanbad	1	0	0	0	1	0	0	0	0	0	0	2
51	Jharkhand	Ranchi	1	0	0	0	1	0	0	0	0	0	0	2
52	Assam	Guwahati	1	0	0	0	1	0	0	0	0	0	0	2
53	Pondicherry	Pondicherry	0	1	0	0	1	0	0	0	0	0	0	2
54	Jammu & Kashmir	Jammu	0	2	0	0	0	0	0	0	0	0	0	2

Table 4.25: Number of UIG Projects, JnNURM as on 2012

					Ele	ven Sec	tors of U	rban	Infrast	ructui	·e			
		-	1	2	3	4	5	6	7	8	9	10	11	cts
SI. No	State	City	Water Supply	Waste Water Management	Storm Water and Drains	Preservation of Water Body	Solid Waste Management	Other Urban Transport	Roads/Flyover/ RoB	MRTS	Parking	Urban Renewal	Development of Heritage Areas	Total No. of Projects
55	Madhya Pradesh	Ujjain	1	0	0	0	0	0	0	0	0	0	1	2
56	Bihar	Bodhgaya	-1	1	0	0	0	0	0	0	0	0	0	2
57	Tripura	Agartala	1	1	0	0	0	0	0	0	0	0	0	2
58	Meghalaya	Shillong	1	0	1	0	0	0	0	0	0	0	0	2
59	Gujarat	Porbandar	1	1	0	0	0	0	0	0	0	0	0	2
60	Orissa	Puri	1	0	1	0	0	0	0	0	0	0	0	2
61	Goa	Panaji	1	0	0	0	0	0	0	0	0	0	1	2
62	Sikkim	Gangtok	1	1	0	0	0	0	0	0	0	0	0	2
63	Punjab	Ludhiana	0	1	0	0	0	0	0	0	0	0	0	1
64	Jharkhand	Jamshedpur	0	0	0	0	1	0	0	0	0	0	0	1
65	Chhattisgarh	Raipur	1	0	0	0	0	0	0	0	0	0	0	1
	Т	otal	158	112	73	4	45	17	106	21	5	11	7	559

Analysis based on JnNURM Projects Status, 2012

Performance of UIG Projects Completion: Performance of overall projects completion under UIG sub-mission of JnNURM was quite low. Out of 65 cities, there were only 23 cities which have completed more than 10 percent of total sanctioned projects. The remaining cities have not completed even a single project. The city of Ahmadabad completed the maximum number of projects with 73.08 percent completion. Madurai, Surat and Bangalore have completed 62.50, 60.00, and 55.26 percent respectively.

Out of the 559 projects, 373 projects were in progress, 52 projects have not been started yet and 134 projects have been completed as on 2012. The overall percentage of completion was only 23.97 percent of total JnNURM projects. It reveals that the performance of the project completion was quite low. The completion of projects does not depend on the size of the cities rather it depends on the attitude of the implementing agencies, sense of responsibility among the ULBs and coordination among the departments / agencies to work out effectively and efficiently to complete projects on time. The details of projects delay in the low performing cities is lack of coordination among the agencies and lack of proper set of institution framework at municipalities. The state government had not transfered the power and function to the respective departments as a result of which the staffs were unsure of their duties and responsibilities.

Sl. No	Name of City	Complete	In	Not Started	Total No. of Projects	% of Completion
1	Ahmadabad	19	progress 6	1	26	73.08
2	Madurai	5	3	0	8	62.50
3	Surat	15	8	2	25	60.00
4	Bangalore	21	17	0	38	55.26
5	Bhopal	3	4	0	7	42.86
6	Vijayawada	5	8	0	13	38.46
7	Hyderabad	8	14	0	22	36.36
8		5	8	1	14	35.71
<u>8</u> 9	Vishakhapatnam Indore	3		1		
10	Asansol	3	6	2	10 11	30.00 27.27
			18	3		
11	Delhi	7			28	25.00
12	Agra	1	3	0	4	25.00
13	Ajmer	1	3	0	4	25.00
14	Vadodara	3	10	0	13	23.08
15	Kolkata	12	32	16	60	20.00
16	Chennai	7	27	1	35	20.00
17	Greater Mumbai	5	20	1	26	19.23
18	Nanded	2	9	0	11	18.18
19	Nagpur	3	14	0	17	17.65
20	Nashik	1	5	0	6	16.67
21	Rajkot	1	5	0	6	16.67
22	Pimpri Chinchwad (Pune)	3	17	0	20	15.00
23	Jaipur	1	8	0	9	11.11
24	Mysore	0	8	1	9	0.00
_ 25	Lucknow	0	7	0	7	0.00
26	Kanpur	0	6	0	6	0.00
27	Kochi	0	5	1	6	0.00
28	Patna	0	6	0	6	0.00
29	Varanasi	0	6	0	6	0.00
30	Coimbatore	0	5	0	5	0.00
31	Thiruvananthapuram	0	4	1	5	0.00
32	Amritsar	0	3	2	5	0.00
33	Dehradun	0	5	0	5	0.00
34	Haridwar	0	2	3	5	0.00
35	Shimla	0	2	3	5	0.00
36	Faridabad	0	4	0	4	0.00
37	Jabalpur	0	4	0	4	0.00
38	Allahabad	0	4	0	4	0.00
39	Nainital	0	3	1	4	0.00
40	Aizawl	0	1	3	4	0.00
41	Meerut	0	3	0	3	0.00

Table 4.26: Progress of Projects Completion

Sl.	Name of City	Complete	In	Not	Total No.	% of
No	•	-	progress	Started	of Projects	Completion
42	Srinagar	0	3	0	3	0.00
43	Chandigarh	0	2	1	3	0.00
44	Bhubaneshwar	0	3	0	3	0.00
45	Tirupati	0	2	1	3	0.00
46	Mathura	0	3	0	3	0.00
47	Imphal	0	3	0	3	0.00
48	Kohima	0	2	1	3	0.00
49	Itanagar	0	3	0	3	0.00
50	Dhanbad	0	2	0	2	0.00
51	Ranchi	0	2	0	2	0.00
52	Guwahati	0	2	0	2	0.00
53	Pondicherry	0	2	0	2	0.00
54	Jammu	0	1	1	2	0.00
55	Ujjain	0	2	0	2	0.00
56	Bodhgaya	0	2	0	2	0.00
57	Agartala	0	2	0	2	0.00
58	Shillong	0	2	0	2	0.00
59	Porbandar	0	0	2	2	0.00
60	Puri	0	2	0	2	0.00
61	Panaji	0	0	2	2	0.00
62	Gangtok	0	2	0	2	0.00
63	Ludhiana	0	1	0	1	0.00
64	Jamshedpur	0	0	1	1	0.00
65	Raipur	0	1	0	1	0.00
	Total	134	373	52	559	23.97

Source: Analysis Based on JnNURM Projects Status, 2012

4.9.3 Discussion

Under UIG sub-mission of JnNURM, maximum numbers of projects were implemented in the water sector followed by urban transport system. The mega cities had executed more on urban transport system than rest urban infrastructure sectors; whereas, the smaller and medium towns had more projects on the water sectors than the urban transport system. The municipalities and other urban service providers should be smart to provide better urban services to growing cities. Otherwise the cities would become a slum. As per the urban infrastructure service benchmarks, all urban infrastructure service sectors had not met the benchmarks set by Government of India. This was due to the weak governance at states and city level and hence the urban services were poor.

More over the low performance of cities in terms of project implementation under UIG submission has been mainly due to the less attention given to mandatory reforms. This is the current situation in Indian cities and towns reflecting the gap of urban services between demand and supply. There need to be more number of projects that have to be executed in all cities to fill the gap of urban services. Projects performance of JnNURM cities reflects that the program implementation has been very poor. The finding suggests that the city and state governance should build more capacity to execute more number of projects as well as improve the operation and maintenance part.

4.10 COMPARATIVE ANALYSIS OF BSUP PROJECT IMPLEMENTATION

4.10.1 BSUP Project Implementation at State Level

State Level Dwelling Units Target: The total number of dwelling units proposed under Basic Service to Urban Poor (BSUP) projects was 1060446 with an approved cost of Rs. 29906.53 Crore in 31 states/TUs in India (BSUP projects status, 2011). In comparison between the states/TUs, Maharashtra has covered the maximum number of dwelling units and lowest number of dwelling units is in the state of Goa.

One to ten lakh new dwelling units are being targeted in the states of Maharashtra, West Bengal, Andhra Pradesh and Gujarat. Between ten thousand to one lakh dwelling units are targeted in the states of Tamil Nadu, Delhi, Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Karnataka, Kerala, Rajasthan, Bihar, and Jharkhand whereas the states of Jammu and Kashmir, Punjab, Nagaland, Haryana, Pondicherry, Orissa, Assam, Uttarakhand, and Manipur have targeted between one thousand to ten thousand dwelling units. The remaining states have targeted less than one thousand slum dwelling units per lakh slum families (Annexure-V).

Nine states/UTs have targeted more than 10000 slum dwelling units per one lakh Slum Family (SFs) as per census 2011. Chandigarh is the only UT which has targeted more slum dwelling units than the slum families as per census, 2011. The other 8 states/UTs are Kerala (58345 DUs per 100000 SFs), Gujarat (31342 DUs per 100000 SFs), Arunachal Pradesh (27374 DUs per 100000 SFs), Jharkhand (22418 DUs per 100000 SFs), Nagaland (21282 DUs per 100000 SFs), Delhi (20811 DUs per 100000 SFs), West Bengal (12102 DUs per 100000 SFs) and Pondicherry (10251

DUs per 100000 SFs). These targeted numbers of DUs in states with the highest numbers of targeted slum dwelling units per lakh slum families are compared in Fig. 4.10.

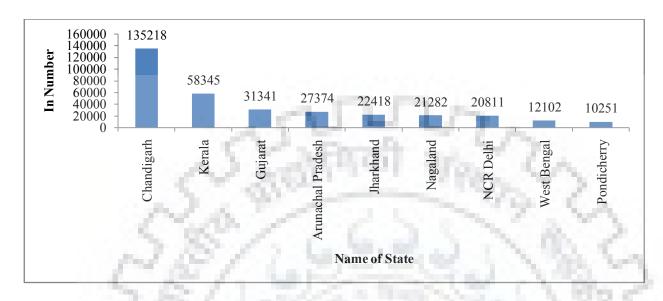


Fig.4.10: Variation of BSUP Dwelling Units Approved per Lakh Slum Family (above 10000 DUs)

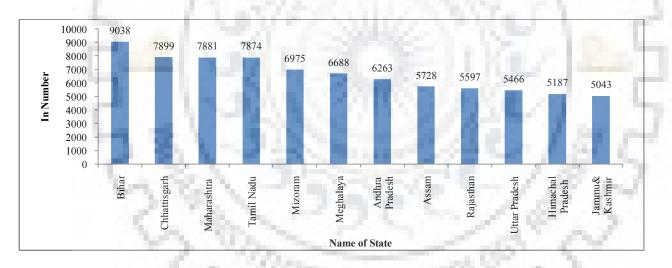


Fig.4.11: Variation of BSUP Dwelling Units Approved per Lakh Slum Family (between 5000 - 10000 UDs)

Twelve states have targeted between 5000 slum DUs to 10000 DUs per 100000 SFs as per census 2011. Bihar has targeted (9038 DUs per 100000 SFs), Chhattisgarh (7899 DUs per 100000 SFs), Tamil Nadu (7874 DUs per 100000 SFs), Mizoram (6975 DUs per 100000 SFs), Meghalaya (6688 DUs per 100000 SFs), Arunachal Pradesh (6263 DUs per 100000 SFs), Assam (5728 DUs per 100000 SFs), Rajasthan (5597 DUs per 100000 SFs), Uttar Pradesh (5466 DUs per 100000 SFs), Himachal Pradesh (5178 DUs per 100000 SFs) while Jammu and Kashmir has targeted (5043 DUs

per 100000 SFs) respectively. The targeted numbers of slum dwelling units of states which have targeted between 5000 to 10000 DUs per Lakh slum families are compared in Fig. 4.11.

In states/UTs of Karnataka Sikkim, Madhya Pradesh, Goa, Uttarakhand, Punjab, Haryana, Tripura and Odisha less than 5000 slum dwelling units per 100000 SFs are targeted under BSUP submission, JnNURM. Among these, Karnataka has targeted 4171 slum dwelleing units per 100000 Slum Families, for Sikkim (4047 DUs per 100000 SFs), for Madhya Pradesh (3643 DUs per 100000 SFs) for Goa (2953 DUs per 100000 SFs), Uttarakhand (1844 DUs per 100000 SFs), Punjab (1764 DUs per 100000 SFs), for Haryana (977 DUs per 100000 SFs), Tripura (916 DUs per 100000 SFs) and Odisha (804 DUs per 100000 SFs) respectively. The targeted numbers of slum dwelling units in states targeting less than 5000 DUs per 100000 SFs are compared in Fig. 4.12.

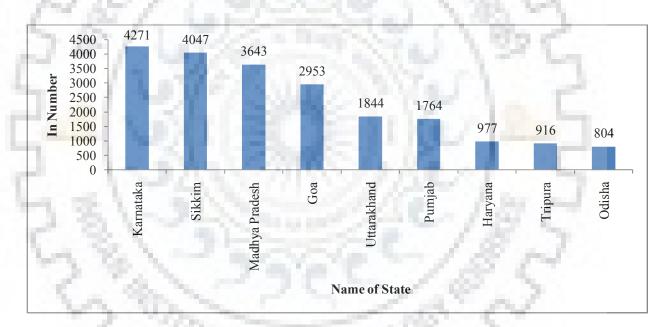


Fig.4.12: Variation of BSUP Dwelling Units Approved per Lakh Slum Family (below 5000 DUs)

Among 34 states and UTs, Manipur, Daman and Diu, Dadra and Nagar Haveli and Lakshadweep have not identified any slum families as per census 2011. However, Manipur state has targeted 1250 dwelling units in Imphal city under BSUP project for urban poor (below poverty line). In rest of the states/UTs, Chandigarh has targeted more number of slum dwelling units than the number of slum families (estimated slum families as per census 2011 was 23784 while targeted slum DUs under BSUP was 25728).

4.10.2 BSUP Project Implementation at City Level

The number of dwelling units implemented in mega cities is 445080 while those implemented in medium size cities is 457745, those implemented in other cities is 138823, and those implemented in north east and Jammu and Kashmir cities is 16917. In mega cities the highest numbers of DUs are implemented in Kolkata (131009) while lowest numbers of DUs are implemented in Bangalore (19984). In medium cities the most number of DUs are implemented in Pune (Pimpri Chinchwad) (57650) while the least number of DUs are implemented in Amritsar (320). In other cities most number of DUs are implemented in Raipur (30000) while least number of DUs are in Haridwar (96). And finally, in north east and Jammu and Kashmir cities, maximum number of DUs are implemented in Srinagar (5222) while least number of DUs are implemented in Gangtok (254).

4.11 SUMMARY

The JnNURM had two sub-missions (UIG and BSUP) and focused in two areas – urban infrastructure facilities under UIG and housing for urban poor under BSUP. The JnNURM had covered 65 cities. The comparative analysis on the implementation of mandatory reforms at state and city levels and even optional reforms at city level reveal significant findings. Out of 65 cities under JnNURM in India, only few cities have implementation success and majority of the cities had very poor performance in terms of the project implementation, reforms achievement, and completion of the projects. The states of Gujarat and Maharashtra have been the leading states for reforms which were to be achieved before implementing projects and poorest performer states are those of north east region.

In the city level mandatory reforms, only few cities of Surat, Kolkata and Pimpri Chinchwad (Pune) had achieved the maximum number of reform components whereas the poorest performers are the north east cities of India. This reveals that the ULBs were very weak to implement the projects since they were not able to carry out the projects successfully due to lack of technical skill as well as the poor management among the municipal staffs. The optional reforms at city level were less implemented in comparison to the other mandatory reforms. Only few cities could implement option reforms, while majority of the cities could not implement them in the first phase of the JnNURM.

The comparative analysis of the UIG projects shared among 65 cities shows the different levels of project implementation. Some cities had implemented maximum number of projects in maximum sectors out of the eleven infrastructure sectors and some of the cities had implemented only a few sectors, while some cities had implemented projects in two or three sectors.

For the BSUP, the bigger cities had implemented more projects and targeted maximum population while the smaller and medium cities had less number of projects as compared to mega cities. However, the coverage of slum population was highest in the Chandigarh, Kerala and Gujarat and Arunachal Pradesh whereas Madhya Pradesh, Goa, Uttarakhand, Haryana, Tripura, and Odisha had covered low percentage of the total slum population. The remaining cities had only a few projects and targeted a small percentage of slums dwellers. In highest investments under UIG are in Kolkata, Delhi and Mumbai and the lowest investments are in Nainital and Jamshedpur. Under BSUP Kolkata, Hyderabad, and Delhi have highest investment and the cities of Panaji and Haridwar have lowest investments.

The cities had different level levels of knowledge / know how for DPR preparation and as a result, the implementation has varied from one city to other. The success level was not the same under JnNURM. Only few cities had done well and some cities could not make DPRs in water supply sectors, waste water management, and so on. Majority of the projects were still in progress at end of JnNURM and completion percent was very low. This was due to lack of effective management, less responsibility of the governing bodies and lack of coordination among line agencies.





EVALUATION of UIG AND BSUP FOR SELECTED CITIES

5.1 **RESEARCH TECHNIQUES ADOPTED**

The evaluation of Urban Infrastructure Governance (UIG) and Basic Services to Urban Poor (BSUP) projects are based on the data available on public domain i.e. secondary data which are collected from various resources of government departments, other agencies etc and the primary data collection through household surveys. Research techniques used for evaluation are discussion, key interview with implementing agencies, Focus Group Discussion (FGD) with beneficiaries of the UIG and BSUP projects beneficiaries, Photographic, Arc GIS and Excel etc.

The selection of Surat, Pimpri Chinchwad and Kolkata cities has been done on the basis of their performance as discussed in previous chapter 4 in Table 4.5 Table 4.8, and Table 4.9. The performances of these cities are better among the JnNURM cities on account of reforms, project implementation under UIG and BSUP sub-missions. The completion of projects under UIG and BSUP projects in these cities is at advanced stage.

Selection of UIG project sectors for evaluation - water supply, waste water management, storm water drainage and solid waste management has been done on the basis of discussion in Table 4.20, Table 4.20 and Fig. 4.5 of previous chapter 4. Water supply, waste water management and storm water drainage are highest number of DPRs approved and highest investment among the eleven sectors under UIG while solid waste management sector is covered almost all cities. Housing for urban under BSUP sub-mission of JnNURM is covered in the selected cities and had different strategies for improvement of urban poor. These are reason for selection of the particular projects / sectors for evaluation in these cities.

There are three main stage for suvey; (1) secondary data analysis at nationall level, (2) secondary data analysis from the seclection cities in the sectors of water supply, waste water management, storm water and drainage and solid waste management and (3) households survey data analysis and

Fosus Group Discussion (FGD) with beneficiaries. Different types of survey have been carried out as per the requirement of data. The sample size for evaluation of project benefited population for UIG in selected cities was 200 households in each project and FGD had been conducted in each benefitted project location of selected cities. The surveys has been conducted in multiple visits to selected cities from June, 2012 to Jan, 2014.

5.2 PROFILES OF SELECTED CITIES – SURAT, PIMPRI CHINCHWAD (PUNE) AND KOLKATA

Surat, Pune (Pimpri Chinchwad), and Kolkata cities had implemented UIG projects in the sectors of water supply, waste water management, storm water and drainage, and solid waste management and these four sectorsreceived primary attention among eleven sectors. Housing for urban poor under BSUP sub-mission of the JnNURM was also included in these cities. These selected cities have their different characteristics in terms of population size; urban services level, economic activities etc and they are considered as the best cities in terms of projects implementation as well as reforms.

Surat City: Surat is a fast growing city in Gujarat State with a population of 44,66,826 (Census, 2011) and its geographical area is 326 Sq km (Fig. 5.1 showing the location of Surat city). It lies at 21.1700°N, 72.8300°E and connects with other cities through air, rail, road, and port. This city is famous for textile trade and diamond cutting-polishing industry which has a big scope of job prospect (Surat CDP, 2008). The city lies on the Tapti River which pass through the middle of the city. It experiences a hot temperature with an average of 40°C and during winter season, the temperature is around 25°C. The average annual rainfall of the city is 1143 mm (Surat CDP, 2008). The city is experiencing a rapid growth in population over the last decade and considered as one of fastest growing in the country. Surat city is divided into 7 administrative zones namely; North Zone, West Zone, East Zone, South Zone, South West Zone, South East Zone, and Central Zone for better administrative and easy to handle the urban services. Annexure-IX shows the zone wise profile of Surat city.

Pune (Pimpri Chinchwad) City: The Pimpri Chinchwad (Pune) is located towards the north east of Pimpri Chinchwad (Pune) around 160 Km from the Mumbai city, the capital of Maharashtra

state (Fig. 5.1). This city is newly developed and being an extension of Pimpri Chinchwad (Pune) city, it is well connected with Puneand Mumbai. It has excellent connectivity by road, rail and air to other cities (Mumbai, Hyderabad, Bangalore, Delhi, Kolkata, and Chennai) in India. The city lies on the Pune-Mumbai NH-4. This city was basically established as centre for refugees from Pakistan (Pimpri Chinchwad (Pune) CDP, 2008). It is pre dominantly an industrial area, which has developed chiefly during last decades. The city is located near the western margin of the Deccan Plateau on the leeward side of the Sahayadri range and Western Ghats at 560 m above sea level, on the bank of the rivers Mula, Pawana and Indrayani (Pimpri Chinchwad (Pune), CDP, 2008). This city experienced an annual maximum temperature of 39°C and minimum temperature of 6°C and receives moderate rainfall, an annual average of 722 mm, mainly between June and September from southwest monsoon. July is the wettest month of the year. The weather is very pleasant in the city with average temperatures ranging from 20°C to 28°C (Pimpri Chinchwad (Pune) CDP, 2006). The population of the city over last decades, and decadal growth rate of population was 72% (between 2001 and 2011) and 93% (between 1991 and 2001) while 1960 and 70s witnessed population growth of around 150%. Population of Pimpri Chinchwad (Pune) has increased from 1006417 (Census 2001) to 17,29,359 (Census 2011). The share of slum population is 13 percent to total population (census, 2001). The fact profile of the Pimpri Chinchwad (Pune) city is represented in Annexure X.

Kolkata City: Kolkata is the capital of West Bengal and was once capital of India during the British colonial rule. It is located in Eastern India on the East bank of the River Hooghly. This city is the commercial and financial hubof north east India. The size of Kolkata Metropolitan Corporation is 187.33 Sq Km whereas Kolkata Metropolitan Area (KMA) extends to 1854 sq km. This city has well established railway line, air way, and roads transport system (Kolkata CDP, 2006). The geographical location of this city is 20 °30 'latitude in the north and 88 °25 ' longitude east (Dobrivoje, 2008) (Fig. 5.1). Kolkata is situated in a low, flat alluvial plain within the lower orbit of the Gengetic Delta. A typical riverine city, in the earlier days, it was surrounded by marshes, tidal creeks, and mangroves. The annual mean temperature is 24.8°C and its annual rainfall is 1582 mm. The population of the city is 141.13 lakh (census, 2011) and the share slum population in the city is around 10% (census, 2001). The fact profile of Kolkata cities are shown

in Fig. 5.1 and Imphal city was a special case study for poor performing cities under JnNURM. The aim of this selected Imphal city was to investigate for the reason of situation responsible for its poor performance. The fact profile of Imphal city is shown in Annexure-XII.

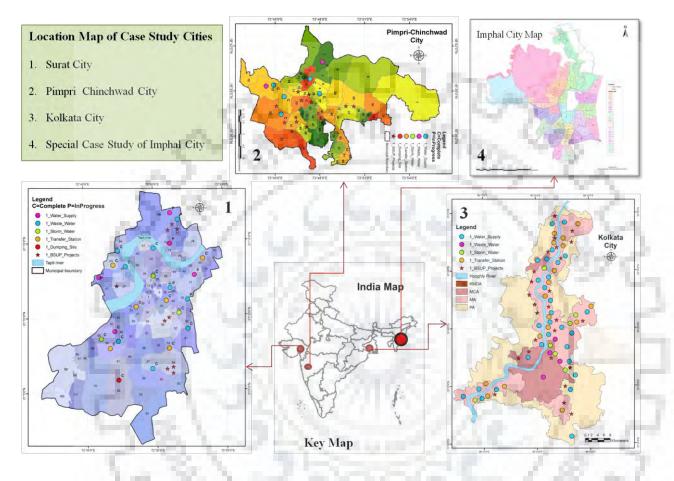
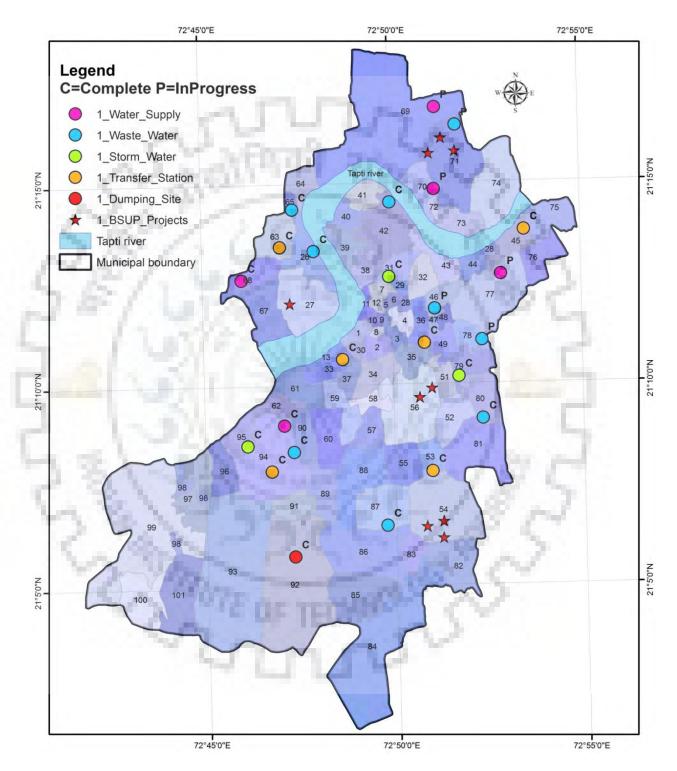


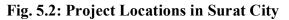
Fig. 5.1: Location Maps of Case Study Cities

5.3 SELECTED URBAN INFRASTRUCTURE SERVICES

Under UIG sub-mission of JnNURM, eleven sectors had identified for urban infrastructure development in India. Out of these, water supply, waste water management, storm water and drainage, and solid waste management habe been selected for research in three select cities of Surat, Pimpri Chinchwad (Pune), and Kolkata cities. Surat had implemented 19 projects in the research areas, Pimpri Chinchwad (Pune) city had implemented 8 projects, and Kolkata city had implemented 43 projects. The evaluation was done for the completed projects in based data collected from households surveys, filed observation, and FGD in benefited project areas. The

locations of project in Surat (Fig. 5.2), Pimpri Chinchwad (Pune) (Fig. 5.3) and Kolkata cities (Fig. 5.4) are shown below.





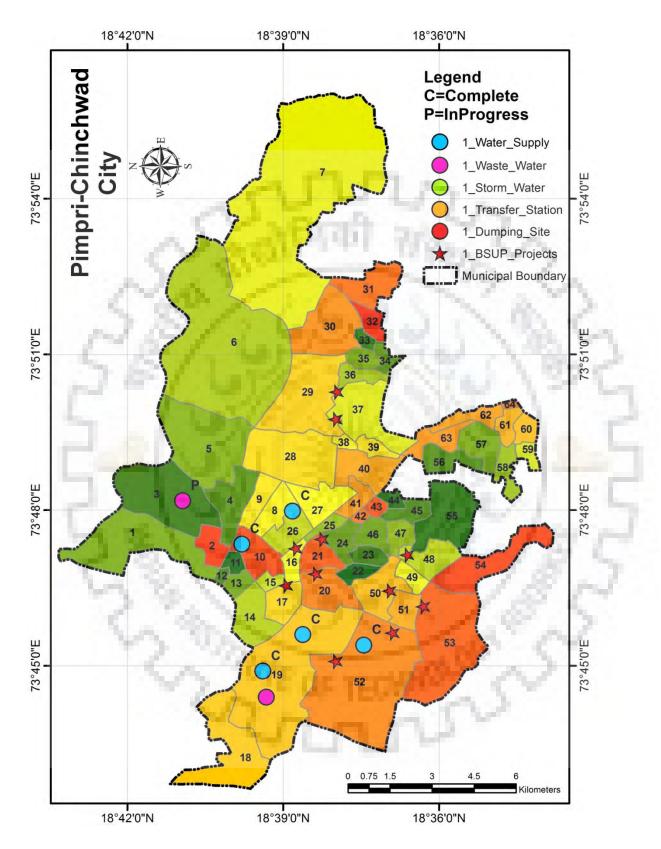
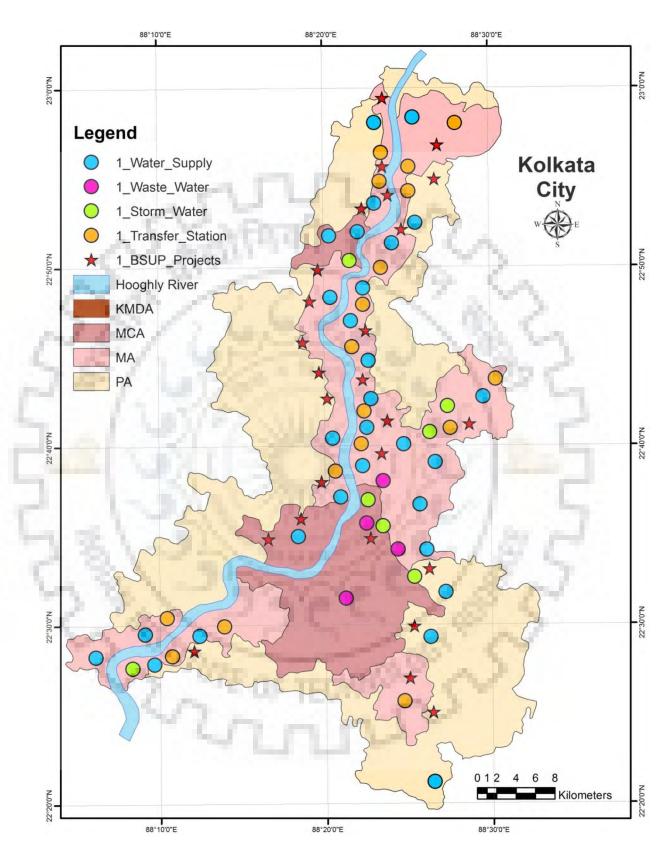
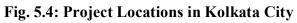


Fig. 5.3: Project Locations in Pimpri Chinchwad (Pune) City





5.4. WATER SUPPLY SECTOR

5.4.1 **Project Description**

Water supply projects in Surat city are construction of water storage both raw water and clean water, and distribution of pipelinesin west and south zones under DPR-I and DPR-IV while other five DPRs were on the renovation of the existing pumping stations and augmentation of water treatment plants. In Pimpri Chinchwad (Pune) city, four DPRs were proposed for water supply. The DPR-I was proposed for construction of Water Treatment Plant (WTP), Pipe Line (Distribution networks), metering system, and pumping machinery. The DPR-II was proposed for intake works & Pumping station, Master Reservoir at Pawana dam, pipe line (distribution network), and metering. DPR-III was proposed for -pipe line (pumping main + gravity main)", and -electrical and mechanical" and DPR-IV is for gravity main of 1800 mm diameter and installation of metering system. There was phase-II for waste supply which is for construction of Water Treatment Plant (WTP) at Nigadi (Table. 5.1)

SI. No.	DPRs Proposal	Name of DPR	DPRs Description			
		Contraction of the	WTP (100 MLD) ESR & Pump			
1	and the second	Proposal –I (DPR-I)	Pipe Line (Distribution network)			
1		Tioposai – T(DTR-I)	Metering System			
	10 C C C C C C C C C C C C C C C C C C C	the second s	Pumping Machinery			
	1.4.50	A set along	Intake works & Pumping station			
2	Water Supply Proposal (4 Numbers)	Proposal –II (DPR-II)	Master reservoir at Pawana dam			
2		Floposal –II (DFK-II)	Pipe Line (Distribution network)			
	for Pimpri Chinchwad (Pune)		Metering System			
3	(i une)		Pipe Line (Pumping Main +Gravity Main)			
3		Proposal – III (DPR-III)	Electrical & Mechanical			
		7	Gravity Main 1800 mm dia.,			
4		Proposal – IV (DPR-IV)	PSC (L = 19050)			
			Metering System			
5	Water Supply Phase - II	DPR -V	Construction of WTP Nigadi			

Table 5.1: DPRs Description in Pimpri Chinchwad (Pune) City

Source: Based on Compilation of DPRs, 2006

The water supply projects in Kolkata city were mainly augmentation and construction of water treatment plant, laying distribution line, transmission line and renovation of the old pumping

station. The construction of over head tanks and storage in different location of Kolkata metropolitan region were one another components of the UIG sub-mission under JnNURM in Kolkata city. Type of the water works within Kolkata city limit at various places is summarized in given below (Table. 5.2);

CL N	Name of		
SI. No	DPRs	Place	Projects Description
1	DPR-I	Salt Lake	Construction of elevated services reservoir, –Pumping House" (PH), –Rising Main and Distributions Pipeline" (RMDP), and chlorination at sector-V, Naba Diganta Industrial Township Authority (NDITA
2	DPR-II	Uluberia	-Raw Water Intake Arrangements" (RWIA), -Raw Water Transmission System" (RWTS), -Water Treatment Plant' (WTP), -Clear Water Reservoir" (CWR), and -Elevation Reservoirs"
3	DPR-III	Bansberia	Raw Water Intake Arrangements" (RWIA), -Raw Water Transmission System" (RWTM), -Water Treatment Plants' (WTPs), -Clear Water Reservoir" (CWR),and -Water Pumping Stations" (WPTs)
4	DPR-IV	Baruipur	Under Ground Reservoir" (UGR), - C lear Water Pumps" (CWPs) -Booster Chlorination Plant" (BCPs), -Elevated Service Reservoirs" (ESRs), and -Distribution Networks"
5	DPR-V	Gandhi Maidan and Akra	-Under Ground Storage" (UGS), -Pumping Machinery" and -Installation of Chlorination System" (ICS)
6	DPR-VI	Howrah	Under Ground Reservoir" (UGR), -Laying DI or de-ionized rising Main Line" (LML), and -Installation of Revenue Meters" (IRMs)
7	DPR-VII	Naihati, Halisahar, Kanchrapara, Gayeshpur and Kalyani	Laying pipe line in uncovered areas at Naihati, Halisahar Kanchrapara, Gayeshpur and Kalyani and same nature for the eighth project
8	DPR-VIII	Barrakpore and North Barrackpore	laying pipe line and elevated reservoirs
9	DPR-IX	Chandanagar	Construction of —Water Treatment Plants" (WTPs), Laying of D Pipelines and Distribution Networks
10	DPR-X	Palta to Talla	Laying pipeline and Pumping stations
11	DPR-XI	Dhapa	Renewal of the Water Treatment Plant (WTP) includes civil construction works including raw water pumping house/raw water lifting station, sedimentation tanks, sludge disposal wit sludge drying beds and procurement and installation of electrica / mechanical equipments and machinery
12	DPR-XII	Garulia	Construction of Water Intake jetty including rising main pump house and substation, construction of water treatment Plant pla

Table 5.2: Projects Description in Kolkata city

Sl. No	Name of DPRs	Place	Projects Description						
			including clear water reservoir, and construction of primary grid						
			& six Elevated Services Reservoir, and Electrification						
		Dumdum, North	Construction of Raw Water Pump House" (CRWPH), -Laying of						
13	DPR-XIII	Dumdum and South	Raw Water Rising Main" (LRWRM), and construction of -Under						
		Dumdum	Ground Reservoir" (UGR)						
			Intake Well, Rising Main, Water Treatment, Clear Water Pump						
14	DPR-XIV	Bhadreswar	House, Over Head Reservoirs, Distribution System and						
			Installation of Bulk & Consumers Water Meters						
15	DPR-XV	Budge Budge	Clear Water Pump House" (CWPH), -Elevated Service						
15	DI K-AV	Dudge Dudge	Reservoirs" (LSRs), and Installation of Bulk Meters						
16	DPR-XVI	Dhapa	Water Treatment Plant" and Under Ground Reservoir and Raw						
10	DIRAVI	Блара	Water Pipelines						
17	DPR-XVII	Bhatpara	construction of Intake Jetty and Rising Main, primary feeder main and distribution mains and carrier bridge, shifting of utilities, sub-station and E & M works and last is Internal roads/path ways and yards lighting						
18	DPR-XVIII	Chandanagar	Fully on the metering system						
19	DPR-XIX	Bally	-Raw Water Intake Jetty, -Water Treatment Plant" and -Over Head Reservoirs" plus distribution networks and metered housing connection						
20	DPR-XX	Panihati	24X7 hours water supply for Panihati Municipal Corporation						
21	DPR-XI	Uluberia	Water Supply Phase –II for Uluberia Municipal Corporation						
		Madhyamgram,	Trans-municipal water supply project for Municipal of						
22	DPR-XII	Barrackpore and Barasat	Madhyamgram, Barrackpore and Barasat						

Source: Based on DPRs for Water Supply, 2006

5.4.2 Financial Progress of Water Supply Sector

Surat City Financial Progress: The total investment for water supply projects in Surat city was Rs. 538.34 lakh. The DPR-I was targeted for the population of 3.34 lakh with an investment of Rs. 19.19 Crore in south west zone. The per capita investment of DPR-I is Rs. 574.551. DPR-II had targeted 2.5 lakh of population with a total investment of Rs. 9.95 Crore in the west zone and per capita investment was Rs. 398. DPR-III had targeted in 3.34 lakh population with an investment of Rs. 167.43 Crore in north zone and their per capita investment is Rs. 5012.87.

The DPR-IV was invested with Rs. 201.09 Crore and targeting a population of 3.34 lakh in the north zone area. The per capita investment of this DPR-IV was Rs. 6020.695. The finally, DPR-V was for augmentation of water supply system at Sarthana, Katargam and Rander with an

investment of Rs. 140 Crore and targeted a population of 0.14 lakh. The details of the total investment for water supply in Surat city per capita investment and targeted population of the respective projects are been shown in Table 5.3.

			ii	Sura	at Mur	nicipal	Corpo	oration	Zones N	lame	ii (y		E.
Sl. No	Sectors	Projects Name	Project Cost in Crore	North	South	West	East	Central	South East	South West	Benefited City Population in Lakhs	Per Capita	Projects Cost in Lakhs
	Water	Project-I: Water Supply Distribution System for T.P Schemes No. 1 to 7 of Vesu (Phase-I up 2019 AD)	19.19					Þ		Ċ	3.34	574.551	1919
1		Project-II: Water Supply Distribution systems for T.P. Schemes No. 8, 9, 10, 14, 15, 16 of Pal-Palampor of SUDA Area (Phase-I up to 2019 AD)	9.95				Ĵ	5		5	2.5	398.000	995
	Supply	Project-III: Water Supply scheme for new North Zone of SMC	167.43								3.34	5012.874	16743
		Project-IV: Water Supply Distribution systems for south east zone areas of SMC	201.09								3.34	6020.659	20109
		Project-V: Augmentation of Sarthana, Katargam and Rander water works of SMC	140.68								10.14	1387.377	14068
		Total	-										68592

Table 5.3: JnNURM Coverage Zones and Investment in Surat City

Source: Based on data collected from filed survey, 2012-13

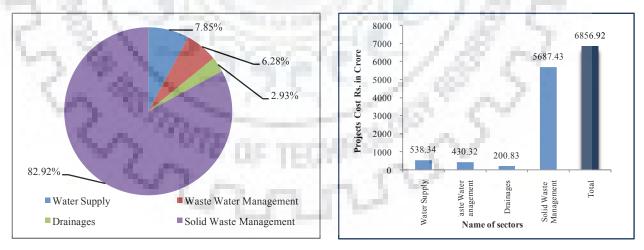


Fig. 5.5: Selected Sectors share in Percentage

Fig. 5.6: Investment in Selected Sectors in Surat City

Among the four four selected sector of urban infrastructure, solid waste management was highest interms of investment (82.92 percent), followed by water supply sector (7.85%), waste water

management (6.28%) and storm water and drainage was least percentage (2.93%). The comparative picture of investment is shown in Fig. 5.5 and 5.6

Pimpri Chinchwad (Pune) City Financial Progress: In Pimpri Chinchwad (Pune) city, the total investment was Rs. 49373.82 lakh in 5 projects. The DPR-I targeted ward number 19 in the areas of Kidawale, Ravet, Mamurdi, PimpleNilakh, Sanghavi, and Thergaon with an investment of Rs. 7615.65lakh. The total investment of DPR–II was Rs. 15130.38 lakh benefing areas of Nigadi (wards no. 10, 11, 12, 13). The DPR-III was an investment of 14148.77 lakh and getting benefits in the wards no. 17, 18, 19, 20, 21, and 22. The DPR-IV was an investment of Rs. 6707.3 lakh and getting a benefit of the wards no. 17, 18, 19, 20, 21, and 22. The DPR-V was an investment of Rs. 13511.82 lakh and benefiting areas are in the wards no. 10, 11, 12, and 13 (Table 5.4).

Sl. No	DPR Name	Investment (Rs. in lakh)	Benefited Wards Number Location
1	DPR-I, Water Supply Proposal – I for Pimpri – Chinchwad City.	7615.65	Ward No. 19
2	DPR-II, Water Supply Proposal – II for Pimpri – Chinchwad City.	15130.38	Ward No. 10, 11, 12 and 13
3	DPR-III, Water Supply Proposal – III for Pimpri – Chinchwad City.	14148.77	Ward No. 17, 18, 19, 20 21, and 22
4	DPR-IV Water Supply Proposal – IV	6707.3	Ward No. 17, 18, 19, 20, 21 and 22
5	DPR-V Water Supply Phase -II	131511.82	Ward No. 10, 11, 12 and 13
	Total	49373.82	

Source: Based on JnNURM Projects Status Report, 2012

Kolkata city Financial Progress: The total investment for water supply sector in Kolkata city was Rs. 308969.98 lakh in 24 projects. Out of the 24 only 5 projects / DPRs had been completed and working at present. The rest of the projects are in progress. The water supply projects were patially covered in various municipalities within the Kolkata metropolitan area. The major works of the projects were construction of new water treatment plants, new transmission lines, storage points and over heads tanks. These projects had planned to improve the water quality and quantity at post projects situation. The per capita investment of 24 DPRs which had been implemented in Kolkata city is given Table 5.5.

Sl. No	Project Name	Project Cost (Rs. In Lakh)	Beneficiriey Population in lakh	Per Capita Investment in Rs.
1	Trans-municipal Water Supply Project for Municipal Towns of Madhyamgram, New Barrackpore and Barasat	44547.77	No data	No data
2	24x7 WS Project for Dumdum, South DumDum and North Dumdum	31272.08	6.75	4632.90
3	Tala Palta Dedicated Transmission Main	30492.48	The entire population served by the city	No data
4	Water Supply Scheme for Bhatpara Municipal Area	24970.42	4.42	5649.42
5	24X7 Water Supply scheme for Panihati Municipalities, Kolkata UA.	24602.30	No data	
6	Comprehensive Distribution Network within the command zone of 30 MGD Dhapa Water Treatment Plant	21555.27	7.5	2874.04
7	Trans-municipal Water Supply Project for Municipal Towns of Titagarh and Khardah	19484.00	No data	No data
8	24×7 surface water supply scheme for municipal towns of Naihati, Halisahar, Kanchrapara, Gayeshpur and uncovered areas of Kalyani	14194.25	No data	No data
9	Surface Water supply scheme for Bally Municipality	13849.36	3	4616.45
10	Surface Water supply scheme for Barrakpore & North Barrakpore Municipal Areas	12950.88	No data	No data
11	Water Supply Project (Ph- II) for Uluberia Municipality	12478.23	No data	No data
12	30 MGD (Ph-I) water treatment plant at Dhapa	9875.00	7.5	1316.67
13	Surface Water Supply Scheme for the added areas of Howrah Municipal Corporation	9068.91	2.56	3542.54
15	24x7 water supply scheme for Budge Budge Municipality	8164.12	0.81	10079.16
16	Water Supply Scheme for Bhadreswar Municipal Area	7462.89	1.21	6167.68
17	24x7 Comprehensive Water supply Scheme for Garulia Municipality (UA) Kolkata	4719.26	1.08	4369.69
18	10 MGD water treatment plant for Uluberia (W)	4558.00	2.62	1739.69
19	15 MGD Water Treatment Plant at Bansberia	4492.00	4.70 (projects for 2039)	No data
20	Development and Management of Water Supply at Sector-V, NDITA at Salt Lake	2606.62	2.27	1148.29
21	24×7 water supply scheme for Chandanagar Municipal Corporation	2521.87	1.75	1441.07
22	Integration of Maheshtala UGR with the existing water supply network under KMDA	1717.00	No data	No data
23	Metering of Water Supply System for Chandanagar Municipal Corporation	1369.41	No data	No data
24	3 MGD UGR-cum-Booster Stn. At Gandhi Maidan , Akra	1066.00	1.86	573.12
25	Water Supply Scheme for Baruipur Municipality	951.86	0.45	2115.24
	Total	308970		

Table 5.5: Financial Progress in Kolkata City for Water Supply

Source: Based on JnNURM Projects Status Report, 2012-13

5.4.3 Physical Progress of Water Supply Sector

Physical Progress in Surat City: The physical progress in Surat city was at advanced stage and almost all projects had been completed and working. Out of the 5 projects two have been completed and one was at final the stage of completion and remaining two are in progress (as on Dec, 2012). The completed projects in the west zone of Surat city were

begetting benefit in term of water quality and quantity. The duration of water supply had



Fig 5.7: Water Supply Project at Vesu, Source: Field Investigation, 2013

been increased in the post projects situation in comparison to the pre projects status. In newly developing region of Vesu location (south west zone) also water supply situation has improved (Fig. 5.7). The physical progress of the water supply system and benefited zones of Surat city under UIG sub-mission, JnNURM is shown in Table 5.6.

Sl. No	Name of Project	Physical Status of completion (Independently Evaluation)	Benefitted Areas/Localities	Working Status
1	Water Supply Distribution systems for T.P. Schemes No. 1 to 7 of Vesa of SUDA Area (Phase-I up to 2019 AD)	100%	Vesu (south west zone)	Working
2	Water Supply Distribution systems for T.P. Schemes No. 8, 9, 10, 14, 15, 16 of Pal-Palampor of SUDA Area (Phase-I up to 2019 AD)	100%	Pal (west zone)	Working
3	Water supply scheme for new North Zone of SMC	72%	North Zone	Partially Working
4	Water supply distribution system for south east zone areas of SMC	42%	Magop (south east)	Partially Working
5	Augmentation of Sarthana, Katargam and Rander water works of SMC	97%	For Entire city	Working

Table 5.6: Physical	progress f	for water	supply	in Surat city
Table 5.0. Thysical	progressi	or water	Suppry	in Surat city

Source: Based on JnNURM Projects Status, 2012 and Filed Investigation (2012-13)

Physical Progress in Pimpri Chinchwad (Pune) City: There were five DPRs which had been

implemented and fully functional, that benefitted ward Number 19, 10 11, 12, 13 14, and 15 of the Pimpri Chinchwad (Pune) city. The DPR-I was mainly for construction of the water treatment plant, laying the distribution line, installation of water meters and installation of pumping machines in the benefited location while DPR-II was mainly renovation, and laying pine lines to the uncovered areas in the pre project situation (Fig.5.8). The DPR-III, and DPR-VI were mainly



Fig. 5.8: WTP at Pimpri Chinchwad at Ward No. 19 under DPR-I, Source: Field Investigation, 2013

installation of the electrification at the pumping station and metering system and DPR-V was augmentation of the water treatment in order to increase the water quality at post project. These projects were completed and fully functional at current situation and giving benefit as per the DPRs objectives. The details of the physical status of the water supply sector in the Pimpri Chinchwad (Pune) city and benefitted localities are represented in Table 5.7. The natures of the projects were almost same in both Surat and Pimpri Chinchwad (Pune) cities. However, completion was more advanced in the Pimpri Chinchwad (Pune) city.

DPR Name	DPR Components	Physical Status	Benefitted Areas/Localities	Working
100	WTP (100 MLD) ESR & Pump	Completed		Working
DPR-I	Pipe Line (Distribution network)	Completed	Ward No. 19	Working
DPK-I	Metering System	Completed	wald No. 19	Working
1.1.1.1	Pumping Machinery	Completed		Working
	Intake works & Pumping station	Completed		Working
DPR-II	Master reservoir at Pawana dam	Completed	Ward No. 10, 11,	Working
DPK-II	Pipe Line (Distribution network)	Completed	12, 13, 14 and 15	Working
	Metering System	Completed		Working
DPR-III	Pipe Line (Pumping Main +Gravity Main)	Completed	Ward No. 19	Working
DPK-III	Electrical & Mechanical	Completed	wald No. 19	Working
DPR-IV	Gravity Main 1800 mm dia. PSC ($L = 19050$)	Completed	Ward No. 19	Working
DPK-IV	Metering System	Completed	walu No. 19	Working
DPR-V	DPR-V Construction of WTP Nigadi		Ward No. 10, 11, 12, 13, 14, and 15	Working

Table 5.7: Physical Status of the	Water Supply System in	Pimpri Chinchwad	(Pune) Citv
			(

Source: Based on JnNURM Projects Status, 2012 and Field Investigation (2012-13)

Physical Progress in Kolkata City: Kolkata city had approved 25 DPRs and distribution in various locations within Kolkata Metropolitan area. The aims of these projects were renewal of the existing water supply system as well as construction of new water supply system in various location of the Kolkata metropolitan area. Out of 25 DPRs in Kolkata city, only 6 DPRs hadbeen completed and fully functional. These projects had benefited the areas of Nabadiganta Industrial Township, Uluberia, wards 137 to 141, Naihati, Halisahar, Kanchrapara, Gayeshpur, Kalyani, Maheshtala, and KMC area. The remaining of DPRs were in progress. The percentage of project completion was very low. The performance of the project's completion status is given in Table 5.8.

SI. No.	Project Name	Physical Progress	Impact Areas	Status
1	Development and Management of Water Supply at Sector-V, NDITA at Salt Lake	100% Completed	Nabadiganta Industrial Township	Working
2	10 MGD water treatment plant for Uluberia (W)	100% Completed	Uluberia	Working
3	15 MGD Water Treatment Plant at Bansberia	72% Completed	Municipal towns of Bansberia and Hooghly- Chinsurah	Not Working
4	Water Supply Scheme for Baruipur Municipality	72% Completed	17 wards of Baruipur Municipality	Not Working
5	3 MGD UGR-cum-Booster Stations. At Gandhi Maidan, Akra	100% Completed	Wards Nos. 137 to 141 under Borough of KMC	Working
6	Surface Water Supply Scheme for the added areas of Howrah Municipal Corporation (HMC)	88% Completed	Inhabitants of the Added Areas of HMC	No working
7	24×7 surface water supply scheme for municipal towns of Naihati, Halisahar, Kanchrapara, Gayeshpur and uncovered areas of Kalyani	100% Completed	Naihati, Halisahar, Kanchrapara, Gayeshpur and Kalyani	Working
8	Surface Water supply scheme for Barrakpore and North Barrakpore Municipal Areas	88% Completed	North Barrackpore	Not Working
9	Integration of Maheshtala UGR with the existing water supply network under KMDA	100% Completed	Maheshtala	Working
10	24×7 water supply scheme for Chandanagar Municipal Corporation	55% Completed	Chandanagar	Not working
11	Tala Palta Dedicated Transmission Main	100% Completed	Kolkata City	Working
12	30 MGD (Ph-I) water treatment plant at Dhapa	85% Completed	Dhapa	Not working
13	24x7 Comprehensive Water supply Scheme for Garulia Municipality (UA) Kolkata	92% Completed	Garulia	Partially Working

Table 5.8: Physical Progress of Water Supply Works in Kolkata City

Sl. No.	Project Name	Physical Progress	Impact Areas	Status
14	24x7 WS Project for Dumdum, South DumDum and North Dumdum	59% Completed	Dumdum, South Dumdum and North Dumdum	Not Working
15	Water Supply Scheme for Bhadreswar Municipal Area	8% Completed	Bhadreswar Municipal town	Not Working
16	24x7 water supply scheme for Budge Budge Municipality	35% Completed	Budge Budge town	Not Working
17	Comprehensive Distribution Network within the command zone of 30 MGD Dhapa Water Treatment Plant	9% Completed	Dhapa	Not Working
18	Water Supply Scheme for Bhatpara Municipal Area	54% Completed	Bhatpara town	Not Working
19	Metering of Water Supply System for Chandanagar Municipal Corporation	5% Completed	Chandanagar	Not Working
20	Surface Water supply scheme for Bally Municipality	24% Completed	Bally	Not Working
21	24X7 Water Supply scheme for Panihati Municipality, Kolkata UA.	6% Completed	Panihati	Not Working
22	Water Supply Project (Ph- II) for Uluberia Municipality	6% Completed	Uluberia	Not Working
23	Trans-municipal Water Supply Project for Municipal Towns of Madhyamgram, New Barrackpore and Barasat	Not yet started	Madhyamgram, New Barrackpore and Barasat	Not Working
24	Trans-municipal Water Supply Project for Municipal Towns of Titagarh and Khardah	Not yet started	Titagarh and Khardah	Not Working

Source: Based on JnNURM Projects Status, 2012

5.4.4 Community Participation

Based on the field survey and Focus Group Discussion (FGD), there was no community participation for projects planning and implementation of the water supply projects in any of the selected cities – Surat, Pimpri Chinch, and Kolkata. The accountability and sense of the beneficiaries was incorporated by municipality or implementing agencies. The beneficiaries had responded with information regarding water supply projects.

The responsibility of the respective implementing agencies was totally absent in the projects planning and implementation in the selected cities (Surat, Pimpri Chinchwad (Pune) and Kolkata). The beneficiries had come to know about JnNURM projects for water supply through third persons only. As per the JnNURM directives, projects for water supply should be accountable to the

society while preparation of the projects plan and even during the implementation stage. Community participation was one of the major components of tool kits under JnNURM process for planning and preparation of DPR. The issues for water supply at grass root level and an expected service by common citizen needs to address while planning projects.

5.4.5 Comparative Picture of Case Study – Surat, Pimpri Chinchwad (Pune), Kolkata

The comparative study on duration of water supply of the three cities namely Surat, Pimpri Chinchwad (Pune) and Kolkata was done through households surveys for obtaining pre project and post project situation briefly. The results showed that duration of water supply in Surat city was increased from the pre projects situation to post projects in the benefited areas of the project. Maximum number of households had responded for 3-6 hours for water supply in a day for all the locations (Pal, Vesu and Magop). In Pal and Vesu locations some of the households had shared the views for 6-12 hours in day. However, in Kolkata city, there was relative increase as compared to pre project situation but relatively not much impact in terms of water supply duration. Maximum number of households had responded for 3-6 hours in day and some of households had responded for less than 3 hours for water supply in a day for water supply and remaining had responded for 3-6 hours for water supply in a day. The comparative picture of water supply duration in a day of the three cities in pre project stage is shown in Fig. 5.9.

In Surat city, the completed project targeted population in three places namely Pal, Vesu and Magop. The study shows that water supply duration of 3-6 hour was commonly followed in all the three locations of Surat city during pre-project and post project. However, in Pal location, water supply duration of 6-12 hour was found to increase from 4 per cent in pre-project to 17 per cent in post project, while 3-6 hour duration of water supply was found to decrease from 80 per cent in pre project to 70 per cent in post project; Similar picture was for the less than one hour water supply duration. But, the water supply duration of 1-3 hour remain constant in pre- and post project. The similar situation was found in Vesu (South West Zone) location while in Magop (East Zone) location, a tremendous increase was found in the water supply duration of 3-6 hour from pre-project to post-project and sharp decline in the water supply duration of 1-3 hour (Fig. 5.9).

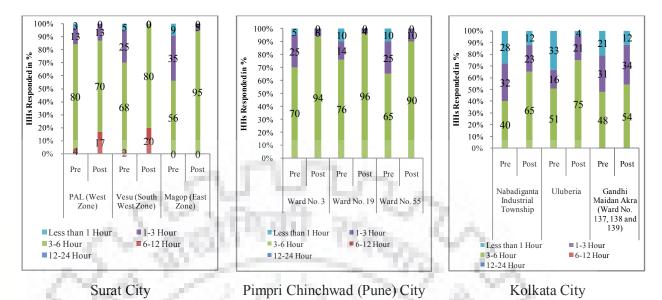


Fig. 5.9: Comparative Pictures of Water Supply Duration in a Day, Source: Analysis Based on Household Survey Data, 2013-14

In Pimpri Chinchwad (Pune) city, the study found that in none of the locations under study there was a water supply of duration 6-12 hour. However, 3-6 hour duration of water supply occupied a major part of the response prior to project as well as post project. In all the three wards under study, it was found that 3-6 hour duration of water supply increases tremendously by 94, 96 and 90 per cent in post project situation. Decrease of water supply was found for duration of 1-3 hour from pre project to post project in all the three wards (Fig. 5.9).

In Kolkata city, improvement in the water supply was observed due to initialization of project in the three study areas namely, Uluberia and Gandhi Maidan Akra (Ward No. 137,138 and 139). The water supply duration of 3-6 hour was found to increase by 65, 75 and 54 per cent in post project in the above said three study areas. However, 1-3 hour water supply duration in post project was found to decrease from 38 per cent to 23 per cent in Nabadiganta Industrial Township but it was found to increase in Uluberia and Gandhi Maidan Akra (Ward No. 137,138 and 139) by 21 and 34 per cent respectively. For water supply duration of less than one hour was found to decrease in all the three study areas in post project (Fig. 5.9). Therefore, the study of impact of project on duration of water supply indicate an improvement in various water supply duration, most importantly improvement was seen for 3-6 hour duration of water supply in three cities.

Focus Group Discussion Finding: During FGD, various indicators such as awareness of JnNURM, water quality, pressure, meter facilities, willingness to pay, pipe line leakages, operation and maintenance, purchase of water from non-municipalities, percentage of connection, and community participation were discussed. Based on response in these indicators, the findings show the outcome of the projects and comparing pre and post projects status. The major findings from FGD in three cities are summarized and represented in Table 5.9.

Awareness about JnNURM among the beneficiaries was almost nil in all cities at pre project stage. Even at post project stage, only few of beneficiaries came to know about JnNURM through third persons. There was no community participation during planning and implementation of projects under JnNURM.

The water quality (taste) was relatively better in all cities from pre projects situation to post projects stage. However, not much impact was seen in Kolkata city. Maximum beneficiaries responded for good in post projects situation in all cities.

Further the perusal of Table 5.9 showed that Water Meter facilities was not available in Surat and Kolkata cities in pre as well as post projects, while, in Pimpri Chinchwad (Pune) city no meters facilities at pre project but at present all the beneficiaries under JnNURM projects were having meters facilities.

The beneficiaries in the three cities were willing to pay for water user charge due to better water facilities in terms of water quality, quantity, maintenance and so on. The operation and maintenance (O&M) of water services had improved from pre projects situation to the post projects stage in all cities. The purchase of water from the non-municipality sources was found at pre projects stage in Surat and Pimpri Chinchwad (Pune) cities except Kolkata city. But at post project all the three cities do not purchase water from the non-municipal sources. The results further indicate that 100 per cent household connectivity was observed in Pimpri Chinchwad (Pune) and Kolkata cities and 99 per cent in Surat city at post project. There was no community participation in FDG prior to project as well as in post project in all the three cities. The overall comparative picture of three cities based on the FGD is shown in Table 5.9.

Benefitted Localities	Sura	t City	Pimpri Chinchwad (Pune) City		ad Kolkata City	
Name of DPRs	DP	R-II	DPR-I DPR-V		R-V	
Indicator	2005 (Pre)	2012 (Post)	2005 (Pre)	2012 (Post)	2005 (Pre)	2012 (Post)
Awareness of JnNURM	No	Yes	No	Yes	No	Yes
Water Quality (Taste)	Average	Good	Average	Good	Average	Average
Pressure	Low	High	low	high	low	high
Meter facility	No	No	Yes	No	No	No
Willing to pay	No	Yes	Yes	Yes	Yes	Yes
Pipe Line Leakages	Existing	No	Existing	No	Existing	No
Operation and Maintenance	Average	Good	Average	Good	Average	Good
Purchase of water from the non-SMC sources	Yes	No	Yes	No	No	No
HHs Connected (in %)	50	99	70	100	80	100
Community Participation	Nil	Nil	Nil	Nil	Nil	Nil

Table 5.9: FGD Findings in Selected Cities for Water Supply Projects

Source: Analysis Based on FGD, 2013-14

5.5 WASTE WATER MANAGEMENT SECTOR

5.5.1 Project Description

The waste management projects in selected cities (Surat, Pimpri Chinchwad (Pune), and Kolkata) had almost same projects. Their project components are given below as per the DRPs (2008) for waste water management of the respective cities;

There were nine projects in Surat city regarding waste water management and all these projects have focused on STPs, and laying sewer line in the uncovered areas of the west and south zones in the developing region within the city limit. The details of the projects descriptions in the Surat city are (1) Up gradation of Anjana Sewerage Treatment Plant (STP), (2) Augmentation of Adajan Sewerage System, (3) Augmentation of Bhesan Sewerage Treatment Plant, (4) Secondary Sewerage Treatment Plant (STP) at Bamroli (100MLD), (5) Proposed sewerage system for Town Planning Scheme (TP) No. 1, 2, 3, 4, 5, 6, 7, and 13 for Vesu of Surat Development Authority area (phase –I up to 2019 AD), (6) proposed sewerage system for Town Planning scheme No. 8, 9,

10, 14, 15, and 16 of Pal-Palampor of Surat Development Authority area, (7) sewerage system for new eastern zone of Surat Municipal corporation which was adding in 2006, (8) sewerage system in north zone which was uncovered before JnNURM projects implementation and (9) Automation/SCADA of existing Pumping Station (PS) and Sewerage Treatment Plant (STP) of Surat Municipal Corporation .

Waste water management projects for the Pimpri Chinchwad (Pune) city were more on the collection of waste system i.e. laying sewer line, construction of Sewerage Treatment Plant (STP), and effluent pumping station & machinery works. The PCMC had implemented only two DPRs, (1) Sewerage Proposed for Pimpri Chinchwad (Pune), and (2) Sewerage Phase-II for Pimpri Chinchwad Municipal Corporation.

The Kolkata Municipal Corporation had implemented a variety of DPRs for the waste water management in the city. The projects were –Rehabilitation of sewer system, Upgradation of sewer, development and management of sewerage system at Salt Lake, Sector – V, and Sewerage Projects for Raniganj Municipality". The description of the four DPRs is illustrated in Table 5.10.

Sl. No.	DPRs Name	Components
DPR-I	Rehabilitation / up gradation of man entry Brick Sewer System for the city of Kolkata	 Topographical Survey, Geo-technical Survey and CCTV Survey. Initial flow diversion Desilting and taking out of silt by mechanical devices Safe disposal of silt Lining of sewer with Glass Reinforced Plastic Pipes including manhole rehabilitation.
DPR-II	Up gradation of Sewer System (Non-man entry) for the city of Kolkata	 Open excavation of road / tram track to sewer depth Dismantling of crown arch of brick sewers Manual Desilting, using hand tools Recasting of side walls of sewers and plastering of inner side and then covering with RCC slab Manhole rehabilitations Restoration of road to desired strength after sewer rehabilitation (RCC for tramtrack)
DPR-III	Development and management of Sewerage system at Salt Lake, Sector - V	 Laying of sewer pipes and construction of manhole chambers Construction of Sewerage Treatment Plant Electrification.
DPR-IV	Sewerage Project for Raniganj Municipality	 Construction of off-site STP and MPS. Laying of Sewerage pipelines. E and M Works. Usage of Treated effluent for cultivation and Pisiculture.

Table 5.10: Project Description for Waste Water Management in Kolkata City

Source: Based on relevant DPRs, 2008

5.5.2 Financial Progress of Waste Water Management Sector

The total investment of nine DPRs for waste water management projects in Surat city was Rs. 430.32 Crore. The highest per capita investment was for DPR-IX and lowest is DPR-III. The per capita of the nine DPRs was Rs. 1388.58. Surat city had planned to cover the uncovered areas of newly developing region (west and south west zones). In this context, Surat Municipal Corporation had invested more on the laying of sewer lines in the Pal and Vesu of west and south west zones under DPR VI and DPR VII. There was investment for the upgradation of the existing sewer system at Bamroli, and Adajan and also installation of the pumping station. The details of the financial progress and targeted population and their per capita investment of nine DPRs are prescribed in Table 5.11.

Sl. No	Name of Project	Projects cost Sanction by Government of India (Rs in Crore)	Benefitted Population (in lakh)	Per Capita
DPR-I	Up gradation of Anjana Sewerage Treatment Plan	10.98	3.2	343.12
DPR-II	Augmentation of Adajan Sewerage System	11.93	3.2	372.81
DPR-III	Augmentation of Bhesan Sewage Treatment Plant	13.22	5.81	227.83
DPR-IV	Secondary Sewage Treatment Plant at Bamroli (100MLD)	13.22	3.2	413.12
DPR-V	Automation/SCADA of existing sewage pumping stations and sewage treatment plant of SMC	30.63	3.2	957.18
DPR-VI	Proposed Sewerage system for T.P. Schemes No. 1, 2, 3, 4, 5, 6, 7, and 13 for Vesu of SUDA Area (Phase-I up to 2019 AD)	34.37	3.34	1029.04
DPR-VII	Proposed Sewerage system for T.P. Schemes No. 8, 9, 10, 14, 15, 16 of Pal-Palampor of SUDA area	21.28	2.5	851.20
DPR-VIII	Sewerage System for New Eastern Zone of SMC	110.65	3.2	3457.81
DPR-IX	Sewerage System in new Northern Zone area of SMC	184.04	3.34	5510.18
	Total	430.32	30.99	1388.58

Table 5.11: Financial Progress for Waste Water Management in Surat City

Source: Based JnNURM Project Status, 2012

The projects for waste water management in the Pimpri Chinchwad (Pune) city were on construction of sewer treatment plants and laying of sewer line in ward number 18, 19, 52, 53 and 54. These were the only projects and consist of two namely; DPRs I and DPR II. The main components of these DPRs were construction of STPs and collection line for waste water and installation of pumping machines. Therefore, these projects invested huge amount and are getting benefit out of the projects. The total approved cost in the Pimpri Chinchwad (Pune) city was Rs. 24009.33 lakh. The targeted population under DRP-I was 15 lakh population and DPR-II was for 813960 population. The per capita investment for DPR-I is Rs. 795.92 and DPR-II is Rs. 1481.06. The overall per capita investment is Rs. 1037.06. The financial progress, targeted population and per capita investment of Pimpri Chinchwad (Pune) city is shown in Table 5.12.

Table 5.12: Financial Progress for Waste Water Management in Pimpri Chinchwad (Pune)

Sl. No	Name of Project	Projects cost Sanction by Government of India (Rs in Lakh)	Population Targeted (2011)	Per Capita Investment
DPR-I	Sewerage proposals for Pimpri Chinchwad (Pune)	11938.88	15,00,000	795.92
DPR-II	Sewerage Phase II for	12070.45	813960	1481.06
	Pimpri Chinchwad	A PARTY AND A PARTY		
	Municipal Corporation	Contraction of the second second		
	Total	24009.33	2313960	1037.06

Source: Based on JnNURM Projects Status, 2012

There were four DPRs approved by government of India in Kolkata Metropolitan region for waste water management. The total approved cost for four DPRs was Rs. 57418.97 lakhs with a targeted population 17.19 lakh under DPR-I, DPR-III for 2.27 lakhs population, and DPR-IV for 1.11 lakhs population while DPR-III was likely to impact the whole population of Kolkata Municipal Corporation area. The financial status, targeted population and per capita of the four projects is represented in Table 5.13.

Sl. No.	Project Name	Project Cost (Rs. in Lakh)	Population Targeted (in Lakh)	Per Capita Investment in Rs.
DPR-I	Rehabilitation / up gradation of man entry Brick Sewer System for the city of Kolkata		17.19	2353.86
DPR-II	Up gradation of Sewer System (Non- man entry) for the city of Kolkata	9712	Entire city of KMC	
DPR-III	Development and management of Sewerage system at Salt Lake, Sector- V	3407.15	2.27	1500.94
II IPR - IV	Sewerage Project for Raniganj Municipality	4008.82	1.11	361154
	Total	57418.97	S. 1	

Table 5.13: Financial Status for Waste Water Management in Kolkata City

Source: Based on JnNURM Projects Status, 2013-14

5.5.3 Physical Progress of Waste Water Management Sector

About 66 percent of the waste water management projects in Surat had been completed. The completed projects mainly up gradation, augmentation and STPs in various locations of the city and benefitting the wards No. 36, 46, 47, 48 and 49 under DPR-I while DPR –II was benefitting in ward No. 26, 27, 67, and 68. The DPR-III was augmentation of STP at Bhesan and improving the sewer system in ward No. 63 and 68 and also slightly improved



Fig. 5.10: Anjana STP under DPR-I, Source: Field Investigation, 2013

in the neighboring areas. The DPR-IV was on the secondary sewer treatment plant at Bamroli and hence it affect for surrounding areas mainly wards No. 85, 86, 87, and 92. The DPR-VI and DPR-VII were on the laying of sewer line in the developing region of south west and west zones. These projects (DPR-VI and DPR-VII) had been for collecting waste water in an effective manner. In the pre projects situation, disposal of waste water was mainly on the open drains and adjacent areas. These projects had brought in a lot of improvement for waste water management. The six DPRs

were fully functional and benefitting the population of the covred wards. The remaining three DPRs were about to complete. The detail of the physical progress as well as the targeted areas is represented in Table 5.14.

Sl. No	Name of Project	Physical Status of completion Independently Evaluation)	Working Status	Benefited areas
DPR-I	Up gradation of Anjana Sewerage Treatment Plan	Completed	Working	Wards No. 36, 46, 47, 48 and 49
DPR-II	Augmentation of Adajan Sewerage System	Completed	Working	Ward No. 26, 27, 67, and 68
DPR-III	Augmentation of Bhesan Sewage Treatment Plant	Completed	Working	Ward No. 63, and 68
DPR-IV	Secondary Sewage Treatment Plant at Bamroli (100MLD)	Completed	Working	Ward No. 85, 86, 87 and 92
DPR-V	Automation/SCADA of existing sewage pumping stations and sewage treatment plant of SMC	95% completed	Not working	Ward No. 46, 48,49, 77 and 78
DPR-VI	Proposed Sewerage system for T.P. Schemes No. 1, 2, 3, 4, 5, 6, 7, and 13 for Vesu of SUDA Area (Phase-I up to 2019 AD)	Completed	Working	Ward No. 91, 93, 94, 95, 96, 97, and 98
DPR-VII	Proposed Sewerage system for T.P. Schemes No. 8, 9, 10, 14, 15, 16 of Pal-Palampor of SUDA area	Completed	Working	Ward No. 67, 68, and 27
DPR-VIII	Sewerage System for New Eastern Zone of SMC	85%	Not Working	Ward No. 52, 54, 54, and 81
DPR-IX	Sewerage System in new Northern Zone area of SMC	88%	Not Working	Ward No. 69

Table 5.14: Physical Progress for Waste Water Management Projects in Surat City

Source: Based on JnNURM Projects Status, 2012, and Field Investigation, 2013-14

Report on the projects status, 2012, field surveys and discussion with implementing staff had revealed that the major works at Pimpri Chinchwad (Pune) city for waste water management on the collection of waste water, conveyance system, pumping machines, STP and effluent pumping station under DPR-I while DPR-II were of the same nature of the DPR-I at different location (Kidawale). The DPR-I was completed and running smoothly while DPR-II was in progress (about 60% completed). DPR-I was directly improving ward No. 18 and 19 and DPR-II would be directly

improved the waste water management in the ward No. 52, 53 and 54. However, these two projects were planned with broader scope within Pimpri Chinchwad (Pune) city in future.

In Kolkata city, four projects were implemented related to waste water management sector of which only one was completed and rest were in progress. The DPR-I had many components such as topographical survey, Geo-Technical survey and CCTV survey, Initial flow diversion, Desilting and taking out of silt by mechanism devices, safe disposal of silt, and lining of sewer with glass reinforced plastic pipes including manhole rehabilitation. The DPR-I had covered almost 36.27 km of sewer line along roads of Kolkata city. About 77 percent of DPR is being completed and likely improve in the areas of Rashbehari Avenue, Hazra Road, Lenin Sarani, Canning Street, Kolutola, Nimtala Ghat Street and Beasdon Street. The works of DPR-II was on open excavation of road/tram to sewer dept, dismantling of crown arch of brick sewers, manual Desilting using hand tools, recasting of side walls of sewers and plastering of inner side and then covering with RCC slab, manhole rehabilitation, and restoring of road to desired strength after sewer rehabilitation (RCC for tram track). About 52 percent work of DPR-II is being completed. The DPR-III was on the renewal of the existing sewer system and physically it had been fully achieved and working at the moment the benefitting the areas of Salt Lake Sector-V.The DPR-IV for waste water management was on the construction of STP and laying sewer line in ward No. 1 to 21 of the Raniganj Municipal. Almost 30 percent work is being completed under DPR-IV. The physical progress of the waste water management projects in Kolkata city is being represented in the Table 5.15.

Sl. No.	Project Name	Physical Progress (%)	Working Status	Benefited areas
	Rehabilitation / up gradation of man entry Brick Sewer System for the city of Kolkata	77.39	Not Working	Rashbehari Avenue, Hazra Road, Lenin Sarani, Canning Street, Kolutola, Nimtala Ghat Street and Beasdon Street
	Up gradation of Sewer System (Non-man entry) for the city of Kolkata	52.70	Not working	36 Km of sewers network along 49 road stretches spreading over different locations in the city of Kolkata
DPR-III	Development and management of Sewerage system at Salt Lake, Sector - V	100.00	Working	Salt Lake Sector-V
DPR-IV	Sewerage Project for Raniganj Municipality	30.42	Not working	Ward No. 1 to 21 of the Raniganj Municipal

Table 5.15: Physical progress for Waste Water Management in Kolkata City

Source: Based on JnNURM Projects Status, 2012, and Filed Investigation, 2012

5.5.4 Community participation

As per household survey information and focus group discussion with beneficiaries, community participation was absent in the selected cities (Surat, Pimpri Chinchwad (Pune), and Kolkata) for waste water management projects. There was big gap between state government/ULBs and beneficiaries. The community participation was highly postulated as far the waste water management project was concern. In the pre projects, there was lot of issues for waste water management. The common citizens were disposing of waste water into open drain and in and around the adjacent areas. These were very common practices in Surat and Pimpri Chinchwad (Pune) and even in the Salt Lake City in pre projects. The basic news and participation of the common citizens were to be involved in the planning as well as the implementation stage by implementing agencies. Awareness program advanced to the beneficiaries was another important aspect as far as waste water management projects under JnNURM. Unfortunately, such program was absent in the first phase of JnNURM in the selected cities (Surat, Pimpri Chinchwad (Pune), and Kolkata). There was no proper channel of link between the beneficiaries, ULBs and states level nodal agencies in terms of corporation, transparency and mutual understanding in all the stages of project planning and implementation and operation & maintenance and.

5.5.5 Comparative Pictures of Case Study Cities – Surat, Pimpri Chinchwad (Pune), and Kolkata

The comparative picture of the pre and post projects situation in three cities had been carried out for waste water management by considered the parameters of (1) disposal of waste water disposal mechanism, (2) willingness to pay for sewer connection, (3) satisfaction level of waste water management, through Household's Survey (HHs) and Focus Group Discussion (FGD).

The results presented in Figure 5.11 showed that the waste water disposal mechanism in benefited a number of households which had connection of sewer lines. These were indicated by the per cent distribution of waste disposal mechanism in the three study areas (Pal, Vesu and Unna). In the Pal location, there was increase from 12 per cent in pre project to 80 per cent in post project, in Vesu, increase was from 30 to 90 per cent and in Unna 70 to 80 per cent from pre project to post project stage. The other mechanisms like Kutcha open drain (4-14 per cent to 0-2 per cent), Pucca open

drain (6-44 per cent to 2.5-4 per cent) and Soak pits/Septic tank (20-60 per cent to 10-20 per cent) was found to be drastically decreased from pre project to post project in all the three locations in Surat city.

Pimpri Chinchwad (Pune) city had increased the connection of sewer in post projects while in pre projects households had discharged into the soak pits/septic tanks, open and closed drains. The impact of the project regarding waste water disposal mechanism was studied in the two locations such as ward No. 18 (Kidawale) and ward No. 19 (Ravet). It was found that 23 per cent of the respondents in ward No. 18 (Kidawale) disposed waste water through sewer line in pre project which was increased to 85 per cent in post project. Similarly, in Ward no. 19 the disposal through sewer line increased from 25 to 78 per cent from pre project to post project. In both the locations, the per cent respondents using other waste water disposal mechanism were found to be decreased from pre project to post project (Fig. 5.11).

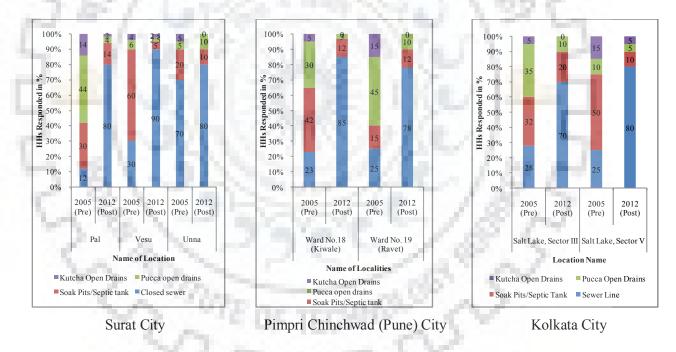


Fig 5.11: Comparative Pictures for Waste Water Disposal Mechanism, Source: Analysis Based on Household Survey, 2012-13

In Kolkata city, there was increased in the sewer line connection while in pre projects situation beneficiaries had discharging into the pucca drains, soak pits/septic tanks and some of households had sewer line in pre projects situation. The sample results from the two locations in Kolkata city indicated that the sewer line connection increased from 28 to 70 per cent and from 25 to 80 per cent respondents in Salt Lake Sector III and Sector IV respectively. The per cent decrease of respondents was found for other disposal mechanisms from pre project to post project. The comparative picture of the pre and post situation of three cities is shown in Fig. 5.11.

Therefore, the results showed that waste water disposal mechanism was little improved in all the three cities due to initialization of the projects. These projects had changed the disposal of waste water from discharging open drain to sewer line at maximum percentage of HHs. The improvement of the waste water disposal mechanism was more or less same in all the cities.

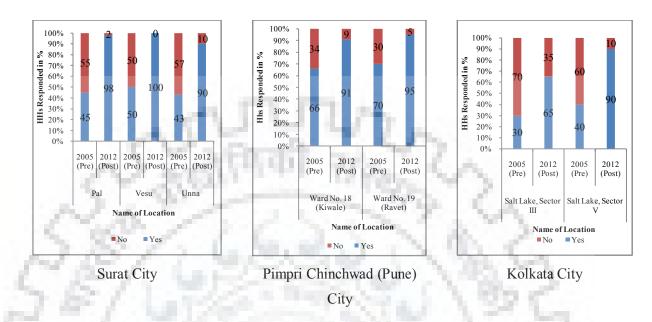
Willingness to Pay for Sewer Connection: The results pertaining to Fig 5.12 showed that in three cities, more beneficiaries were willing to pay for sewer connection in post projects situation as compared to pre projects. In Surat city maximum number of beneficiaries had responded for willingness to pay for sewer line while in pre projects almost half of households showed not willing to pay. The increase in beneficiaries' responded for willingness to pay in post project in Pal, Vesu and Unna was found to be 98, 100 and 90 per cent respectively.

In case of Pimpri Chinchwad (Pune) city, more than 50 per cent of the respondents were willing to pay for sewer line in pre projects but the number of respondents was found to increase in post projects. This could be seen more clearly from Figure 5 where 66 per cent of the respondents from Ward no 18 were willing to pay for sewer connection in pre project which was increase to 91 per cent in post project. Similarly, the figure was found to be 70 per cent in pre project and increase to 95 per cent in post project (Fig 5.12).

In Kolkata city, about half of the benefited population was not willing to pay for sewer line in Salt Lake however the number of the households willing to pay had increased to 65 percent of households. In Salt Lake-V, 90 percent HHs respondents were found willing to pay in post project as it was only 40 per cent respondents in pre projects. The comparative picture for willingness to pay in three cities is shown in Fig. 5.12.

The above HHs response had shown that beneficiaries wanted sewer line and realized the important of waste water issues and problems in the pre projects. The improvement of sanitation

and hygienic condition had been reflecting for willing to pay for newly connection of sewer line of the beneficiaries.

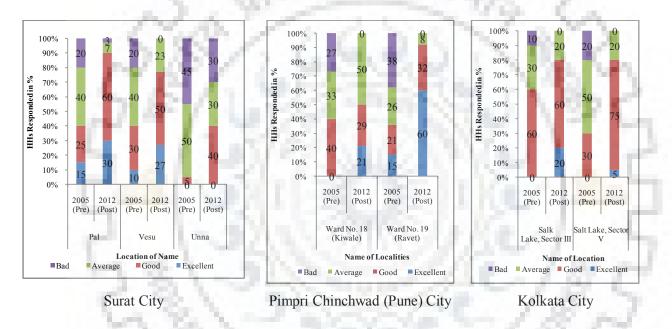


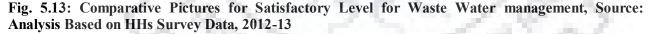


Satisfaction levels of waste water management: In Surat city regarding the satisfaction level of waste water management, maximum number of beneficiaries had responded for average and good while less percentage of HHs responded for bad in post projects status. The maximum number of the beneficiaries responded for good followed by excellent and average and least responded for bad in Pal and Vesu location while in Unna location maximum respondents were responded for good and same number of respondents responded for average and bad and none for excellent in post project (Fig5.13).

In Pimpri Chinchwad (Pune) city, maximum number of beneficiaries had responded for excellent average level of satisfaction. Comparatively in Ward no. 18, the maximum response was for average followed by good and excellent, while in ward No. 19 maximum responded for excellent level of satisfaction (60 per cent) followed by good (32 per cent) and average (eight per cent) in post project. Thus, the level of satisfaction for waste water management due to project was more in ward No. 19 than Ward no. 18 (Fig5.13).

In Kolkata city, maximum number of HHs had responded for good and excellent in post projects as compared to pre projects situation. The results presented in Figure 4 shows that in Salt lake Sector-III, maximum beneficiaries was responded for good (60 per cent) in both pre and post project. However, none had responded for excellent in pre projects but 20 per cent respondents responded for excellent level of satisfaction, 20 per cent average and none for bad in post projects. In Salt lake Sector-V, 75 per cent of the respondents responded for good, 20 per cent for average, five per cent for excellent and none for bad in post projects. The comparative picture based on survey finding of three cities is shown in Fig.5.13. The satisfaction had slightly increased at post projects as compared to the pre projects situation in terms of average and good.





Focus Group Discussion (FGD) Finding: During FGD in the three cities, the following indicators -(1) awareness of JnNURM, (2) reason for connection, (3) problems due to waste water, (4) type of diseases due to waste water, (5) satisfaction level, and (6) willingness to pay for improved services had been discussed.

The perusal of Table 5.16 indicate that satisfaction level of the waste water management had increased from pre projects situation to post projects status in all three cities. The respondents in all the three cities were not at all aware of JnNURM. The practice of waste water disposal in the adjoining open drains caused the problems such as bad smell, mosquito menace, spillover on the

road etc which were faced by the respondents prior to projects but such problems were found to be reduced in post projects in all the three cities. In pre projects, different types of diseases such as diarrhea, jaundice and gastroenteritishad occurred due to bad waste water management in all the three cities while in post projects stage it was observed that such diseases did not occurr. Waste water management system in pre project stage was not satisfactory but the waste water management system after the project satisfied the respondents in the three cities. In pre projects, the respondents were not willing to pay for improved services but in post project there was good respond for willingness to pay. The comparative FGD findings in three cities is summarized as follow; (Table 5.16).

Beneficiaries Localities	(Pune) ('ity		Kolkata City (Salt Lake, Sector –II)			
Name of DPRs	DPR-	VII	DP	R-I	DPR-	IV
Indicators	2005 (Pre)	2012 (Post)	2005 (Pre)	2012 (Post)	2005 (Pre)	2012 (Post)
Awareness of JnNURM Scheme	No	Yes	No	Yes	No	Yes
Reason for connection	Hygienic	More Hygienic	Hygienic	More Hygienic	Hygienic	More Hygienic
Problems due to waste water	Bad Smell, Mosquito Menace, Spillover on the road	Less Problems (Improved)	Bad Smell, Mosquito Menace, Spillover on the road	Less problems (Improved)	Bad Smell, Mosquito Menace, Spillover on the road	Less Problems (Improved)
Types of diseases due to waste water	Diarrhea, Jaundice, Gastroenteritis	No	Diarrhea, Jaundice, Gastroenter itis	No	Diarrhea, Jaundice, Gastroenteritis	No
Satisfaction level	Not satisfied	satisfied	Not satisfied	Satisfied	Not satisfied	satisfied
Willingness to pay (WTP) for improved service	No	Yes	No	Yes	No	Yes

Table 5.16: FGD Finding in Selected Cities

.

Source: Based on FGD, 2012

5.6 STORM WATER DRAINAGE SECTOR

5.6.1 **Projects Description**

There were three projects for storm water and drainage projects in the Surat city of which DPR-I (Storm Water Drainage Scheme of Surat City for SMC Areas) was in the old city for upgrading the existing drains (renovation and rejuvenation of the drains). The DPR-II (Storm Water System for New Eastern Zone of SMC)

was for the construction of closed drains along the roads in the eastern zone area and DPR-III (Storm Water Drainage Scheme in Vesu, South Zone) was the same work as DPR-II.



Fig. 5.14 : Storm Water Drainage Sector Project under DPR-II, Source: Field Investigation, 2013

Storm Water Drainage Projects in Kolkata city are on the renovation and rejuvenation of the storm water drains in the Dum Dum areas, south Dum Dum, improvement of drainage in Howrah city and its vicinity, Storm Water Drainage construction in the Chandanagar Municipal Corporation area, Rejuvenation of the storm water drain scheme in Hooghly-Chinsurah Municipality, Bansberia Municipality, Budge Budge Municipality, in the area of Kamarhati Municipality, Baranagar Municipal, Madhyamgram Municipality, and Barasat Municipality area. The details of the storm water and drainages system for upgrading the existing storm water drainages aresummarized Table 5.17.

Sl. No.	DPR Name	Major Components
DPR- I	Trans-municipal Scheme on removal of drainage congestion within Khardah, Panihati, North Dum Dum, Dum Dum & South Dum Dum	 Construction / re - sectioning of lateral surface drains and underground storm water conduits in some areas. Resectioning of Khardah Khal Resectioning and lining of Nadikul, Sonai, Udaypur, Sultanpur, Birati Khal /drains. Construction of pipe bridge over Udaypur Nullah Pumping Station at South Dum Dum Municipality near VIP Road

Table 5.17: Projects Description of the Strom Water and Drainage in Kolkata City

SI. No.	DPR Name	Major Components
DPR- II	Improvement of drainage in Howrah city and its vicinity	 Canal / channel improvement work Drainage network Drainage Pumping Station Outfall structures including operating platforms &connecting foot bridges Refurbishment of existing drainage system including bypass arrangements and connecting to drainage pumping stations Road restoration
DPR- III	Storm water drainage scheme in Chandanagar Municipal Corporation Area	 Construction of RCC covered brick masonry surface drain De-silting of existing outfall Provision of sluice gates Drainage pumping station
DPR- IV	Storm Water drainage scheme in Hooghly-Chinsurah Municipality	 Construction of 54.692 Km of Masonry Surface drains De-silting of existing outfall
DPR- V	Storm Water drainage for Bansberia Municipality	 Construction of 42.63 Km of surface drains Underground conduits Construction of drainage pumping station
DPR- VI	Storm Water Drainage Scheme in Budge Budge Municipal Area within Kolkata U.A.	
DPR- VII DPR-	Storm Water Drainage for Bidhannagar Municipal Area Storm Water Drainage	120102
VIII	Scheme for Kamarhati Municipality, Kolkata	1. Construction of RCC covered brick masonry surface
DPR- IX	Improvement of Upper Bagjola Canal within Kolkata U.A.	drain2. De-silting of existing outfall3. Provision of sluice gates
DPR- X	Storm Water Drainage for Baranagar Municipal area within Kolkata U.A.	4. Drainage pumping station
DPR- XI	Storm Water Drainage System for Madhyamgram Municipality, Kolkata	n n n
DPR- XII	Integrated Storm Water Drainage System for Barasat Municipality, Kolkata	

Source: Based on Compilation of DPRs, 2010

5.6.2 Financial Progress of Storm Water and Drainage

The financial progress under JnNURM for storm water and drainage in two cities had a big difference. The Kolkata had more number of projects as compared to the Surat city and per capita was also highest in the Kolkata. The comparative picture of the financial progress was illustrated in the given below;

There were three projects for storm water and drainage in Surat city with a total investment of Rs. 178.50 Crore. The DPR-I had highest investment of Rs. 116.62 Crore and benefited population of approximately11.96 lakh, whereas DPR-II had lowest investment of Rs. 11.93 Crore and benefited population approximately 5.81 lakh. The DPR-III was an investment of Rs. 49.95 Crore and benefited population is 1.99 lakh. The per capita investment is highest in DPR-III and lowest is in DPR-II (Table 5. 18). The projects aim to improve in the different locations within Surat city. The DPR-I was constructed the closed drain in the areas of old city (central zone) which was not covered by closed drain in pre projects. The DPR-II was constructed in the eastern zone of Surat city and tried to upgrade flow of proper channel. The DPR-III was more on the newly construction of drains in the developing region (south west zone).

Sl. No	Name of Project	Projects Approved cost (Rs in Crore)	Benefitted Population (in Lakh)	Per Capita
DPR-I	Storm Water Drainage Scheme of Surat city for SMC area	116.62	11.96	975.08
DPR-II	Storm Water System for New Eastern Zone of SMC	11.93	5.81	205.33
DPR-III	Strom water Drainage Scheme in Vesu	49.95	1.99	2510.05
	Total	178.50	19.76	903.34

Table 5.18: Financial Progress for Storm Water and Drainage in Surat City

Source: Based on JnNURM Projects Status, 2012

There were12 DPRs which had been implemented in Kolkata city, out of which DPR-III had the highest per capita investment and least was DPR-I. Among 12 DPRs, DPR-II was highest investment and per capita was Rs 723.31 while DPR-XI, DPR-VIII, DPR-III, DPR-IX were consequent highest investment with a per capita of Rs. 1667.67, Rs. 2072.71, Rs. 3257.60, and Rs.

1179.56 respectively. The remaining DPRs had lowest investment. The detail of the projects financial status and their beneficiary population with per capita investment is shown in Table 5.19.

SI. No.	DPR Name	Project Cost (Rs. in Lakh)	Beneficiary population in lakh	Per Capita Investment in Rs.
DPR-I	Trans-municipal Scheme on removal of drainage congestion within Khardah, Panihati, North Dum Dum, Dum Dum & South Dum Dum	4530.04	9.59	472.38
DPR-II	Improvement of drainage in Howrah city and its vicinity	9338.03	10.09 lakh in Howrah and 2.82 lakh in Bally	723.31
DPR-III	Storm water drainage scheme in Chandanagar Municipal Corporation Area	6189.45	1.9	3257.60
DPR-IV	Storm Water drainage scheme in Hooghly-Chinsurah Municipality	3881.96	2.09	1857.39
DPR-V	Storm Water drainage for Bansberia Municipality	2979.36	1.25	2383.48
DPR-VI	Storm Water Drainage Scheme in Budge Budge Municipal Area within Kolkata U.A.	3480.16	2.11	1649.36
DPR-VII	Storm Water and Drainage for Bidhannagar Municipal Area	1915.53	1.47	1303.08
DPR- VIII	Storm Water Drainage Scheme for Kamarhati Municipality, Kolkata	6757.05	3.26	2072.71
DPR-IX	Improvement of Upper Bagjola Canal within Kolkata U.A.	5131.12	4.35	1179.56
DPR-X	Storm Water Drainage for Baranagar Municipal area within Kolkata U.A.	3587.39	3.28	1093.71
DPR-XI	Storm Water Drainage System for Madhyamgram Municipality, Kolkata	7204.37	4.32	1667.67
DPR-XII	Integrated Storm Water Drainage System for Barasat Municipality, Kolkata	8548.33	3.16	2705.16
	Total	63542.79		

Table 5.19: Financial progress for Storm Water and Drainage in Kolkata city

Source: Analysis Based on JnNURM Projects Status, 2012

5.6.3 Physical Progress of Storm Water and Drainage

If we compared the physical progress of projects in two cities (Surat and Kolkata), Surat had completedall its projects whereas Kolkata city had completed only three projects out of the 12 projects. The physical achievement of two cities are discussed in the given below.

Surat city had completed all the three projects executed in the central zone and other locations of new eastern and Vesu (south west zone). The DPR-I was getting benefited in ward number 1 to 13 and 28 to 30 (central zone) while DPR-II was benefitting ward number 77 in the east zone. The DPR-III was getting benefited in the ward number 62, 90, 93, 94, 95, and 96 in the south west zone. The DPR-I was more on the rejuvenation of the existing 112 sq km of area while DPR-II was on the construction of closed drain for areas of 12.15 sq km and DPR-III was newly constructed closed drain along the roads of Vesu (south west zone) for area of 37.40 sq km. The detail of the physical achievement of the storm water and targeted location are shown in Table 5.20.

Sl. No	Name of DPR	Physical Status of completion	Area project	Status	Benefited Ward No.
DPR-I	Storm Water Drainage Scheme of Surat city for SMC area	100% Completed	112 Sq. Km	Functioning	Ward No. 1 to 13 and 28 to 30.
DPR-II	Storm Water System for New Eastern Zone of SMC	100% Completed	12.15 Sq.Km	Functioning	77
DPR-III	Strom water Drainage Scheme in Vesu	100% Completed	37.40 km	Functioning	62, 90, 93, 94, 95, 96,
	Total	Sec.		197 A.	34

Table 5.20: Physical Achievement for Storm Water and Drainage in Surat City

Source: Based on Discussion with SMC and JnNURM Projects Status, 2012

The physical progress in the Kolkata city was slow in terms of completion. Only three projects had been completed (DPR-I, DPR-IV and DPR-V). The **DPR-I**was improve drainage system in the water logging prone and low lying areas in the five municipal towns namely; Khardah, North Dum Dum, Dum Dum, and South Dum Dum. The **DPR-II**was for the rejuvenation of existing drains in Howrah and Bally and completed 70.50 percent. This DPR-II aims at removal of water logging in

the city of Howrah and its adjoining areas. The DPR-III was on the construction of drains for proper flow of channelization and removal of drainage congestion leading to removal of water logging in the town of Chandanagar. The DPR-IV was for constructs of closed drains along the roads and completed 100 percent. This DPR-IV had improved the water logging situation which was occurring in pre project situation in the municipal town of Hooghly–Chinsurah. Removal of water logging of entire municipal town of Bansberia under DPR-IV was the positive impact of DPR-IV. The rest of the DPRs have similar projects that is construction of closed drains along roads and storm water drainages projects in different locations. The detail of the physical progress is shown in Table 5.21.

Sl. No.	Project Name	Benefited Location	Status /Remarks	Physical Progress
DPR-I	Trans-municipal Scheme on removal of drainage congestion within Khardah, Panihati, North Dum Dum, Dum Dum & South Dum Dum	Khardah, Panihati, North Dum Dum, Dum Dum and South Dum Dum	Functioning	100% Completed
DPR-II	Improvement of drainage in Howrah city and its vicinity	Howrah city and Bally	Partially Functioning	70.50
DPR-III	Storm water drainage scheme in Chandanagar Municipal Corporation Area	Chandanagar	Not Functioning	39.36
DPR-IV	Storm Water drainage scheme in Hooghly-Chinsurah Municipality	Hooghly-Chinsurah	Functioning	100% completed
DPR-V	Storm Water drainage for Bansberia Municipality	Bansberia	Functioning	100% completed
DPR-VI	Storm Water Drainage Scheme in Budge Municipal Area within Kolkata U.A.	Budge Budge	Not Functioning	61.24
DPR-VII	Storm Water Drainage for Bidhannagar Municipal Area	Bidhannagar	Partially Functioning	96.75
DPR-VIII	Storm Water Drainage Scheme for Kamarhati Municipality, Kolkata	Kamarhati	Not Functioning	40.79
DPR-IX	Improvement of Upper Bagjola Canal within Kolkata U.A.	Bagjola	Not Functioning	27.79
DPR-X	Storm Water Drainage for Baranagar Municipal area within Kolkata U.A.	Baranagar	Not Functioning	42.44
DPR-XI	Storm Water Drainage System for Madhyamgram Municipality, Kolkata	Madhyamgram	Not Functioning	32
DPR-XII	Integrated Storm Water Drainage System for Barasat Municipality, Kolkata	Barasat	Not Functioning	21

Table 5.21: Physical Progress for Storm Water and Drainage for Kolkata City

Source: Based on JnNURM Projects Status, 2012

5.6.4 Community participation

The community participation was absent in the two cities (Surat, and Kolkata). Focus Group Discussion (FGD) with beneficiaries had revealed that there was no involvement of the community in the project identification and location of the areas which had come under DPRs.

In the planning of infrastructure intervention with storm water and drainages projects, there was no interaction with the concern citizen community. Beneficiries came to know about the projects after the completion of the projects. Need for awarenessamount about citizensthe infrastructure projects in order to upgrade the quality of life was main concern of JnNURM. This had not happened at the projects site. A couple of site visit and surveys and discussion with the prospective beneficiary community on the field of implementation would have awarded perennial problems such as water logging etc in post project stage.

5.6.5 Comparative Picture of Case Study Cities – Surat, and Kolkata

For the evaluation of the completed projects in the cities of Surat and Kolkata, the following indicators – (1) Storm water disposal mechanism, (2) flooding problems, (3) frequency of flooding, (4) cleaning drains by municipality, (5) satisfaction level for municipal services, and (6) FGD had been discussed with beneficiaries in comparison of pre and post projects status. The household survey findings and FGD outcome had been illustrated in the given below in city wise.

Storm Water Disposal Mechanism: The storm water disposal mechanism in Central zone of Surat city at post projects stage was in the closed and pucca drains while in pre projects stage maximum number of households were discharging into Kutcha drains. In the East zone, maximum number of HHs discharged into Kutcha drains in pre projects situation while in post project, maximum number of HHs were still discharging this storm water into pucca drains. In South zone, maximum respondents discharge storm water into Kutcha open drains in both pre projects (70 per cent) and post projects (60 per cent). This reveals that more HHs were discharging the storm water inclosed drains at post projects stage (Fig.5.15).

In Kolkata city, positive response was found in terms of storm water flow into proper drains. In Hooghly-Chinsurah, maximum respondents were found to discharge storm water into Kutcha open

drains in pre projects (60 per cent) but in post projects maximum response was for closed drains and eight per cent of HHs for soak pit for storm water disposal mechanism. In Howrah, 37 per cent of the respondents disposed storm water in to closed drains and pucca open drains and 26 per cent discharged into Kutcha open drains in post projects. In Bansberia, maximum respondents discharged storm water into Pucca drains (45 per cent) and closed drains (32 per cent in post projects. Thehousehold survey finding for storm water discharging mechanism of two cities under JnNURM in comparison between pre and post projects is shown in Fig. 5.15.

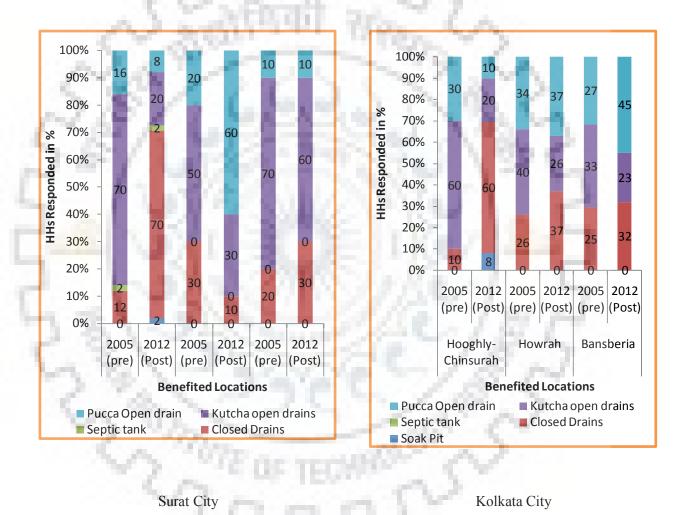
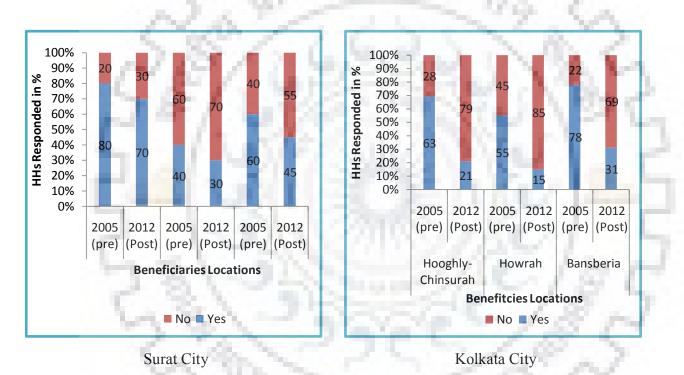


Fig. 5.15: Storm Water Disposal Mechanism, Source: Analysis Based on HHSurvey Data,

2012-13

Flooding Problems: The flooding problems were found to get reduced in post projects stage as compared to pre projects stage in Surat city. In all the three locations of Surat city the respondents attribute _Yes' indicating flooding problems was found to reduce from pre projects to post projects

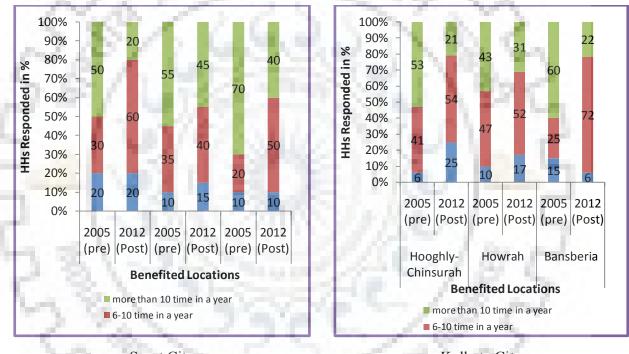
while the attribute _No' indicating no flooding problems was found to increase from pre projects to post projects. In Kolkata city, beneficiaries had responded for less flooding problems in post projects in comparison to the pre projects situation. In all the three locations of Kolkata city the respondents attribute _Yes' indicating flooding problems was found to reduce drastically from pre projects to post projects while the attribute _No' indicating no flooding problems was found to increase considerably from pre projects to post projects. However, based on the survey finding, it shows that there were still flooding problems. The comparative picture of two cities based on HHs survey finding for flooding problems is shown in Fig. 5.16.





Frequency of Flooding: The maximum number of HHs had responded for 6-10 time flooding in a year in central zone in post projects stage while maximum HHs responded for more than 10 times in a year in pre projects situation. In East zone of Surat city, maximum HHs responded for more than 10 times in a year in pre projects as well as in post project. In South-West zone, maximum number of HHs responded for more than 10 times in a year at pre projects situation while in post project 6-10 times in a year (Fig 5.17).

In the Kolkata city, maximum number of HHs had responded for 6-10 time in a year. In Hooghly-Chinsurah, maximum respondents responded for more than times 10 occurrence of flooding in a year in pre projects while in post projects, 54 per cent responded for 6-10 times flooding in a year and found a tremendous increase of the respondents (25 per cent) responding 1-5 times flooding in a year. In Howrah, maximum respondents responded for 6-10 times flooding in a year in both pre projects and post projects stage. In Bansberia area, maximum number of HHs responded for more than 10 times in a year at pre projects situation while in the post projects maximum number of HHs responded for 6-10 times flooding in a year of HHs responded for 6-10 times flooding in a year of HHs responded for 6-10 times flooding in a year (Fig. 5.17). The comparative picture based on the HHs survey for frequency of flooding in two cities (Surat and Kolkata) is shown in Fig.5.17.



Surat City

Kolkata City



Cleaning of Drains by Municipalities: A perusal of Fig. 5.18 indicates responses of the beneficiaries about of cleaning drains by municipalities. The maximum number of beneficiaries were found to respond for 6-10 times cleaning in a year by SMC at pre projects situation while maximum number of HHs had responded for more than 10 times in year in Central zone. In East zone of Surat city, maximum number of HHs responded for 6-10 time in a year for cleaning drains at pre projects situation while post projects stage maximum number of HHs responded for more

than 10 times in a year. In South-West zone, maximum number of HHs responded for 1-5 times in a year for cleaning the drains by SMC while at post projects maximum numbers of HHs responded for 6-10 time in a year.

In Kolkata city, maximum number of HHs had responded for 6-10 times cleaning drains by municipalities in a year in post projects. In Hooghly-Chinsurah location, maximum respondents responded for 6-10 times cleaning in a year in both pre projects (45 per cent) and post projects (61 per cent). There was decrease in the number of respondents for cleaning more than 10 times and 1-5 times in a year in post projects. In Bansberia, at post projects more number of the HHs had responded for 6-10 times cleaning drains in a year (Fig.5.18). Based on HHs survey, the cleaning of drains in both cities are almost same and times of cleaning relative 6-10 time in a year at post projects stage.

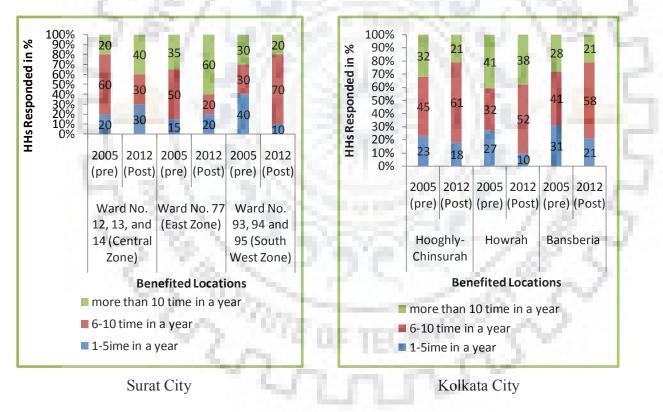
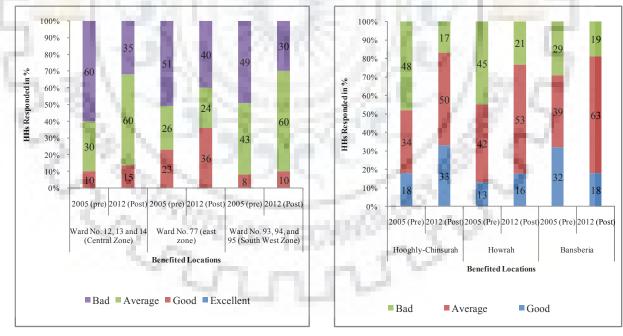


Fig.5.18: Cleaning of Drains by Municipalities, Source: Analysis Based on HH Survey Data, 2012-13

Satisfaction Level for Surat Municipal Corporation Services. The satisfaction level, of the beneficiary community in pre projects and post projects in two cities (Surat and Kolkata) is shown in Fig 5.15. At pre projects situation, more number of HHs had responded for bad while in post projects maximum HHs had responded for average for satisfaction level of municipal services for drainages in Central zone of Surat city. In East zone, more number of HHs had responded for bad was decrease and found increase for good level satisfaction in post projects. In South-East zone of Surat city, more number of HHs responded for average in pre projects situation while at post projects maximum numbers of HHs responded for average level of satisfaction (Fig 5.19).

In Kolkata city, there is little improvement in post projects situation as compared to pre projects regarding level of satisfaction. None of the respondents responded for excellent level of satisfaction in all the three locations of Kolkata city. The maximum numbers of HHs responded for average level of satisfaction in post projects as compared to pre projects in all the three locations. The comparative picture of satisfaction level based on HHs survey is shown in Fig.5.19.



Surat City

Kolkata City

Figure 5.19: Satisfactory Level of Municipality Services, Source: Analysis Based on HH Survey Data, 2012-13 **FGD** Finding: During focus group discussion with beneficiaries, the following aspects were covered -(1) damage caused due to flooding in drainage, (2) reason for over flowing, (3) duration of flooding, (4) drainage system, and (5) clogging of drains. The intenof the discussion was the effect of the completed projects in two cities (Surat, and Kolkata city). The comparison of pre and post projects status was motive behind of the evaluation.

After the intervention of storm water and drainage projects in Surat city, there was improved in terms of aesthetic, spread of diseases had, flood duration, clogging of drains at post projects stage where as Kolkata city had almost the same situation. The quality of life after implementation of storm water projects under JnNURM became better. Duration of the flooding become less hours (1-2 hours) in the post projects as compared to the pre projects (2-3 hours) while flooding low laying areas was still was still occurred in the both situation (pre and post projects). The duration of flooding had not improved; it remained same in both the situations (pre and post projects). The comparative pictures of the storm water projects in two cities in comparison of pre and post projects are shown in Table 5.22 based on the FGD finding.

	- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1				1.1.	10	
Sl. No	T. I.	Description	Units	Surat under DPR-I		Kolkata under DPR- V	
	Indicator			2005 (Pre)	2012 (Post)	2005 (Pre)	2012 (Post)
	100	Poor aesthetic	Yes/No	Yes	No	No	Yes
	Damage caused	Spread of diseases	Yes/No	No	No	Yes	No
1	due to flooding in the drainage	Damage to roads	Yes/No	Yes	No	Yes	No
	in the diamage	loss of property	Yes/No	No	No	No	No
2	Reasons for	Blocked drains	Yes/No	Yes	Yes	Yes	No
2	over flowing	Low- Lying area	Yes/No	Yes	Yes	Yes	Yes
3	Duration of Flooding	1-2 Hours, 2-3 Hours, above 3 Hours	c.05	2-3 Hours	1-2 Hours	1-2 Hours	1-2 Hours
4		Open drains	Yes/No	Yes	No	Yes	Yes
	Drainages System	Closed Drains	Yes/No	No	Yes	No	No
	System	No Drains	Yes/No	Yes	No	Yes	No
-							

Table 5.22: FGD Finding in Two Cities (Surat and Kolkata) for Storm Water and Drainage

Source: Based on FGD, 2012

Due to lack of proper

drains

Clogging of

drains

5

Yes/No

Yes

No

Yes

No

5.7 SOLID WASTE MANAGEMENT SECTOR

Municipalities are responsible for solid waste management within their administrative boundary. As per the notification of Ministry of Environment and Forests, Government of India (2000) had rules for solid waste management for - (1) collection of municipal solid wastes, (2) segregation of municipal solid waste, (3) storage of municipal solid wastes, (4) transportation of municipal solid waste, (5) processing of municipal solid wastes, and (6) disposal of municipal solid wastes under Schedule –II. Besides, JnNURM aimed to improve the solid waste management in 65 cities by investing lot of money in the installation of various equipments, and vehicles for transportation of solid waste management. The description of the projects in selected cities (Surat, Pimpri Chinchwad (Pune) and Kolkata) is summarized as below;

5.7.1 Project description

Projects Description in Surat City:Solid waste management project in Surat city had mainly focused on the buying machineries and equipment for primary and secondary collection and transportation and Information Education and Communication (IEC activities). There was only one project under UIG sub-mission, JnNURM and comprises of four components namely; (1) machinery and equipment for primary and secondary collection and transportation, (2) construction of elevated transfer station in six location, (3) landfill cell, and (4) machinery and equipment at land fill. The first machinery and equipmentwas installed and 620 primary collection system containers had been put up in and around the city. The second components was constructed in six zones of Surat city except the central zone due to land constraint. The third project component was mainly installation of the machines and equipments at the land fill site, and last component was equipments at land fill site such as crawndozer (2 numbers), wheel dozer (1 number), dumpers/tipper (4 numbers), backhole loader (1 number), compactor (1 number), and water tank (1 number). The project details of solid waste management initiated under JnNURM in Surat city is shown in Table 5.23.

Name of Project	Project Components	Project Sub-Components
		Primary collection system containers (620 No.)
	Machinery and equipment for	Littering Bins (100 No.)
	primary collection and	Wheel Barrows (2083)
	secondary collection transportation, IEC activity	Mechanical sweeper (2)
	transportation, nec activity	Primary Transportation Dumper placer (19)
	C. W. WRITE	Relevant IEC activities on SWM
	A. 2. 4 11 19 19	At Pal
	C	At Bhesan
	Construction of Elevated	At Varachha-
-	Transfer Station 6 Nos.	At Bhatar
	18 X 1 Lan	At Anjana
100	7/ . 202	At Katargam
Up gradation of Solid Waste management in	Land fill cell 1 No. 6.5 lakhs cum capacity	Land fill cell at Khajod – 6.5 lakhCuM capacity strengthen Earthen bund Cement concrete Road – $7.0 \text{ M} \times 2700 \text{ M}$
Surat		Bituminous Road – 5.0 M × pump house 5.0 M × 5.0 M
2		Pumping machinery 10 Hp submersible storm water 600 mm o to 1600 mm o RCC NP3 pipe 5400 M. Leachate collection under Ground Sump Leachate Pumping Main
	A CONTRACTOR OF	Storm water Drain at Khajod
		Bituminous Road at Khajod
200	Machinery and equipment at	Crawler Dozer (2 No.)
	land fill	Wheel Dozer (1 No.)
100		Dumpers / Tipper (4 No.)
	2 Marine	Backhoe loader (1 No.)
	An OTT and	Compactor (1 No.)
	- / · · · · · · ·	Water Tank (1 No.)

Table 5.23: Projects Description for Solid Waste Management in Surat City

Source: Based on Solid Waste Management DPR, 2006

Projects Description in Pimpri Chinchwad (Pune) City: The name of solid waste management project in the Pimpri Chinchwad (Pune) city was –solid waste management – Pimpri Chinchwad (Pune)" compriing of many components. Theywere - (1) roads sweeping, (2) street cleaning, (3) secondary storage, (4) compactor, (5) dumper placers, (6) Baltimore Recycling Coalition (BRC),

(5) hoppers, (6) construction of transfer stations, (7) secondary transportation, and (8) treatment facilities at Moshi dumping yard. The first component of roads sweeping covered around 2082 km while for the secondary storage had installed 1260 number in around the city. There were 31 number of compactor for entire the city and 20 numbers of dumper placers. The PCMC had constructed one transfer station where waste was being collected from the various locations of colonies and compress it and transfer for further processing at dumping site at Moshi. Vermicomposting facility at Moshi, and construction of engineered sanitary landfill facility was also one the component. The components for solid waste management project in Pimpri Chinchwad (Pune) city is shown in Table 5.24.

Component	Quantity
Road Sweeping	2082 Km
No. of Secondary Storage	1260
No. of Compactor	31
No. of Dumper Placers	20
Baltimore Recycling Coalition (BRC)	5
No. of Hoppers	362
Transfer Station	
Secondary Transportation	*
Treatment Facilities at Moshi Dumping	Vermicomposting, Mechanical Compositing facilities, Plastic
Yard	to fuel plant, Engineered Sanitary Landfill facilities,

Table 5.24: Major Components for SWM Project in Pimpri Chinchwad (Pune) City

. . .

Source: Based on Solid Waste management DPR, 2007, * Data Not Available

Projects Description in Kolkata City: Two DPRs were implemented in Kolkata city of which one project (DPR-I) consisted of many components in 10 municipalities within Kolkata metropolitan area. The municipalities covered under DPR-I were – (1) Bansberia, (2) Hooghly-Chinsurah, (3) Bally, (4) Budge Budge, (5) Rajpur-Sonarpur, (6) Rajarhat-Gopalpur, (7) North Barrackpore, (8) Garulia, (9) Barrackpore, and (10) Kamarhati. The major components of DPR-I ware (1) equipments for primary and secondary collection, storage and transportation, (2) treatment and recycling of waste through Vermicomposting, sanitary land fill and (3) public awareness campaign and so on. In case of DPR-II components were slightly different due to the nature of projects which mainly focused on (1) construction of vermin pits and shed, (2) construction of concrete yards, and

office, (3) building, boundary wall and so on, (4) construction of sanitary landfill and electrifications, and (5) procurement of equipment for primary and secondary collection in 13 ULBs within Kolkata metropolitan area. The municipalities which had covered under DPR-II were namely; Halisahar, Kanchrapara, Kalyani, Gayeshpur, Naihati, Bhatpara, Khardah, Barasat, Madhyamgram, Maheshtala, Pujali, Baruipur, and Uluberia. The major components of DPR-II for solid waste management are. The detail for solid waste management projects components is shown in Table 5.25.

SI No.	Project Name	Major Components			
DPR-I	Trans-Municipal SWM for 10 municipal towns of Kolkata Bansberia, Hooghly Chinsurah, Bally,Budge Budge, Rajpur- Sonarpur, Rajarhat-Gopalpur, North Barrackpore, Garulia, Barrackpore and Kamarhati	 Equipments for primary and secondary collection, storage and transportation. Treatment and recycling of waste through Vermicomposting, Sanitary land fill/ land fill. 3. Public awareness campaign etc 			
DPR-II	SWM for 13 ULBs of KMA (Halisahar,Kanchrapara,Kalyani,Gay eshpur,Naihati,Bhatpara,Khardah,Ba rasat,Madhyamgram,Maheshtala,Puj ali,Baruipur and Uluberia)	 Construction of Vermicomposting Pits and sheds. Construction of concrete yards, office. Building, boundary wall etc. Construction of sanitary landfill and electrification. Procurement of equipment for primary and secondary collection 			

Table 5.25: Components of Solid Waste management projects in Kolkata City

90 A

Source: Based on Compilation of DPR, 2006

5.7.2 Financial Progress of Solid Waste Management Sector

The total investment for solid waste management in the Surat city was Rs. 5687.43 lakh for improvement of collection efficiency, transportation, and processing. The project had many sub components for various purposes for solid waste management in the city. The sub-components were (1) primary collection system containers (620 No.), (2) littering bins, (100 No.), (3) wheel barrows (2083 No.), (4) primary transportation dumper placer (19 No.), and (5) relevant IEC activities with an investment of Rs. 657 .41 lakhs.

The second sub-component was on the construction of 6 elevated transfer station at Pal, Bhesan, Varachha, Bhatar, Anjana and Katargam with an investment of Rs. 3526.82 lakhs.

The third sub-component was on the land fill site at Khajod and consist of (1) land fill 6.5 lakhs cum capacity strengthen earthen bund cement concrete road -7 meter \times 2700 meter, (2) bituminous road -5 meter \times pump house 5 meter \times 5 meter, (3) pumping machinery 10 HP submersible storm 600 mm to 1600 mm RCC NP3 pipe 5400 meter, (4) storm water drain, and bituminous road at Khajod with an investment of Rs. 1185.39 lakhs.

The last sub-component was equipmentand machines at dumping site (Khajod) and name of the sub-components were (1) crawler dozer (2 No.), (2) wheel dozer (1 No.), (3) dumper / tipper (4 No.), (4) backhoe loader (1 No.), (5) compactor (1 No.) and (6) water tank (1 No.) with an investment of Rs. 317.81 lakhs. The detail sub-components for solid waste management project in Surat city and investment is shown in Table 5.26.

N <mark>ame o</mark> f Project	Project Sub-Components	Component Cost (in Rs lakhs)	P <mark>rojects</mark> Cost Rs. in Lakhs	% of Projects cost
Up gradation of	Primary collection system containers (620 No.)	254.21	1	11.56
Solid Waste	Littering Bins (100 No.)	43.7	6.87.6.1	
Solid	Wheel Barrows (2083)	70.81	657.41	
NY 18	Mechanical sweeper (2)	102.91	037.41	
10	Primary Transportation Dumper placer (19)	165.78	~~	
	Relevant IEC activities on SWM	20	C	
	At Pal	190.75		62.01
	At Bhesan	270.34		
	At Varachha-	211.06	2526.92	
	At Bhatar	2429.9	3526.82	
	At Anjana	229.52	_	
	At Katargam	195.25		
	Land fill cell at Khajod-6.5 lakhCuM capacity strengthen Earthen bund Cement concrete Road-7.0 M × 2700 M	1596.16,	1185.39	20.84

Table 5.26: Financial Status for Solid Waste management in Surat City

Name of Project	Project Sub-Components	Component Cost (in Rs lakhs)	Projects Cost Rs. in Lakhs	% of Projects cost	
	Bituminous Road -5.0 M \times pump house 5.0 M \times 5.0 M	73.79			
Solid Waste Management in Surat	Pumping machinery 10 Hp submersible storm water 600 mm o to 1600 mm o RCC NP3 pipe 5400 M Leachate collection under Ground Sump Leachate Pumping Main	545.69	20		
	Storm water Drain at Khajod	251.62	10 S. A.	100 C	
	Bituminous Road at Khajod	314.29	505. T.	2	
	Crawler Dozer (2 No.)	152.28		5.50	
	Wheel Dozer (1 No.)	63.26	N 84		
	Dumpers / Tipper (4 No.)	46.64	317.81		
	Backhoe loader (1 No.)	22.15	517.81	5.59	
	Compactor (1 No.)	22.92	27. C %	800	
	Water Tank (1 No.)	10.56			
	Total	5687.43	5687.43	100	

Source: Based on JnNURM Projects Status, 2012

The total investment for solid waste management in Pimpri Chinchwad (Pune) city was Rs. 7044 lakh and per capita investment was Rs. 407.44 (PCMC, 2012). This project aimed to benefit of entire city (1729320 populations as census, 2011).

In the case of the Kolkata city, total approved cost was Rs. 16855.05 lakhs and covered 23 ULBs within Kolkata metropolitan area. The DPR-I had investment of Rs. 5658.53 lakhs and targeted areas are 10 municipalities (Kolkata Bansberia, Hooghly Chinsurah, Bally,Budge Budge, Rajpur-Sonarpur, Rajarhat-Gopalpur, North Barrackpore, Garulia, Barrackpore and Kamarhati) to install the equipments while DPR-II was an investment of Rs. 11196.52 lakh which had covered 13 municipalities (Halisahar, Kanchrapara, Kalyani, Gayeshpur, Naihati, Bhatpara, Khardah, Barasat, Madhyamgram, Maheshtala, Pujali, Baruipur and Uluberia) to construct the vermin compost pits and sheds, construction of concrete yards, office building boundary wall and construction of sanitary landfill and electrification and so on (KMC, 2012).

5.7.3 Physical progress of Solid Waste Management Sector

The physical progress for solid waste management project in Surat city had been fully achieved and operating. The first sub-component had been installed and expected to benefit of the entire city. The second sub-component of construction of 6 elevated conatainers at Pal (west zone), Bhesan (south zone), Varachha (east zone), Bhatar (south west zone), Anjana (south east zone), and Katargam (north zone) had completed and started collecting from respective zones. This had improved the working mechanism of management of the solid wastes. The remaining sub-components were also completed and operating in full swing. The specific status of the sub-components under project and benefited location is shown in Table 5.27.

Name of Project	Project Sub-Components	Locations	Physical Progress in %	Status	Benefited areas
	Primary collection system containers (620 No.) Littering Bins (100 No.) Wheel Barrows (2083) Mechanical sweeper (2) Primary Transportation Dumper placer (19) Relevant IEC activities on SWM	Partially Distributed within City	100 (Available)	Working	Entire City
Up	At Pal	West Zone	West Zone		West Zone
gradation of Solid Waste	At Bhesan	South Zone	1.8	<u>c</u> .	South Zone
management	At Varachha-	East Zone	1	2.	East Zone
in Surat	At Bhatar	South West Zone	100	Working	South West Zone and Central Zone
	At Anjana	South East zone			South East and Central Zone
	At Katargam	North Zone			North Zone

Table 5.27: Physical Progress for Solid Waste management in Surat City

10 M 10

Name of Project	Project Sub-Components	Locations	Physical Progress in %	Status	Benefited areas
	Land fill cell at Khajod-6.5 lakhCuM capacity strengthen Earthen bund Cement concrete Road-7.0 $M \times 2700 M$ Bituminous Road -5.0 M × pump house 5.0 M × 5.0 M Pumping machinery 10 Hp submersible storm water 600 mm θ to 1600 mm θ RCC NP3 pipe 5400 M. Leachate collection under Ground Sump Leachate Pumping Main Storm water Drain at Khajod	Ward No. 92 (South West Zone)	100	Working	Entire City
	Bituminous Road at Khajod Crawler Dozer (2 No.)		100 C 100 B		2.0
	Wheel Dozer (1 No.)				
	Dumpers / Tipper (4 No.)		100	Working	1
	Backhoe loader (1 No.)		100	WORKING	
	Compactor (1 No.)				
	Water Tank (1 No.)				

Source: Based on SWM Projects Status, 2012

The physical progress for solid waste management in Pimpri Chinchwad (Pune) city had completed and various equipments (Table 5.24)had installed and fully working while projects in Kolkata city were in progress. The DPR-I was completed 62 percent completed and partially working in some municipalities' area such as Hooghly-Chinsurah and Bansberia while DPR-II was also progress, about 5 percent is being completed (JnNURM Projects Status, 2012).

5.7.4 Community participation

Community participation is recognized as factor contributing to the success of solid waste management of the JnNURM. Community participation was difficult to achieve in the selected cities (Surat, Pimpri Chinchwad (Pune) and Kolkata). As far as solid waste management was concerned, community participation would be mandatory before implementing the projects in the

selected cities. Awareness program at community level is a key to success the solid waste management. The awareness program to common people at community and household levels for use of waste as resources by process the waste into fertilizer was an important step to success.

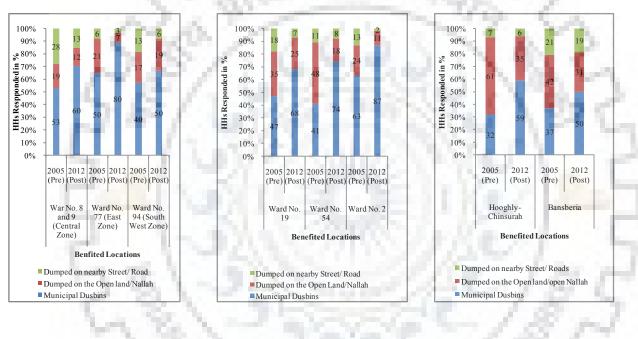
The awareness for segregation of solid waste at sources (household level) was required in one way and municipalities are responsible to provide the separated dustbins for degradable and nondegradable waste and so on. In this matter, community participation was required for better management. Positive attitude of common people for solid waste management was need adopted so that citizen would be thrown in open space and adjacent areas. The importance of community participation was to motivate the citizens to play their role at household level and also community to think of new innovative way in solid waste management. However, community participation was totally absent for improvement of solid waste management in the Surat, Pimpri Chinchwad (Pune) and Kolkata.

5.7.5 Comparative Picture of Case Study Cities – Surat, Pimpri Chinchwad (Pune), and Kolkata

The evaluation of the completed projects in selected cities (Surat, Pimpri Chinchwad (Pune) and Kolkata) had been carried by considering the parameters -(1) method of disposal mechanism, (2) door to door collection, (3) satisfaction level of municipalities service, and followed by FGD. Comparative analysis of pre and pre projects status through HHs and FGD had revealed the affect of the projects whether projects was getting benefit or not. Outcome of the projects after the intervention of JnNURM schemewere the main ideas in comparison between pre and post projects stage.

Method of Disposal Mechanism: The results presented in Fig 5.20 indicated the comparative study on methods of SWM disposal of the three cities. In Surat city, more than 50 per cent of the respondents use municipal dustbin for SWM disposal in post project. The study in three locations of Surat city show that respondents adopting municipal dustbin method to disposed SWM increased in post projects in East zone (80 per cent), Central zone (60 per cent) and South-West zone (50 per cent). Hoowever, some of the HHs had still practice of disposal on the open drains and along roads side.

In Pimpri Chinchwad (Pune) city, more percentage of HHs per cent disposed solid waste materials in municipal dustbins in post projects stage as compared to pre projects situation. In Kolkata half of HHs were still throwing into open space and drains and roads sides and rest of HHs disposed SWM to municipal dustbins in pre projects situation while at post projects stage, little improvement was observed and number of HHs increased by more than 50 per cent who disposed SWM in municipal dustbin (Fig 5.20). The comparative picture of solid waste disposal after intervention of JnNURM projects for solid waste management based on HHs survey is shown in Fig.5.20.



Surat City

Pimpri Chinchwad (Pune) City

Kolkata City

Fig. 5.20: Method of SWM Disposal, Source: Analysis Based on Households Survey Data, 2012-13

Door to Door Collection: Door to door collection of solid waste was found to increase from pre projects situation to post projects stage in Surat and Pimpri Chinchwad (Pune) cities. This shows the positive impact of solid waste management projects in Surat and Pimpri Chinchwad (Pune) cities. However, beneficiaries had responded that almost the same was observed in both pre projects and post projects in Kolkata city. The comparative picture of three cities for door to door collection of solid waste is shown in Fig. 5.21 based on the HHs survey finding.

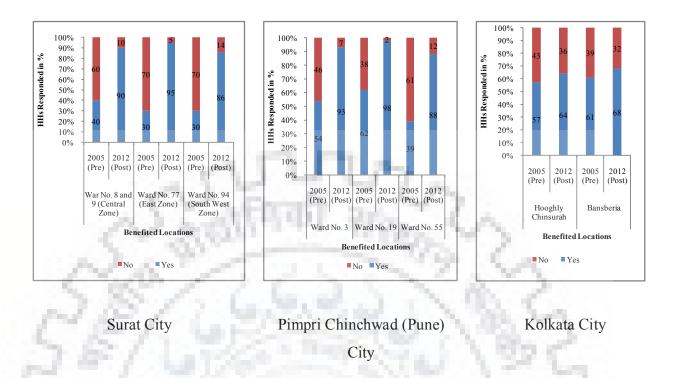


Fig. 5.21: Door to Door Collection, Source: Analysis Based on Households Survey Data, 2012-13

Satisfaction Level of Municipalities Service: The responds to satisfaction level for solid waste management is presented in Fig. 5.22. It was observed that maximum number of HHs responds for bad in pre projects situation while in post projects stage, maximum HHs responded for average, good and least for excellent in Central and East zones of Surat city. But in South West zone, HHs responded for bad in both pre projects (50 per cent) and in post project (37 per cent).

In the case of the Pimpri Chinchwad (Pune) city, relative improvement was observed and most of the HHs had responded for average, good, and excellent in post projects stage while in pre projects maximum responds was for bad to the satisfaction level of solid waste management.

In the case of Kolkata city, maximum number of HHs had responded for average and some HHs responded for bad in pre project while in post projects maximum HHs responded for average and good and a few for excellent and very few for bad in Hooghly. In Bansberia, still not much improvement was observed at post projects stage. The comparative picture of satisfaction level for solid waste management in three cities is shown in Fig. 5.22.



Fig. 5.22: Satisfactory Level for SWM, Source: Analysis Based on Households Survey Data, 2012

FGD Finding: The following aspect were discussed with tye beneficiries – (1) awareness of JnNURM, (2) responsibility for solid waste management, (2) method of waste disposal, (4) segregation of waste, (5) common bio-medical waste treatment facilities, (6) problems due to cattle and stray dog, (7) problems due to rag pickers,(8) mosquito and fly menace, (9) satisfaction level, and (10) willingness to pay were in three cities to evaluate the completed projects based on discussion with beneficiaries(Table 5.28).

Beneficiaries were not aware of JnNURM for solid waste management projects in all selected cities. The beneficiaries came to know about the JnNURM through third prty sources. Municipalities and other planning and implementing agency did not discuss about JnNURM projects planningor implemention. The segregation of solid waste was not practiced in any of the selected cities and disposal of solid waste on the open space was practiced. Bio-medical waste treatment ws too followed in all selected cities at post stage and problems of rag pickers was not

reported. The mosquito had not occurred in post projects in the selected cities while satisfaction level had become good in Surat and Pimpri Chinchwad (Pune) city where as Kolkata city had remained the same satisfaction level in both pre and post project stages. The FGD had revealed that there was slightly improvement at post project as compared to the pre project stages (Table 5.28).

City Name	Sur	at	Pim Chinc (Pu	hwad	Koll	kata
Projects Name	DPF	R-I	DP	R-I	DP	R-I
Parameters	Pre	Post	Pre	Post	Pre	Post
Awareness of JnNURM	No	Yes	No	Yes	No	Yes
Responsibility for solid waste management	SMC	PCM C	РСМС	РСМС	Municipa lity	Municip ality
Method of waste disposal on (1) streets, (2) open space, (3) municipal dustbins	2	3	1, 2	3	3	3
Segregation of waste	No	No	No	No	No	No
Common Bio-medical waste treatment facility	Yes	Yes	No	Yes	Yes	Yes
Problems due to cattle, stray dog	Yes	No	Yes	No	No	No
Problems due to rag pickers	No	No	No	No	No	No
Mosquito and fly menace	Yes	No	Yes	No	No	No
Satisfaction Level	Average	Good	Average	Good	Average	Average
Willingness to pay for services	Yes	Yes	No	Yes	Yes	Yes

Table 5.28: FGD Finding for Solid Waste Management in three Cities

Source: Based on FGD, 2012

5.8 **BASIC SERVICE TO URBAN POOR**

The goal of Basic Services for the Urban Poor (BSUP) under JnNURM was to provide shelter and basic services (physical and social infrastructure facilities) to all urban poor. Security of tenure, improved housing conditionat affordable prices and ensured delivery of social services of education, health, social security and sanitation to urban poor people were the main principles under BSUP (sub-mission of JnNURM).

5.8.1 Objectives of Basic Service to Urban Poor

Government of India had planned to provides the housing with proper provision of infrastructure facilities both social and physical, the following objectives had been identified under sub-mission of Basic Services to Urban poor (BSUP), JnNURM;

- 1. Focus attention to integrated development of Basic Services to the Urban Poor in the cities covered under the mission.
- 2. Provision of Basic Services to Urban poor including security of tenure at affordable prices, improved housing, water supply, sanitation and ensuring delivery through convergence of other already existing universal services of the Government for education, health and social security. Care will be taken to see that the urban poor are provided housing near their place of occupation.
- Secure effective linkages between asset creation and asset management so that the basic services to urban poor created in the cities are not maintained efficiently but also become self-sustaining over time.
- 4. Ensure adequate investment of funds to fulfill deficiencies in the Basic Services to the Urban Poor.

5.8.2 Project Description

In the Surat city, there are 12 projects under BSUP, of which 3 projects are new housing at Besthan area from the industrial areas. Three projects are relocation from the Tapti River Bank to Kosad in the north zone of city and five projects are redevelopment on the same place at the various places of the Surat Municipal

Corporation administrative region (SMC, 2012). In the case of **Pimpri Chinchwad (Pune) city**, there are 10 projects of which



Fig. 5.23 : New Housing at Besthan, Surat City, Source: Field Survey, 2013

half of the projects are redevelopment on the same place and the allowing projects are relocation at various places within the PCMC administrative area (PCMC, 2012). In the case of the **Kolkata city**, the projects are redevelopment in KMC area, and In-Situ projects in other ULBs of Kolkata Metropolitan Region (KMC, 2012).

5.8.3 Financial progress of Basic Service to Urban Poor

Financial Progress in Surat: The total investment for BSUP projects in Surat city was Rs. 437 lakhs in 12 DPR in various types of slums improvement. Group housing consisted of DPR-III, DPR-IV and DPR-V with an investment of Rs. 262.39 lakhs (60.04% share of the total cost) and ranks as the highest investment in Surat city in terms of different types of slum improvement. Group housing at Besthan from various locations has invested around Rs. 233.43 lakhs consisting of DPR-I, DPR-II and DPR-VI. In the case of the redevelopment, the total investment of Rs. 192.99 lakh consists of DPR-VIII, DPR-IX, DPR-X, DPR-VI, and DPR-XII. The last DPR-XIwas for improvement of environment up gradation at Kosad with an investment of Rs. 10.58 lakhs. The details of the financial status and percentage of shared in various types of slum improvement in Surat city is shown in Table 5.29.

Sl. No	Slum Improvement Types	Name of Project	Project Cost in Lakhs	% of Projects Cost
DPR-III		DPR-III : E.W.S. Housing at Kosad, Surat Total housing units :5280 Nos.	72.03	
DPR-IV	New Group housing at Kosad from Tapti River Bank	DPR-IV : E.W.S. Housing at Kosad, Surat Total housing units :6768 Nos.	91.49	60.04
DPR-V		DPR-V : Housing for Urban Poor at Kosad Total housing units :7392 Nos.	98.87	
DPR-I	N. C. H.	DPR-I: Detail Project for Slum Relocation Total Housing for Urban Poor: 5572 Nos. (20 Different sites)	62.74	
DPR-II	New Group Housing at Besthan from different location	DPR-II: Detail Project for Slum Relocation Total Housing for Urban Poor:5424 Nos. (Besthan)	56.45	53.42
DPR-VII	5	DPR-VII : Construction of Housing Units for Urban Poor at 15 various locations of Surat	114.24	
DPR-VIII	Redevelopment on	DPR- VIII: Redevelopment of BhimnagarVasahat R.S.No. 150, Udhana Udyognagar Sangh, Surat	29.53	44.16
DPR-IX	same location DPR-IX: Construction of Housing Under		23.84	44.16

Table 5.29: Financial Progress for BSUP Projects in Surat City

Sl. No	Slum Improvement Types	Name of Project	Project Cost in Lakhs	% of Projects Cost
DPR-X		DPR-X: Construction of 2240 Houses at Four Locations of Surat City For Rehabilitation of Urban Poor, Surat	60.95	
DPR-VI		DPR-VI: Construction of Housing Units for Urban Poor at 11 various locations of Surat	61.65	
DPR-XII		DPR-XII: Redevelopment of Ektanagar, Adajan & Ektanagar Navi Vasahat	17.02	
DPR-XI	Environment up gradation at Kosad	DPR-XI Up gradation of environment at Kosad& Besthan	10.58	2.42
		Total	437	100

Source: Based on BSUP Projects Status, 2012

Financial Progress in Pimpri Chinchwad (Pune): The total investment of the BSUP projects in the Pimpri Chinchwad (Pune) city was Rs. 1353.43 Croreand targeted number of dwelling units was 160410. In comparison among the 10 projects, DPR-X was highest investment and approved 10000 dwelling. The cost of per dwelling unit was Rs. 4.84 lakhs. The DPR-IX was second highest investment (Rs. 484.03 Crore) and approved 132250 dwelling units and cost of a dwelling unit was lowest 0.37 lakh.

The breakup of the investment in the rest of the DPRs are details out as follows; DPR-I and DPR-II were same amount of approved investment Rs. 94.98 Crore for 4960 dwelling units and cost per dwelling unit was Rs. 1.91 each. For DPR-III approved 1840 dwelling units with an investment of Rs. 35.23 Crore and per dwelling unit was Rs. 1.91 lakh while DPR-VI approved 1440 dwelling units with an investment of Rs. 36.19 Crore and per dwelling was Rs. 2.51 lakhs, DPR-V approved 800 dwelling units with an investment of Rs. 20.17 Crore and per dwelling unit was Rs. 2.52, DPR-VI approved 1280 dwelling units with an investment of Rs. 31.76 Crore and per dwelling unit was Rs. 2.48, DPR-VII approved 1440 dwelling units with an investment of Rs. 35.76 Crore and per dwelling unit was Rs. 248 respectively. The detail of the BSUP profile in Pimpri Chinchwad (Pune) city is shown in Table 5.30.

Sl. No	Name of Project	Projects cost Approved (Rs in Crore)	Numbers of HHs	Cost Per Unit in lakh
DPR-I	Pimpri Chinchwad (Pune)	94.98	4960	1.91
DPR-II	Pimpri Chinchwad (Pune)	94.98	4960	1.91
DPR-III	Pimpri Chinchwad (Pune)	35.23	1840	1.91
DPR-VI	Pimpri Chinchwad (Vetalnagar Slum)	36.19	1440	2.51
DPR-V	Pimpri Chinchwad (Udyognagar Slum)	20.17	800	2.52
DPR-VI	Integrated Rehabilitation Projects of Slum Dwellers of Pimpri Chinchwad under BSUP (Milindnagar)	31.76	1280	2.48
DPR-VII	Integrated Rehabilitation Project of Slum Dwellers of Pimpri Chinchwad under BSUP, (Vithal Nagar)	36.3	1440	2.51
DPR-VIII	Integrated Rehabilitation Project of Slum Dwellers of Pimpri Chinchwad under SUP, (Ajanta Nagar)	35.76	1440	2.48
DPR-IX	Generation of Affordable housing Stock for Urban poor in Pimpri Chinchwad under Integrated Rehabilitation	484.03	132250	0.37
DPR-X Generation of Affordable Housing Stock for the migrating Urban poor in Pimpri Chinchwad under Integrated Rehabilitated Project (BSUP)		484.03	10000	4.84
	Total	135343	160410	

Table 5.30: Financial Status of BSUP Projects in Pimpri Chinchwad (Pune) City

Source: Based on BSUP Projects Status, 2012,

Financial Progress in Kolkata: The BSUP projects were spatially distributed in four regions namely; (1) Hooghly, (2) Howrah, (3) Naida, (4) North 24 Parganas, (5) South Parganas, and (6) Kolkata Municipal Corporation. The total approved dwelling units in Kolkata city was 109366 with an investment of Rs. 258988.38 lakhs and average per dwelling unit cost was Rs. 2.37 lakhs.

In comparison of the four regions within Kolkata metropolitan area, North Parganas approved 41701 dwelling units with an investment of Rs. 109049.93 lakhs and cost of dwelling was Rs. 2.62 and followed by Hooghly was highest number of dwelling units (26277 DUs) with an investment of Rs. 58305.96 lakhs. The Kolkata Municipal Corporation had approved 12908 dwelling units with an investment of Rs. 24780.77 lakhs and cost of per dwelling unit was Rs. 1.92 lakhs while in

the Nadia region approved 10269 dwelling units with an investment of Rs. 24763.6 lakhs and cost of per dwelling unit was Rs. 2.41 lakhs, for South Parganas region approved 9499 dwelling units with and investment of Rs. 22587.92 Crore and per dwelling unit was Rs. 2.38 lakhs, and lastly Howrah region approved 8712 dwelling unit with an investment of Rs. 19500.2 lakhs and per dwelling unit was Rs. 2.24 lakhs (Table 5.31).

Sl. No.	Project Area	Zone	Approved Cost Rs. In lakhs	No. of Project	No. of DUs	Cost Per Unit
1	Hooghly	West of	58305.96	20	26277	2.22
2	Howrah	Hooghly River	19500.2	5	8712	2.24
3	Nadia	210	24763.6	7	10269	2.41
4	North 24 Parganas	East of	109049.93	29	41701	2.62
5	South 24 Parganas	Hooghly River	22587.92	9	9499	2.38
6	КМС	1.00	24780.77	7	12908	1.92
Total		1.14	258988.38	77	109366	2.37

Table 5.31: BSUP projects in Kolkata City in Six Locations

Source: Based on BSUP Projects Status, 2012

5.8.4 Physical Progress of the Basic Services to Urban Poor

Physical progress under BSUP projects in Surat City: There were twelve DPRs which were implemented in Surat city of which six projects had been completed and allotted to the beneficiaries (urban poor/slum dwellers) who settled in different locations within city limit. Most of the beneficiaries were settled along the Tapi River in vulnerable areas such as low laying areas and railway stracts. Under DPR III, DPR IV, and DPR V there were relocation from the slum settlement (central zone slum pockets) to the fringe areas (ward No. 71) in north zone. These DRR III and DPR IV and DPR V were mass group housing and allowed to the beneficiaries. The DPRs-I, DPR-II, and DPR-VII had cleaned up small pockets of slum dwellers who lived within the city and new housing in flat type development in south zone. The SMC had arranged a small piece of land in and around the slums pockets to construct two build which had rehousing on multi storey

(G+3) and these project were completed and allowed to the beneficiaries. The last strategies for urban poor were DPR VIII, DPR IX, DPR X, and DPR VI which had relocation on the same location and constructed houses with multi storey tenament. These projects are in progress. The projects details under BSUP in Surat city for different types of strategies in various locations and targeted dwelling units are shown in Table 5.32.

SI. No	Type of Slum Improvemen t	Name of Project	Project Location	Benefited Slums Pocket	Targeted Dwelling Units	Occupied Dwelling Units
DPR- III	New Group housing (Relocation)	E.W.S. Housing at Kosad, Surat Total housing units :5280 Nos.	North Zone (Ward No. 71)	Central and North Zone	2	5164
DPR- IV	New Group housing (Relocation)	E.W.S. Housing at Kosad, Surat Total housing units :6768 Nos.	North Zone (Ward No. 71)	Central and North Zone	19424	6753
DPR- V	New Group housing (Relocation)	Housing for Urban Poor at Kosad Total housing units :7392 Nos.	North Zone (Ward No. 71)	Central and North Zone	-5	3986
DPR- I	New Group Housing (Relocation)	Detail Project for Slum Relocation Total Housing for Urban Poor: 5572 Nos. (20 Different sites)	t for Slum South South Zone Over: 5572 (Ward No. Zone		.5	5013
DPR- II	New Group housing (Relocation)	Detail Project for Slum Relocation Total Housing for Urban Poor:5424 Nos. (Bhesan)	South Zone (Ward No. 54)	South and South East Zone	18700	3148
DPR- VII	New Group housing (Relocation)	Construction of Housing Units for Urban Poor at 15 various locations of Surat	South Zone (Ward No. 54)	South and South East Zone	2	371
DPR- VIII	Redevelopme nt on same location	Redevelopment of Bhimnagar Vasahat R.S.No. 150, Udhana Udyognagar Sangh, Surat	South Zone (Ward No. 54)	South zone	1176	In progress
DPR- IX	Redevelopme nt on same location	Construction of Housing South		South East zone	740	In progress

 Table 5.32: Physical progress of BSUP Projects in Surat City

SI. No	Type of Slum Improvemen t	Name of Project	Project Location	Benefited Slums Pocket	Targeted Dwelling Units	Occupied Dwelling Units
DPR- X	Redevelopme nt on same location	Construction of 2240 Houses at Four Locations of Surat City For Rehabilitation of Urban Poor, Surat	South Zone (Ward No. 94)	South West	2240	
DPR- VI	Redevelopme nt on same location	Construction of Housing Units for Urban Poor at 11 various locations of Surat	West Zone (Ward No. 27)	West zone	4032	In progress
DPR- XII	Environment up gradation at Kosad	Redevelopment of Ektanagar, Adajan & Ektanagar Navi Vasahat	North Zone (Ward No. 71)	North	544	In progress
DPR- XI	Environment up gradation at Kosad and Besthan	Up gradationof environment at Kosad& Besthan	North Zone (Ward No. 71)	35	S.	In progress
	1.2.1	46856	24435			

Source: Based on BSUP Projects Status, 2012

*Physical progress under BSUP projects in Pimpri Chinchwad (Pune):*BSUP projects in Pimpri Chinchwad (Pune) city was almost the same as Surat city had developed for urban poor housing. The DPR I, DPR II, III, DPR IV were mass housing projects in ward No. 10 of Pimpri Chinchwad (Pune) city. The beneficiaries under DPRS, I, II, III and DPR IV were resident in ward No. 10 and few beneficiaries were from wards 12, 13 and so on. The PCMC had allotted dwelling units to the beneficiaries as soon as they were completed. The rest of DPRs were development on the same location out of which few were multi storey denament building.The physical status of BSUP projects in Pimpri Chinchwad (Pune) city is shown in Table 5.33.

Table 5.33: Physical Progress of BSUP in Pimpri Chinchwad (Pune) City as on 2012

Sl. No	Name of Project	Project Location	Approved Dwelling Units	Occupied Dwelling Units	% of completion
DPR-I	Pimpri Chinchwad (Pune)	Ward No. 10	4960	1200	24
DPR-II	Pimpri Chinchwad (Pune)	Ward No. 10	4960	1440	29
DPR-III	Pimpri Chinchwad (Pune)	Ward No. 10	1840	800	43
DPR-IV	Pimpri Chinchwad (Vetalnagar	Ward No. 10	1440	560	39

Sl. No	Name of Project	Project Location	Approved Dwelling Units	Occupied Dwelling Units	% of completion
	Slum)				
DPR-V	Pimpri Chinchwad (Udyonagar Slum)	Ward No. 46	800	112	14
DPR-VI	Integrated Rehabilitation Projects of Slum Dwellers of Pimpri Chinchwad under BSUP (Milindnagar)	Ward No. 4	1280	336	26
DPR- VII	Integrated Rehabilitation Project of Slum Dwellers of Pimpri Chinchwad under BSUP, (Vithal Nagar)	Ward No. 11	1440	1440	100
DPR- VIII	Integrated Rehabilitation Project of Slum Dwellers of Pimpri Chinchwad underBSUP, (Ajanta Nagar)	Ward No. 28	1440	672	47
DPR-IX	Generation of Affordable housing Stock for Urban poor in Pimpri Chinchwad under Integrated Rehabilitation	Ward No. 13	132250	79350	60
DPR-X	Generation of Affordable Housing Stock for the migrating Urban poor in Pimpri Chinchwad under Integrated Rehabilitated Project (BSUP)	Ward No. 13	10000	In progress	0
	Total		160410	6576	100

Source: Based on BSUP Projects Status, 2012

Physical progress under BSUP Projects in Kolkata City: The BSUP projects in Kolkata Metropolitan Areas (KMA) had 77 number of DPRs had implemented the highest number of DPRs in JnNURM cities (Annexure XIII). Maximum numbers of DPRs were In-situ projects which were implemented in various locations of city. The respective ULBs were handling the DPRs in their respective administrative boundary for improvement in the living environment of urban poor. Regio wise of Kolkata city had been divided into six namely; (1) Hooghly, (2) Howrah, (3) Nadia, (4), North 24 Parganas, (5) south 24 Parganas and (6) KMC. In comparison of these six regions, maximum number of DPRs had been implemented in Hooghly region with 20 DPRs and a targeted of 26277 dwelling units, followed by north 24 Parganas with 29 DPRs and targeted of 41701 dwelling units, Howrah had the least number of DPRs (5 DPPRs and targeted of 8712 dwelling units). The evaluation of the BSUP projects in the Kolkata city had been carried out in the

completed project locations namely (1) Chandanagar, West Hooghly River, (2) Bansberia, West Hooghly, and (3) Baranagar, ward No. 6 within Kolkata Municipal area. The physical progress of the BSUP projects in Kolkata city is shown in Table 5.34.

Sl. No.	Project Area	Location	No. of Project	No. of DUs	Occupied Dwelling Units	% of Completion
1	Hooghly	West of	20	26277	11586	44.09
2	Howrah	Hooghly River	5	8712	3173	36.42
3	Nadia	66.7	7	10269	5377	52.36
4	North 24 Parganas	East of Hooghly	29	41701	19336	46.37
5	South 24 Parganas	River	9	9499	4483	47.19
6	КМС	1.5	7	12908	2858	22.14
Total	the second se	1.50	77	109366	46813	42.80

Table 5.34: Physical Progress of BSUP Projects in Kolkata city

Source: Based on BSUP Project Status, 2012

5.8.5 Community Participation

Community participation in the process of BSUP projects planning and implementation was given more emphasis for the success of the JnNURM. The need of participation regarding the socioeconomic profile information, micro-planning and even operation and maintenance (O&M) of services in pre project was required.

As per the focus group discussion with beneficiaries, the beneficiaries had no awareness of the any policies and provision for slum development. The aspects covered in the fosus group discussion include the need of community participation and involvement for projects design, work with acceptance of a housing community – management eviction and resettlement, adjustment to a new location, and capacity of social infrastructure. However, none of agencies had contact or interaction with community before projects implementation. As a result he had to face difficulty at Kosad (group housing) for municipal services and even loss the job prospect as they were

relocated away from the Surat city whereas in Pimpri Chinchwad (Pune) city, beneficiries had appreciated the BSUP projects and had improved the quality of life.

5.8.6 Comparative Picture of Case Study Cities – Surat, Pimpri Chinchwad (Pune) and Kolkata

The comparative analysis of three cities (Surat, Pimpri Chinchwad (Pune) and Kolkata) based on the household data and Focus Group Discussion (FGD). The indicators for evaluation of BSUP projects were (1) job prospect in pre and post projects stage, (2) monthly income of the beneficiaries, (3) source of water, (4) water supply duration, (5) frequency of water supply, (6) satisfaction level of water supply system, (7) satisfaction level for waste water management, (8) types of solid waste disposal mechanism, (9) frequency of collection from storage for SWM, and (10) satisfaction level for SWM system in comparison of pre and post projects status in selected cities. The FGD had another technique for evaluating of BSUP projects on the following parameters (1) awareness of JnNURM, (2) water supply improvement, (3) sewerage connection, (4) drainages status, (5) solid waste management status, (6) job prospect, and (7) satisfaction level of BSUP projects. There were discussed with beneficiaries in comparison of pre and post projects status in selected cities. The household survey and FGD findingsare summarized as given below;

Job Prospect: The results in Fig. 5.24 indicate the distance covered by the respondents for job in pre and post projects stage. In the ward No. 71 at Kosad (North zone), 60 percent of the HHs were travelling less than 5 km, 30 percent of HHs were travelling 5-10 km, 5 percent of HHs were travelling 10-15 km and 5 percent of HHs were travelling above 15 km in pre projects whereas in post projects, 25 percent of HHs are travelling 10 – 15 km and 5 percent of HHs are travelling 10 – 15 km and 5 percent of HHs are travelling 10 – 15 km and 5 percent of HHs are travelling above 15 km (Figure). In ward No. 54 (South zone), 35 percent of beneficiaries were travelling 10-15 km and 12 percent of HHs were travelling above 15 km in pre projects situation whereas in post project 6 percent of HHs are travelling less than 5 km, 24 percent of HHs are travelling 5-10 km, 50 percent of HHs are travelling 10-15 km and 20 percent of HHs are travelling 5-10 km, 50 percent of HHs are travelling 10-15 km and 20 percent of HHs are travelling 5-10 km, 50 percent of HHs are travelling 10-15 km and 20 percent of HHs are travelling 5-10 km, 50 percent of HHs are travelling 10-15 km and 20 percent of HHs are travelling 5-10 km, 50 percent of HHs are travelling 10-15 km and 20 percent of HHs are travelling 5-10 km, 50 percent of HHs are travelling 10-15 km and 20 percent of HHs are travelling 5-10 km. This shows that the distance travelled by the respondents for job was minimized in post projects. Fig. 5.24 shows that there were negative impacts by relocating in Kosad from various places of the city.

It would be the proper plan under provision of land management to earmarking 20-25% of developed land in all housing projects for EWS/LIG land for urban poor within city limit.

In Pimpri Chinchwad (Pune) city, 37 to 60 per cent of the respondents had to travel 5-10 km for job in the three locations at pre projects stage which was found to decrease at 32 to 54 per cent in post project. Few respondents (less than 20 per cent) travelled less than 5 km in both pre projects and post projects in Pimpri city. A considerable increase was found for distance above 15 km from pre projects to post projects. This had reflected the negative impact on job location. In Kolkata city, maximum number of the respondent travel a distance of 5-10 km for job in both pre project and post project. The distance of less than 5 km was travelled by less than 30 per cent in pre project which was decreased to less than 25 per cent in post project (Fig 5.24).

In Kolkata city, there were no negative for job location since mostly developed on the same plots (In-situ projects).

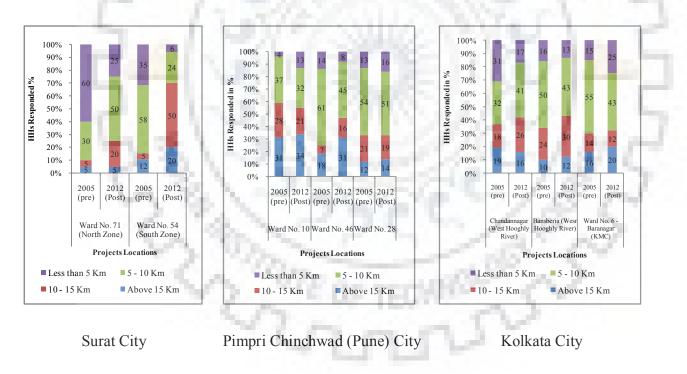
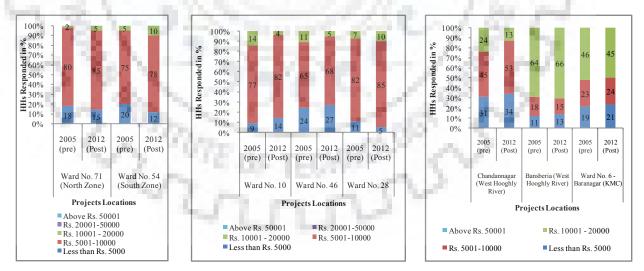


Fig. 5.24: Job Prospect, Source: Analysis Based on Households Survey Data, 2012

Monthly Income of Beneficiaries: Income level of beneficiaries at Ward no. 71 (North zone) and Ward no. 54 (South zone) has been illustrated in Fig 5.25 in Surat city. In ward No. 71 (north

zone), 2 percent of HHs monthly income are Rs. 10001 to 20000, 80 percent of HHs (Rs. 5001 to 10000), 18 percent of HHs (less than Rs. 5000) in pre projects whereas in projects 5 percent of HHs (Rs. 10001 to 20000), 85 percent of HHS (Rs. 5001 to 10000), 15 percent of HHs (less than Rs. 5000). In ward No. 54 (south zone), 5 percent of HHs (Rs. 10001 to 20000), 75 percent of HHs (Rs. 5001 to 10000), and 20 percent of HHs (less than Rs. 5000) in pre projects situation where as in the post 10 percent of HHs (Rs. 10001 to 20000), 78 percent of HHs (Rs. 5001 to 1000), and 12 percent of HHs (less than Rs. 5000). The overall picture of the beneficiary income in Surat city is shown in Fig. 5.25. This reveals that maximum number of beneficiaries incoming were Rs.5000 to Rs. 10000 per month. In Pimpri Chinchwad (Pune) city, maximum number of the respondent monthly income was Rs. 20001-50000 in both pre project and post project, however, the number of respondents of the said income was found to increase in post project. The respondents of income level above Rs. 50001 was few in pre project but increase in post project in Ward no. 10 and 46 except in Ward no. 23. This indicates that due to the projects initiation in the city, the income level of the beneficiaries increased which shows the rise of the beneficiaries. In Kolkata, there was quite fluctuation in income level of the beneficiaries. In Chandanagar, the maximum number of the respondent (45 per cent) monthly income was Rs. 5001-10000 in pre project which increase to 53 per cent in post project. Only 34 per cent of the respondents earned a monthly income of Rs. less than Rs. 5000 and 13 per cent earn above Rs. 50001 in post project.



Surat CityPimpri Chinchwad (Pune) CityKolkata CityFig. 5.25: BeneficiariesMonthly Income, Source: AnalysisBased on HouseholdsSurveyData, 2012-13

In comparison, the BSUP beneficiaries of Pimpri Chinchwad(Pune) city had the highest income level ranging Rs. 10000-20000 per month where as in Surat and Kolkata, max beneficiaries income level was ranging from Rs. 5000-10000 per month. Job prospect and income level were necessary in considering of BSUP projects plan and implementation. Maximum numbers of urban poor were engaged in informal job in the city. This inflected factor need to be considered in the planning process of BSUP projects.

Water source: The source of water in pre projects of the respondents settle in Ward no. 71 (North zone) was hand pump (12 percent of HHs), and public stand post (88 percent of HHs) while in post projects stage the beneficiaries were having water connection from Surat Municipal Corporation.

In the case of Ward no. 54 (South zone), source of water were hand pump (15 percent of HHs), public stand post (80 percent of HHs), and pipe line connection (5 percent of HHs) (Fig. 5.26).

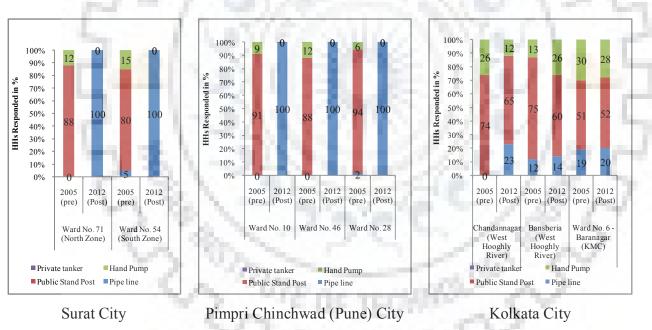


Fig. 5.26: Source of Water Supply, Source: Analysis Based on Households Survey Data, 2012-13

In Pimpri Chinchwad (Pune) city, all the three locations .in pre project more than 88 per cent of the respondents had water from public stand post and only few (less than 12 per cent) have hand pump

as a source of water. In post project, all the three locations have water connection through pipe line (Fig 5.26).

In Kolkata city, maximum respondents in all the three location had public stand post as source of water and few had hand pump in both pre project and post project. But dependency on the public stand post and hand pump as source of water decreased in post project. Some of the respondents use pipe line as a source of water in post project (Fig 5.26).

Water Supply Duration: Surat city of the ward No. 71 (north zone), 8 percent of HHs responded for less than 1 hours, 80 percent of HHs had responded for 1 to 3 hours, 12 percent of HHs for 6 to 12 hours in pre projects situation whereas in post projects stage, 35 percent of HHs for 1-, and 65 percent of HHs for 6-12 hours. In ward No. 54 (south zone) of Surat city, 60 percent of HHs responded for 6 to 12 hours, 30 percent of HHs for 1 to 3 hours and 10 percent of HHs for less than 1 hour in day in pre projects situation whereas in post projects stage, 75 percent of HHs had responded for 6 to 12 hours, 22 of HHs for 1 to 3 hours and 3 percent of HHs for less than 1 hour in a day. The comparative picture for duration of water in two locations is shown in Fig. 5.27.

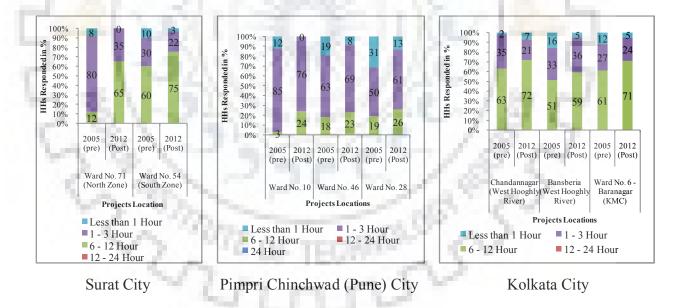
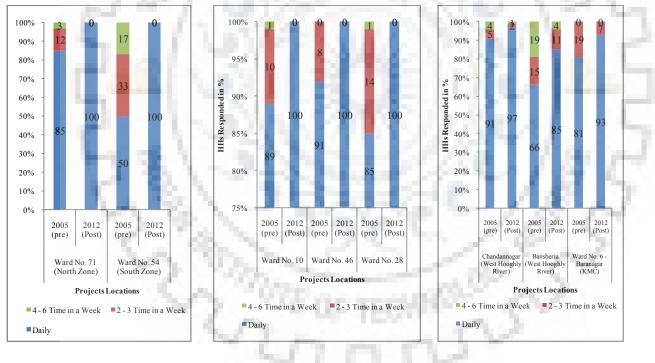


Fig. 5.27: Duration of Water in a Day, Source: Analysis Based on Households Survey Data, 2012-13

In Pimpri Chinchwad (Pune) city, maximum respondents had 1-3 hour of duration of water supply in day in pre project and post project but response decreased in post project. Less than 30 per cent responded for less than one hour duration in day in pre project which was decrease to less 13 per cent in post project. Few of the respondents (less than 19 per cent) responded for 6-12 hour in day in pre project but increase to more than 23 per cent in post project. In Kolkata city, maximum responded for 6-12 hour duration of water in a day in both pre project and post project. Few of about 17 per cent responded for 24 hour water supply in a day (Fig5.27)

Frequency of water supply: In ward No. 71 (North zone) of Surat city, 85 percent of HHs have daily supply of water 12 of HHs have 2 to 3 time in a week, and 3% of HHs have 4 to 6 time in a week in pre projects situation whereas in post projects stage, all the beneficiaries have dily water supply. In Ward no. 54 (South zone), 50 percent of HHs responded for daily, 33 percent of HHs for 2 to 3 time in a week, and 17 percent of HHs for 4 to 6 time in a week in pre projects situation whereas in the post projects stage, 100 percent of HHs had responded water supply is daily (Fig. 5.28).





Pimpri Chinchwad (Pune) City

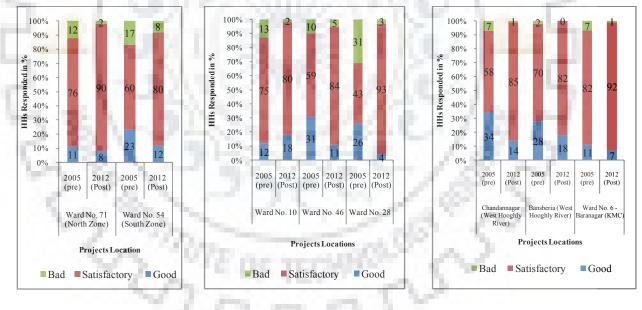
Kolkata city

Fig. 5.28: Frequency of Water Supply, Source: Analysis Based on Households Survey Data, 2012-13

In Pimpri Chinchwad (Pune) city, less than 85 per cent responded for daily water supply in all three locations in pre project while in post project 100 per cent of the respondents had daily water supply and few responded for 2-3 times in a week in pre project. In Kolkata city, the maximum respondents had daily water supply but in Chandanagar area more than 91 per cent responds had daily water supply in both pre and post projects (Fig 5.28).

Satisfaction level for Water Supply: In ward no. 71 (North zone) of Surat city, 76 percent of HHs responded for satisfactory, 11 percent for good, and 12 percent for bad in pre projects whereas in post projects, 90 of HHs responded for satisfactory, 8 percent of HHs for good, and 2 of HHs for bad in pre projectssituation (Fig 5.29).

In ward no. 54 (South zone), 60 percent of HHs responded for satisfactory, 23 percent for good, and 17 percent for HHs for bad in pre projects whereas in the post projects, 80 percent of HHs responded for satisfactory, 12 percent of HHs for good and 8 percent of HHs for bad. The comparative picture of three locations is shown in Fig 5.29.



Pimpri Chinchwad (Pune) City

Surat City

Kolkata City

Fig. 5.29: Satisfactory Level for Water Supply, Source: Analysis Based on Households Survey Data, 2012

Satisfaction Level for Waste Water Management: In ward no. 71 (North zone) of Surat city, 85 of percent of HHs responded for bad, and 15 percent of HHs for satisfactory in pre projects situation

whereas in the post projects 70 percent of HHs for satisfactory, 24 percent for good and 6 percent of HHs for bad (Fig 5.30).

In ward no. 54 (South zone), 90 percent of HHs responded for bad, and 10 percent for satisfactory in pre projects whereas in the post projects stage, 80 percent of HHs for satisfactory, 14 percent for good, and 6 percent for bad. The picture of the services level satisfactory in the three locations of different types of slum improvementis shown in Fig. 5.30.

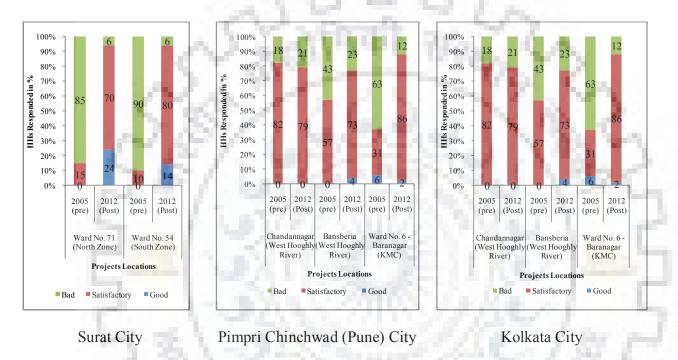


Fig. 5.30: Satisfactory Level for Waste Water Management, Source: Analysis Based on Households Survey Data, 2012-13

Type of Solid Waste Disposal Mechanism: In ward no. 71 (North zone) of Surat city 75 percent of HHs responded that the solid wste were thrown on street, 10 of HHs responded that they were thrown in municipal dustbins, and 15 percent of HHs responded that they were thrown in open space whereas in the post projects 90 percent of HHs responded that they were throwing solid waste in municipal dustbins, 3 percent of HHs and 7 percent of HHs are throwing on the streets and open space respectively (Fig 5.31).

In Ward no. 54 (South zone), 23 percent 27 percent and 50 percent of the HHs were throwing the solid wastes on streets, municipal dustbins and open space respectively in the pre project stage

whereas in the post projects stage 80 percent of HHs, 12 percent of HHs, and 8 percent of HHs are throwing on municipal dustbins, streets, and open space respectively (Fig.5.31).



Surat City Pimpri Chinchwad (Pune) City Kolkata City Fig. 5.31: Types of Solid Waste Disposal, Source: Analysis Based on Households Survey Data, 2012-13

Frequency of collection from Storage Points for SWM: In ward no. 71 (North zone) of Surat city, 70 percent, 30 percent and 10 percent of HHs had responded that municipality used to collect daily, 1 to 3 time in a week, and 4 to 6 times in a week respectively in pre projects situation whereas in post projects stage, 80 percent of HHs for 1-3 times in a week, 5 percent for daily, and 15 percent for 4 - 6 time in a week (Fig 5.32).

In ward no. 54 (South zone), 34 percent of HHs responded for daily, 54 percent of HHs for 1-3 times in a week, and 12 percent of HHs for 4-6 times in a week in pre projects situation whereas in post projects 90 percent of HHs for 1-3 times in a week, 7 percent for daily, and 3 percent for 4-6 times in a week (Fig. 5.32).

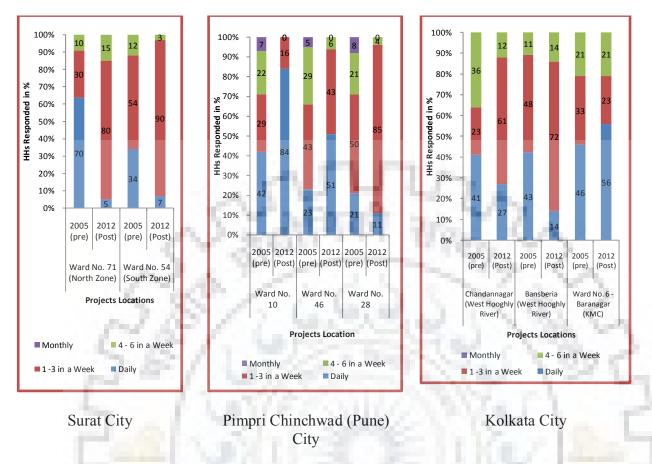


Fig. 5.32: Frequency of Solid Waste Collection from Collection Point, Source: Based on Households Survey Data, 2012-13

Satisfaction Level for Solid Waste Management: In ward no. 71 (North zone) of Surat city, 85 percent of HHs responded for bad, 15 percent of HHs responded for satisfactory in pre projects situation whereas in post projects, 45 percent of HHs for bad, 50 percent for satisfactory and 5 percent for good (Fig 5.33).

In Ward no. 54 (South zone) of HHs 85 percent for bad, 13 percent of HHs for satisfactory, and 2 percent for good in pre projects situation while as in post projects stage, 63 percent for satisfactory, 25 percent for good, and 12 for bad (Fig.5.33).

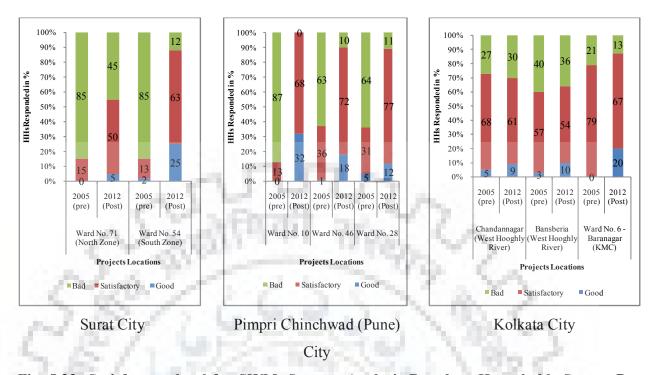


Fig. 5.33: Satisfactory level for SWM, Source: Analysis Based on Households Survey Data, 2012-13

FGD Finding: During FGD, the following aspects such as awareness of JnNURM, water supply improvement, sewerage connection, drainage status, solid waste management status, job prospect, and satisfaction level of BSUP projects in comparison of pre and post projects stage in three cities (Surat, Pimpri Chinchwad (Pune) and Kolkata) were covre variety of projects had been implemented in these cities. The completed projects had been allotted to the beneficiaries of the respective cities.

Based on the FGD, Suart city feed back of beneficiaries had been somewhat negative about the houidng projects in Kosad (north zone) while from Pimpri Chinchwad (Pune) city, there was a positive feedback. As far as In-situ projects in Kolkata city, there was of positive feedback. In comparison the three cities Pimpri Chinchwad (Pune) had better services level to facilities as compared to the Surat city while Kolkata city had remained the same level of services in both stages (pre and post projects) The awareness of the JnNURM was not there in Surat city particularly for those who were benefitted in group housing at Kosad (north zone) in the pre project stage but latter came to know about JnNURM while allotting the houses to beneficiaries. In the case of Pimpri Chinchwad (Pune), and Kolkata the beneficiaries had knew about the BSUP

projects while preparation of DPR. For water supply facilities, there were only few houses which had water supply connection in pre projects stagewhereas in post projects stage the beneficiaries had supply water from the municipalities. The same provided in the Pimpri Chinchwad (Pune). For Kolkata city, there was no need for new water supply connection since they were already having water supply connection. Drainagessystem had little improved by construction of pucca drain and surrounding of colonies at post projects stage in the cities of Surat and Pimpri Chinchwad (Pune) only. Major findings in terms of various parameters based on FGD in three cities are shown in Table 5.35.

Name of Cities			Surat		Pimpri Chinchwad (Pune)		Kolkata	
Types of Slum Improvement			Relocation		Relocation		In-situ Projects	
Sl. No.	Parameters	Units	Pre	Post	Pre	Post	Pre	Post
1	Awareness of JnNURM	Yes/ No	No	Yes	No	Yes	Yes	Yes
2	Water Supply Improvement	Yes/No	No	Yes	No	Yes	Yes	Yes
3	Sewerage Connection	Yes/No	No	Yes	No	Yes	Yes	Yes
4	Drainage Status	Pucca/Kutcha/open drain	Kutcha	Pucca	Kutcha	Pucca	Open drain	Open drain
5	Solid Waste Management Status	Bad/Average/Good	Bad	Average	Average	Good	Average	Average
6	Job prospect	Bad/Good	Good	Bad	Good	Good	good	Good

Table 5.35: FGD Finding in Selected Cities

Source: Based on FGD, 2012-13

5.9 SPECIAL CASE STUDY OF IMPHAL CITY

5.9.1 Introduction

Imphal is a capital of Manipur state located in the extreme of north east India. The city is having a population of 967,344 (2011 census). The city has consisted of 27 wards. The location of Imphal

city is shown in Fig. 5.34. It is the commercial centre of the Manipur. All the other districts of Manipur state depend on the Imphal city to have facilities of health, education and so on. The demand for urban service in Imphal city has been increasing. The Imphal Municipal Corporation was able to cope up the demand of urban services. The state has nine districts (Imphal east (452,661 population), Thoubal (420,517 population), Senapati (354,972 population), Churachanpur (271,274 population), Bishnupur (240,363 population), Ukhrul (183,115 population), Chandel (144,028 population), and Tamenglong (140,143 population) having a total population of 2,721,756of which Imphal west is fastest growing in urban population(Shyamkeshor, 2011).

Imphal with a population of 967,344 as per census 2011 (including Imphal west and Imphal east districts) and 18.91% of population is shared in Imphal West district and 16.63% is shared in the Imphal East district of the Manipur population. The decadal growth rate is 15.82 in Imphal west and 14.63 in Imphal east in years 2001-11. Imphal west has highest population as compared with other districts of Manipur and second highest is in the Imphal East district. Imphal Municipal area is 30.75 Sq. Km and has population of 250234. The decadal growth rate is 11.56 in the year of 1991-2001 (Shyamkeshor, 2014).

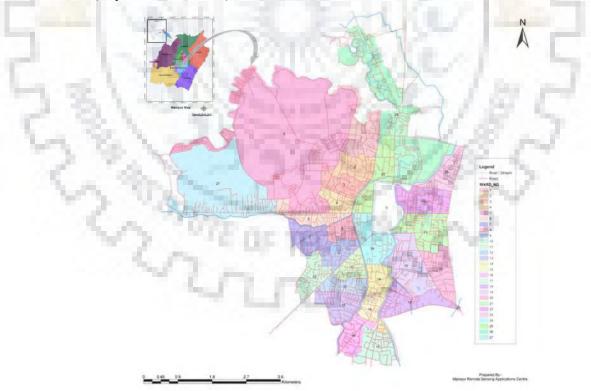


Fig. 5.34: Imphal City Map, Source: Based on Imphal City Map, 2012

Imphal valley is surrounded by hills which are connected with Myanmar in the east and Nagaland in the north by the national high way no. 39 which is passing through the congested city center, without having a bypass. The New Cachar road is another national high way no. 53 which is connecting to Imphal city with Cachar district of Assam in the western side. The nearest railway head is at Dimapur in Nagaland, about 230 km. away from Imphal. The second nearest rail head is at Silchar nearly 250 km. away from Imphal city (Imphal CDP, 2006).

5.9.2 Urban Services Scenario

The urban infrastructure of Iphal city is very poor as compared to other cities of north east India. The dequacy nd quality of urban services specially water supply, waste water management and storm water and drainages system has very poor. The water supply was on alternate days and duration of supply was hardly 2-3 hours (Shyamkeshor, 2013). The services level reported be unsatisfied. The sewer line was being constructing in the last two year. There are no proper storm water and drainages system within the city limit. The solid waste management was very poor in terms of collection and transportation and no dumping site in pre projects situation (Imphal CDP, 2006).

5.9.3 JnNURM Intervention under UIG Sub-Mission

Imphal city is one city that had intervention under JnNURM to improve the urban infrastructure facilities. The total investment in Imphal city (Manipur) under UIG was Rs. 15395.66 Lakhs and shared percentage was 0.21 to the total investment in India. The approved projects in city were 3 DPRs in the sectors of storm water and drainage,

preservation of water body and solid waste management (TPD, 2012). The city had implemented only three DPRs



Fig. 5.35 : Preservation of Water Body Project at Imphal city, Source: Field Survey, 2013

due to weak governance at ULBs level. More over staffs were not capable enough to prepareDPR in the other sectors. The performance of an implementation of mandatory reforms which were to be achieved are also very poor (Table 4.5, Table 4.8 and Table 4.11). This was the reason for poor performance of the city.

The in-depthanalysis of mandatory reforms in city reveal that only 5 components were achieved and rest 5 components were not achieved as on 2012. The implemented mandatory reforms were repeal of ULCRA, 74th CAA (constitution of DPC), enactment of public disclosure law, and stamp duty rationalization to 5 percent. The rest components such as enactment of community participation law, transfer of water supply and sanitation, transfer of city planning functions, 74th CAA (constitutes of 12 schedule function), and last by 74th CAA (constitution of MPC). The most important components of reform had not been achieved leading to implemented limited projects under JnNURM in first phase while the rest of components must be initiative by state government with optimistic manner.

Performance of JnNURM mandatory Reforms at Imphal city Level based on Reform Status 2012: In Imphal city which had been achieved were only two i.e. internal earmarking of fund for services to urban poor and provision of basic services to urban poor out of eight components. These two components of reforms would not able to support and help implementing the projects. The rest of the components such as shift to accrual based double entry accounting, property tax (85% coverage), e-governance set-up, property tax (90% collection efficient), 100% cost recovery (water supply), and 100% cost recovery (solid waste) were equally important. This reforms implementing performance shows that state government pays less attention toward the governing mechanism. This reforms achievement performance was very poor and incomparable to rest cities in India. Strong governance was required to have a JnNURM projects in the city. The positive attitude towards the reforms at state and ULBs level is essential in Imphal city. The state governance should focus on the capacity building in next phase of JnNURM.

Performance of JnNURM Optional Reforms at Imphal city based on Reform Status 2012: In the case of optional reforms, city had achieved only three out of ten components. The implemented reforms were revision of building bye laws-streamlining the approval of land and property, introduction of computerized process of registration of land and property, and earmarking 20-25% developed land in all housing projects for EWS/LIG. The rest components i.e. encouraging public private partnership, revision of building bye laws-mandatory rainwater harvesting in all buildings, simplification of legal and procedural framework for conversion of agricultural land for non-agricultural purpose, byelaws on reuse of recycle water, administrative reforms and introduction of

property title certificate system were not introduced. The overall performance of the all JnNURM reforms is very low and incomparable to rest of the JnNURM cities.

UIG projects Implementation in Imphal City: In Imphal city consisted of three sectors namely; Comprehensive Drainage for Imphal City, Improvement of Nambul River and Naga Nalla River Front, and Solid Waste Management for Imphal city. The financial approved for storm water and drainage sector was Rs. 102.50 Crore, preservation of water sector (Rs. 25.64 Crore), and solid waste management (Rs. 25.80 Crore) respectively.

The nature storm water and drainage works was construction of new channel along the existing roads of Imphal city and finally discharging into the Loktak Lake. For the preservation of water body. The emphasiswas mainly on cleaning the existing water body in the heart of Imphal city; Naga Nallah and Nambul River which would be developed (Fig.5.36). The last project was solid waste management. This projectcomprises of three components namely; (1) supply of municipal solid waste machineries and transportation vehicles (100% physical progress), (2) boundary wall (100% completed), administrative block (95% completed), storm water drainage (80% completed), development of green belt (100% completed) at dumping site, and (3) construction, supply and commission of MSW processing plant (5% completed). The equipments (collection points, storage points, and transportation vehicles) for solid waste management were partially working .The details of UIG projects city is shown in Table 5.36.

SI. No.	Sector	Name	Approved Financial in (Rs. in Crore)	Physical Progress	Targeted Beneficiaries Location	Present Status
1	Storm Water and Drainage	Comprehensive Drainage for Imphal City	102.50	43 % completed	Whole Imphal City	Not Functioning
2	Preservation of Water Body	Improvement of Nambul River & Naga Nalla River Front	25.64	56% completed	Wards No. 2, 3, 4, 14, and 24	Partial Improved
3	Solid Waste Management	Solid Waste Management for Imphal City	25.80	74% completed	Whole City	Partial Working Function (wards No 2, 3, 4, 14, 21, 23)
	Total		153.94			

 Table 5.36: Detailed Projects under UIG in Imphal City

Source: Based on JnNURM Projects Status of Imphal City, 2012





Scenario of Pre Project (Picture Credit by Author, 2012) Likely to Impact at Post Project (source, IMC, 2012)

Fig.5.36: Impact of Preservation of Water Body Project, Source: Field Survey, 2012

5.9.4 JnNURM Project Impact

Out of three projects under UIG sub-mission in Imphal city, only solid waste management had been partly functioning and rest projects were in progress. The major component of the solid waste management under JnNURM scheme at Imphal city was purchase of equipments like dustbins, vehicles for transportation, and construction of dumping site under the projects name --Solid Waste Management at Imphal city" with an approved project cost of 2,580.71 lakhs as per the records of JnNURM projects status 2012, Ministry of Urban Development. Under solid waste management projects, various equipments (dustbins, vehicles, storage etc) had installation in all wards of Imphal city.

After intervention of JnNURM projects for solid waste management, the city had a little improvement in terms of collection, transportation and scientific process of solid waste at dumping site. As per the field observation and surveys in and around the city of Imphal, there was not much improvement in solid waste management especially in the market areas (Ima Keithel Bazaar) and the municipal wastes were still found to be thrown waste into the open drains and open spaces.

The present scenario of solid waste management in the Imphal city is highly inadequate at post projects situation. The dumping of solid waste into open drains of entire city choke and blocks the drains during the rainy season, causing water overflows on the entire city roads. This has created a lot of disturbance to the people (Fig. 5.37, Fig. 5.38, Fig. 5.39, and Fig. 5.40).

Survey Pictures for Solid Waste Management at Post Projects



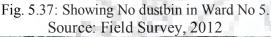




Fig. 5.39: Solid Waste Dumping near Bridge in Ward No.24.Source: Field Survey, 2012

Fig. 5.38: Solid Waste Dumping into Drains in Ward No.14, Source: Field Survey, 2012



Fig 5.40: Solid Waste dumping near Cremation Ground in Ward No.8.Source: Field Survey, 2012

5.9.5 Project Glance under BSUP

As per census 2011, Imphal city had no slum population. However, the Imphal Municipal Council had initiated to take up housing for urban poor projects under BSUP sub-mission, JnNURM. The project was only for In-situ projects in various wards within Imphal. The total number of the targeted beneficiaries was 1250 dwelling units with an approved outlay of Rs. 51.23 Crore. Based on the statistical data, the cost per dwelling unit is Rs. 4.1 lakhs. Release of complete housing cost is divided into four stages – (1) on completion of foundation up to plinth level is 25% of the total housing cost, (2) on completion of superstructure up to roof level is 25% of the total housing cost,

(3) on completion of C.G.I sheet roofing is 25% of the total housing cost, and (4) after completion of house in all respect is 25% of the total housing cost. The cost per dwelling units was higher in Imphal city than Kolkata city. About 4percent of the BSUP projects had completed. The physical progress was very slow due lack of coordination among beneficiaries and IMC. More over there was no study carried out by the Imphal Municipal Council to understand the really condition of poor. The main result for poor performance of BSUP projects was due to weak governance. The advantage and disadvantage of In-situ project is shown in Table 5.37.

Investigation	Investigation Advantages			Disadvantages			
	Improved	Housing	for	Weak Governance, No Transparency to Beneficiaries, No			
Based on	Urban	Poor,	Easy	co-operation with beneficiaries, No Financial sound at			
Field	Implement In-situ Project;			ULB, Own Decision by ULB and No community			
Observation	1.1			participation. No proper provision for Urban Poor			
in the In-situ				Housing.			
Projects in	Better Hou	uses, and	better	Not Pay in Time for Payment of Installment wise,			
Imphal city	Living Quality			Financially burden at the time constructing the foundation			
Impliar City				of houses at maximum number of beneficiaries due to			
	100			financial weak of beneficiaries.			

Table 5.37: In-situ Project in Imphal City

Source: Analysis Based on Field Survey, 2012

5.9.6 Conclusion

The implementation of JnNURM projects in Imphal was very poor. The Urban Local Body was very weak in terms of technical soundness as well as the poor administration at state level whereas the cities of Surat, Pimpri Chinchwad (Pune) and Kolkata had well set up of administrative structure. Since, it was first experience urban infrastructure development projects with huge scale of budget in various sectors in urban area, the Municipality had implemented only three DPRs under UIG sub-mission and one DPR for BSUP. The BSUP project was only In-situ project and targeted 1250 dwelling units, of which 50 of dwelling units were completed and allotted to the beneficiaries. As city hasface stress on urban infrastructure and could not meet the demand of services mainly water supply, sanitia and so on. There was need to encourage the reforms which

had identified series of components under JnNURM reforms. Without implementing reforms, city would not be able to process with urban infrastructure development in the next phase of JnNURM. In order to have capacity building at ULBs as well as state government level, good governance was necessary to exist in Imphal city by following the guidelines and policies of central government for urban infrastructure development. The Imphal city needs to learn from the high performer cities which had performed better in first phase of JnNURM in the two prospects i.e. reforms part for strengthening the ULB and technical knowledge for JnNURM projects for preparation and implementation.

5.10 SUMMARY

The comparative picture of the selected cities (Surat, Pimpri Chinchwad (Pune), Kolkata and Imphal) has shown the performance of the mandatory reforms at state and city level and optional reforms at different level. The other aspects comparative scenario under UIG and BSUP projects performance is discussed below;

Mandatory reforms at state and city level studies carried out based on the secondary data had which goes a pictures of performance levels. Surat performedbetter in comparison to Pimpri Chinchwad (Pune), Kolkata, and Imphalinterm of the overall project outcome (quality and quantity). Imphal city has shown poorest performing among selected cities.

The Surat and Kolkata had a number of projects for water supply, waste water management, storm water and drainages and solid waste management while Pimpri Chinchwad (Pune) city had covered only water supply and waste water management and solid waste management and storm water. Pimpri Imphal city had implemented preservation of water body and solid waste management.

All selected cities had implement BSUP projects under sub-mission of BSUP. They had implemented with different scale of slum pocket/slums dwellers in the respective cities. The strategies of the slums improvement had been slightly different from city to city. In Surat, most of projects were group housing in the fringe areas and these group housing beneficiaries were shifted from central cities to fringe around 10-13 km away from original places to present resident place. Some of projects were relocation of slums dwellers on same location and no In-situ projects.

Kolkata and Imphal cities had implemented In-situ projects in various places within ULBs administrative boundary while Pimpri Chinchwad (Pune) city had implemented the group housing, relocation and no In-situ projects.

The major finding for UIG projects in the selected cities was the project outcome in terms of projects benefit. UIG projects were successful in Surat and Pimpri Chinchwad (Pune) whereas in the Kolkata city had not shown much positive impact in terms of quantity and quality at post projects. The beneficiaries had responded positive feed back / problem about the projects in Surat and Pimpri Chinchwad (Pune) cities under UIG projects while in the Kolkata and Imphal city had responded little improvement at post projects after completion of the projects.

For BSUP projects, Surat city had negative feedback from the beneficiaries, those who are getting benefit under group housing while in Pimpri Chinchwad (Pune) city, beneficiaries had positive response and appreciate the BSUP projects under JnNURM. Imphal and Kolkata had same nature of projects but the beneficiaries had different response for projects. Kolkata had much better performance than Imphal city in planning and implementing process. As a result Imphal city had a negative feedback while Kolkata had positive response.





6.1 GENERAL

The first section of this chapter deals with the findings from national level analysis of JnNURM reforms, fund flow, e-governance, DPRs preparation, and project implementation status. Findings from similar analysis regarding projects – in sectors of water supply, waste water management, storm water and drainage, solid waste management under UIG sub-mission and basic services to urban poor projects under BSUP sub-mission – in the selected cities is discussed in the later section of this chapter.

6.2. STATE AND CITY LEVELS COMPARATIVE PICTURE

6.2.1 Reforms

The reforms are not new in India to strengthen the ULBs for betterment of the urban services. In the last two decades, the government of India has come up with new innovative ideas to ensure the strengthening and empowering of the ULB governance across the country. The 74th CAA is a set of major reforms which have been introduced by Government of India. In the same direction, JnNURM has further enforced a series of reforms at both state and ULB levels. These have been classified into two types, namely: mandatory reforms (consisting of 10 components of reforms at state levels and 8 components of mandatory reforms at city levels) and optional reforms (consisting of 10 components of reforms at city level).

The aim of the reforms under JnNURM is to strengthen the ULBs to perform functionally efficient, financially sound and involvement of community participation in the planning process and preparation of DPRs and so on. In order to provide better urban services across the section of society, reforms are needed. By achieving the reforms, ULBs would be able to carry out JnNURM projects in a sustainable manner. In order to successfully achieve the objectives of JnNURM, a reform strategy has been developed which is represented in Fig. 6.1.

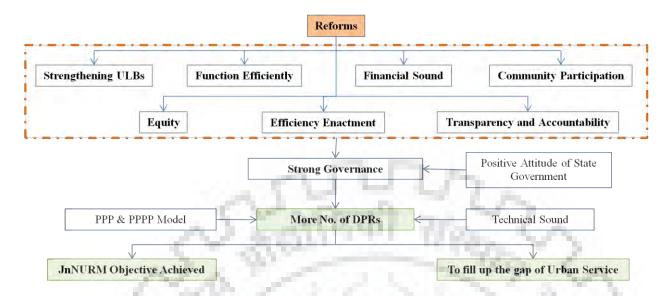


Fig. 6.1 Reforms Strategy to be adopted for Urban Renwal Project

State Level Mandatory Reforms: States of Gujarat, Andhra Pradesh, and Maharashtra have performed better than rest of states/UTs. The reforms performance is based on the attitude of the state government. All states need to implement all JnNURM reforms to ensure better governance. However, most of the state governments have been able to implement only few reforms such as (1) repeal of ULCRA, (2) 74th CAA (constitution of DPC), (3) enactment of community participation law, (4) stamp duty rationalization to 5 percent, (5) enactment of community participation. While they have not been able to implement other important reforms such as (6)transfer of water supply and sanitation, (7)transfer of city planning function, (8)reforms in rent control. The intension of the state governments is to enjoy the power and function in their hand. This situation results in confusion and overlapping of functional duties i.e. no clarity on who will do what and who is responsible for what.

The most important component of reform is 74th CAA (transfer of 12 scheduled functions) which is to deligate identified functions to ULBs. Identified functions cover all sectors of urban planning, and development activities. However, this reform has not been achieved till date and this is main reason for poor performance of JnNURM. Among the 10 components under mandatory reform at state level 74th CAA (constitution of MPC) is applicable only in metropolitan cities (population more than 4 million) and it has been achieved.

Mandatory Reform at City Level: Performance of reform implementation at city level is very poor. Only few cities like Vishakhapatnam, Surat, Vadodara, Indore, and Pimpri Chinchwad (Pune) have achieved all eight out of targeted eight components of mandatory. All eight components of mandatory reforms are equally important, but among these, implementation of components such as -100 percent recovery for water supply", -provision of basic service to urban poor", and -100 percent cost recovery for solid waste management" is required to be completed in short period of 1 year in order to facilitate implementation of proposed JnNURM projects as well as for operation and maintenance of the completed projects in the related sectors. Implementation of remaining components of reform such as -internal earmarking of fund for urban poor", -shifting to accrual based double entry accounting", -property tax (85% coverage)", and -e-governance set up" is needed to be completed in medium term of 2 years. Most achieved reform component -Internal earmarking of funds for urban poor" has been achieved in 63 out of the targeted 65 cities, followed by -shifting to accrual based double entry accounting" (achieved in 54 out of 65 cities) and -property tax (85% coverage)" (achieved in 40 out of 65 cities). Where as the reform component -e-governance set up" was least achieved with implementation complete in only 37 out of 65 cities.

Optional Reform at City Level: The ten components of the optional reforms at city level are (1) encouragement of public private partnership, (2) revision building of bye law – mandatory rainwater harvesting in all buildings, (3) revision of building byelaw – streamlining the approval process, (4) introduction of computerized process of registration of land and property, (5) earmarking 20-25% developed land in all housing projects for EWS/LIG, (6) simplification of legal and procedural framework for conversion of agricultural land for non-agricultural purpose, (7) byelaw on reuse of recycled water, (8) administrative reforms, (9) structural reforms, and (10) introduction of property title certificate system. These components of optional reform are not fully achieved in all 65 cities. One component of reform, namely –introduction of property title certificate system in a single city. Most of the remaining components of optional reforms are achieved in most of the cities. Two important components namely –structural reform" and –administrative reform" are implemented only in few cities. Overall implementation of the optional reform is very poor.

The performance of cities like Kohima, Imphal, Pondicherry, and Patna is very low, they have implemented only 3 components of reforms. Whereas the performance cities like Kolkata, Asansol, Mumbai and Pimpri Chinchwad (Pune), Nashik, Nanded, Hyderabad, Tirupati, Vishakhapatnam, Vijayawada, Ahmadabad, Surat, Vadodara, Rajkot, Porbandar, Allahabad, Kanpur, Lucknow, Varanasi, Meerut, Mathura, Agra, and Raipur is very good, they have implemented 9 out of 10 components of optional reforms. Cities of Panaji, Jammu, and Srinagar have achieved five components of optional reforms and remaining cities have achieved more than five components of reforms.

JnNURM cities have been able to achieve implementation of the ten prescribed components of optional reforms at different levels. Components of reform such as -encouraging PPP", -revision of building byelaws – mandatory rainwater harvesting in all building", -revision of byelaws – streamlining the approval process", -introduction of computerized process of registration of land and property" and -earmarking 20-25% developed land in all housing projects for EWS/LIG categories" have been implemented in most of the cities. The remaining components have been implemented in few cities.

This study shows that, different cities perform at different level. Few cities are able to achieve better performance while most cities achieve low performance. This is due to negative attitude and less attention paid by state government toward reform. Only few cities have sense of responsibility toward citizen welfare. Sustainable urban infrastructure development can never be achieved without implementing JnNURM reforms, identified by Government of India. In this context achieve and sustain the JnNURM project across the country, two types of strategies (short term & medium term) are indentified. The short term strategy plan is illustrated in Fig. 6.2 and medium term strategy plan is illustrated in Fig. 6.3.

Short Term Strategy Plan for JnNURM Reforms: Out of ten components of reform at state level, top priority should be given to implementation of (1) transfer of water supply and sanitation, (2) transfer of city planning function, and (3) transfer of 12^{th} schedule function (74th CAA). Out of the eight components of mandatory reform at city level, top priority should be given to implementation of (1)100% cost recovery for water supply, (2) provision of basic services to urban poor and (3) 100% cost recovery for solid waste management. Out of 10 components of optional

reform two components namely, (1) Administrative reform and (2) Structural reform needed to be implemented on top priority. The identified top priority components of reforms are required to be implemented in short period of time (within 1year). The state government should adopt this strategy of short term prioritization so as to successfully implement JnNURM projects over the long run. A model showing the priority components of reform which significantly influence project planning and implementation as well as operation and maintenance of the completed projects is given in Fig. 6.2.

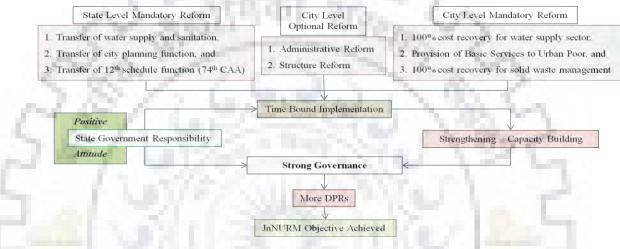


Fig. 6.2 Short Term Plan Strategy for JnNURM Reforms

Medium Term Plan Strategy for JnNURM Reform: Implementation of second priority components of reform at state level namely, (1) Repeal of ULCRA, 74th CAA (constitution of DPC), (2) stamp duty rationalization to 5%, (3) reform in rent control, (4) 74th CAA (constitution of MPC), (5) enactment of public disclosure law, and (6) enactment of community participation law, should be included in the medium term strategy plan. Implementation of second priority components of mandatory reform at city level namely, (1) internal earmarking of fund for urban poor, (2) shifting to accounting double entry accounting, (3) e-governance set up, (4) property tax (90% collection efficiency), and (5) property tax (85% coverage) should be included in medium term strategy plan. Implementation of second priority components of optional reforms at city level namely (1) encourage PPP, (2) revision of byelaws – mandatory rain harvesting in all buildings, (3) revision of byelaws – streamlining the approval process, (4) introduction of computerized process of registration of land and property, (5) earmarking 20-25% developed land for all housing projects for EWS/LIG, (6) simplification of legal and procedure frameworks for conversion

agricultural land for non-agricultural purpose should be included in medium terms strategy plan. The identified second priority components of reform should be implemented within 2 years. The flow chart of medium term plan strategy under JnNURM reforms is shown in Fig. 6.3.

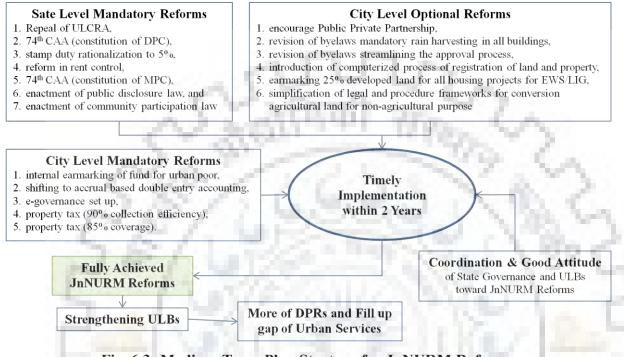


Fig. 6.3: Medium Term Plan Strategy for JnNURM Reforms

6.2.2 E-Governance

E-governance is one of the components of mandatory reforms at city level. This is very important for the citizen to access the information to achieve transparency between the government and citizen. It would ensure comfortable and easy provision of services to citizen. The overall implementation of e-governance in 65 cities is very poor. Considering the implementation of eleven elements of e-governance services namely, (1) department information, (2) mobile governance (m-governance), (3) complaint, (4) online payment for municipal uses, (5) property tax, (6) birth certificate, (7) death certificate, (8) budget, (9) tender, (10) press release, and (11) recruitment; Surat city has achieved best performance. Amongst these elements of e-governance elements of *-*eomponents" and *-*tender" are the most implemented ones while the element of *-*recruitment" is least implemented. In comparison among the 50 cities which have implemented egovernance setup, Mumbai, Kolkata, Delhi, Chennai, and Surat are better performing cities; whereas Guwahati, Raipur, Ujjain, Tirupati, Nainital, Shimla and Panaji, are the poor performing cities. Fifteen cities namely Kochi, Jamshedpur, Pondicherry, Nanded, Bodhgaya, Mathura, Shillong, Imphal, Aizawl, Haridwar, Puri, Kohima, Itanagar, Gangtok, and Porbandar have not implemented even a single element of e-governance setup (Table 4.14).

Best Practice of Administrative Structure: Surat Municipal Corporation, Pimpri Chinchwad Municipal Corporation and Kolkata Municipal Corporation have proper administrative structure. Various departments are set up to deliver various urban physical services namely (1) delivery of water supply across the section of society, (2) construction and maintenance of sewerage and storm water drainages, (3) collection of solid waste efficiently and effectively, (4) construction and maintenance of streets, bridges, flyovers, (5) construction and maintenance of the public facilities such as public latrines, and urinals, (6) lighting of streets and public spaces, (7) preservation of monuments and other historical buildings, (8) removal of the encroachment, and (9) facilitate egovernance services. Apart from these there are other departments setup to deliver urban social services namely (10) education, (11) sanitation, (12) relief in the time of famine, flood or earthquake, (13) orphanage, and (14) medical facilities by these best performing municipalities (SMU, PCMP, and KMC). Sophisticated administrative structure is the main reason for the better performance of the cities (Surat, Pimpri Chinchwad (Pune), and Kolkata).

Surat city is divided into seven zones namely central, north, west, south west, south, south east, and east zone for better administration and functioning. There are different departments with separate role, duties and functions. The administrative structure of Surat Municipal Corporation is represented in Fig.6.4. The names and functions of various departments are (1) Engineering - takes care of bridge cell, street light, special projects, traffic cell, BRTS, CE special, Energy Efficiency cell, environment cell, town planning, town development and hydraulic and drainage, (2) Health – caters to various works namely, solid waste management, health care, vector borne diseases, birth and death registration, Maskati Hospital, SMIMER Hospital, (3) revenue - takes care of collection of revue such as property tax, professional tax, octroi and other tax, (4) social welfare - looks into the slum up-gradation, and urban community development, and (5) fire and emergency department caters to natural and man made dissasters. Pimpri Chinchwad (Pune) has an administrative structure similar to Surat Municipal Corporation but with slit variation as shown in Fig. 6.5. Kolkata city local body being one of the oldest, has a more complex administrative structure than Surat or Pimpri Chinchwad (Pune), due to which it has performed better in administrative reforms.

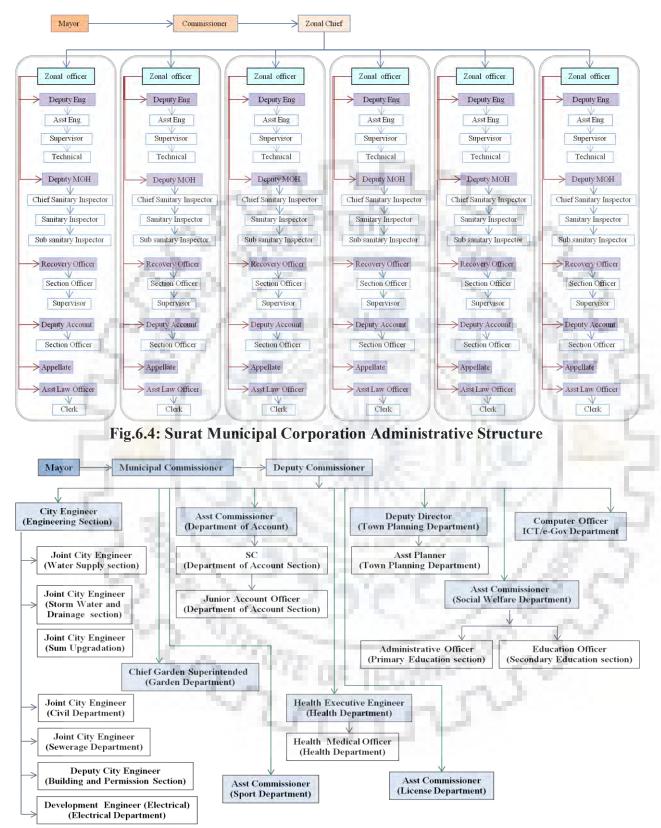


Fig. 6.5: Pimpri Chinchwad Municipal Corporation Administrative Structure

6.2.3 Fund

Fund Flow under UIG in Sector Wise: The total budget approved is Rs. 7269619.67 lakh in eleven sectors (1) water supply, (2) waste water management, (3) storm water and drainage, (4) preservation of water body, (5) other urban transport, (6) roads/flyover/RoBs, (7) MRTS, (8) parking, (9) solid waste management, (10) urban renewal, and (11) development of heritage areas. The highest investment is in the –water supply" sector with 43.37% of the total investment, next sector is –waste water management" with 19.79% investment. Low investments are in the sectors of –development of heritage areas" with 0.2% and –urban renewal" with 0.61%. These eleven sectors are grouped into five Major Sectors; (1) water sector, (2) urban transport, (3) solid waste management, (4) urban renewal, and (5) development of heritage areas based on the similar characteristic of project. In comparison of the Major Sector under UIG, water sector has highest (74.88%)investment, next is urban transport sector (21.45%), solid waste management (2.87%), urban renewal (0.61%) and heritage development (0.20%) (Fig. 4.5).

Fund Flow under UIG at State Level: Fund flow in comparison of 31 state/UTs, West Bengal has highest investment, followed by Maharashtra; while lowest investment is in Nagaland, Sikkim, and Goa. The states of West Bengal, Maharashtra, Delhi, and Gujarat have spent more money under JnNURM as compared to rest of states in India. The state of Uttar Pradesh, Tamil Nadu, Andhra Pradesh, Karnataka, and Madhya Pradesh share above 3 percent of total fund allocation under UIG sub-mission whereas the rest states share below 3 percent of the total fund allocation. The different level of projects implementation is due to different level of capacity, advanced skill and experience of the project management.

Fund Flow under UIG at City Level: In comparison of 65 cities, Kolkata and Delhi have spent highest investment under UIG sub-mission. Kolkata city has spent Rs. 1728201.07 lakh and share 23.77 percent of the total investment under UIG sub-mission, while Delhi has spent Rs. 694371.00 lakh and share 9.55 percent of the total investment. Cities of Mumbai, Chennai, and Pimpri Chinchwad (Pune), have spent more than 4 percent of the total investment while Bangalore, Hyderabad, and Ahmadabad share between 3 and 4 percent of total investment. Surat, Lucknow, Vishakhapatnam, and Nagpur shared between 2 and 3 percent of total investment, while the remaining JnNURM cities have spent less than 2 percent of the total investment.

In brief, sharing of fund pattern is different for different size of the cities. The funding pattern for different category of city size is discussed in chapter 2. The north eastern cities and Jammu and Kashmir cities have more opportunities in term of fund sharing for the projects (90% share from centre and 10% from states). Many cities require various numbers of projects from the eleven UIG sectors; however, funds and size of the city do not matter for success of the JnNURM projects. Performance level depends totally on how city governance has approached the issue of urban development. For example even though there are 28 cities in 1 to 4 million population (as per Census 2001) category with similar funding pattern, three cites of Surat, Pimpri Chinchwad (Pune) and Coimbatore have performed far better than other cities of that category. State governance is another matter regarding reforms. Not only lack of co-ordination between state government and ULBs, but also delays in implementation of 74th CAA has resulted in difference in level of fund utilization.

Fund Flow under BSUP: The total investment under BSUP sub-mission is Rs. 29906.53 Crore in 31 state/UTs. In comparison among 31 states/UTs, Maharashtra, West Bengal, Andhra Pradesh, Delhi, Uttar Pradesh, Tamil Nadu and Gujarat states have spent Rs. 7009.28 Crore, Rs. 4003.38 Crore, 3415.49 Crore, Rs. 3257 Crore, Rs. 2353.81 Crore, 2327.32 Crore, and 1723.76 Crore respectively. These states have highest investment and targeted maximum numbers of dwelling units. The states of Karnataka, Bihar, Madhya Pradesh, Chandigarh, Jharkhand, Rajasthan, Chhattisgarh, Kerala, Jammu and Kashmir, Pondicherry, Nagaland, and Assam have shared between 108.44 Crore and 841.48 Crore while the rest of the states have shared less than Rs. 100 Crore.

In comparison of 65 cities, Kolkata, Hyderabad, Delhi, Mumbai, and Pimpri Chinchwad (Pune) have highest investment of Rs. 3382.52 Crore, Rs. 1884.95 Crore, Rs. 3257.72 Crore, Rs. 3061.39 Crore, and Rs. 1761 Crore respectively. The lowest invested cities are Itanagar, Shillong, Shimla, Puri, Nainital, Amritsar, Agartala, Gangtok, Panaji and Haridwar which have invested Rs. 49.25 Crore, Rs. 51.25 Crore, 51.74 Crore, Rs. 24.01 Crore, Rs. 11.02 Crore, Rs. 19.79 Crore, Rs. 5.79 Crore, Rs. 16.73 Crore, Rs. 33.58 Crore, Rs. 10.22 Crore and Rs. 3.62 Crore respectively. In India, mega cities which have population of more than 4 million share more budget allocation (approved cost Rs. 14006.69 Crore), whereas cities having population between 1 to 4 million have spent Rs.

11678.61 Crore. Remaining JnNURM cities have spent Rs. 3597.22 Crore. In the north east cities and Jammu and Kashmir cities have spent Rs. 699.18 Crore.

In brief, lack of urban planning and inclusive plan for basic services to urban poor led to the poor performance of most JnNURM cities. Management of urban land is another issue in housing projects for urban poor in most of cities. State governments have lacked coordination with ULBs in the implementation of BSUP sub-mission of JnNURM. Inadequate technical skills staff at ULBs has impaired their capacity to prepare DPRs. Ineffective implementation of special reforms – like –earmarking 25% developed land in all housing projects for EWS/LIG" and –provision of basic services to the urban poor", intended at facilitating fund utilization – in most cities has not only led to ineffective utilization of funds under BSUP sub-mission, but also reduced its success rate. Municipalities are facing difficulty in upkeeping the basic services provided along with DUs to the identified slum families in implemented Relocation Projects; as a result living conditions in these projects have deteroriated.

6.2.4 DPR

The City Development plan (CDP) is a vision document for city development for specific period of time (for five year plan). This CDP would highlight the requirement of the urban infrastructure facilities of the respective cities and financial requirement of each urban infrastructure sectors. Based on the CDP document, Detail Project Report (DPR) is to be prepared by ULBs. The JnNURM cities have different levels of DPR preparation due to availability of different level of technical staff at ULBs level. As a result, each JnNURM city is performing at different level.

DPR Preparation: Many states and cities are not unable to leverage available fund under JnNURM because of the lack of implementation capacity. Municipal staff has poor DPR preparation skills due to lack of exposure and technical expertise. While preparing and planning for city development, PPP and PPPP model are not adopted except for few state and cities (advance cities and better performing cities). The JnNURM reforms are key elements to build up the implementation capacity in identified JnNURM cities. The mechanism to implement the reforms and DPRs did not exist in first phase of JnNURM; therefore, the performance of the DPRs implementation is at different level amongst JnNURM cities. Hence, capacity building is required to provide better services to the society. **DPR Approved at State Level:** As shown in Table 4.23, Maharashtra, and Gujarat have most number of DPRs approved under UIG sub-mission as on 2011 at state level. Maharashtra has proposed 174 DPRs and approved 78 DPRs, while Gujarat state has proposed 112 DPRs and approved 71 DPRs. Lesser number of DPRs are proposed and approved in the states of Goa (proposed 7 DPRs and approved 1 DPR), Chhattisgarh (proposed 9 DPRs and approved 1 DPR), and Mizoram (proposed 10 DPRs and approved 1 DPR). Considering the percentage of approved DPRs out of the proposed DPRs; Chandigarh has the highest percentage (75% of DPRs approved), Rajasthan (72.22% of DPRs approved), and Tamil Nadu (68.12% of DPRs approved) while low percentage of DPRs have been approved in the states of Mizoram (9.52% of DPRs approved).

DPR Approved at City Level: As shown in Table 4.24, a total of 599 DPRs have been approved in 65 cities. Highest numbers of DPRs have been approved for the cities of Kolkata, Bangalore, and Chennai while lowest numbers of DPRs have been approved for the cities of Jamshedpur and Raipur. Each city required investment in different sectors and focus to improve based on city specific requirements. Mega cities have gone for more investment in urban transport sector while medium cities have gone for more investement in water supply sector. North east and Jammu and Kashmir cities have gone for more investement in solid waste management sector.

6.2.5 Implementation

UIG Implementation: Total of 559 DPRs has been approved for implementation under UIG in 65 cities. Mega cities of Kolkata, Bangalore, Chennai, Delhi, Mumbai, Ahmadabad and Hyderabad share 42.03 percent of DPRs, while north eastern cities of Aizawl, Srinagar, Imphal, Kohima, Itanagar, Guwahati, Jammu, Agartala, Shillong and Gangtok share 4.65 percent of DPRs. The remaining cities share 53.31 percent of DPRs.

Total number of DPRs approved in mega cities of Kolkata, Bangalore, Chennai, Delhi, Mumbai, Ahmadabad and Hyderabad are 235. Out of these most number of DPRs have been approved in water supply sector (56 DPRs), waste water (43 DPRs), storm water and drainage (37 DPRs), solid waste management (7 DPRs), other urban transport (14 DPRs), Roads/flyover/RoBs (65 DPRs), MRTS (4 DPRs), parking (3 DPRs), urban renewal (4 DPRs) and development of heritage areas (2 DPRs). Fig. 6.6 shows that mega cities are facing more serious issues/problems in urban transport

system and implemented more number of roads/flyover/RoBs projects than water supply and waste water management projects.

Total number of DPRs approved in Jammu, Srinagar and north eastern cities of Aizawl, Imphal, Kohima, Itanagar, Guwahati, Agartala, Shillong and Gangtok is 26. Out of which 8 DPRs have been approved in water supply sector, 5 DPRs in waste water management sector, 3 DPRs in storm water and drainage sector, 1 DPR in preservation of water body sector, 3 DPRs for solid waste management, 1 DPR in other urban transport, 4 DPRs in roads/flyover/RoBs, and 1 DPR in parking. Fig. 6.6 shows that north east cities have inverted more in the water supply and waste water management sectors.

The remaining 48 cities have 298 approved DPRs, of which water supply (94 DPRs), waste water management (64 DPRs), storm water and drainage (33 DPRs), preservation of water body (3 DPRs), solid waste management (35 DPRs), other urban transport (2 DPRs), road/flyover/RoBs (37 DPRs), MRTS (37 DPRs), parking (1 DPR), urban renewal (7 DPRs), and development of heritage areas (5 DPRs) . Fig. 6.6 shows that smaller and medium cities have focued on water and waste water management sectors while less focus in parking sector.

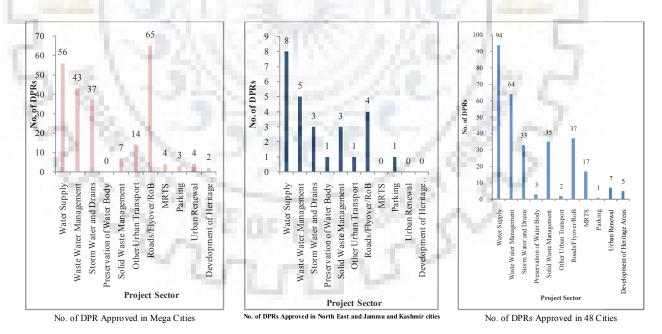


Fig. 6.6 Project Distribution in India under UIG, JnNURM

Except for few metropolitan cities and medium towns, most Indian cities are in various stages of transformation from rural to urban. These transforming cities lack urban sanitation and services and hence they require more investment on the creation of urban infrastructure facilities such as water supply, waste water management and storm water and drainage and solid waste. On the other hand mega cities are facing more problems in urban transport sector and renewal of old city areas. This is the reason behind different target for different cities. North eastern cities have inadequate infrastructure for water supply system and waste water management but they could not implement many DPRs in these sectors due to the lack of capacity and expertise at ULB level. This necessitates focusing on the capacity building by setting up proper administrative structure.

BSUP Projects Implementation at State Level: In comparison of BSUP project implementation at state level, Maharashtra, West Bengal, Andhra Pradesh, and Gujarat have targeted maximum number of slum dwelling units (above 100000 DUs) in comparison to other states/UTs across the country. Tamil Nadu, Delhi, Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Kerala, Rajasthan, Bihar, and Jharkhand have targeted below between 10,000 to 1,00,000 dwelling units in respective state. The third highest groups of states are Jammu and Kashmir, Punjab, Nagaland, Haryana, Pondicherry, Orissa, Assam, Uttarakhand, Manipur, and Mizoram have targeted between 1,000 to 10,000 DUs. The remaining states/UTs have tageted less than 1,000 slum dwelling units. The BSUP sub-misssion of JnNURM has provided 10,53,343 slums dwelling units across the country serving about 8.04 percent of slum families (Census, 2011 figure, slum population 6,54,94,604 / 5 persons per family = 1,30,98,921 slum families).

BSUP Projects Implementation at City level: Kolkata, Hyderabad, Delhi, Mumbai, and Pimpri Chinchwad (Pune) cities have targeted and approved maximum number of slum dwelling units as compared to other cities. However, coverage of slum population is low under BSUP sub-mission, JnNURM. Smaller cities namely; Itanagar, Shillong, Shimla, Puri, Nainital, Amritsar, Agartala, Gangtok, Panaji and Haridwar have targeted between 100 to 1,000 slum dwelling units. In comparison among categories of cities by population size (mega cities, medium cities, other smaller cities, and cities in north east and Jammu and Kashmir), the mega cities targeted 4,45,080 dwelling units with an investment of Rs. 582.85 Crore, while medium cities have targeted 4,57,745 dwelling units with an investment of cost of Rs. 11678.61 Crore. Other smaller cities targeted

138823 dwelling units with an investment of Rs. 3597.22 Crore, while cities in North east and Jammu and Kashmir have targeted 16917 dwelling units with an investment of Rs. 699.18 Crore.

The cost of the dwelling units is highest in the cities of Panaji (Rs. 7 lakhs per dwelling unit), Nagpur (Rs. 5 lakhs per dwelling unit), Mathura (Rs. 5 lakhs per dwelling unit), Dehradun (Rs. 5 lakhs per dwelling unit), and Pondicherry (Rs. 5 lakhs per dwelling unit) whereas in the cities of Surat, Madurai, Jabalpur, Ludhiana, the cost is 1 lakh per dwelling unit.

Above comparison study of cities performed among JnNURM cities have reveal that all cities are not at same level for urban infrastructure development. Disparity occurs among the JnNURM cities (better performing and poor performing cities). This is mainly due to incapacity to prepare the DPR and other reforms matter (achievement level). In order to implement urban infrastructure development under JnNURM in a sustainable manner, a model has been developed based on the research study which includes peer experience and reflective learing as shown in Fig 6.7.

6.3 PEER EXPERIENCE AND REFLECT LEARNING (PEARL) MODEL

Peer Experience and Reflect Learning (PEARL) is a model for successful implementation of JnNURM based on the present study. All cities could not achieve their objectives, but few of them had performed remarkably well, so sharing and learning from better performing cities can help other cities to achieve JnNURM objectives.

The performance of the JnNURM cities are quite poor, only few cities have successed in terms of the project completion. The cities are classified into three category based on the performance of projects implementation and reforms achieved. The state governments perform at different levels and consequently reflecting different level of projects implementation. Therefore, in order to achieve success in the next phase of JnNURM the peer experience and reflective learning (PEARL) model is adapted, such that all experienced cities could share their experiences with the low performing cities on a regional level (north region, western region, central region, southern region, north east region). Quality improvement programs for DPRs preparation and project implementation at city level are integrated in the model. Cities belonging to three performance categories (viz. High performance, average performance and poor performance) should participate in separate Quality improvement programms, under sub-missions (UIG and BSUP) to share

knowledge and experiences among themselves. Inputs from highly technical and subject experts nominated by the central government are recommended in the PEARL apart from the Quality Improvement Programs. Fig. 6.7 shows a conceptual framework of QIPs and PEARL workshops intended to improve the quality and quantity of the staffs involved in planning and implementation of projects both under sub-missions of JnNURM.

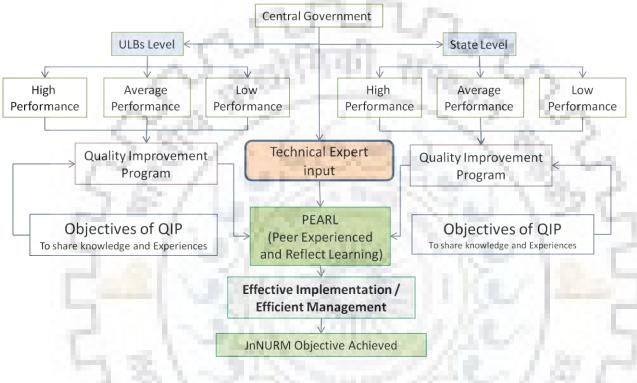


Fig. 6.7: PEARL Model for JnNURM

6.4 DISCUSSION ON SELECTED INFRASTRUCTURE OF THE SELECTED CITIES

Analysis done in chapter five reveals various levels of performance achieved by different cities in projects implemented under different sectors of urban infrastructure. In the case of water supply sector, DPR-I in Surat city, DPR-III in Kolkata and DPR-I in Pimpri Chinchwad (Pune) city have achieved best performance.

In the case of waste water management sector, DPR-VI in Surat, DPR-V in Kolkata and DPR-I in Pimpri Chinchwad (Pune) city have achieved best performance. Whereas in the case of storm water and drainage sector, DPR- III in Surat and DPR-V in Kolkata city have achieved best performance. And in case of solid waste management sector, Vesu areas in Surat city and Bansberia in Kolkata city have achieved best performance, while Pimpri Chinchwad (Pune) has achieved poor performance. In the case of BSUP project, Pimpri Chinchwad (Pune) has performed better implemented redevelopment in Nigadi (ward No.10) while Kolkata has best implemented In-situ project in Chandanagar. The remaining cities of Surat and Imphal have performed poor in the implementation of BSUP projects. The Table 6.1 show the comparative performance of the projects implemented in three selected cities.

Sector	Surat City	Pimpri Chinchwad (Pune) City	Kolkata City	Imphal City
Water Supply	DPR-I	DPR-III	DPR-I	Nil
Waste Water Management	DPR-IV	DPR-V	DPR-I	Nil
Storm Water and Drainage	DPR-III	Nil	DPR-V	Nil
Solid Waste Management	DPR-I	DPR-I	DPR-I (Bansberia Municipal)	Nil
BSUP Project	Nil	Redevelopment Project (DPR-I) at ward No.10	In-Situ Project at Chandanagar Municipal	Nil

Table 6.1: Best Practices of DPRs in Selected Cities

Based on Field Investigation, 2013-14

6.4.1 Water Supply

6.4.1.1 Operational Inference from Best Practices of Selected Cities

Water supply projects of similar nature have been implemented in cities of Surat, Pimpri Chinchwad (Pune) and Kolkata. These mostly include construction and creation of physical infrastructure like, water treatment plants, distribution network, pumping stations, over head tanks, etc. Surat has 7 projects while Pimpri Chinchwad (Pune) has 5 projects and Kolkata has 22 projects.

Focus group discussions with agencies implementing water supply projects in the three cities revealed various aspects leading to variation in project performance. Staff at Surat Municipal Corporation has planned the projects in an effective and efficient manner which resulted in timely completion of projects. Maximum number of projects in Pimpri Chinchwad (Pune) been related to

the augmentation and creation urban infrastructure facilities. Water supply projects in Kolkata mostly included renovation rather than creation of urban infrastructure. But construction of new water supply facilities have been implemented to fill the gap of urban services in some Municipality locations within Kolkata Metropolitan region.

Best Practice for Water Supply Project in Surat City: Based on field observation and focus group discussion with implementing agencies of Surat city, it was revealed that under JnNURM water supply has tremendously improved in terms of coverage as well as quality and quantity in newly developed areas of south zone and west zone. As represented in Fig. 6.8 the projects located at Vesu (south zone) and Pal (west zone) have been completed and residents there are getting benefited. As compared to the pre projects status these projects have brought major improvement in socio-economic status of residents. In the post project stage, beneficiaries no longer depend on ground water for their daily needs, which is a positive impact on the ground water table in the areas.





Vesu (South Zone) under DPR-

Pal (West Zone) under DPR-

Fig: 6.8: Physical Progress of the Water Supply Projects in Surat City. Source: Field Survey, 2012

Under DPR-I (water supply distribution systems for Town Planning Scheme No. 1 to 7 of Vesu of SUDA area) pumping machinery was installed in pumping station at Vesu and clean water reservoir was constructed at Pal. This project has been successfully completed in time as per the project schedule. The major component of this project included laying pipeline in maximum areas in west zone and supplying average of 3-4 hours daily water supply. The quality and quantity of water have improved at post project stage. The taste of water is relatively better as compared to pre

projects situation. The satisfaction level has also increased from pre projects. The project has been working and residents are getting benefits as per the DPRs objectives. This is one of the best practices which SMC has carried out successfully under JnNURM. Fig.6.9 represents physical progress of water supply projects in Surat city.



Pumping under DRP-, at Vesu

Clean Water Storage under DPR-, at Pal Fig. 6.9: Water Supply Progress under UIG, in Surat City, Source: Field Survey, 2012

Best Practice for Water Supply Project in Pimpri Chinchwad (Pune): Under DPR-I Pimpri Chinchwad (Pune) city has constructed new water treatment plants which covered the uncovered areas in wards 19 and 18. This project also included construction of elevated service reservoirs, laboratory setting up for checking water quality and installation of water meters (Fig 6.10). Based on household survey data it is revealed that quality and quantity of water has improved post project. The social improvement of the project is that women do not fetch water from other sources at post project stage. The DPR-I is the best projects which is implemented in Pimpri Chinchwad (Pune) and it is successful in terms of benefits considering the parameters of water quality and N. quantity.



Water Quality Monitoring under DPR, at 19



Newly Connection of Sewer Line in Ward No. 19



Water Clarifier under DPR, at Ward No. 19



Water Meter Facility Installed at Post Proejet under DPR-I in ward No. 19

Fig. 6.10: Water Quality testing at WTP in Pimpri Chinchwad (Pune) City, Source: Field Survey, 2012

Best Practice for Water Supply Management in Kolkata City: Development and management of water supply project at Salt Lake, sector-V under UIG, JnNURM has been choosen as Best Practice for Water Supply and Waste Water Management in Kolkata. In the pre projects situation, this area did not have proper water supply (Fig 6.11). The residents had to use ground water for daily requirement. Kolkata Metropolitan Development Authority (KMDA) has planned for water supply and sewerage projects under UIG, JnNURM and implemented in the year of 2006. The process of implementation was totally based on the Build Operate



Fig. 6.11: Over Head Tank at Salt Lake, Sector – V, Kolkata City, Source: Field Survey, 2012

Transfer (BOT) through the competition of bid by tendering system.

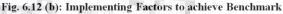
The major components of work executed include (1) laying of dedicated main from existing underground reservoir to be constructed at a designated location in Sector – V; (2) laying of water supply pipeline network in sector – V, and delivery of water to all premises in sector –V by running and mapping the system, against levy of combined water and sewerage charge. The projects included - Construction of a Sewerage Treatment Plant (STP), laying down the entire sewerage pipeline network within Sector – V, and Operate and Maintain (O&M) of this entire installed facility for a period of thirty years after construction of this installation against payment of combined water and sewerage charges by the consumer. This project has been completed and working at full swing. The success of this project is mainly due to the Public Private Partnership model. The positive impact of this project is water pipe line connection, and sewer connection to all premises, sanitation improvement and avoiding drawing ground water at post projects stages. It would be best model to demonstrate the JnNURM projects to other poor performing cities.

4.6.1.2 Useful Guideline for Sustainable Water Supply System

The assets of urban infrastructure facilities created under JnNURM should be maintained in a sustainable manner. The operation and maintenance is very important and mandatory for effective and efficient urban services to meet the benchmark. The services benchmark which was documented are (1) water supply benchmark (24×7 water supplies, and 100% coverage), (2) extent of non revenue water (NRW) -15%, (3) extent of metering of water connections -100%, (4) QUALITY OF WATER SUPPLY-100%, (5) efficiency of redressal of customer complaints -80%, (6) cost recovery in water supply service, and efficiency in collection of water supply-related change-90% (Fig. 6.12 (a)). Therefore, it is suggested to encourage the implementing factors such as (1) strong institution (capacity building), (2) Public Private Partnership (PPP) and People Public Private Participation (PPPP), (3) public awareness, and (4) monitoring and auditing and operation and maintenance (Fig. 6.12 (b)). These two are correlated to bring the better services for water supply.

	Water Supply Benchmark (Documented by Ministry of Urban Development)		
1. 2. 3. 4. 5. 6. 7. 8. 9.	coverage - 100% 135 lpdc Water Supply -24x7 Non Revenue Water - 15% Extent of metering of water connections - 100% Extent of non-revenue water (NRW) - 20% Quality of water supply - 100% Efficiency of redressal of customer complaints -80% Cost Recovery in water supply services - 100% Efficiency in collection of water supply-related changes	1. 2. 3. 4. 5. 6.	Implementing Factors Institutional Strong and Capacity Building at ULBs PPP and PPPP Model Adopt while DPR Preparation Revenue Collection Public Awareness for any Projects Monitoring and Auditing Operation and Maintenance

Fig. 6.12 (a): Water Supply Benchmark



6.4.2 Waste Water Management

There are nine projects approved in Surat city. Out of nine projects, maximum number of projects had been completed. The projects are mainly on the construction of sewer laying in the Pal and Vesu in the south west and west zone of Surat city. The components of the projects are on construction of STPs and laying the sewer line in the developing region of the south west and west zone of the Surat city. These projects are covering large number of population. The major works for waste management in the Surat city are creation and providing line facilities in the uncovered areas within city. There is lot of positive impact of projects on the environment as well as the beneficiaries appreciated this project. In the Pimpri Chinchwad (Pune), the major works for waste water management is also almost the same as Surat and result the positive impact of the projects. But in Kolkata, there is less impact except the projects in Salt Lake, Sector-V.

6.4.2.1 Operational Inference from Best Practices from Selected Cities

Waste Water Management Project in Surat city: The major findings are (1) sewer lines had covered the localities of west zone and south west zone where no sewer line was present at pre projects situation. Waste water is collected efficiently and the sanitation is improved; (2) the waste water management projects observed positive impacts in the benefited localities by having proper sewer connection; and (3) community participation in the projects was totally absent, no involvement from the beneficiaries in the projects planning and implementation of JnNURM.

The positive impact is that waste water is collected through sewer lines and treated at STPs that is ultimately discharged for agriculture purpose at post project. This has improved the ground water as per the field observation since all the houses want to connect the sewer line and connected almost 90 percent of the houses which was targeted as per DPR-I. This newly constructed sewerage treatment plant has brought up the living standards by improving the sanitation of Surat city. Fig. 6.13 shows the physical progress of the waste water management projects under JnNURM.



Sewer Connection at Post Project Situation

Sewerage Treatment Plant under DPR-I at Anjana,

Sewerage Treatment Plant under DPR-II at Anjana

Fig. 6.13: Physical progress of the Waste Water Management Projects under JnNURM in Surat City, Source: Field Survey, 2012

Best Practice for Waste Water management in Pimpri Chinchwad (Pune) City: In pre projects the beneficiaries didn⁴t have sewer connection and discharged into open drains whereas at post project beneficiaries start connecting sewer line and consequently improve the surround areas. Fig. 6.14 shows the comparative pictures of pre and post situation for waste water management in ward No. 19. In post projects, the beneficiaries have positive response regarding the waste water management. These projects brought tremendous changes of sanitation improvement. The newly connected sewer line in ward No. 19 of Pimpri Chinchwad (Pune) city has improved the sanitation. Flows of waste water merged with open drains in the existing area are almost improved. As per the field observation, benefited project areas are awared of hygienic disposal of the waste water. The maintenance of the municipality is also good in current situation which results improvement of sanitation and reduces the unhygienic. Surrounding environment, soil and vegetable and ground reflects the improvement.





No connection in Pre Project Situation in Ward No. 19 Sewer connection in Post Project Situation in Ward No. 19 Fig. 6.14: Comparative Picture for Waste Water management in Pimpri Chinchwad (Pune) City, Source: Field Survey, 2012

Best Practice for Waste Water Management in Kolkata city: DPR-I for waste water management in Salt Lake City Sector-V of Kolkata is one of the best implemented works. The project included construction of STP and installation of pumping equipements at pumping station. In the absence of sewer in the pre project, waste water from the households was dischareged into open drains resulting in acute water logging problems in the adjoining low lying areas and open drains as well. Diseases related to waste water such as Diarrhea, Amoebiasis, jaundice and gastroenteritis were rampeant in the localities in pre project stage; these have reduced to a great extent in post project stage. Due to implementation of this project discharge of waste water into open drains and adjoining areas within the colony is stopped and the surrounding environement has improved. The satisfaction level of waste water disposal system is high at post project stage. The physical progress for waste water management project for Salt Lake Sector-V is represented in Fig. 6.15.

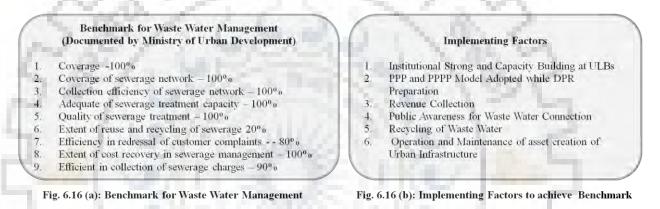




STP at Salt Lake, Sector-VSewerage Pumping Station at Salt lake Sector-VFig. 6.15: STP and Pumping at Salt Lake Sector-V, Source: Field Survey, 2012

6.4.2.2 Useful Guideline for Sustainable Waste Water Management

The benchmarks documented by Ministry of Urban Development listed in Fig. 6.16 (a) are intended to enable operation and maintenance of waste water management assets created through JnNURM projects in a sustainable manner. Guildlines have been drawn from the case study best practices to achieve this objective. The identified implementation factors include (1) strong institution structure and capacity building at ULBs, (2) PPP and PPPP model while preparation of DPRs, (3) revenue collection, (4) public awareness for waste water management, (5) recycling of waste water, (6) operation and maintenance of the asset created under the JnNURM projects (Fig. 6.16 (b)).



6.4.3 Storm Water and Drainage

Three projects have been implemented and completed in Surat city, in central zone, south west zone and eastern zone respectively. DPR-I of Kolkata city included storm water and drainage projects in Hooghly-Chinsurah and Bansberia locations. In all twelve storm water and drainage projects have been approved in Kolkata, including Kharah, Panihati, North Dum Dum, Dum Dum and South Dum Dum, etc.

6.4.3.1 Operational Inference from Case Studies of Selected Cities

Field Observation in Surat City: In Surat City, storm water and drainage projects have been implemented in coordination with most roads constructed in newly developed areas of west zone and south west zone. Drainage projects implemented in the old city area (central zone) include rejuvenation of drains along existing roads. Fig. 6.17 shows the physical progress of storm water

and drainages projects. It can be seen that, during raining season, newly constructed drainage projects in eastern zone (ward no. 77) are functioning well, while central zone (ward no. 9) is still facing problems of water logging. The storm water is finally discharged into the Tapti River (Fig 6.17). There was no plan for recycling method. This shows lacuna in project planning and implementation.



Newly Constructed Drainage line (ward no. 77)



Discharging into Tapti River (ward no. 11)



Newly Constructed at Central zone (ward no. 11)



Water logging during rainy season (ward no. 9)

Fig. 6.17: Physical Achievement under JnNURM for Drainage projects in Surat City, Source: Field Survey, 2012

Filed Observation in Kolkata City: In Kolkata, implementation of most of storm water and drainage project along roads in Bansberia has been completed. In pre projects situation, rain water would accumulated in low laying region of study areas which led to harboring of mosquitoes and spreading of water born diseases. Another issue was that household waste water (grey water) discharged into the road side open drains, which ultimately entered the major storm water drains, carrying with it huge quantity of silt. Twenty percent of total road length in Bansberia has been covered under the storm water and drainage project. The flow of storm water in the covered drain has improved the environment condition in the projects areas in post project stage. This also results

in the improvement of ground water quality, aesthetics and health conditions in surrounding localities. This project has significantly improved the overall quality of life at post project stage. The problem of over flow during rainy season has been reduced to some extent. Fig. 6.18 shows the physical progress of the closed drain in Bansberia.





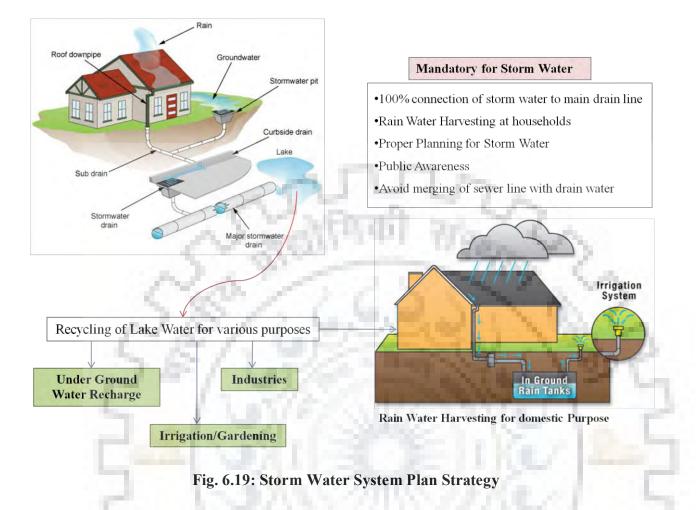
Drainage Constructed at Bansberia, Kolkata City Closed Drainages Constructed at Bansberia, Kolkata City Fig. 6.18: Physical Progress of Storm Water and Drainages in Bansberia, Source: Field Survey, 2013-14

Awareness at community level is necessary in order to stop disposal of as well as cleaning of solid waste accumulated in the newly constructed drains. Discharge of household waste water into storm water drains is a common malpractice in the selected areas.

In the selected cities coverage of storm water drainage is less than 40% of total road length and collection of storm water is inadequate. As per field investigation, most of households discharge waste water into open drains which empty into adjoining lowlying areas. This results in unhygienic environments surrounding residential colonies. Both government authority and beneficiaries have to participate in planning and designing of storm water drainage system.

6.4.3.2 Useful Guideline for Sustainable Storm Water and Drainage

Based on the filed observation, the best practice to be adopted for storm water at household level is that each household should have separate connection for storm water as shown in Fig. 6.19. Water bodies should be planned in every watershed for collecting storm water from houses which shoul be recycled for used in various municipal purposes. On the other hand, government authority / municipalities have to cover maximum roads within city limit under storm water network.



6.4.4 Solid Waste Management

Municipality is responsible for solid waste management in cities and towns (census town). Surat, Pimpri Chinchwad (Pune) and Kolkata cities have initiated the implementing of solid waste management projects under JnNURM in order to keep the city clean and hygienic. These cities have implemented various works like installations of the dustbins at source, collection points within society/colonies, construction of transfer stations, secondary transportation vehicles, and construction and installed of various equipments at dumping site, cleaning machines on roads side and so on.

6.4.4.1 Operational Inference from Best Practices of Selected Cities

Solid Waste Solid waste management project in Surat City: The SWM project implemented in Surat city consist of many components namely, collection vehicles, storage points, transfer stations

and transportation vehicles and dumping site construction with other machineries. This project which will benefit the entire city is completed. Private company has been involved in the installation and function of SWM at post project. Very serious steps had been taken by the Surat Municipal Corporation to improve the solid waste management of whole city right after plague broke out in 1994. However newly developed areas faced irregular collection, dumping of solid waste in open space in pre project stage. There has been tremendous change in the door to door collection, cleaning of roads side, and putting up dustbins to every corner of societies within city limit in post project stage. The major physical component under solid waste collected from houses through primary collection vehicles. The PPP model has been implemented for segregating, processing, scientifically treating and disposing solid waste at Khajod. The treated waste is then dumped in land filling site at Khajod.

Best practice for solid waste management in Surat city: Public Private Partnership for SWM in the process of door to door collection, primary collection of waste from commercial/markets areas, waste transportation, waste treatment, and waste disposal are practically good. Door to door collection of SW covered only four zones in pre project situation while in post projects situation it has been started in all zones of the city. The private agencies pay tipping fee of Rs. 30 per metric ton to the SMC. The role of private agencies in the SWM of Surat City is shown in Table 6.1.

Areas of Waste Management	Responsible agency	
Door to Door Collection	Private operator	
Street Sweeping	SMC staff	
Drain Cleaning	SMC staff	
Primary Collection of waste from other commercial generators and market places	Private operator	
Secondary collection	SMC, only one ward is handle by private operator	
Waste Transportation	Private operator	
Waste Treatment	Private operator	
Waste Disposal	Private operator	

 Table 6.2: Roles of Private Agencies for SWM

Source: SMC, 2012

The Surat city is one of best practicing cities for solid waste management among the JnNURM cities. The way SMC has carring out the JnNURM projects in the planning, implementing and participation of other agencies such as NGOs and private company for operation and maintenance of solid waste in dumping site is better. This will be lesson to be learned for other cities to works out for solid waste management. Fig. 6.20 shows the present practice for solid waste management in Surat city.

The best practice for Waste Treatment and Disposal in Surat city is totally based on PPP model which is successful in term of works quality and quantity. This model of Build Own Operate and Transfer (BOOT) is for a period of 25 years. The SMC rent the land to private agencies at dumping site at rate of Rs. 1 per sq meter per annum. The SMC is benefited in terms of revenues generated from solid waste management project. Total area of 8 acre is rented to private agency for implementing SWM project.



Transfer Station in West Zone (Pal)



Door to Door Collection Ward No.



Newly Constructed Dumping Site at Khajod Ward No. Installed the new machine for extracting oil from solid waste Fig. 6.20: SWM Practice in Surat City, Source: Field Survey, 2012

The positive impact of the projects are - (1) collection coverage has increased in post project as compared to pre project situation, (2) overall environment status is improved in post projects stage, (3) timely collection is being done, (4) sweepers and workers are covered in the newly developed areas in south west and west zones, (5) the IEC activities being undertaken help spreading awareness of solid waste management among the citizen, and (6) revenue generation is increased at post projects stage.

The major finding based on field observation and households survey data are (1) door to door collection for municipal solid waste are being collected by private agencies and satisfaction level is high at post projects stage in compared to the pre project; (2) coverage of collection is increased in terms of areas; (3) the collected solid waste is being transported by SMC vehicles and compressed at transfer station; (4) After compressing the solid waste is transported to the treatment site and processing is done by private agency; (5) solid waste from public places and markets are collected by SMC; (6) medical solid waste treatment is done separately through incineration. The best practice for solid waste management in Surat city is representing in Fig. 6.21.

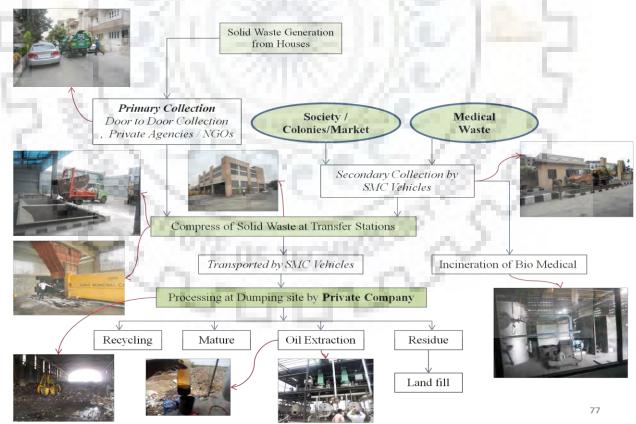


Fig. 6.21: Best Practice for SWM in Surat City

Solid Waste Management Projects in Pimpri Chinchwad (Pune) City: Pimpri Chinchwad Municipal Corporation has implemented projects for solid waste management which has target for entire city. This project comprises of many components such roads sweeping vehicles, secondary storage points, compactors, dumpers, hopper, transfer station, secondary transportation and treatment facility at dumping site. The PCMC has planned for whole city for efficient collection and proper treatment of solid waste.



Municipal Dustbin at Ward No.



No dustbin in Market Area (Nigadi, ward No.)



Collecteing Dustbin at Ward No.



Vehicle Colleting solid waste at Ward No.

Fig. 6.22: Scenario of SWM in Pimpri Chinchwad (Pune) City at Post Project, Source: Field Survey, 2012

In pre projects situation, the city had less collection of solid waste from the storage points and only few vehicles were available to collect solid waste from houses while in the post projects stage, there is an increased number of transport vehicles and 100 percent collection is being done. The environment has improved interms of health and hygiene, drainages and water bodies, and aesthetic at post project satge. In Pimpri Chinchwad (Pune) city people used to dispose solid waste

into open space and adjoining areas of the society / colonies at pre project stage; while at post project stage there is some improvement in terms of collection and transport of solid waste. There was general lack of awareness about solid waste management at pre project stage. However PCMC starts door to door collection of solid waste at post stage. The installation of the more number of dustbins around city has helped reduce the scattering of solid waste in open space and adjoining areas. Fig. 6.22 shows the installed dustbins and collecting vehicle.

The major survey finding for solid waste management in Pimpri Chinchwad (Pune) city are (1) solid waste collection is being done by Pimpri Chinchwad Municipal Corporation and collection is slightly improved in the post projects stages in comparison to pre project stages; (2) more numbers of dustbins have been installed around the city and every corner in residential colonies and beneficiaries are using them; (3) involvement of community participation has helped implementation of the project.

Solid Waste Management Project in Kolkata city: In Kolkata city, first of the two SWM projects coveres 10 municipal areas while the other project covers 13 municipalities. The major components of these two projects include installation of the equipments for collection and transportation and dumping site. At the time of Field survey these

projects were partially working in the areas of Hooghly and Bansberia. The implementation of the



Fig. 6.23: Constructed Vermicomposting-Pit at Bansberia, Source: Field Survey, 2012

project in other municipality ares was in progress. The impacts of the completed projects in the Hooghly and Bansberia in terms of collection and management of solid waste are (1) the solid waste collection is done though private agencies and door to door collection is being done at post projects; and (2) the municipality has started involving mobilized awareness of the solid waste in society / colonies to segregate solid waste into biodegradable and non-biodegradable in order to convert valuable material. The vermin Pit at Bansberia has been developed and result in betterment of solid waste management for entire Bansberia municipality area. Fig. 6.23 shows the Bansberia vermin pit which has been installed under JnNURM. In the post projects situation of the SWM

project in Bansberia has improved however the awareness is still lacking for solid waste management. There is no segregation at sources and collection from houses is not fully covered by municipalities in post project stage but it has improved to some extend at post projects as compared to the pre projects.

The field observation at completion of solid waste management project in Bansberia reveals little improvement in terms of surrounding environment such water bodies, open space, and adjoining areas. Few houses still dispose solid waste into vacant plots and adjoining areas. The attitude of people towards the urban environment is not sensitive for upgradation. Therefore, there is a need to improve public awareness for solid waste management. Based on household survey data, it is reveal that there is little community participation in solid waste management projects under JnNURM.

The municipalities should conduct awareness program to public through NGOs/Parastatal for solid waste management project. The community participation is a key to success of the project. The transparency to public for any development projects in urban areas is required in order to sustain the project. So, there should be more transparency and accountability to people in order to succed.

6.4.3.2 Useful Guideline for Solid Waste Managament

Fig. 6.21 shows flow chat of solid waste management practiced in Surat city. This is the best useful guideline which should be adopted by poor performing cities.

6.4.5 Basic Service to Urban Poor

The projects under BSUP sub-mission of JnNURM in three cities have different strategy and implement different nature of projects. In Surat, projects are implemented using strategies of relocation, group housing, and redevelopment on same location; while in Pimpri Chinchwad (Pune), projects are implemented only using redevelopment on the same location. In Kolkata, too In-situ projects are implemented in various municipalities of Kolkata Metropolitan Region. Most of the projects are still in progress and few projects have been completed and allotted to the beneficiaries in all three cities (Surat, Pimpri Chinchwad (Pune) and Kolkata).

Community Participation (CP) was not there in the DPR preparation or implemention of BSUP projects. As a result, some of these projects are not appreciated by beneficiaries at post project stage in the selected cities (Surat, Pimpri Chinchwad (Pune) and Kolkata). The lack of study by municipality for slum socio-economic profiles cause the loss of job prospect to slum dwellers at post project mainly in the case of group housing projects in Surat city.

6.4.5.1 Operational Inference from Best Practices of Selected Cities

BSUP Projects in Surat: At Kosad the work quality and quantity of BSUP projects is very poor. This reveals the lack of attention paid toward monitoring by municipality while constructing the buildings. Fig. 6.24 shows the building quality found during the field survey (2012).





Work Quality under BSUP projects at Kosad

Work Quality under BSUP project at Kosad

Fig.6 24: Status of BUSP project at Surat City, Source: Field Survey, 2012

The maintenance of group housing of the existing services at post projects is found to be very poor. The water supply quantity is not matching the actual need as per the benchmark (135 LPCD) in urban area. Generally average water supply is 2 hour daily which is not sufficient for them as family size is 5 on an average. There are water logging in adjoining areas of buildings due to lack of poor operation and maintenance by municipality. Fig. 6.25 shows leakages in waste water pipes collected to main sewer line. Beneficiaries should be encouraged to form cooperative societies to take care of maintenance. The positive impact of BSUP projects in Surat city is seen in the form of river front development implemented along the Tapti River. Slum settlements along the Tapti River have been cleared for the implementation of this project. Fig. 6.26 represents the proposed river front development.



Leakage of Pipe at Kosad



Water Logging Scenario at Post Project at Kosad

Waste Water Leakages at Kosad



Water Logging Scenario at Post Project at Kosad

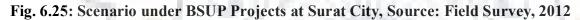




Fig. 6.26: Positive Impact after BSUP along the Tapti River Back in Surat City

The major findings in Surat city are (1) beneficiaries of BSUP projects (group housing) at Kosad in north zone do not have access to basic urban services - shortage of drinking water, unclean surroundings, poor esthetic, less job prospect at post project; and (2) No community participation in the projects planning and implementation.

BSUP Projects in Pimpri Chinchwad (Pune) City: Pimpri Chinchwad (Pune) has performed better in terms of services as well as the work quality under the BSUP projects, in comparison to Surat. The beneficiaries at ward No. 10 (Nigadi) are satisfied about the quality of implementation of BSUP project. Fig. 6.27 shows that better performance of BSUP projects as compared to Surat city in the group housing.



Group Housing at Nigdi (ward No.10)



Work Quality, Ward No. 10



Vehicle Collected Solid Waste at BSUP Projects at Ward No. 10



Fire Service under BSUP project Ward No. 10



Lift Facility under BSUP project Ward No. 10



Sanitation in Ward No. 10

Fig. 6.27: BSUP Work Performance in Pimpri Chinchwad (Pune), Source: Field Survey, 2012

Household survey data reveals that the urban services to the beneficiaries at post projects are much better than pre projects situation. The post projects status of the BSUP projects in Pimpri Chinchwad (Pune) city is shown in (Fig 6.27.). All houses provided under BSUP in PCMC have metered water supply connections, whereas in Surat water meter facility is not installed. Another reason for success of BSUP project in Pimpri Chinchwad (Pune) is redevelopment in the same location which does not afffect job security of the beneficieries. PCMC identified the need to understand the socio-economic profile of the targeted beneficieries who are urban poor engaged in informal services sectors, before implementating BSUP project. This resulted in a positive attitude of beneficiaries towards the PCMC projects under JnNURM. These BSUP projects have brought change to their quality of life by providing proper infrastructure facilities and improving the environment status at post projects stage in comparison to the pre projects.





Newly Constructed Houses under In-situ Projects under BSUP at Chandan Nagar Newly Constructed Houses under In-situ Projects under BSUP at Chandan Nagar





Newly Constructed Houses under In-situ Projects at Chandan Nagar Newly Installed Storage Moving Storage Points Fig. 6.28: In-situ projects under BSUP in Kolkata City, Source: Field Survey, 2012

BSUP Projects in Kolkata City: In case of Kolkata, maximum projects are In-situ projects in various locations of municipalities within Kolkata Metropolitan Development Region (KMDA). Maximum projects are still under progress. The Kolkata city has performed better for In-situ projects under BSUP (Chandanagar area). The In-situ projects do not affect status of their life (economic activities) and it upgrade the quality of houses. Moreover, municipality required no facility to be provided except community hall under BSUP projects. Fig. 6.28 shows the physical progress of In-situ projects in Chandanagar at post project stage, Kolkata. The major finding in

post project in Chandanagar are (1) the services level of water supply remain the same in both situation; (2) solid waste collection has little improvement as compared to pre project situation; (3) the duration of water supply is 3 hour per day on an average; and (4) drainages system remain the same in both situation (pre and post project situation). The municipality does not give attention towards the other facilities of both physical and social aspects.

Based on the field observation and findings from the analysis of different nature of slum development under BSUP projects in three cities (Surat, Pimpri Chinchwad (Pune), and Kolkata) strategies have been developed in order to succeed in the next phase of JnNURM.

6.4.5.2 Useful Inference from Best Practices of Selected Cities

Strategy for BSUP Projects: Specific strategies have been developed based on the detailed study of the BSUP projects which have been implemented in Surat, Pimpri Chinchwad (Pune), and Kolkata city. Field knowledge and experiences gained after investigating the three cities reveals that, In-situ projects are successful in Kolkata and redevelopment projects are successful in Pimpri Chinchwad (Pune) whereas BSUP projects have not been so successful in Surat. The main factors for poor performing under BSUP projects are (1) lack of urban land management and urban planning, (2) lack of awareness about the beneficiaries, (3) lack of community participation, (4) inefficient and insufficient maintenance of created assets, and (5) lack of proper monitoring of physical progress. Therefore, the best way to achieve success in future BSUP projects is to understand the salient features of BSUP projects which have succeeded in three cities (different performance). Besides, implementation of reform namely; -implement earmarking 20-25% developed land for all housing projects for EWS/LIG" it is necessary to encourage community (beneficiary) participation in the planning and implementation of BSUP projects. The flow chart of recommended strategy for successful implementation in the three modes of sulm development under BSUP project is shown in Fig. 6.29.

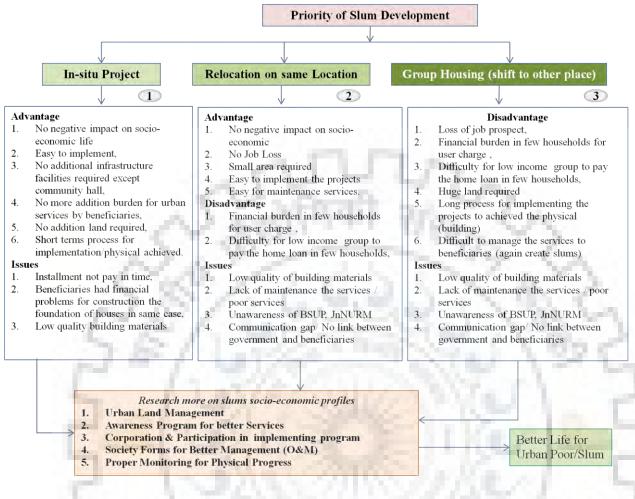


Fig. 5.29: Strategy for BSUP Projects

6.5 SPECIAL DISCUSSION ON IMPHAL CITY

The Imphal is one of city listed under JnNURM to improve the urban infrastructure facilities and housing for urban poor. The city has implemented projects in three sectors namely, (1) storm water and drainages, (2) preservation of water body, and (3) solid waste management under UIG submission. Only one project has been implemented under BSUP which targeted 1250 dwelling units within Imphal Municipal Corporation area. All projects under JnNURM in the city are in progress.

The city has not implemented 50 percent of mandatory reforms components at state required under JnNURM, while at city level only two components of mandatory reforms out of 8 have been implemented. Further, only 3 of the 10 components of optional reform have been implemented. Non-implementation of reforms coupled with improper administrative structure at ULB level are

the main factor for poor performance of Imphal city in the first phase of JnNURM. Other factors responsible for the poor performance are (1) overlapping of function among the department at states and no coordination between them, (2) financial weakness at municipality; and (3) lack of transparency to the citizen, as mostly politicians handle the implementation of projects.

The best strategy for Imphal city is to set up proper administrative structure and smoothen the functioning of various developments to ensure that they work effectively and efficiently. The projects under JnNURM are delay due to the lack of co-operation among line agencies. Implementation of JnNURM reforms should be the first priority for Imphal city to build up capacity building. The city has to learn form the best practices followed better perfoming cities such as Surat, Pimpri Chinchwad (Pune) and Kolklata for urban infrastructure development projects. As per field investigation at post project for solid waste management in the city, many euipements are found unused at present scenario (Fig. 6.30).



Dustbin not in used at IMC



Fig. 6.30: Scenario of SWM at Post Project in Imphal City, Source: Field Survey, 2012

6.6 SUMMARY

Based on the performance of mandatory reforms and optional reforms, short term plan and long term plan (Fig. 5.2 and Fig 5.3) Surat, Pimpri Chinchwad (Pune) and Kolkata are the best performing cities for JnURM reforms among the JnNURM cities, and Imphal city is one of the poorest performing cities. E-govrenance which is one of the components under mandatory reform has been implemented best in Surat among JnNURM cities. E-governance brings transparency to the citizen.

Under UIG, a total cost of Rs. 7269619.67 lakh has approved in eleven sectors (water supply, waste water management, storm water and drainage, preservation of water body, other urban transport, Road/Flyover/RoBs, MRTS, solid waste management, urban renewal, and development of heritage areas, highest being in water supply (42.37%) and development of heritage areas (0.20%). At city level, highest and lowest investments are Kolkata (23.77%) and north east cities. Under BSUP sub-mission, Rs. 29906.53 Crore are invested in 31 states/UTs. The highest investment is Maharashtra state (Rs. 7009.28 Crore).

Th JnNURM cites have different level of DPR prepration due to technical sound at ULBs under UIG sub-mission. In 65 cities 599 DPR have been approved and implemented, highest numbers are at Kolkata (42.03%), and lowest in north east cities (4.75%). In state level, Maharashtra and Gujarat have highest number of DPRs approved and implemented as on 2011.

Under BSUP sub-mission, at state level Maharashtra has maximum targeted dwelling units while city level, Kolkata has highest dwelling units. Only few cities perform properly under JnNURM scheme while others do not. So, the perfoming cities should shared thier peer experienced and knowledge (PEARL) in order to improve effectiveness of JnNURM scheme.

In the water supply sector under UIG sub-mission, DPR-I performs best in Surat city, DPR-III in Kolkata while in Pimpri Chinchwad (Pune) city DPR-I performs best. While in the sector of waste water management, Surat has better performance in DPR-VI, for Kolkata DPR-V and for Pimpri Chinchwad (Pune) DPR-I. For storm water and drainage sector, Surat has better for DPR- III and Kolkata performs best under DPR-V and in solid waste management sector, Surat city and Kolkata city have best performance in Vesu and Bansberia areas respectively, while Pimpri Chinchwad (Pune) has little improvement for solid waste management under -solid waste management project". In the case of BSUP project, Pimpri Chinchwad (Pune) has performed better in redevelopment in Nigadi (ward No.10) while in Kolkata, In-situ project is implemented best in Chandanagar. The rest cities of Surat and Imphal are performing poor.

Imphal is one of the poorest performing cities under JnNURM as compare to other cities in terms of JnNURM reform and project implementation.

7

CONCLUSION

7.1 CONCLUSIONS

The JnNURM is very unique for urban infrastructure development in India. This is an initiative by government of India for improvement in urban infrastructure in 65 cities under UIG sub-mission and housing for urban poor under BSUP sub-mission. The aim and objectives of the research is to encourage the low performing cities by learning from the better performing cities such as Surat, Pimpri Chinchwad (Pune) and Kolkata in the preparation of project proposal (DPRs), and implementation of projects as well as JnNURM reforms. The progress of JnNURM reforms are very slow and poor in performance at state and city levels, and therefore the performance of JnNURM program can not achieved as per JnNURM objectives. Based on the research study, many of the municipalities were found to be inefficient in projects management. This is due to the lack of administrative function at city level. Surat Municipal Corporation, Pimpri Chinchwad Municipal Corporation, and Kolkata Municipal Corporation have set up the proper administrative structure. Efficient management of the administration had resulted better enforcement of reforms and their good performance in the first phase of JnNURM, the three cities had strong technical staff for preparation and management of projects.

There was lack of co ordination among the line agencies within municipality for implementing the projects which leads to delay of projects in most of cities. This was a very common issue in the first phase of JnNURM.

A positive attitude of state government and urban local governance towards the mandatory reforms and optional reforms should enable them to accomplish project implementation in time and avoid the overlap of the functional duties among various departments. The sense of responsibility and duty to perform well in project implementation goes well with good governance by made possible by the adoptions of e-governance. For second phase of JnNURM, central government should look into the capacity building at ULBs level and need to be more transparent to the citizen by implementing the e-governance in all 65 cities. Through the completed projects of water supply, waste water management, storm water and drainage, and solid waste management in the selected cities have benefitted the communities to some extent, they have not been able to meet urban services benchmarks, set forth by Govt of India. Various equipments were fully installed which tried to improve services under solid waste management projects, but the operational and maintenance of assets were not achieved as per benchmark of urban services. The ULBs should be encouraged to be more efficient in terms of collection, transportation and scientific processing of municipal solid wastes.

The special case study of Imphal city was an example for poor performance under JnNURM both the sub-missions (UIG and BSUP) of JnNURM. This study was useful experience to learn from Imphal as a poor performing city as it was from high performing cities such as Surat, Pimpri Chinchwad (Pune), and Kolkata cities. These three cities had implemented projects effectively and efficiently up to a satisfactory level in some sectors (Surat city for solid waste management project), Pimpri Chinchwad (Pune) city for BSUP projects, and Kolkata city for water supply and waste water management project, In-situ projects.

Redevelopment and group housing project were executed and performed by PCMC at satisfactory level of beneficiaries as well as Kolkata for In-situ projects. The Surat city had implemented number of projects for urban poor under BSUP, but the beneficiaries had not appreciated the projects outcome due to a lack of understanding of the socio-economic status of the beneficiaries community and poor operation and maintenance of services.

The evaluation of the completion of projects in selected cities had resulted in various levels of performance. The results of completed projects had not meet achieved the JnNURM objectives.

In the sector of waste water management, city government should have legal documents which are mandatory for all houses to have sewer connection. This would help to avoid discharging of waste water into open drains and adjoining areas. The household surveys reveal that there was less positive impact of waste water management projects on the surrounding areas (in terms of environmental quality). Some of the households were still discharging waste water into the open drains and few houses were avoiding sewer connection as they were using the septic tank. In the same way, storm water drainage was not improved in the urban environment at post projects stage. The coverage of drain was less about 40 percent coverage of total road length in all cities. In this context, municipalities need to encourage drain networks at maximum road length of the city limit. There was no awareness program to inform/educate the citizen almost their role in all urban infrastructure development projects.

The household survey data had revealed the lack of awareness to the beneficiaries for solid waste management and the need to organize awareness programs at community level before implementing the projects. PPP model was not introcuced in the project management as a result; there was no positive impact on the urban environment status. Therefore, it is suggested to have sound legal framework (documentations) for the improvement of solid waste management. The duties and responsibilities of agencies must include (1) prohibit littering of solid waste on the roads / streets and open spaces; (2) segregation (biodegradable and non-biodegradable) of solid waste at the sources level; and (3) minimize the generation of solid waste at source level. These steps should be encouraged at the community and household levels.

Household survey data finding under BSUP projects had revealed that different cities had different slum development approaches (redevelopment, relocation, group housing, and in-situ). Compared to Surat, The Pimpri Chinchwad (Pune) city had a better performance in group housing and redevelopment while Kolkata had better performance in In-situ projects.

Lesson to Learn from Better Performing Cities: In the first phase of JnNURM scheme, the infrastructure development planning process suffered on account of the following deficiencies (1) lack of integrated planning at city and regional level, (2) absence of community lack of participation in planning, (3) exclusion of peri-urban areas, (4) process heavy and lack of coordination, (5) failure to adopt service level benchmarks, (6) lack of adequate capacity, (7) lack of differential approaches towards reforms, (8) Delay in the implementation of 74th CAA.

7.2. POLICY RECOMMENDATIONS

Based on the research study findings, the following points were needed to be encouraged and initiated by respective authorities.

- 1. State government need to initiate action towards Capacity Building" at ULBs level.
- 2. The state government need to implement infrastructure projects planning and development in time for strengthening the ULB's which would help in the success of JnNURM.
- Short term plan for JnNURM reforms should be followed which will be first step towards the completion of projects as well as equips them for future projects preparation and implementation.
- 4. Medium term plan for JnNURM reforms should be at second priority to ensure the efficient and sufficient of delivery services of governing body at satisfactory level by beneficiaries.
- 5. Implementation of E-governance is to scale up at ULBs level for improving the services. Municipality development plan and policies should be more transparent to the citizens. It will be easy and more efficient in providing a variety of services including registration of birth and death, online payment for user charge, and revenue collection and so on.
- 6. Projects Implementation Unit (PIU) is to be set up within Municipalities which would be helping in management of projects for all eleven sectors under JnNURM as well as BSUP projects. The strategy for projects management could be by hiring the consultancy / private company.
- Community Participation is to be encouraged in the projects planning and implementation under JnNURM in the next phase of JnNURM. It should a mandatory in DPRs preparation and implementation stage.
- 8. Peer Experience and Reflect Learning (PEARL) centers should be set up in regional level and share the knowledge and experienced of JnNURM cities along with high performance cities. There should be a proper training to technical staffs in periodically as Quality Improved Program (QIP) at reputed Institutes in order to have technical good skills while preparation of DPRs.
- There should be encouragement for NOGs/concerns development workers to study the socio-economic profiles of slum dwellers and urban poor which would be helpful in the DPRs under BSUP projects, JnNURM.

- 10. There should be encouragement for preparation of master plans for various urban infrastructure facilities such as water supply, waste water management, storm water and drainage which would be helpful in project execution.
- 11. Mutual understanding among line agencies / departments within municipality should be encouraged in order to avoid delaying projects under JnNURM.
- 12. A massive and grass root level awareness program need to be launched for educating the beneficiaries through either campaign or television or radio on regular basis for better understanding of JnNURM and their role in making it more successful.
- 13. The JnNURM Mission monitoring and evaluation need to be done by a network of professional agencies.
- 14. There should be encouragement of the water audit on regular basis in order avoids waste at household level and need to provide water meters.
- 15. The beneficiaries of the BSUP at group housing should be encouraged to form a Society or Resident Welfare Association (RWA) for dealing with address for problems and issues of municipal services. Proper set up with president and vice president and secretary and executives members at block level for management of operation and maintenance.

7.3 SCOPE FOR FURTHER RESEARCH

The scope of research study was limited to the sectors of water supply sector, waste water management, storm water and drainage and solid waste management under UIG sub-mission and housing for urban poor under BSUP sub-mission. These selected sectors form a part, though on limited scope under infrastructure development of JnNURM. It is suggested that further research need to be done in the areas of preservation of water body, other urban transport, roads/flyover/RoBs, MRTS, urban renewal, and development of heritage area under UIG sub-mission for a more comprehensive evaluation of JnNURM. The evaluation of the completed projects through household survey and FGD was carried out only in four cities namely; Surat, Pimpri Chinchwad (Pune), Kolkata and Imphal cities. Therefore, there is a scope and need for further research in the remaning cities.



References

- 1. ACCA, Is Corporation Singapore Ready for the Green Economy? *Associate of Chartered Certificate Accounts* (2012).
- 2. AGR, Water and Waste Water Treatment Opportunity in India, Avalon Global Research, Mumbai (2011).
- 3. Alok, R, and Satish, P., Urban Sustainability and Inherent Issues, *7th International Conference on Humane Habitat* by International Conference on Humane Habitat at Mumbai,(2005).
- 4. Alok, R., and Ashok, P., Architectural Education, *Journal of Indian Building Congress* Vol. 7, pp. 54-57, (2000).
- 5. Alok, R., and Satish, P., Urban Reforms: The Urban Planning in New Paradigm, *Journal* of Institute of Town Planners India, Vol. 5, pp. 39-41(2008).
- 6. Anand, C., Kallidaikurichi, S. and Cheon, K T. Good Practices in Urban Water Management Decoding Good Practices for a Successful Future. *National University of Singapore, Singapore* (2012)
- 7. Anjal, P., Medhavi, S. and Jayati, C., Water in India: Situation and Prospects. UNICEF, FAO, New Delhi (2013)
- 8. Areeba, H. 74th Amendment: An Overview. *Centre for Civil Society*, New Delhi (2004)
- 9. Arun, K. S., Urban Drainage System, *Ministry of Urban Development, Government of India, Delhi* (2012)
- 10. ASCI, Regional Capacity Building Hub Module 1 Urban Governance. Administrative Staff College of India, Hyderabad (2011)
- 11. Balas, C.J.L., City Centre Revitalization in Portugal: A Study of Lisbon and Porto, Journal of Urban Design, Vo. 2 (2), pp. 231-259 (2007)
- 12. Batram L., A Review of Urbanization and Urban Policy in Post- Independent India, *Centre* for the Study of Law and Governance, Jawaharlal Nehru University, (2009)
- Bharat A. and Chawla C., "Urban governance in Democratic set-up for Sustainable Development: A Case of India" in *International Conference on Healthy Cities, Belfast,* Northern Ireland, U.K. (2003)

- 14. Bharat A., and Sharma A., Sustainable Spatial Development Model For Transforming Inner-City Built Fabric, *ITPI Journal*, Vol.20 No.2 (181) (2002).
- Bharat A., Housing for Urban Poor: A challenge to community planning and environment, *XXIII IAHS World Congress* at Singapore. (1995)
- 16. Bharat A., Land Use & Infrastructure: Controlling factors of Urban Form, *Proceedings of International conference on Infrastructure*, Melbourne (Australia) (1993).
- Bhooshan B. S., Housing the urban low income: some institutional issues, *Proceedings of the national convention on architectural engineering and national housing policy*, Mysore, (1990)
- 18. Bhooshan B. S., A fresh look into urban development planning, Development Studies No.12, Quality of Life in Human Settlements, Mysore, (1976)
- 19. Bhooshan B.S. and Misra R.P., Housing in urban strategies in developing countries, Development Studies no.11, Issues in Urban Development, Mysore, (1976)
- 20. Biswas, A. K & Cecilia T, Changing global water management landscape in Water Management in 2020 and beyond, *(Berlin: Springer)* pp. 1-34, (2009)
- 21. Carmon, N., Housing Policy in Israel: Review, Evaluation and Lessons, *Journal of Israel Affairs*, Vol. 7, (4) pp. 181-208. (2000)
- Carmon, N., Israel's Project Renewal: Evaluation of Goals Achievement, Urban Revitalization - Israel's Project Renewal and Other Experiences (eds. Elazar, D.J. and Marom, Z.R.), New York: University Press of America, pp. 51-83. (1992)
- 23. Carmon, N., *Project Renewal Social and Physical Outcomes*, Haifa: Neaman Books, (Hebrew, 376 pages) (ISBN 965-386-002-X) (1989)
- 24. CDIA, Pre-Feasibility Study Guidelines, *Cities Development Initiative for Asia, Pasig City* (2011)
- Cecilia Tortajada, -Water management in Singapore" Water Resources Development, Vol. 22, No. 2. pp 227-240, (2006)
- Cecilia, T., Singapore: An Exemplary Case for Urban Water Management, HDR, Mexico (2006)
- Chan, E.H.W. and Lee, G.K.L., Critical factors for Improving social sustainability of urban renewal projects, Social Indicators Research, 85 (2), 243-257, (2008)

- Chandra, S., and Sharma, U., Bamboo- An Alternative Building for Modest Housing, to Increase the Stock of Affordable Housing, for Urban poor Living Close to Bamboo Production Region in India, *World Academic of Science, Engineering and Technology*, Vol. 6, pp-11-27, (2011)
- 29. Chandra, S., Madhuwanti, L., and Sharma, U., The Urban Informal Sector and Housing, International Journal of Scientific and Research Publications, Vol. 4 (5), (2013)
- Chandrappa, R. and Das, D. B., Waste Quantities and Characteristics. *Environment Science and Engineering*, pp. 47-63 (2012)
- 31. Cheong, H. L., Solid Waste Management: Issues and Challenges in Asia, National Environment Agency, Singapore (2007)
- 32. Chetan, V., Urban Issues, Reforms and Way Forward in India, Department of Economic Affairs, Ministry of Finance, Government of India, Working Paper, 4/2009-DEA (2009)
- 33. Chew, M. L. Managing Urban Runoff- Drainage Hand Book. *Public Utilities Board, Singapore* (2013)
- 34. Christine, M. D., Ravi, H., and Scott R., *Displacement, Resettlement, Rehabilitation, Reparation, and Development*, World Commission on Dam, Issue I.3 (2000)
- 35. Cleff, T. and Rudolph-Cleff, A., Innovation and innovation policy in the German construction sector, *Innovation in Construction: An International Review of Public Policies* (Eds Manseau A. and Seaden G.), London, Spon, pp. 201-234 (2001)
- 36. CPCB, Status of Water Supply, Waste Water Generation and Treatment in Class-I Cities and Class-II Towns of India, *Central Pollution Control Board, Ministry of Environment and Forests, Government of India, Delhi* (2009)
- 37. CPHEEO, Status of Water Supply, Sanitation and Solid Waste Management in Urban Areas, Central Public Health Environment Engineering Organization, Ministry of Urban Development, Government of India, New Delhi (2005)
- 38. Craig, J., Decentralization in India: Poverty, Politics and Panchayat Raj, *Overseas Development Institute, London* (2003)
- Darshini, M. and Abhijit, D., The Status of Pro-Poor Reforms in Indian States, Centre for Urban Equity, Ahmedabad (2012)
- 40. Dobrivoje T., -A review on Salt Lake City, Kolkata, India: Master planning and realization," *Spatium*, no. 17–18, pp. 98–105, (2008).

- 41. Dobrivoje T., -Man-environment interaction: A review of modern architecture of Libya in transition," *Spatium*, no. 13–14, pp. 47–54, (2006).
- 42. Dobrivoje T., -Sustainable urban environmental quality," *Spatium*, no. 11, pp. 7–20, (2004).
- Doreshor, K., Shankar, R. and Mahua, M. Evaluation of Urban Renewal Projects under JnNURM-Case Study Surat City. *International Journal of Current Research*, Vol. 06, pp. 7242-7246 (2014)
- 44. EPA, Enhancing Sustainable Communities with Green Infrastructure, United States Environment Protection Agency (EPA), 100-R-14-006, (2014)
- 45. Essa, A. S., John, M.B., Wolfgang, L., Quek, S. K., Ajit, V., Jesff, M. C. and Jordan, S., Singapore: A Sustainable City Blue Print. *Singapore Business News*, (2013)
- Giok, L. O. and Kai, H. P., Urbanization and Slum Formation, *Journal of Urban Health*, Vol. 84 (1) pp. 27-34 (2007)
- 47. Grant Thornton, Appraisal of Jawaharlal Nehru National Urban Renewal Mission (JnNURM), *Grant Thornton*, Vol. 1, (2012)
- 48. Gulten, K., The Examination of the Urban Renewal Projects Case Study of Trabzon, *Turkey, FIG Working* (2011).
- 49. Gurumukhi K T., Model Building Bye-laws, *Town and Country Planning Organization*, *Ministry of Urban Development*, (2004)
- 50. Gurumukhi, K. T., Land Pooling Technique: A tool for Plan Implementation-An Indian Experience, TCPO, Government of India. (2003).
- 51. HDB, Provision of Public Housing in Singapore, *Housing Development Board, Singapore* (1997).
- Igor, S. M., Ellen, M. V. B., Pieter, W. G. B. and Haiko, V. D. V., Collaborative Decision Making for Sustainable Urban Renewal Projects: A Simulation – Gaming Approaches, *Environment and Planning B: Planning and Design*, Vol. 32, pp. 403-423 (2005).
- 53. Imphal Municipal Corporation, BSUP Projects Status in Imphal City. Imphal Municipal Corporation, Government of Manipur, Imphal (2012)
- 54. Imphal Municipal Corporation, City Development Plan 2006, Imphal Municipal Corporation, Government of Manipur (2006)

- 55. Imphal Municipal Corporation, Detail Project Report for Preservation of Water Body 2008, Imphal Municipal Corporation, Government of Manipur, (2012)
- 56. IRDA, Drainage and Storm Water management, *Iskandar Regional Development Authority, Kuala Lumpur* (2011)
- 57. Isher J. A., Nasser, M., Vijayanumi M., Rajiv L., Ramesh R., Nachiket M., Sudhir M., Hari S., Om, P. M. and Srivastava, P.K., Report on Indian Urban Infrastructure and Services – water supply, sewerage, Solid Waste management, Storm Water Drains, Urban Transport, Street Light, Traffic Support Infrastructure, *Ministry of Urban Development, Government of India* (2011)
- 58. Isher, J. A., High Power Expert Committee Report on Urban Infrastructure in India, *Ministry of Urban Development, Government of India, Delhi* (2011)
- 59. Joel A., Goldenfum, R.T., Adalberto, M., Daniel, G., Allasia, A. L. and Da, S., Challenge for the Sustainable Urban Storm Water Management in Developing Countries: From Basic Education to Technical and Institutional Issues. *Novatech*, pp. 1-8 (2007)
- 60. John, F., Tamsin, R. and Julian, W., Sustainable Livelihoods Approaches in Urban Areas: General Lessons, with Illustrations from Indian Cases, *Overseas Development Institute*, *Working Paper*, 162, London (2002).
- 61. Jonathan, P. and Kevin, T., Decentralized Waste Water Management in Peri-Urban Areas in Low-Income Countries, *Environment and Urbanization*, Vol. 15 (1), pp. 75-90 (2003)
- 62. Jurg, C., Sustainable Reconstruction in Urban Areas, A Hand Book, International Federation of Red Cross and Red Crescent Society, Switzerland (2012).
- 63. Kevin, F. G., Urban Redevelopment, Past and Present, Critical Perspective on Urban Redevelopment, Vol. 6, pp. 1-31, (2001)
- 64. Knoll M., Neuheuser K., Vogt J. and Rudolph-Cleff A., Einflussfaktoren der gebauten Umwelt auf wahrgenommene Aufenthaltsqualitat bei der Nutzung stadtischer Raume, *Umweltpsychologie*, 18 (2), 84-102, (2014)
- 65. Knoll M., Rudolph-Cleff A., Developing Urban Health Games An Interdisciplinary Approach, *Workshop on Smart City Learning at EC-TEL 2014* in Graz, Austria, (2014)
- 66. Koli. D. B., and Vijayan, K. P., Determinant of Women's Non Family Works in Ghana and Zimbabwe, *Canadian Studies in Population*, Vol. 33 (2), pp. 389-406, (2003)

- 67. Kolkata Municipal Corporation, BSUP Projects Status under JnNURM for Kolkata City, Kolkata Municipal Corporation, Government of West Bengal, Kolkata (2012)
- 68. Kolkata Municipal Corporation, Detailed Project Report for Solid Waste Management in Kolkata City, *Kolkata Municipal Corporation, Government of West Bengal, Kolkata* (2006)
- 69. Kolkata Municipal Corporation, Detailed Projects Report for Water Supply-2006, Kolkata Municipal Corporation, Government of West Bengal, Kolkata (2008)
- 70. Kolkata Municipal Corporation, JnNURM Projects Status for Kolkata City, Kolkata Municipal Corporation, Government of West Bengal, Kolkata (2012)
- 71. Kolkata Municipal Corporation, Kolkata City Development Plan 2006-2012. Kolkata Municipal Corporation, Government of West Bengal, Kolkata (2006).
- 72. Kulshrestha, S. K., A review of the Development and Infrastructure Provision of the Tenth Five-Year Plan, ITPI Journal, Vol. 4 (1), pp. 1-12, (2007)
- 73. Law, C. K., Social Sustainability in Urban Renewal: An Assessment of Community Aspiration, *Urban IZZIV*, Vol. 23 (1), (2012)
- 74. Law, C. K., Study Report on Urban Renewal Policies in Asian Cities for the Urban Renewal Strategy Review, University of Hong Kong, (2009)
- 75. Law, C. K., Wong, Y. C. and Lee, K. M. and Feon, L. Y. C. Study Report Urban Renewal Policies in Asian Cities for the Urban Renewal Strategy Review, *University of Hong Kong*, *Hong Kong* (2010)
- 76. Leo, Y. Annual Report 2013-2014. Singapore Economic Development Board, Singapore (2014)
- 77. Lewis, M., The Culture of Cities. New York: Harcourt Brace and Company, (1938)
- 78. Mahavir and Maqbool, A., <u>A Tale of Two Schemes: JnNURM and NUIS</u>, *Spatio-Economic Development Record*, Vol.17 (3), (2010)
- 79. Mahavir, 'Modeling Settlement Patterns for Metropolitan Regions: Inputs from Remote Sensing', *ITC Publication* No. 35, Enschede, The Netherlands, (1996)
- 80. Mahavir, Geospatial Vision or Lack of it for Urban India, SPACE, *The SPA Journal of Planning and Architecture*, Vol. 15(1), (2010)
- Manasi S., Smitha K C., and Nadudur., Urban Property Ownership Records in Karnataka: Computerized Land Registration System for Urban Properties, *Economic and Political Weekly*, Vol. (47), pp. 4699-4722, (2013)

- 82. Marwaha, B., Chandigarh –Emerging Information Age Metropolitan Area of North India, *Proceeding International Conference – Contemporary Architecture, Beyond Corbursierism, Tagore Theater, Sector 18, Chandigarh* (2011)
- 83. Marwaha, B., Role of ITC in the development of New Function, Activities and changing Urban Form in Urban Areas, Urban India, Journal of National Institute of Urban Affair, New Delhi, (2009)
- Marwaha, B., The new Urbanism Aerotropolis, *Proceeding of ICONUGU, NIT Hamipur* (2010)
- 85. Marwaha, B., Video Mediated Communication for Smart Home, Proceeding of Civil Engineering National Conference – Innovation without limits, NIT Hamipur, (2009)
- MoHUPA, BSUP Projects Status, *Ministry of Urban Development, Government of India, New Delhi* (2012), Available at <u>http://jnnurm.nic.in/</u> (accessed on 28th September, 2011)
- 87. MoHUPA, Funding Pattern for BSUP Projects under JnNURM, *Ministry of Housing and Urban Poverty Alleviation, Government of India, New Delhi* (2009), Available at <u>http://mhupa.gov.in/PQAS/jnnurm.pdf</u> (accessed on 7th July, 2012)
- 88. Morakinyo, K., Opeyemi, O., Micheal, O., Bili, O. A. and Olufunmilola, O., Urban Slums as Spatial Manifestation of Urbanization in Sub-Saharan Africa: A Case Study of Ajegunle Slum Settlement, Lagos. *Developing Country Studies*, Vol. 2 (11), pp. 1-10 (2012)
- 89. MoUD, Annual Report 2008, Ministry of Urban Development, Government of India, (2008)
- 90. MoUD, DPRs Approved Status. *Ministry of Urban Development, Government of India, New Delhi* (2012a), Available at http://jnnurm.nic.in/ (accessed 1st May 2012)
- 91. MoUD, Jawaharlal Nehru National Urban Renewal Mission Overview, Ministry of Urban Development, Government of India (2005)
- 92. MoUD, JnNURM Projects Status, *Ministry of Urban Development, Government of India, New Delhi* (2012b), Available at <u>http://jnnurm.nic.in/</u> (accessed on 3rd May 2013)
- 93. MoUD, Primer: 03 Revision of Byelaw to Make Rainwater Harvesting Mandatory, Ministry of Urban Development, (2011)
- 94. MoUD, Primer: 06: Introduction of Computerized Process of Registration of Land and Property: Optional Reform under JNNURM, Ministry of Urban Development, (2011).

- 95. MoUD, Primer: 09: Structure Reforms: Optional Reform under JNNURM, *Ministry of Urban Development*, (2011)
- 96. MoUD, Primer: Simplification of Legal and Procedural Framework for Conversion of Agricultural Land to Non-Agricultural Purposes, *Ministry of Urban Development*, (2011)
- 97. MoUD, Reform Status Report-2012, *Ministry of Urban Development, Government of India, New Delhi*, (2012c), Available at <u>http://jnnurm.nic.in/</u> (accessed on 3rd May 2013)
- 98. MTI, (2012): Economic Survey of Singapore, Ministry of Trade and Industry, Singapore
- 99. Mustard, S. and Ostendorf, W., Integrated urban renewal in the Netherlands: A critical appraisal. Urban Research & Practice, Vol. 1(1): pp. 78 92 (2008)
- 100. Needhidasan, S. and Manoj, N., Design of Storm Water Drains by Rational Method an Approach to Storm Water Management for Environmental Protection, *International Journal of Engineering and Technology*, Vol. 5 (4), pp. 3203-3214 (2013)
- 101. Neil, A., The Challenges of Sustainable Urban Drainage in Developing Countries, University of South Florida, Florida (2008)
- 102. NIUA, 04 Earmarking at Least 20-25 Percent of Developed Land in all Housing Projects (Both Public and Private Agencies) for EWS/LIG Category with a System Cross Subsidization –Optional Reform: Land for Poor, National Institute of Urban Affair, Ministry of Urban Development, (2009)
- 103. NIUA, Documentation of Best Practices, Urban Reforms under Peer Experience and Reflective Learning (PEARL), JnNURM, National Institute of Urban Affair, Government of India, New Delhi, Vol. 2 (2009)
- 104. NIUA, Impact of 74th Amendment Act on the Working of Urban Local Bodies, sponsored by the Ministry of Urban Development, *NIUA, Government of India*, 2005
- 105. Pandey, K.K. Administrative of Urban Development and Urban Service Delivery, *Indian Institute of Public Administration, New Delhi* (2012)
- 106. Patricia, C. A. and Johannes, F. L., An Agenda for Research on Urbanization in Developing Countries, *World Bank: Policy Research Working Paper*, 5476 (2010)
- 107. Pimpri Chinchwad Municipal Corporation Report, BSUP projects Status under JnNURM for Pimpri Chinchwad City. Pimpri Chinchwad Municipal Corporation, Government of Maharashtra, Pimpri Chinchwad (2012)

- 108. Pimpri Chinchwad Municipal Corporation Report, Detailed Project Report for Solid Waste Management in Pimpri Chinchwad-2007, Pimpri Chinchwad Municipal Corporation, Government of West Bengal, Pimpri Chinchwad (2007)
- 109. Pimpri Chinchwad Municipal Corporation Report, Detailed Projects Report Water Supply Comprehensive Report Proposal No. 01, 02, 03 and 04, *Pimpri Chinchwad Municipal Corporation, Government of Maharashtra, Pimpri Chinchwad* (2006)
- 110. Pimpri Chinchwad Municipal Corporation Report, JnNURM Projects Status for Pimpri Chinchwad City, Pimpri Chinchwad Municipal Corporation, Government of Maharashtra, Pimpri Chinchwad (2012)
- 111. Pimpri Chinchwad Municipal Corporation Report, Pimpri Chinchwad City Development Plan 2006-2012, Pimpri Chinchwad Municipal Corporation, Government of Maharashtra, Pimpri Chinchwad (2006)
- 112. Pimpri Chinchwad Municipal Corporation, City Development Plan 2008, Pimpri Chinchwad Municipal Corporation, Government of Maharashtra, (2008)
- 113. Planning Commission Report, Eleventh Five Year Plan 2007-12, Volume III Agriculture, Rural Development, Industry, Services and Physical Infrastructure, *Planning Commission*, *Government of India* (2008)
- 114. Planning Commission, Towards Faster and More Inclusive Growth: An Approach to the 11th Five Year Plan, *Planning Commission, Government of India* (2012)
- 115. Pranati, D. Urbanization in India, Indian Statistical Institute, Kolkata (2006)
- Preeti, O., Krishna, K. D. and Ashutosh, S. Exploring the Concept of Urban Renewal in the
 Indian Context. *Institute of Town Planner India*, Vol. 5 (2), pp. 42-46 (2008)
- 117. PUB Report, Conclusions and Recommendations of the Expert Panel on Drainage Design and Flood Protection Measure, *Public Utilities Board, Singapore* (2012)
- 118. PUB, (2001): Annual Report, 2001. Public Utilities Board, Singapore, Singapore
- 119. PUB, (2012)_Innovation in Water: Singapore', *Public Utilities Board, Singapore*, Vol. 2, March (2012)
- 120. Rachel, M. G. Good Governance as a Concept and Why This Matters for Development Policy. United Nations University, World Institute for Development Economic Research, Working Paper No. 2012/30, Finland, Helsinki (2012)

- 121. Rajiv B. L. India Infrastructure Report 2011, *Water: Policy and Performing for Sustainable Development*, Oxford University, London (2011)
- Rashmi, G. V., Vijayan, K. P., and Eilee F. L., Relationship Quality and Elder Care Giver Burden in India, *Journal of Social Science Invention: Theory and Practical*, Vol. 21 (2), pp. 39-62, (2012)
- 123. Registrar General and Census Commission, Census of India 2001, Population Projects for India and States 2001-2026, *Registrar General Commission and Census*, Government of India, New Delhi (2006)
- 124. Registrar General and Census Commission, Census 2011 Provisional Population Totals, *Registrar General and Census*, Government of India (2011).
- 125. Registrar General and Census Commission, City having Population 1 lakh and above, Registrar General and Census, Government of India (2011)
- 126. Richard, K. Green toward an Urban Housing Strategy, Marron Institute, Working paper –
 4, 1st April 2014, New York (2014)
- 127. Rob, D., Realities of Storm Water Quality Singapore vs Small Town Australia, (2010)
- 128. Roberts, P., and Sykes, H., Urban Regeneration A Handbook, British Urban Regeneration Association, SAGE Publications, London (2000)
- Rumi, A., Challenges for Urban Local Governments in India, Asia Research Centre, Working Research Paper 19, (2007)
- Sameer, S., Raval, P.M. and Mapuskar, S.V., Review of Sustainable Waste Water Management Option for Urban Sanitation Facilities in Developing Countries, Case Study: Upper Bhima Basin, India, *Journal of Applied Sciences in Environmental Sanitation*, Vol. 5 (4), pp. 361-373 (2010)
- Sanjukta, G., Planning for Baruipur District Headquarters A Future Growth Node in the Kolkata Metropolitan Area by 2025, *Journal of Humanities and Social Sciences*, Vol. 1 (1), pp. 09-13 (2012)
- Scott, B. Social Transformations in the Global City: Singapore. Urban Studies, Sage, Vol. 36 (7), pp. 1095-1117 (1999)
- Sharma, U. and Chakraborty, S. K., E-governance initiative in Technical Institute Case Study of Dr. B.R. Ambedkar Institute of Technology, Andaman & Nicobar Island (India),

International Journal of Computational Engineering Research, Vol.2(3) pp.671-680, (2012)

- 134. Shirish, S., Ireena, V., Richard, D., Ajit, M., Ankur, A., Shishir, G., Alex K., Sudipto, P., Aditya, S. and Gurpreet, S., India's Urban Awakening Building Inclusive Cities, *Sustaining Economic Growth*, Mckinsey Global Institute, London (2010)
- Shyamkeshor, A., Koireng, A. S., and Ruolkhumzo, State of Democracy in Manipur in State of Democracy in Manipur and others Essay, New Delhi, *(Sunmarg Publishers & amp; Distributors)*, pp-120-145, (2013)
- 136. Shyamkeshwor A., Domestic Dimensions of India's Look East Policy (LEP) with reference to Manipur, *Journal of International Relations*, Vol. 1(1), pp-16-24. ISSN: 2348-7496. (2014)
- Shyamkeshwor A., Good Governance and Insurgency in Manipur, *Public Administration Review*, Vol. XII, pp. 165-176 ISSN: 2249-3360, (2011)
- Siddegowda and Shivashankara, G.P. Environment Impact Assessment of Urban Slums in Bangalore Agglomeration. *Institute of Town Planner India*, Vol. 5 (2), pp. 19-25 (2008)
- 139. Sivarramakrishnan, K.C. The JnNURM Story, *Centre for policy Research, New Delhi* (2010)
- 140. Srila, G., Rajive, S., Kalyan, B., Jeyanthi, G., Harijan, B.B., Jeyakumar, M.B., Philip M., Sadanala, M.E., Tryphena, S., Suresh, C.R., Thomas, V.A., Pethuru, D., Ranjit K., David, S., Gagandeep, K. and Vinohar, B. Study of Water Supply and Sanitation Practice in India using Geographic Information System: Some Design and Other Considerations in a village setting, *Indian J Med Res*, Vol. 129, pp. 233-241 (2009)
- 141. Surat Municipal Corporation, BSUP Projects Status under JnNURM for Surat City, Surat Municipal Corporation, Government of Gujarat, Surat (2012)
- 142. Surat Municipal Corporation, Detailed Projects Report for Solid Waste management in Surat City-2006, Surat Municipal Corporation, Government of Gujarat, Surat (2006)
- 143. Surat Municipal Corporation, JnNURM Projects for Surat City-2012, Surat Municipal Corporation, Government of Gujarat, Surat (2012)
- 144. Surat Municipal Corporation, Surat City Development Plan 2008-12, Surat Municipal Corporation, Government of Gujarat, Surat (2008)

- 145. Town Planning Department, Based Map of Imphal City, Town Planning Department, Government of Manipur, Imphal (2012)
- 146. Town Planning Department, UIG Projects Status for Imphal City, Town Planning Department, Government of Manipur, Imphal (2012)
- 147. UNEP, Municipal Waste Management Report: Status-Quo and Issues in South East and East Asian Countries, United Nations Environment Programme, Thailand, Pathumtheni (2010)
- United Nations, Cities in a Globalizing World: Global Report on Human Settlement 2011, United Nations Centre for Human Settlement, London, (2001)
- 149. Vijayan, K. P., Arati, M., and Fangttsun, W., Maternity Mortality and Female Literacy Rates in Developing Countries During 1970-2000: A Latent Growth Curve Analysis, *International Journal of Population Research*, Vol. 2, pp. 1-11, (2013)
- 150. Wankhade, K., JnNURM: An Opportunity for Sustainable Urbanization. International Growth Centre, Working paper February 2013, London (2013)



Annexure – I: Fact Profile of India

Indicator	Description			
Capital	Delhi			
Area	3287590 Sq Km			
Number of State/UTs	28 States and 7 Union Territories			
Districts	640			
Sub-districts	5924			
Towns	7936			
Village	6.41 lakh			
Government	Federal Republic			
Ruling Party (2014)	BJP Party			
Population (2011)	1210193422 / (1210.19 million)			
Sex Ratio (2011)	940			
Decadal Growth (2001-2011)	17.64%			
Urban population (2011)	377.2 million (31.16% shared urban population)			
Slum Population (2011)	65494604			
Literacy Rate in Percentage	74.04% (Urban -84.9% and Rural-68.9%)			
Male Literacy Rate in Percentage	82.14%			
Female Literacy Rate in Percentage	65.46%			
Gross Domestic Product	1.877 trillion USD (2013)			
Density	364 sq km			
Water Supply Coverage	46.6% (within the premises), 35.8% (near the premises) and 17.6% (away)			
Sewerage Treatment Capacity	Mega Cities (51% Treated), Class I Cities (31% Treated), and Class II (8% Treated),			
Storm Water Drainage Coverage	18.1% (closed drainage), 33.0% (open drainage) and 48.9% (No drainage)			
Solid Waste Collection Coverage	Approximately 40 percent coverage in urban areas			

Source: Based on Compilation of Census data, 2011



Rank	Urban Agglomeration/City	Population in Million
1	Greater Mumbai	18.41
2	Delhi	16.31
3	Kolkata	14.11
4	Chennai	8.70
5	Bangalore	8.5
6	Hyderabad	7.75
7	Ahmedabad	6.35
8	Pimpri Chinchwad (Pune)	5.05
9	Surat	4.59
10	Jaipur	3.07
11	Kanpur	2.92
12	Lucknow	2.90
13	Nagpur	2.50
14	Ghaziabad	2.36
15	Indore	2.17
16	Coimbatore	2.15
17	Kochi	2.12
18	Patna	2.05
19	Kozhikode	2.03
20	Bhopal	1.88
21	Thrissur	1.85
22	Vadodara	1.82
23 Agra		1.75
24	Visakhapatnam	1.73
25	Malappuram	1.70
26	Thiruvananthapuram	1.69
27	Kannur	1.64
28	Ludhiana	1.61
29	Nashik	1.56
30	Varanasi	1.44
31	Madurai	1.46
32	Meerut	1.42
33	Vijayawada	1.49
34	Faridabad	1.40
35	Rajkot	1.39
36	Jamshedpur	1.34

Annexure – II: Population of Urban Centre in India (2011 Census)

Rank	Urban Agglomeration/City	Population in Million
37	Jabalpur	1.27
38	Srinagar	1.27
39	Asansol	1.24
40	Vasai-Virar	1.22
41	Dhanbad	1.20
42	Allahabad	1.22
43	Aurangabad	1.19
44	Amritsar	1.18
45	Jodhpur	1.14
46	Ranchi	1.13
47	Raipur	1.12
48	Kollam	1.11
49	Gwalior	1.10
50	Durg-Bhilainagar	1.06
51	Chandigarh	1.02
52	Tiruchirapalli	1.02
53	Kota	1.00
	Total population	160.7

Source: Census, 2011



	Towns Category wise Slum Population					on	% of Slum	
Sl. No.	Name of State/UTs	Statutory towns	Slum reported towns	Total Population	Notified Slums	Recognized Slums	Identified Slums	Population to Total Slum Population
1	India	4041	2613	65494604	22535133	20131336	22828135	100
2	Maharashtra	256	189	11848423	3709309	3485783	4653331	18.09
3	Andhra Pradesh	125	125	10186934	8338154	877172	971608	15.55
4	West Bengal	129	122	6418594	48918	3703852	2665824	9.80
5	Uttar Pradesh	648	293	6239965	562548	4678326	999091	9.53
6	Tamil Nadu	721	507	5798459	2541345	1978441	1278673	8.85
7	Madhya Pradesh	364	303	5688993	1900942	2530637	1257414	8.69
8	Karnataka	220	206	3291434	2271990	445899	573545	5.03
9	Rajasthan	185	107	2068000	0	0	2068000	3.16
10	Chhattisgarh	168	94	1898931	713654	764851	420426	2.90
11	NCR Delhi	2	22	1785390	738915	0	1046475	2.73
12	Gujarat	195	103	1680095	0	0	1680095	2.57
13	Haryana	80	75	1662305	14912	0	1647393	2.54
14	Odisha	107	76	1560303	0	812737	747566	2.38
15	Bihar	139	88	1237682	0	0	1237682	1.89
16	Jammu& Kashmir	86	40	662062	162909	136649	362504	1.01
17	Uttarakhand	74	31	487741	185832	52278	249631	0.74
18	Jharkhand	40	31	372999	64399	59432	249168	0.57
19	Kerala	59	19	202048	186835	8215	6998	0.31
20	Assam	88	31	197266	9163	70979	117124	0.30
21	Pondicherry	6	6	144573	70092	73928	553	0.22
22	Tripura	16	15	139780	0	124036	15744	0.21
23	Chandigarh	1	1	95135	95135	0	0	0.15
24	Nagaland	19	11	82324	0	48249	34075	0.13
25	Mizoram	23	1	78561	0	78561	0	0.12
26	Himachal Pradesh	56	22	61312	60201	0	1111	0.09
27	Meghalaya	10	6	57418	34699	8006	14713	0.05
28	Sikkim	8	7	31378	31378	0	0	0.04
29	Goa	14	3	26247	6107	0	20140	0.02
30	Arunachal Pradesh	26	5	15562	0	0	15562	0.02

Annexure – III: Slum Population in India

		Towns		Category wise Slum Population				% of Slum
Sl. No.	Name of State/UTs	Statutory towns	Slum reported towns	Total Population	Notified Slums	Recognized Slums	Identified Slums	Population to Total Slum Population
31	Andaman and Nicobar Island	1	1	14172	0	0	14172	0.00
32	Manipur	28	0	0	0	0	0	0.00
33	Daman and Diu	2	0	0	0	0	0	0.00
34	Dadra and Nagar Haveli	1	0	0	0	0	0	0.00
35	Lakshadweep	0	0	0	0	0	0	0.00

Source: Analysis Based on Census, 2011



	Cities having more that	n 4 million Population (Census, 20	11) in Lakhs
SL. No.	Name of State	Name of City	Population
1	Maharashtra	Mumbai	184.00
2	Delhi	Delhi	167.53
3	West Bengal	Kolkata	141.13
4	Karnataka	Bangalore	95.88
5	Maharashtra	Pimpri Chinchwad (Pune)	94.26
6	Gujarat	Ahmedabad	72.08
7	Rajasthan	Jaipur	66.63
8	Uttar Pradesh	Kanpur	63.68
9	Maharashtra	Nashik	61.09
10	Gujarat	Surat	60.79
11	Gujarat	Allahabad	59.59
12	Bihar	Patna	57.72
13	Tamil Nadu	Chennai	46.81
14	Maharashtra	Nagpur	46.53
15	Uttar Pradesh	Lucknow	45.88
16	Uttar Pradesh	Agra	43.80
17	Andhra Pradesh	Visakhapatnam	42.88
18	Gujarat	Vadodara	41.57
19	Chhattisgarh	Raipur	40.62
20	Andhra Pradesh	Hyderabad	40.10
1.00	Cities having 1 to 4	million Population (Census, 2011)) in Lakhs
Sl. No.	Name of State	Name of City	Population
1	Gujarat	Rajkot	37.99
2	Uttar Pradesh	Varanasi	36.82
3	Punjab	Ludhiana	34.87
4	Tamilnadu	Coimbatore	34.72
5	Uttar Pradesh	Meerut	34.47
6	Maharashtra	Nanded	33.56
7	Kerala	Thiruvananthapuram	33.07
8	Madhya Pradesh	Indore	32.72
9	Tamil Nadu	Madurai	30.41
10	Karnataka	Mysore	29.94
11	Jharkhand	Ranchi	29.12
12	Jharkhand	Dhanbad	26.82
13	Rajasthan	Ajmer-Pushkar	25.84
14	Uttar Pradesh	Mathura	25.41
15	Punjab	Amritsar	24.90
16	Punjab	Jabalpur	24.60
17	Madhya Pradesh	Bhopal	23.68
18	Kerala	Cochin	21.18

Annexure – IV: JnNURM City Size (2011 Census)

20 21 22 23 24 25 26	Uttarakhand Haryana Uttarakhand Orissa Jharkhand West Bengal	Haridwar Faridabad Dehradun Puri Jamshedpur	19.27 17.98 16.98 16.97
23 24 25 26	Uttarakhand Orissa Jharkhand West Bengal	Puri	
24 25 26	Orissa Jharkhand West Bengal		
24 25 26	West Bengal	Jamshedpur	
26	-	*	13.37
	-	Asansol	12.43
07	Chandigarh	Chandigarh	10.54
27	Uttarakhand	Nainital	9.55
28	Pondicherry	Pondicherry	9.46
29	Orissa	Bhubaneswar	8.82
30	Himachal Pradesh	Shimla	8.13
31	Gujarat	Porbandar	5.85
32	Andhra Pradesh	Tirupati	4.96
33	Bihar	Bodhgaya	4.71
34	Goa	Panaji	1.14
	North East Cities and Jam	nmu and Kashmir Cities (Census, 2	011) in Lakhs
Sl No.	Name of State	Name of Cities	Population
1	Jammu and Kashmir	Jammu	15.26
2	Assam	Guwahati	15.17
3	Andhra Pradesh	Vijayawada	14.91
4	Jammu and Kashmir	Srinagar	12.69
5	Manipur	Imphal	9.67
6	Mizoram	Aizawl	4.04
7	Tripura	Agartala	4.00
8	Meghalaya	Shillong	3.54
9	Nagaland	Kohima	2.68
10	Sikkim	Gangtok	0.99
11	Arunachal Pradesh	Itanagar	0.59
11			

Sl. No.	Name of State/UTs	Slum Population	BSUP (DUs)	No. of Slum Families Estimated by assuming 5 members as one DUs	Coverage of Slum DUs in %
1	Manipur	0	1250	0	
2	Daman and Diu	0	0	0	
3	Dadra and Nagar Haveli	0	0	0	
4	Lakshadweep	0	0	0	
5	Chandigarh	95135	25728	19027	108
6	Kerala	202048	23577	40410	47
7	Gujarat	1680095	105312	-336019	25
8	Arunachal Pradesh	15562	852	3112	22
9	Jharkhand	372999	16724	74600	18
10	Nagaland	82324	3504	16465	17
11	NCR Delhi	1785390	74312	357078	17
12	West Bengal	6418594	155353	1283719	10
13	Pondicherry	144573	2964	28915	8
14	Bihar	1237682	22372	247536	7
15	Chhattisgarh	1898931	30000	379786	6
16	Maharashtra	11848423	186745	2369685	6
17	Tamil Nadu	5798459	91318	1159692	6
18	Mizoram	78561	1096	15712	6
10	Meghalaya	57418	768	11484	5
20	Andhra Pradesh	10186934	127592	2037387	5
21	Assam	197266	2260	39453	5
22	Uttar Pradesh	6239965	68216	1247993	4
23	Himachal Pradesh	61312	636	12262	4
24	Jammu& Kashmir	662062	6677	132412	4
25	Karnataka	3291434	28118	658287	3
26	Sikkim	31378	254	6276	3
27	Madhya Pradesh	5688993	41446	1137799	3
28	Goa	26247	155	5249	2
29	Uttarakhand	487741	1977	97548	2
30	Haryana	1662305	3248	332461	1
31	Tripura	139780	256	27956	1
32	Odisha	1560303	2508	312061	1
33	Rajasthan	2068000	2315	413600	0
34	Andaman & Nicobar Island	14172	0	2834	0
35	India	65494604	1053343	13098921	6

Annexure - V: Slum Population Targeted in State Wise

Source: Based on Census, 2011 and BSUP Project Status, 2012



Sl. No	State	City	City Population as per 2011 census	Total investment (in lakhs)	Per capita (in Rs)
1	Arunachal Pradesh	Itanagar	0.35	18048.2	51566.29
2	Sikkim	Gangtok	0.29	9653.67	33288.52
3	Maharashtra	Nanded	4.31	68964.45	16001.03
4	Orissa	Puri	1.57	23872	15205.1
5	Nagaland	Kohima	0.77	11594.13	15057.31
6	West Bengal	Kolkata	132.06	1728201.1	13086.48
7	Karnataka	Mysore	7.99	98331.99	12306.88
8	Andhra Pradesh	Vishakhapatnam	13.45	155370.48	11551.71
9	Himachal Pradesh	Shimla	1.45	16373.68	11292.19
10	Rajasthan	Ajmer-Pushkar	5.04	50564.8	10032.7
11	Tripura	Agartala	1.9	18047	9498.42
12	Orissa	Bhubaneshwar	6.58	57325.66	8712.11
13	Maharashtra	Pimpri Chinchwad (Pune)	37.6	319278.2	8491.44
14	Meghalaya	Shillong	2.68	21795.72	8132.73
15	Uttar Pradesh	Varanasi	12.04	95569.73	7937.69
16	Andhra Pradesh	Vijayawada	10.39	77809.02	7488.84
17	Goa	Panaji	1	7484.08	7484.08
18	Uttar Pradesh	Lucknow	22.46	161612.97	7195.59
19	Madhya Pradesh	Bhopal	14.58	104042.11	7135.95
20	Maharashtra	Nagpur	21.29	149969.21	7044.12
21	Tamil Nadu	Madurai	12.03	84288.57	7006.53
22	Maharashtra	Nashik	11.52	79916.15	6937.17
23	Gujarat	Porbandar	2	13811.69	6905.85
24	West Bengal	Asansol	10.67	72949.71	6836.9
25	Haryana	Faridabad	10.56	69481.12	6579.65
26	Manipur	Imphal	2.5	15395.66	6158.26
27	Uttar Pradesh	Coimbatore	14.61	87295.54	5975.05
28	Uttar Pradesh	Allahabad	10.42	61751.71	5926.27
29	Gujarat	Surat	28.11	163424.42	5813.75
30	Karnataka	Bangalore	45.25	258571.44	5714.29
31	Mizoram	Aizawl	2.28	12772.16	5601.83
32	Kerala	Thiruvananthapuram	8.9	48867	5490.67
33	Tamil Nadu	Chennai	65.6	358543.57	5465.6
34	Delhi	Delhi	128.77	694371	5392.34

Annexure – VI: Per Capita under UIG sub-mission, JnNURM in 65 Cities

Sl. No	State	City	City Population as per 2011 census	Total investment (in lakhs)	Per capita (in Rs)
35	Gujarat	Ahmedabad	45.25	239038.01	5282.61
36	Uttarakhand	Haridwar	2.21	11667.34	5279.34
37	Gujarat	Vadodara	14.91	76144.73	5106.96
38	Pondicherry	Pondicherry	5.05	25306	5011.09
39	Maharashtra	Indore	16.4	81516.99	4970.55
40	Gujarat	Rajkot	10.03	49646.86	4949.84
41	Uttar Pradesh	Mathura	3.23	15747.37	4875.35
42	Punjab	Amritsar	10.03	48400	4825.52
43	Uttarakhand	Dehradun	5.3	23968.61	4522.38
44	Madhya Pradesh	Jabalpur	10.98	48937	4456.92
45	Uttar Pradesh	Kanpur	27.15	120422.27	4435.44
46	Andhra Pradesh	Hyderabad	57.42	252787	4402.42
47	Chhattisgarh	Raipur	7	30364	4337.71
48	Uttar Pradesh	Meerut	11.61	48149.4	4147.24
49	Jammu and Kashmir	Srinagar	9.88	40229	4071.76
50	Jharkhand	Dhanbad	10.65	42170.9	3959.71
51	Jharkhand	Ranchi	8.63	33978.58	3937.26
52	Assam	Guwahati	8.19	31610.71	3859.67
53	Kerala	Kochi	13.55	50922	3758.08
54	Bihar	Patna	16.98	58231.21	3429.4
55	Bihar	Bodhgaya	3.94	12950.06	3286.82
56	Maharashtra	Mumbai	164.34	520673.38	3168.27
57	Rajasthan	Jaipur	23.27	72208.27	3103.06
58	Maharashtra	Ujjain	4.31	11425.44	2650.91
59	Andhra Pradesh	Tirupati	3.24	8498	2622.84
60	Uttar Pradesh	Agra	13.31	33108.49	2487.49
61	Jammu and Kashmir	Jammu	6.12	14955.03	2443.63
62	Chandigarh	Chandigarh	8.08	19119.6	2366.29
63	Uttarakhand	Nainital	2.2	4620.27	2100.12
64	Punjab	Ludhiana	13.98	24139	1726.68
65	Jharkhand	Jamshedpur	11.04	3336.24	302.2
		Total	1199.3	7269620	6061.552

Source: Based on JnNURM Progress Status, 2012 and Census, 2011

	Mega	City (with above 4	million Population), Ce	ensus, 2001	
Sl No.	City	Projects Approved (in No.)	Total Project Cost Approved in Cores	Total No. of Dwelling Units Approved	Total Cost Per Units core
1	Kolkata	91	3382.52	131009	0.03
2	Hyderabad	17	1884.95	78746	0.02
3	Delhi	17	3257.72	74312	0.04
4	Mumbai	16	3061.39	70602	0.04
5	Chennai	23	1373.31	37787	0.04
6	Ahmedabad	3	523.95	32640	0.02
7	Bangalore	14	582.85	19984	0.03
	- C - C - C - C - C - C - C - C - C - C	Total	14066.69	445080	0.03
		City with 1 to 4 mill	ion Population (census	2001)	
Sl No.	City Pimpri Chinchwad (Pune)	Projects Approved (in No.) 19	Total Project Cost Approved in Cores 1761.62	Total No. of Dwelling Units Approved 57650	Total Cost Per Units core 0.03
2	Surat	12	699.3	46856	0.01
3	Coimbatore		574.8	27637	0.01
4	Madurai	11	379.21	25894	0.01
5	Visakhapatnam	12	765.27	24423	0.03
6	Vijayawada	8	765.27	24423	0.03
7	Asansol	11	620.86	24344	0.03
8	Bhopal	14	443.45	23609	0.02
9	Patna	17	655.41	20372	0.02
10	Jaipur	3	405.63	17814	0.02
11	Vadodara	4	344.84	17152	0.02
12	Agra	10	605.55	16793	0.04
13	Nagpur	10	850.4	16186	0.05
14	Nashik	8	334.25	16000	0.02
15	Kanpur	14	456.12	14346	0.03
16	Lucknow	8	371.72	14044	0.03
17	Meerut	14	391.86	10838	0.04
18	Cochin	3	135.66	10390	0.01
19	Rajkot	3	155.67	8664	0.02
20	Jabalpur	4	87.53	8500	0.01
21	Indore	3	156.27	8017	0.02
22	Varanasi	10	246	5963	0.04
23	Ludhiana	1	66.64	4832	0.01
24	Jamshedpur	3	148.86	4176	0.04
25	Dhanbad	5	117.94	3620	0.03
26	Faridabad	2	64.23	3248	0.02
27	Allahabad	5	68.46	1634	0.04
28	Amritsar	1	5.79	320	0.02
-	Total	232	11678.61	457745	

Annexure –VII: BSUP Projects Details

	City excluding North Ea		ensus, 2001)		
Sl No.	City	Projects Approved (in No.)	Total Project Cost Approved in Cores	Total No. of Dwelling Units Approved	Total Cost Per Units core
1	Raipur	6	462.49	30000	0.02
2	Nanded	10	1001.62	26307	0.04
3	Chandigarh	2	564.94	25728	0.02
4	Thiruvananthapuram	4	208.01	13187	0.02
5	Ranchi	6	263.58	8928	0.03
6	Mysore	4	258.63	8134	0.03
7	Ajmer-Pushkar	1	107.71	5337	0.02
8	Srinagar	2	113.3	5222	0.02
9	Mathura	7	214.1	4598	0.05
10	Pondicherry	3	135.98	2964	0.05
11	Bhubaneswar	4	63.6	2153	0.03
12	Bodhgaya	1	54.57	2000	0.03
13	Dehradun	9	62.62	1362	0.05
14	Ujjain	1	17.41	1320	0.01
15	Shimla	2	24.01	636	0.04
16	Puri	2	11.02	355	0.03
17	Nainital	2	19.79	341	0.06
18	Panaji	1	10.22	155	0.07
19	Haridwar	1	3.62	96	0.04
20	Porbandar	0	0	0	0
21	Tirupati	0	0	0	0
	Total	68	3597.22	138823	
	North Ea	st City and Jammu	and Kashmir Cities (C	Census, 2001)	
Sl No.	City	Projects Approved (in No.)	Total Project Cost Approved in Cores	Total No. of Dwelling Units Approved	Total Cos Per Units core
1	Srinagar	2	113.3	5222	0.02
2	Kohima	1	134.5	3504	3.84
3	Guwahati	2	108.44	2260	4.8
4	Jammu	3	49.09	1455	0.03
5	Imphal	1	51.23	1250	4.1
6	Aizawl	· · · · · · · · · · · · · · · · · · ·		1096	8.33
7	Itanagar	2	49.25	852	5.78
8	Shillong	3	51.74	768	6.74
9	Agartala	1	16.73	256	6.54
10	Gangtok	3	33.58	254	13.22
	Total	22	699.18	16917	4.13

Source: Analysis Based on BSUP Projects Status, 2011

Sl	State	Total Slum Populations	Estimated No. of DUs (as Family	Approved DUs under	No. of DUs per One Lakh
No.		(Census, 2011)	size 5 member)	BSUP	Slum Family
1	India	65494604	13098921	1053343	8041
2	Maharashtra	11848423	2369685	186745	7881
3	Andhra Pradesh	10186934	2037387	127592	6263
4	West Bengal	6418594	1283719	155353	12102
5	Uttar Pradesh	6239965	1247993	68216	5466
6	Tamil Nadu	5798459	1159692	91318	7874
7	Madhya Pradesh	5688993	1137799	41446	3643
8	Karnataka	3291434	658287	28118	4271
9	Rajasthan	2068000	413600	23151	5597
10	Chhattisgarh	1898931	379786	30000	7899
11	NCR Delhi	1785390	357078	74312	20811
12	Gujarat	1680095	336019	105312	31341
13	Haryana	1662305	332461	3248	977
14	Odisha	1560303	312061	2508	804
15	Punjab	1460518	292104	5152	1764
16	Bihar	1237682	247536	22372	9038
17	Jammu& Kashmir	662062	132412	6677	5043
18	Uttarakhand	487741	97548	1799	1844
19	Jharkhand	372999	74600	16724	22418
20	Kerala	202048	40410	23577	58345
21	Assam	197266	39453	2260	5728
22	Pondicherry	144573	28915	2964	10251
23	Tripura	139780	27956	256	916
24	Chandigarh	95135	19027	25728	135218
25	Nagaland	82324	16465	3504	21282
26	Mizoram	78561	15712	1096	6975
27	Himachal Pradesh	61312	12262	636	5187
28	Meghalaya	57418	11484	768	6688
29	Sikkim	31378	6276	254	4047
30	Goa	26247	5249	155	2953
31	Arunachal Pradesh	15562	3112	852	27374
32	Andaman & Nicobar Island	14172	2834	0	0
33	Manipur	0	0	1250	
34	Daman and Diu	0	0	0	
35	Dadra and Nagar Haveli	0	0	0	
36	Lakshadweep	0	0	0	

Annexure –VIII: Targeted Dwelling Units under sub-mission of BSUP Projects

Source: Based on BSUP Projects Stats, 2011 and Census, 2011



Annexure – IX: Fact Profile of Surat City

Indicator	Description
Name State Comes under	Gujarat
Population (2011 Census)	4.59 million
Name of Municipality	Surat Municipal Corporation
Area	326.515 Sq Km
Administrative Zones	7
Density (2011)	13662 Persons/Sq. Km
Literacy Rate	83%
Sex Ratio (2011)	810
Decadal Growth Rate (2001-2011)	55.29%
Slum Population (2011)	1.04 lakh
Male Literacy Rate in Percentage	88%
Female Literacy Rate in Percentage	76%
Gross Domestic Product	11.15% (2008)
Water Supply Coverage	85% (in population wise)
Sewerage Coverage	85% coverage (in population wise)
Collected of solid waste out of the	88 200/
total generated	88.29%
Storm Water Drainage Coverage	20.3% of the total road length

Source: Based on Census 2011





Indicator	Description
Name State Comes under	Maharashtra
Population (2001)	12.5 lakhs
Name of Municipality	Pimpri Chinchwad Municipal Corporation
Area (2001)	170.51 Sq Km
Density	5902 Sq Km
Total Wards Number	64
Literacy Rate	74%
Sex Ratio (2011)	828
Urban Growth Rate (1991-2001)	36.54%
Slum Population (2011)	1.43 lakhs
Gross Domestic Product	50-55
Water Supply Coverage	95% (area wise)
Sewerage Coverage	50% (population wise)
Solid Waste Collected out of total generated	95%
Storm Water Drainage Coverage	48% of total road length

Annexure – X: Fact Profile of Pimpri Chinchwad (Pune) City

Source: Census, 2011





Annexure – XI: Fact Profile of Kolkata City

Indicator	Description
Name State Comes under	West Bengal
Population (2011 Census)	14.11 million
Number ULBs within Kolkata metropolitan Area	41 ULBs (Municipalities)
Area	1851.41Sq Km
Density	7950 Sq Km
Literacy Rate	87.14%
Sex Ratio (2011)	908
Growth rate of Urban Agglomeration (2011)	7.6%
Slum Population	1490811 as per census 2001 or (29.6% of Total Population
Gross Domestic Product	
Water Supply Coverage	92.70% of Households
Sewerage Coverage	50% area wise
Solid Waste Collection of Total Generated	65% of Total Generated
Storm Water Drainage Coverage	40% area wise
Source: Kolkata City Development Plan 2006 and (Congue 2011

Source: Kolkata City Development Plan, 2006 and Census, 2011





Indicator	Description
Name State Comes under	Manipur
Population (2011 Census)	9.67 lakhs
Name of Municipality	Imphal Municipal Corporation
Total Number of Wards	27
Area	30.75 Sq Km
Density	7000 Sq Km
Literacy Rate	78%
Male Literacy Rate in Percentage	68.76%
Female Literacy Rate in Percentage	31.23%
Sex Ratio	1017
Urban Growth Rate (1991-2001)	11.56%
Slum Population (2011)	Nil as per census, 2011
Gross Domestic Product	50%
Water Supply Coverage	54% area wise
Sewerage Coverage	No sewerage
Solid Waste Collection of total generated	42%
Storm Water Drainage Coverage	21% in area wise

Annexure – XII: Fact Profile of Imphal City

Source: Census, 2011





SI.	Region	Name of Projects	Approved Cost (Rs in	Approved	Physical Progress (DUs)		% of DUs
No.		- ····································	lakh)	DUs	Completed	Occupied	completed
1	-	Urban Renewal Project at Kumartuli	2679.9	524	0	0	0
2		Nonadanga Housing Project	4172.39	2848	1760	1760	61.8
3		Chetla Housing Project	823.84	416	64	0	0
4		Housing for Urban poor within K. M. C. (KEIP)	1577.34	1280	1184	1038	92.5
5	КМС	Integrated Housing Project for slum Dwellers of Rajarghat, Kacharipara and Hatgachia (KMC)	12092.32	6480	110	60	0
6	\mathcal{N}	Integrated Slum Dev. Scheme in Ward No 32 of KMC, Ultadanga, (By KIT)	2827.29	1160	0	0	0
7	N. 101	Kumartuli (Transit)	607.69	200	200	0	100
10	1.00	Total	24780.77	12908	3318	2858	
1		Gayeshpur Ph-I	2002.56	958	1125	1125	117.43
2	- 187 V	Gayeshpur Ph-II	7014.81	2485	911	911	36.66
3		Kalyani Ph-I	1780.66	899	899	899	100
4	Nadia	Kalyani Ph-II	2682.03	1412	1388	1388	98.3
5		Kalyani Ph-III	8404.1	3488	411	411	11.78
6		Kanchrapara Ph-I	1802.86	787	643	643	81.7
7		Kanchrapara Ph-II	1076.58	240	0	0	0
		Total	24763.6	10269	5377	5377	
1		Halisahar	5723.29	4394	2056	2056	46.79
2	1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	Panihati Ph-I	4088.28	2523	1555	1555	61.63
3	1. 35, 3,	Barasat Ph-II	5885.32	2486	464	464	18.66
4		New Barrackpore	5415.45	2191	1042	1042	47.56
5	rt, Ca	Rajarhat-Gopalpur Ph-II	5727.81	2180	1915	1915	87.84
6	2.7	North Dum Dum Ph-III	9054.77	2000	0	0	0
7	Sec. 2	Bhatpara Ph-II	6955.58	1947	0	0	0
8		North Dum Dum Ph-II	5812.6	1974	1605	1605	81.31
9		Kamarhati Ph-I	2727.83	1738	967	967	55.64
10	North Parganas	Rajarhat Gopalpur Ph-III	7744.57	1573	0	0	0
11	T urgunus	North Barrackpore	2801.3	1526	975	975	63.89
12	1	Rajarhat Gopalpur Ph-IV	7135.51	1469	0	0	0
13]	Madhyamgram Ph-II	3973.28	1435	1300	1300	90.59
14	1	Barrackpore Ph-II	3504.11	1434	591	591	41.21
15]	Madhyamgram Ph-III	7501.2	1406	2	2	0.142248
16]	Khardah Ph-II	3355.1	1330	650	650	48.87
17]	Madhyamgram Ph-I	2085.87	1253	1178	1178	94.01
18		Khardah Ph-I	1288.91	1246	635	635	50.96
19		Panihati Ph-II	3550.79	1206	194	194	16.09

Annexure – XIII:BSUP Projects Progress in Kolkata City as on 2012

SI.	Region	Name of Projects	Approved Cost (Rs in	Approved DUs	Physical (DU		% of DUs completed
No.		3	lakh)		Completed	Occupied	
20		Rajarhat-Gopalpur Ph-I	1885.27	973	948	948	97.43
21		Barasat Ph-I	1438.45	868	761	761	87.67
22		Bhatpara Ph-I	1791.38	797	797	797	100
23		Dum Dum	1513.69	748	256	256	34.22
24		Barrackpore Ph-I	1447.59	740	512	512	69.19
25		North Dum Dum Ph-I	1668.24	721	719	719	99.72
26		South Dum Dum Ph-I	1109.82	585	34	34	5.81
27		Halisahar Ph-II	2682.09	500	0	0	0
28		Kamarhati Ph-II	750.46	256	0	0	0
29		Baranagar Ph-I	431.37	202	180	180	89.11
		Total	109049.93	41701	19336	19336	
1		Rajpur-Sonarpur Ph-I	4889.99	2135	1530	1530	71.66
2		Baruipur Ph-II	5583.61	1982	600	600	30.27
3		Rajpur-Sonarpur Ph-II	4447.71	1788	400	400	-22.37
4	South	Pujali Ph-I	1383.01	1103	996	996	90.3
5	Parganas	Pujali Ph-II	1301.04	550	205	205	37.27
6		Baruipur	1008.02	543	540	540	99.45
7		Budge Budge Ph-I	431.97	190	190	190	100
8		Baruipur Ph-III	266.42	78	0	0	0
		Total	22587.92	9499	4483	4483	
1	and the second	Bhadreswar Ph-I	5644.32	4110	1938	1938	47.15
2		Champdani Ph-II	6807.45	3452	190	190	5.5
3		Hooghly-Chinsurah Ph-I	2964.75	2021	750	750	37.11
4		Serampore Ph-II	4865.74	2002	1848	1848	92.31
5		Chandanagar MC Ph-I	3912.57	1905	1720	1720	90.29
6		Rishra Ph-II	4129.25	1643	935	935	56.91
7		Serampore Ph-III	7754.13	1598	0	0	0
8		Bansberia Ph-I	2806.95	1341	1205	1205	89.86
9		Uttarpara-Kotrang Ph-I	2167.46	1286	1172	1172	91.14
10		Konnagar Ph-III	4930.96	1197	55	55	4.59482
11	KMDA	Chandanagar MC Ph-III	3040.75	1177	137	137	11.64
12		Champdani Ph-I	1398.91	882	759	617	86.05
13		Hooghly-Chinsurah Ph-II	2130.04	858	60	60	6.99
14		Serampore	1104.97	640	0	0	0
15		Baidyabati	1023.2	631	315	315	49.92
16		Bansberia Ph-II	1378.38	562	69	69	12.28
17		Konnagar Ph-II	1261.2	428	351	351	82.01
18		Chandanagar MC Ph-II	516.16	288	0	0	0
19		Rishra Ph-I	240.29	128	120	120	93.75
20		Konnagar Ph-I	228.48	128	104	104	81.25

SI.	Region	Name of Projects	Approved Cost (Rs in DV	Physical Progress (DUs)		% of DUs	
No.	5	, i i i i i i i i i i i i i i i i i i i	lakh)	DUs	Completed	Occupied	completed
		Total	58305.96	26277	11728	11586	
1		Howrah MC Ph-I	6403.67	3248	352	352	10.84
2		Uluberia Ph-I	4218.26	2120	2120	2120	100
3	Howrah	Uluberia Ph-II	5369.25	2100	440	440	20.95
4		Bally Ph-II	3244.17	1108	171	171	15.43
5		Bally Ph-I	264.85	136	136	90	100
		Total	19500.2	8712	3219	3173	
		Grand Total	258988.38	109366	47461	46813	

Source: Based on BSUP Projects Status, 2012





Annexure – XVI: Twelfth Schedule (Article 243W)

- 1. Urban planning including town planning
- 2. Regulation of land-use and construction of buildings
- 3. Planning for economic and social development
- 4. Roads and bridges
- 5. Water supply for domestic, industrial and commercial purposes
- 6. Public health sanitation and solid waste management
- 7. Fire services
- 8. Urban forestry, protection of environment and promotion of ecological aspects
- Safeguarding the interest of weaker section of society, including the handicapped and mentally retarded
- 10. Slum improvement and up gradation
- 11. Urban poverty alleviation
- 12. Provision of urban amenities and facilities such as parks, gardens, playgrounds
- 13. Promotion of cultural, educational and aesthetic aspects
- 14. Burials and burial ground; cremations, cremation ground; and electric crematorium
- 15. Cattle pound; prevention of cruelty to animals
- 16. Vital statistics including registration of births and deaths
- 17. Public amenities including street lighting, parking lots, bus stops and public conveniences
- 18. Regulation of slaughter houses and tanneries

Source: Viswanathan, T.K., 2004 (Secretary to the Government of India)



Annexure – XV: Municipal Solid Wastes (Management Handling) Rules, 1999 under Notification of the Government of India in the Ministry of Environment and Forests number S.O 783 (E), date 27th September, 1999

The Central Government hereby makes the following rules to regulated the management and handling of the municipal solid wastes, namely -

1. Short title and commencement -

- 1. These rules may be called Municipal Solid Wastes (Management and Handling) Rules, 2000.
- 2. Save as otherwise provided in these rules, they shall come into force on the date of their publication in the Office Gazette.

2. Application – These rules shall apply to every municipal authority for collection, segregation, storage, transportation, processing and disposal of municipal solid waste.

3. **Definitions** – In these rules, unless the context otherwise requires –

Anaerobic digestion" means a controlled process involving microbial decomposition of organic matter in the absence of oxygen;

-Authorization" means the consent given by the Board or Committee to the -operator of a facility"

"Biodegradable substance" means a substance that can be degraded by micro-organisms;

"*Biomethanation*" means a process which entails enzymatic decomposition of the organic matter by microbial action to produce methane rich biogas;

"Collection" means lifting and removal of solid wastes from collection points or any other location;

"Composting" means a controlled process involving microbial decomposition of organic matter;

"Demolition and construction waste" means wastes from building materials debris and rubble resulting from construction, re-modeling, repair and demolition operation;

"Disposal" means final disposal of municipal solid wastes in terms of the specified measures to prevent contamination of ground-water, surface water and ambient air quality;

"Land filling" means disposal of residual solid wastes on land in a facility designed with protective measures against pollution of ground water, surface water and air fugitive dust, wind-blown litter, bad odour, fire hazard, bird menace, pests or rodents, greenhouse gas emissions, slope instability and erosion;

"Leachate" means liquid that seeps through solid wastes or other medium and has extracts of dissolved or suspended material from it;

"Lysimeter" is a device used to measure rate of movement of water through or from a soil layer or is used to collect percolated water for quality analysis;

"Municipal Authority" means Municipal Corporation, Municipality, Nagar Palika, Nagar Nigam, Nagar Panchayat, Municipal Council including notified area committee (NAC) or any other local body constituted under the relevant statutes and, where the management and handling of municipal solid waste is entrusted to such agency;

"Municipal Solid Waste" includes commercial and residential wastes generated in a municipal or notified area in either solid or semi-solid form excluding industrial hazardous wastes but including treated bio-medical wastes;

"Operator of A Facility" means a person who owns or operates a facility for collection, segregation, storage, transportation, processing and disposal of municipal solid wastes and also includes any other agency appointed as such by the municipal authority for the management and handling of municipal solid wastes in the respective areas;

"*Pelletisation*" means a process whereby pellets are prepared which are small cubes or cylindrical pieces made out of solid wastes and include fuel pellets which is also referred as refuse derived fuel;

"Processing" means the process by which solid wastes are transformed into new or recycled products;

"Recycling" means the process of transforming segregated solid wastes into raw materials for producing new products, which may or may not be similar to the original products;

"Segregation" means to separate the municipal solid wastes into the groups of organic, inorganic, recyclables and hazardous wastes;

"State Board or the Committee" means the State Pollution Control Board of a State, or as the case may be, the Pollution Control Committee of a Union territory;

"Storage" means the temporary containment of municipal solid wastes in a manner so as to prevent littering, attraction to vectors, stray animals and excessive foul odour;

"Transportation" means conveyance of municipal solid wastes from place to place hygienically through specially designed transport system so as to prevent foul odour, littering, unsightly conditions and accessibility to vectors;

"Vadose Water" water which occurs between the ground, surface and the water table that is the unsaturated zone;

"Vermicomposting" is a process of using earthworms for conversion of bio-degradable wastes into compost.

4. Responsibility of the State Government and the Union territory Administrations

(1) The Secretary-in charge of the Department of Urban Development of the concerned State or the Union territory, as the case may be, shall have the overall responsibility for the enforcement of the provisions of these rules in the metropolitan cities.

(2) The District Magistrate or the Deputy Commissioner of the concerned district shall have the overall responsibility for the enforcement of the provisions of these rules within the territorial limits of their jurisdiction.

Source: Ministry of Environment and Forest, Government of India, (1999). *Municipal Solid Waste management Rules*, Ministry of Environment of Forest, Government of India, Delhi available at http://envfor.nic.in/legis/hsm/mswmhr.html (accessed on 5th November, 2014)





Annexure – XVI: Households Questioners

Section I: Household Survey for UIG Projects Evaluation, JnNURM

1. Project Name:.....Name of City:.....

Identification:

- 1. Zone:Ward No:.....
- 2. Name of Colony:.....House No:.....Street Name:....
- 3. Name:.....Sex: Male / Female. Contact
- 4. No/id:....

Family Details:

Gender	No. (Age Group in Year)			No. of persons employed		Education / Training								
	0- 17	18- 60	\geq 60	Total	18- 60	≥ 60	Total	Illiterate	School attended	Under graduate	Post Graduate	Technically Qualified	Skilled	Total
Male														
Female														

5. Monthly income of the household in rupees (i). ≤5000 (ii). 5001-10000 (iii) 10001-20000 (iv) 20001-50000 (vi) above 50001.

6. Monthly saving of the household in rupees (i) Nil, (ii) ≤1000 (iii) 1001-2000 (iv) 2001-5000 (v) 5001-10000 (vi) above 10001.

7. (a) House types: Flat (Apartment) / Plot (Independent) / other (b) Residence types: GF/FF/SF/TF/above FF

8. (a) Housing Tenancy: Own/Rent/Others. (b). Building Construction: Pucca/Semi Pucca/ Kutcha

9. Home appliances (Tick): LP Gas pipe line, Gas Stove, T.V, Computer/Laptop, Mobile Phone, Refrigerator, Air Condition, Car, Two Wheeler, Cycle, Electric iron, Geyser, Washing Machines

10. Ownership of Transport Modes: (i) Bicycle (ii) Scoter /MV (iii) Car (iv) others

11. Physical Infrastructure (JnNURM Projects) Services and Facilities

Infrastructure Services and facilities	Status (2005-06)	Status (2011-12)	Remarks
	(2005-06)	(2011-12)	
Water Supply			
i. Source of water			(1)Pipe line (SMC), (2)Tube well (own), (3)Stand Post
			(SMC), (4)Hand Pump (SMC), (5)Private tankers-
	6 E T		Mineral water bottle (Purchased)
ii. Monthly Expenditure (in Rs.) for water			(1) SMC, (2) Private Tankers, (3) Mineral water Bottle
iii. Duration of supply			Average duration of Supply (in Hrs): (a). 24.(b). 12-24.
			(c). 6-12. (d). 3-6. (e). 1-3. (f). Less than 1 hrs.
iv. Frequency of water supply			(1) Daily, 2-3 time in a week, (2) 4-6 time in a week
v. Water Quality			Quality: Good/Bad/Satisfactory
vi. Water Required in liters/day			100-200, 201-400, 401-600, 601-1000, above 1001
vii. Water Meter			Yes/ No

Infrastructure Services and facilities	Status (2005-06)	Status (2011-12)	Remarks
Water Supply			
viii. Water Uses			(1) Drinking, (2) washing, (3)Sanitation, (4) Bathing,(5) Car washing, (6) other (specified)
ix. Respondent of Breakdown of water supply from SMC			Time: (1) Taking Long time, (2) Immediate, (3) No respond
x. Use of filter/ purified at house	. T. 1.54		Yes/No
xi. Do you drink water straight from tap			Yes/No
xii. Complaints/problems Registration water supply	:53	2.1	147 ~
xiii.How do you get water supply complaints, rectified/redress	100		(1) online, (2) Go to SMC and complaints
Sewerage	Status (2005-06)	Status (2011-12)	Remarks
xiv. Sewerage connection			Yes/No
xv. Septic tanks	100		Yes/No
xvi. Satisfactory level of waste water collection			(1) Good (2) Average (3) Bad (4) Satisfactory
xvii. Practices of waste water recycle at home			(1)Car washed, (2)washing clothes, (3)Bathing,(4)Floor washing
xviii. Complaints/Problems (Respondent /redress)			Time: (1) Taking Long time, (2) Immediate, (3) No respond
Solid Waste Management	Status (2005-06)	Status (2011-12)	Remarks
xix. Door to door collection			(1) NGO, (2) privatization, (3)SMC
xx. Types of Disposal	1.1		(1)Thrown on street, (2)Municipal dustbin, (3)open space
xxi. Segregation Of Solid Waste			(1) Manually, (2) SMC
xxii. Frequency of collection	18		 Daily, (2) 1-3 in a weekly, (3)4-6 in a week, (4) Monthly,
xxiii. Services efficiency by SMC			(1)Good, (2) Average (3) Bad, (3)Satisfactory
xxiv. Environment and Aesthetic			(1)Good, (2)Bad, (3)Satisfactory
xxv. Monthly Expenditure in Rs			
Drainages	Status (2005-06)	Status (2011-12)	Remarks
xxvi. Drains system			(1)Open drains, (2)Closed drains, (3)No drains
xxvii. Storm water disposal mechanism	100	Core -	(1)Soak Pit, (2)Closed drains, (3)Septic tank, (4)Pucca open drains, (5)Kutch open drains
xxviii. Flooding Problems	100		Yes/No
xxix. Frequency of flooding	120	÷.,	 1-5 time in a year, (2) 6-10 time in a year, (3) more than 10 time in a year
xxx. Clogging of drains		-	(1)due to lack of proper drains, (2) dumping of solid waste into drains
xxxi. Cleaning by SMC			(1)1-5 time in a year, (2) 6-10 time in a year, (3) more than 10 time in a year
xxxii. Satisfactory level the SMC service			(1) Good (2) Average (3) bad

- 12. Awareness Programme /Community Participation in JnNURM Projects
- 13. Are you benefitted from JnNURM projects? Yes/No
- 14. Are you aware of those projects (JnNURM projects water supply, waste water management, storm water and drainage? Yes/No
- 15. Did any officer contact you and discussed the JnNURM projects? Yes/No
- 16. Are you satisfied?
- 17. Do you have any complaints/problems?

Section – II: Households Survey for BSUP Projects, JnNURM

1. Project Name:.....Name of City:.....

Identification:

- 2. Zone:Ward No:.....
- 3. Name of Colony:..... House No:...... Street Name:.....
- 4. Name:.....Sex: Male / Female. Contact
- 5. No/id:.....

Family Details:

Gender	Gender No. (Age Group in Year)		No. of persons employed		Education / Training								
	0- 17	18- 60	≥ 60	Total	18- 60	≥ 60	Total	Illiterate	School attended	Under graduate	Post Graduate	Technical Qualification	Skilled
Male													
Female													

5. Monthly income of the household in rupees (i) ≤5000) (ii) 5001-10000 (iii) 10001-20000 (iv) 20001-50000 (v) above 50001.

6. Monthly saving of the household in rupees (i) Nil, (ii) ≤1000 (iii) 1001-2000 (iv) 2001-5000 (v) 5001-10000 (vi) above 10001.

7. House types: Flat (Apartment) / Plot (Independent)

8. (a) Housing Tenancy: Own/Rent/Others. (b). Types of house: Pucca/Semi Pucca/Kutcha

9. Home appliances (Tick): LP Gas pipe line, Gas Stove, T.V, Computer/Laptop, Mobile Phone, Refrigerator, Air Condition, Car, Two Wheeler, Cycle, Electric iron, Geyser, Washing Machines

10. Slum relocation (name of place) in: 2005-06......2011-12......

11. Working Place:.....Distance from Home to working place in Km:....

12. Mode of travel to working place:.....Monthly expenditure in Rs:....

13. Social Infrastructure Services and facilities:

Infrastructure Services a facilities	and Nos.	Status 2005-06	Status 2011-12	Remarks
Educational				
i. Primary				Yes/No
ii. Middle				Yes/No
iii. High				Yes/No
Medical	Nos.	Status 2005-06	Status 2011-12	Remarks

Infrastructure Services and facilities	Nos.	Status 2005-06	Status 2011-12	Remarks
iv. Dispensary				Yes/No
v. Health Centre				Yes/No
vi. Medical Practice				Yes/No
Community Centre				Yes/No
Parks				Yes/No
Post & Telegraph offices				Yes / No
vii. Bus Station			and the second s	Yes / No
viii. Railway Station			1.1.1.2.	Yes / No
ix. Vikram				Yes/No
Power Supply	3	eylpra	T TYPED	Duration of Supply (in Hrs): (a) 24. (b) 12-24. (c) 6-12. (d) 3-6. (e) 1- 3. (f). less than 1 hrs.
Environment Status		Status 2005-06	Status 2011-12	
x. Environment				
problems		and the second se		No. 1866 No. 18
xi. Aesthetic problems			and the second second	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
xii. Drains problems				C & 18 m -
xiii. Sanitation problems				
xiv. Water Logging problems				

14. Physical Infrastructure (JnNURM Projects) Services and Facilities

Infr	astructure Services and facilities	Status (2005-06)	Status (2011-12)	Remarks
	Water Supply			
i.	Source of water	28		 (1)Pipe line (SMC), (2)Tube well (own), (3)Stand Post (SMC), (4)Hand Pump (SMC), (5)Private tankers-Mineral water bottle (Purchased)
ii.	Monthly Expenditure (in Rs.) for water			(2) SMC, (2) Private Tankers, (3) Mineral water Bottle
iii.	Duration of supply	~	2	Average duration of Supply (in Hrs): (a). 24.(b). 12-24. (c). 6-12. (d). 3-6. (e). 1-3. (f). Less than 1 hrs.
iv.	Frequency of water supply	100	Con y	(2) Daily, 2-3 time in a week, (2) 4-6 time in a week
V.	Water Quality			Quality: Good/Bad/Satisfactory
vi.	Water Required in liters/day	13.1	- in	100-200, 201-400, 401-600, 601-1000, above 1001
vii.	Water Meter			Yes/ No
viii.	Water Uses			 (2) Drinking, (2) washing, (3)Sanitation, (4) Bathing, (5) Car washing, (6) other (specified)
ix.	Respondent of Breakdown of water supply from SMC			Time: (1) Taking Long time, (2) Immediate, (3) No respond
х.	Use of filter/ purified at house			Yes/No
xi.	Do you drink water straight from			Yes/No

Infra	astructure Services and facilities	Status (2005-06)	Status (2011-12)	Remarks
	tap			
xii.	Complaints/problems			
	Registration water supply			
xiii.	How do you get water supply			(2) online, (2) Go to SMC and complaints
	complaints, rectified/redress			
	Sewerage	Status (2005-06)	Status (2011-12)	Remarks
i.	Sewerage connection			Yes/No
ii.	Septic tanks		1.1	Yes/No
iii.	Satisfactory level of waste			(2) Good (2) Average (3) Bad (4) Satisfactory
	water collection			
iv.	Practices of waste water recycle at home	-644	110	(1)Car washed, (2)washing clothes, (3)Bathing,(4)Floor washing
V.	Complaints/Problems			Time: (1) Taking Long time, (2) Immediate, (3)
	(Respondent /redress)			No respond
	Solid Waste Management	Status (2005-06)	Status (2011-12)	Remarks
i.	Door to door collection			(2) NGO, (2) privatization, (3)SMC
ii.	Types of Disposal			(1)Thrown on street, (2)Municipal dustbin,(3)open space
iii.	Segregation Of Solid Waste			(2) Manually, (2) SMC
iv.	Frequency of collection			 (2) Daily, (2) 1-3 in a weekly, (3)4-6 in a week, (4) Monthly,
v.	Services efficiency by SMC			(1)Good, (2) Average (3) Bad, (3)Satisfactory
vi.	Environment and Aesthetic			(1)Good, (2)Bad, (3)Satisfactory
vii.	Monthly Expenditure in Rs			
1	Drainages	Status (2005-06)	Status (2011-12)	Remarks
i.	Drains system			(1)Open drains, (2)Closed drains, (3)No drains
ii.	Storm water disposal			(1)Soak Pit, (2)Closed drains, (3)Septic tank,
	mechanism			(4)Pucca open drains, (5)Kutch open drains
iii.	Flooding Problems			Yes/No
iv.	Frequency of flooding	1		(2) 1-5 time in a year, (2) 6-10 time in a year, (3 more than 10 time in a year (4) No flooding
V.	Clogging of drains		- C.,	(1)due to lack of proper drains, (2) dumping of solid waste into drains (3) No respond
vi.	Cleaning by SMC		1	(1)1-5 time in a year, (2) 6-10 time in a year, (3) more than 10 time in a year
	Satisfactory level the SMC			(1) Good (2) Average (3) bad

- Awareness Programme /Community Participation in JnNURM Projects 15.
- 16. Are you benefited from JnNURM projects? Yes/No/Can't say
- 17. Did any officer contact you and discussed the BSUP projects? Yes/No
- Are you satisfied? 18.
- 19. Do you have any complaints/problems?
- If any suggestion and comments 20.



Annexure – XVII: Research Paper Publications

- Khwairakpam, D., Shankar, R., and Mukherjee, M., (2012). An Overview of Performance of Cities in Infrastructure Development under JnNURM, International Symposium – Cities under Change, organized by Centre for Built Environment at Kolkata, 17th, 18th and 19th October, 2012.
- Khwairakpam, D., Shankar, R., and Mukherjee, M., (2013). Municipal Solid Waste Scenario in Urban Areas – Case Study of Imphal City, Manipur, *Research Journal of MDKG*, Vol. 2 (2), pp. 1-10.
- Khwairakpam, D., Shankar, R., and Mukherjee, M., (2013). Inclusive Planning for the Basic Services to Urban Poor (BSUP) under JnNURM: Case Study -Surat,61stNational Town and Country Planners Congress on Indian Cities in Transition organized by Institute of Town Planners, India at Ahmadabad, 8th -10th February, 2013, Technical Papers (Part 1), pp. 246-249.
- Khwairakpam, D., Shankar, R., and Mukherjee, M., (2014). Rural Infrastructure Development through Community based Social Organization: Case Study of Awang Sekmai village in Manipur, *Journal of North East India Study*, Vol. 4(1), pp. 78-88.
- Khwairakpam, D., Shankar, R., and Mukherjee, M., (2014). Evaluation of Urban Renewal Projects under JnNURM – Case Study Surat City, *International Journal of Current Research*, Vol. 6 (6), pp. 7242-7246.





Annexure – XVIII: Education Back ground

Sl. No	Degree	Board/University	Year
1	Class X	CBSE	1996
2	Class XII	CHSE, Manipur	1999
3	BA in Geography	Manipur University	2003
4	MA in Geography	Dr. Bhimrao Ambedkar University, Agra	2006
5	Urban Planning	School of Planning and Architecture, Delhi-2	2008
6	Ph D	IIT Roorkee, Roorkee	

