# CITY SANITATION PLAN FOR AGRA

MINISTRY OF URBAN DEVELOPMENT
GOVERNMENT OF INDIA

AGRA NAGAR NIGAM
AGRA, INDIA

ADMINISTRATIVE STAFF COLLEGE OF IN
HYEDERABAD, INDIA

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## FROM DIRECTORS DESK

"Water is Life and Sanitation is Dignity."

The above quote well impresses upon one the fact that sanitation is the most important aspect for a healthy and dignified living.

Often sanitation is considered to be synonymous to just the solid waste management, especially in the ULBs. To set right this flawed concept, sanitation ideally can be defined as a culmination of efforts to manage the access to toilets, safe management of human excreta, liquid and solid waste, including their safe confined treatment, disposal and associated hygiene-related practices. With increasing urbanization sanitation is becoming a severe problem in all cities in our country.

There arises a need for integrated solutions to take account of the various elements of environmental sanitation, fecal management and disposal, solid waste management; management of industrial and other specialized / hazardous wastes; drainage; as also the management of the quality of the drinking water supply. This is the main aim and purpose underlying the preparation of City Sanitation Plan.

We take an opportunity to express our sincere gratitude to all the officials who have helped and supported us throughout the process which made the completion of the report possible. Extensive and rigorous discussions with ULB officials have well-defined the efforts and the resulting outcomes. The City Sanitation Plan for the city of Agra presents effective strategies for the greater access to sanitation for the city population coupled with safe disposal of solid and liquid waste generated throughout the city by suggesting environment friendly and sustainable technical options.

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# ABBREVIATIONS

| | |
|---|---|
| **ADA** | Agra Development Authority |
| **ANN** | Agra Nagar Nigam |
| **ASCI** | Administrative Staff College of India |
| **ASI** | Archaeological Survey of India |
| **BOD** | Biological Oxygen Demand |
| **BOOT** | Build-Own-Operate and Transfer |
| **BPL** | Below Poverty Line |
| **BSUP** | Basic Services to the Urban Poor |
| **CAA** | Constitution Amendment Act |
| **CDP** | City Development Plan |
| **CFC** | Central Finance Commission |
| **COD** | Chemical Oxygen Demand |
| **CPHEEO** | Central Public Health Engineering and Environment Organization |
| **CSE** | Centre of Science and Environment |
| **CSP** | City Sanitation Plan |
| **CSTF** | City sanitation Task Force |
| **CT** | Community Toilets |
| **DPR** | Detailed Project Report |
| **DUD** | Directorate of Urban Development |
| **DUDA** | District Urban Development Authority |
| **EoI** | Expression of Interest |
| **EWS** | Economically Weaker Sections |
| **FGD** | Focus Group Discussions |
| **GoI** | Government of India |
| **GoUP** | Government of Uttar Pradesh |
| **HHs** | Households |
| **HIG** | High Income Groups |
| **HSC** | House Service Connections |
| **IEC** | Information, Education and Communication |
| **ILCS** | Integrated Low Cost Sanitation |
| **JS** | Jal Sansthan |
| **JNNURM** | Jawaharlal Nehru National Urban Renewal Mission |
| **LIG** | Low Income Groups |
| **MIG** | Middle Income Groups |
| **MoHUPA** | Ministry of Housing and Urban Poverty Alleviation |
| **MoUD** | Ministry of Urban Development |
| **MSL** | Mean Sea Level |
| **MSW** | Municipal Solid Waste |
| **NGO** | Non-Governmental Organizations |
| **NRW** | Non-Revenue Water |
| **NUSP** | National Urban Sanitation Policy |

| | |
|---|---|
| **OD** | Open Defecation |
| **ODF** | Open Defecation Free |
| **O&M** | Operation and Maintenance |
| **PPP** | Public Private Partnership |
| **PSP** | Public Stand Posts |
| **PWD** | Public Works Department |
| **RAY** | Rajiv Aawas Yojana |
| **RWA** | Residents Welfare Association |
| **SFCPoA** | Slum Free City Plan of Action |
| **SHG** | Self Help Group |
| **SI** | Sanitary Inspector |
| **SLB** | Service Level Benchmarking |
| **SPCB** | State Pollution Control Board |
| **STP** | Sewage Treatment Plant |
| **SUDA** | State Urban Development Authority |
| **SWM** | Solid Waste Management |
| **TTZ** | Taj Trapezium Zone |
| **UGD** | Under Ground Drainage |
| **ULB** | Urban Local Body |
| **UPHB** | Uttar Pradesh Housing Board |
| **UPJN** | Uttar Pradesh Jal Nigam |
| **UPJS** | Uttar Pradesh Jal Sansthan |
| **WC** | Water Closet |
| **UNITS OF MEASURE** | |
| **cu.m** | Cubic meter |
| **lpcd** | liters per capita per day |
| **m** | Meter |
| **MLD** | Million liters per day |
| **MT** | Metric Tonne |
| **sq.m** | Square meter |
| **TPD** | Tonnes per day |

## EXECUTIVE SUMMERY

This document presents City Sanitation Plan (CSP) of Agra Nagar Nigam (ANN). Agra is one of the 8 cities whose CSPs are being prepared by ASCI in partnership with Government of Uttar Pradesh and respective Nagar Nigam.

The CSP process in Agra city endeavor's to identify the various areas that are affected by various issues with different sectors of sanitation, (viz. sewerage, solid waste management, storm water drainage and water supply) and also to provide guidance towards the solutions of the said issues.

This has been made possible through an extensive participatory approach including field visits, repeated discussions with various stakeholders, sample surveys, etc. Acquiring and assimilation of varied secondary information also formed an important part of the process.

The plan preparation process was carried out using methodology requiring wide range of data in various areas and population groups, to develop robust analysis and produce outputs. The data collection included both primary and secondary sources and detail analysis of them.
The analysis in turn has paved the way for the preparation of the proposal for various strategies to alleviate the sanitary conditions of the places, so that Agra city may well overcome the various plaguing issues and thereby a healthy sanitized environment prevails for the citizens.

The report has two major sections –

- **The Situational Analysis**
- **The Sanitation Strategies**

The former section deals with depicting the city and its present status with regards to sanitation. The aim is to highlight the existing conditions regarding access and coverage of sanitary facilities, identify the gaps and striking issues, and understand the behavioural aspects of various sections of the society. This section is covered from Chapter 1 to Chapter 4.

The later section thereafter provides gap identification, strategies and solutions to bridge the identified gaps, mitigate the existing issues, and provide ways and means to aid the sustenance of the existing and proposed strategies and projects.

### The Situational Analysis

**Chapter 1** gives an introduction to the CSP process, its background, and the objectives behind it. This is followed by the step-by-step methodology of the CSP process, as well as the status of the CSP for the Agra city. The process of collection of baseline information – both primary and secondary, has been explained at length. Also presents a review of the policies & programmes that are prevalent and followed in Uttar Pradesh to improve the sanitation conditions in the urban areas. It gives detailed insight into the NUSP 2008 and the sanitation ranking of cities, the MSW 2000 rules, the ILCS scheme, Rajiv Awas Yojana, UIDSSMT and 13th FC which have been taken up for the improvement of access and coverage of sanitary facilities.

**Chapter 2** deals with the City Profile where the various aspects of the city are discussed in order to get a fair idea about the city itself. Aspects such as location, regional linkages, demography, economic, land use and housing profiles, the slum and squatter settlements are discussed in brief.

**Chapter 3** summarizes the Institutional Arrangements in Agra and Finance Information of ANN. Functions of ANN and Parastatal bodies and overlap of institutional responsibly is also briefly discussed. Later part of

chapter discusses financial information of ANN related to Water Supply, Sewerage & Drainage and Solid Waste Management.

**Chapter 4: Section A** covers the Service Profile of Agra City. The aim of the chapter is to present a clear picture of the existing systems of sanitation in the city. It contains four sectors; Water supply system, Sewerage & Sanitation, Solid Waste Management and, Storm Water Drainage system of the city. The performance of each of the sectors is evaluated through Service Level Benchmarking (SLB) indicators. In **Section** B discusses Sanitation Situation in Agra City based on information collected by primary sample survey. In this chapter situation analysis is done both at the Household and community level.

**The Sanitation Strategies**

**Chapter 5** covers the Gap Identification and Analysis. In this chapter four sectors (Water supply system, Solid waste Management Sewerage and sanitation and, Storm water drainage system) are analyzed based on the captured and available information. Within each sector, the gaps and issues in access and coverage are identified, the problem areas are clearly demarcated, and projections are also made for the future years, later part covers the communication need assessment.

**Chapter 6** This chapter discusses sanitation consciousness and appropriate IEC & communication methodologies for Agra city.

**Chapter 7** The City Wide Sanitation Strategies and Roadmap are presented. It provides the vision for the CSP and its goals. Thereafter, recommendations of most appropriate options and basic guiding strategies for Water Supply, Solid Waste Management, Sewerage and Drainage are suggested. Strategies have been provided to improve coverage and access to sanitation facilities in phased manner. Concluding the report budget plan to implement effectively the short term proposal and, overall plan for mid-term and long term is also proposed.

# CHAPTER 1. INTRODUCTION

Topics of Discussion

- NUSP: The Background
- Sanitation Related Policies and Laws
- Objectives of City Sanitation Plan
- City Sanitation Planning & Research Methodology

## 1.1 NUSP: The Background

The National Urban sanitation Policy launched during 2008 envisages ***"All Indian cities and towns become totally sanitized, healthy and livable and ensure and sustain good public health and environmental outcomes for all their citizens with a special focus on hygienic and affordable sanitation facilities for the urban poor and women."***

With this vision, the National Urban Sanitation Policy (NUSP) intends to facilitate provision of appropriate sanitation facilities in all cities and towns, through policy, institutional, technical and financial interventions. Some of the areas to address under NUSP include open defecation free towns, providing access to toilets for poor people, waste water and solid waste treatment and disposal and achieving public health outcomes and environmental standards.

The overall goal of National policy is to transform Urban India into community-driven, totally sanitized, healthy and livable cities and towns. Specific goals include – (1) Awareness Generation and Behavior Change; (2) Open Defecation Free Cities; (3) Integrated City-Wide Sanitation; (4) Sanitary and Safe Disposal, and (5) Proper Operation & Maintenance of all Sanitary Installations.

Against this background, and in recognition of its importance to national and state development, the Integrated City-Wide Sanitation Plan for Agra City is prepared to provide city-wide systematic approach and framework to achieve the goals contemplated under NUSP. Govt. of India shall support the following components under NUSP:

- ☐ Awareness Generation
- ☐ Institutional Roles
- ☐ Reaching the Un-Served and Poor Households
- ☐ Knowledge Development
- ☐ Capacity Building
- ☐ Financing
- ☐ National Monitoring & Evaluation
- ☐ Coordination at the National Level

### 1.1.1 Concept of Totally Sanitized Cities

A totally Sanitized City will be one that has achieved the outputs or milestones specified in the National Urban Sanitation policy, the salient features of which are as follows:

- ☐ Cities must be open defecation free
- ☐ Must eliminate the practice of manual scavenging and provide adequate personnel protection equipment that addresses the safety of sanitation workers.
- ☐ Municipal wastewater and storm water drainage must be safely managed
- ☐ Recycle and reuse of treated wastewater for non-potable applications should be implemented wherever possible.
- ☐ Solid Waste collected and disposed off fully and safely
- ☐ Services to the Poor and Systems for Sustaining Results
- ☐ Improved Public Health Outcomes and Environmental Standards

### 1.1.2 Rating and Categorization of Cities

The rating of cities in regard to their performance in sanitation improvements will be based on set of objective indicators of outputs, processes and outcomes.

Three Categories of Indicators

The rating exercise will involve three categories of indicators:

**Output Related Indicators:** pertain to the city having achieved certain results or outputs in different dimensions of sanitation ranging from behavioral aspects and provision, to safe collection, treatment and disposal without harm to the city's environment. *There are nine main output-indicators accounting for 50 points of the total of 100 points.*

**Process Related Indicators:** pertain to systems and procedures that exist and are practiced by the city agencies to ensure sustained sanitation. *There are seven main process-indicators accounting for 30 points of the total of 100 points.*

**Outcome Related Indicators:** include the quality of drinking water and that of water in water-bodies of city, as also the extent of reduction in sanitation-related and water-borne diseases in the city over a time period. *There are three main outcome-indicators accounting for 20 points of a total of 100 points1.*

Ideally, data for the above outputs, processes and outcomes are regularly collected by city authorities but at present, very few cities will have, at best, partial data available. This rating exercise will help in highlighting the need for regular data-collection and monitoring of indicators.

On the basis of the said rating scheme, cities will be placed in different categories as presented in Table 1-1 and the distribution of the 436 cities is also depicted. National rating survey data will utilize these categories for publication of results. On the basis of plans prepared and implemented, cities will be able to measure the results of their actions, and be able to clearly chart out their improvements over time compared to their baseline situation.

**TABLE 1-1: COLOR CODES OF CATEGORIES OF CITIES BASED ON NUSP RATING**

| CATEGORY | POINTS | NO. OF CITIES | DESCRIPTION |
|---|---|---|---|
| **RED** | ≤33 | 204 | Cities on the brink of public health and environmental "emergency"; needing immediate remedial action |
| **BLACK** | 34-66 | 228 | Needing considerable improvements |
| **BLUE** | 67-90 | 4 | Recovering but still diseased |
| **GREEN** | 91-100 | 0 | Healthy and Clean city |

*Source: MoUD, GoI*

On achievement of remarkable results, i.e. coming into the Green category (Healthy and Clean City), cities will typically become eligible for the national award. Other cities showing remarkable incremental performance or selective achievements may also be given special or honorary awards. Cities in different size-classes may also be considered for category-wise awards. Based on results of the Rating survey and selection of awardees, cities will be invited to participate in a National Urban Sanitation Award ceremony.

Findings of a survey commissioned by MoUD rated 423 Class-I (with a population of more than 100,000) Indian cities on safe sanitation practices. Agra has been ranked at 113 out of 423 Class I cities, scoring **39.51 marks out of 100 marks** and falls in Black category. This means performance of Agra in regard to safe sanitation is abysmal on various indicators. A complete profiling of Agra against 19 parameters has been presented below in a table, indicating the present status.

**TABLE 1-2: METHODOLOGY AND NUSP RATING - AGRA CITY**

| | INDICATORS | POINTS | POINTS SCORED BY AGRA |
|---|---|---|---|
| **1** | **OUTPUT RELATED** | **50** | **20.30** |
| A | No open defecation | | |
| i. | Access and use of toilets by urban poor and other un-served households (including slums) - individual and community sanitation facilities | 4 | 0.0 |
| ii. | Access and use of toilets for floating and institutional populations - adequate public sanitation facilities | 4 | 1.1 |
| iii. | No open defecation visible | 4 | 1.2 |
| iv. | Eliminate Manual Scavenging and provide personnel protection equipment to sanitary workers | 4 | 4.0 |
| B | Proportion of total human excreta generation that is safely collected (6 points for 100%) | 6 | 4.0 |
| C | Proportion of total black waste water generation that is treated and safely disposed off (6 points for 100%) | 6 | 0.0 |
| D | Proportion of total grey waste water generation that is treated and safely disposed off (3 points for 100%) | 3 | 0.0 |
| E | Proportion of treated water that is recycled and reused for non-potable applications | 3 | 3.0 |
| F | Proportion of total storm-water and drainage that is efficiently and safely managed (3 points for 100%) | 3 | 3.0 |
| G | Proportion of total solid waste generation that is regularly collected (4 points for 100%) | 4 | 1.0 |
| H | Proportion of total solid waste generation that is treated and safely disposed off (4 points for 100%) | 4 | 0.0 |
| I | City wastes cause no adverse impacts on surrounding areas outside city limits (5 points for 100%) | 5 | 3.0 |
| **2** | **PROCESS RELATED**** | **30** | **12.76** |
| A | M&E systems are in place to track incidences of open defecation | 4 | 0.0 |
| B | All sewerage systems in the city are working properly and there is no ex-filtration (Not applicable for cities without sewerage systems) | 5 | 2.37 |
| C | Septage / sludge is regularly cleaned, safely transported and disposed after treatment, from on-site systems in the city (Maximum 10 marks for cities without sewerage systems) | 5 | 5.0 |
| D | Underground and surface drainage systems are functioning and are well maintained | 4 | 2.0 |
| E | Solid waste management (collection and treatment) systems are efficient (and are in conformity with the MSW Rules, 2003) | 5 | 2.39 |
| F | There is clear institutional responsibility assigned; and there are documented operational systems in practice for b/c) to e) above | 4 | 0.0 |
| G | Sanctions for deviance on part of polluters and institutions is clearly laid out and followed in practice | 3 | 1.0 |

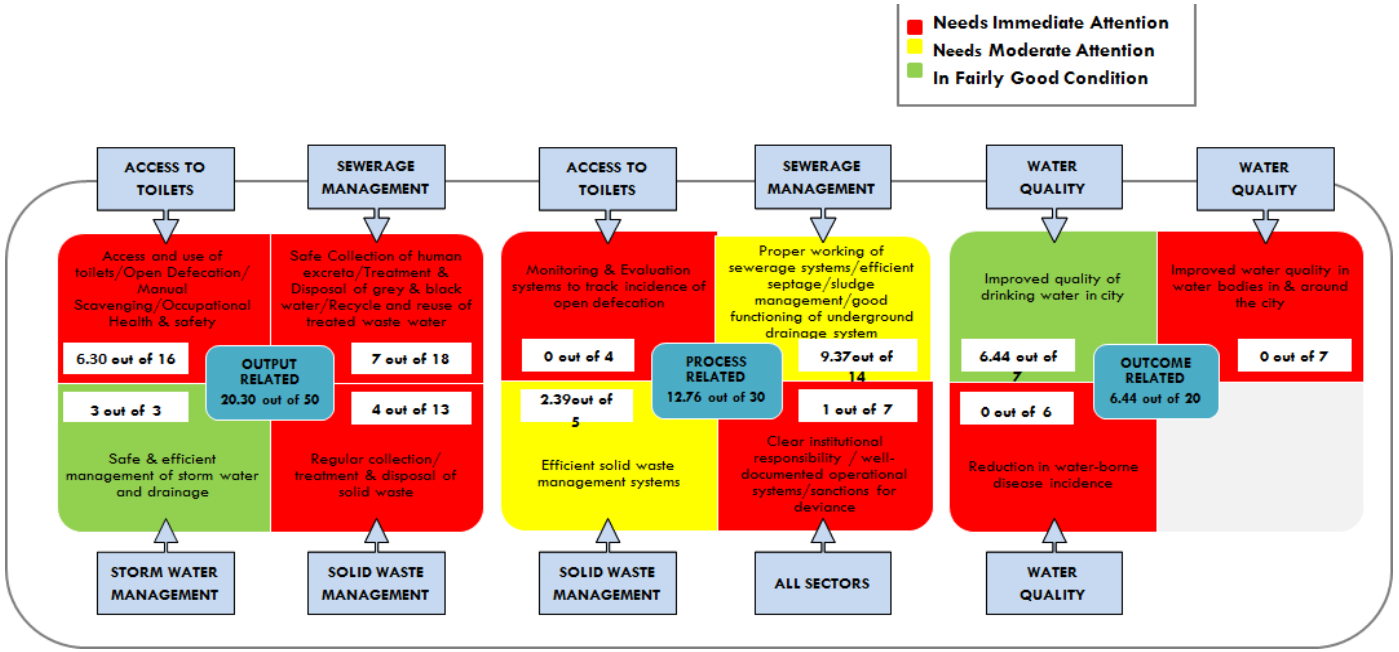
| | INDICATORS | POINTS | POINTS SCORED BY AGRA |
|---|---|---|---|
| **3** | **OUTCOME RELATED** | **20** | **6.44** |
| A | Improved quality of drinking water in city compared to baseline | 7 | 6.44 |
| B | Improved water quality in water bodies in and around city compared to baseline | 7 | 0 |
| C | Reduction in water-borne disease incidence amongst city population compared to baseline | 6 | 0 |
| **GRAND TOTAL** | | **100** | **39.50** |

*Source: MoUD, GoI*

### 1.1.2.1 IDENTIFICATION OF PROBLEM AREAS

Based on the survey conducted in the City of Agra to assess the sanitation situation against the defined nineteen (19) indicators grouped under the three categories related to output, process and outcome; it may be fairly inferred that there are areas under the three categories which require immediate attention in order to improve the condition of sanitation.

**FIGURE 1-1: NUSP RATING OF AGRA CITY: IDENTIFICATION OF PROBLEM AREAS**




**IDENTIFIED PROBLEM AREAS -**

***Output Related Category***

- Access to Toilets -
  - ✓ *Access & Use – individual /community/public toilets*
  - ✓ *Open Defecation*
- Sewerage Management
  - ✓ *Safe collection of human excreta*
  - ✓ *Treatment & Disposal of black & grey water*
  - ✓ *Recycle & Reuse of treated water*

***Process Related Category***

- Institutional, Governance and Regulatory
  - ✓ *Clear role & responsibilities*
  - ✓ *Operational systems*
  - ✓ *Sanctions for non-compliance*

***Outcome Related Category***

- Water quality in water bodies, in and around the city

### 1.1.3 National Award Scheme for Sanitation for Indian Cities

In order to rapidly promote sanitation in urban areas of the country (as provided for in the National Urban Sanitation Policy and Goals 2008) and to recognize excellent performance in this area, Government of India has instituted an annual award scheme for cities. The award is based on the premise that improved public health and environmental standards are the two outcomes that cities must seek to ensure for urban citizens. In doing so, governments in states and urban areas will need to plan and implement holistic city-wide sanitation plans, thereby put in place processes that help reach outputs pertaining to safe collection, disposal and disposal (including conveyance, treatment, and/ or re-use without adverse impacts on the environment in and around the cities). It may be noted that the awards will not recognize mere inputs, hardware or expenditure incurred in urban sanitation but assess how these lead to achievements of intermediate milestones toward the final result of 100 % safe disposal of wastes from the city on a sustainable basis. Cities will need to raise the awareness of city stakeholders (households, establishments, industries, municipal functionaries, media, etc.) since improved sanitation can ensure improved public health and environmental outcomes only if considerable changes in behavior and practice take place across the spectrum of society.

## 1.2 Sanitation Related Policies and Laws

### 1.2.1 Municipal Solid Waste Rules, 2000

The Municipal Solid Wastes (Management and Handling) Rules, 1999 were published under the notification of the Government of India in the Ministry of Environment and Forests. In exercise of the powers conferred by section 3, 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government hereby made the rules to regulate the management and handling of the municipal solid wastes, 2000.

Municipal Solid Waste (Management & Handling) Rules, 2000 (MSW Rules) are applicable to every municipal authority responsible for collection, segregation, storage, transportation, processing and disposal of municipal solids. The Rules contains four Schedules namely;

**TABLE 1-3: SCHEDULE DETAILS OF MSW RULES 2000**

| | |
|---|---|
| **SCHEDULE-I** | Relates to implementation Schedule |
| **SCHEDULE-II** | Specifications relating to collection, segregation, storage, transportation, processing and disposal of municipal solid waste (MSW). |
| **SCHEDULE-III** | Specifications for land filling indicating; site selection, facilities at the site, specifications for and filling, Pollution prevention, water quality monitoring, ambient air quality monitoring, Plantation at landfill site, closure of landfill site and post care. |
| **SCHEDULE-IV** | Indicate waste processing options including; standards for composting, treated leachates and incinerations. |

*Source: MoEF GoI*

The MSW Rules -2000 categorically state the roles and responsibilities of ULBs, the State Govt., the Union Territory Administrations and the Pollution Control Boards. The roles of the ULBs as stated are as follows:

- ☐ Every municipal authority shall, within the territorial area of the municipality, be responsible for the implementation of the provisions of these rules, and for any infrastructure development for collection, storage, segregation, transportation, processing and disposal of municipal solid wastes.
- ☐ The municipal authority or an operator of a facility shall make an application in Form-I, for grant of authorization for setting up waste processing and disposal facility including landfills from the State Board or the Committee in order to comply with the implementation programme laid down in Schedule I.
- ☐ The municipal authority shall comply with these rules as per the implementation schedule laid down in Schedule I.
- ☐ The municipal authority shall furnish its annual report -

- To the Secretary-in-charge of the Department of Urban Development of the concerned State or as the case may be of the Union territory, in case of a metropolitan city; or
- To the District Magistrate or the Deputy Commissioner concerned in case of all other towns and cities, with a copy to the State Board or the Committee on or before the 30th day of June every year.

### 1.2.2 Integrated Low Cost Sanitation (ILCS)

The programme envisages construction of new sanitary latrines in households not having latrines by adopting the low-cost leach pit system, with an objective to eliminate dry latrines and manual scavenging. The scheme is being implemented with 63% HUDCO loan, 32% Government of India subsidy and 5% of contribution of beneficiary. Initially during the year 1992 the Integrated Low Cost Sanitation Scheme was taken up in 34 municipalities, subsequently extended the programme covering all the Urban Local Bodies in a phased programme. The scheme was implemented in all 113 Urban Local Bodies with HUDCO financial assistance.

**TABLE 1-4: ILCS SCHEME DETAILS**

| EARLIER PROVISION | REVISED PROVISION |
|---|---|
| The scheme has been taken on a 'whole town basis' and the towns having population less than 5 lakh are being covered | The earlier programme was town-wise for population upto 5 lakh as per 1981 census which need not be restricted any more as the whole country is to be declared as scavenger free. The new guidelines will cover all towns on "All Town" basis. |
| Pattern of Assistance: The HUDCO is providing loan and a mix of subsidy from the Central Government in a synchronized manner as per the following financing pattern.<br>Category/Subsidy/Loan/Beneficiary Contribution<br>EWS/45%/50%/5%<br>LIG/25%/60%/15%<br>MIG/HIG/Nil/75%/25% | 75% subsidy for the EWS beneficiaries 15% of State's contribution and 10% of Beneficiaries contribution. |
| The present unit cost for different categories of sanitary latrines is as follows:- 5 user unit Rs4000.00, 10 user unit Rs6000.00, 15 user unit Rs7000.00 Super structure cost not included. | Provision of subsidy including the superstructure in case of individual toilets: An upper ceiling of Rs. 10,000/-for complete unit of pour flush units with superstructure. |
| No provision of IEC component. | It is proposed to include the Information, Education and Communication (IEC) component with 1% of the total central allocations under the scheme in each of the financial year with the Ministry. In case the funds retained are not utilized, these may be utilized in the projects. |
| No involvement/ participation of NGOs at implementation stage. | NGOs may be involved by the State Governments in the implementation of the scheme in various activities meant for the benefit of EWS population under the scheme with maximum charges upto 15% over and above the total project cost to be borne by the Centre and States in the ratio of 5:1 at different stages of implementation. |
| Technology used for construction and conversion of toilets was as per HUDCO's pattern/recommendation. | Options like septic tank, connecting to small bore or conventional sewer network etc. may also be permitted under the cost ceiling. Technology which can enable to tap local resources should be permitted to be adopted. State implementing agencies may decide the technology best suited for the site/ locality which may be adopted. |

*Source: MoHUPA, GoI*

### 1.2.3 Jawaharlal Nehru National Urban Renewal Mission (JNNURM)

The aim of JNNURM is to encourage reforms and fast track planned development of identified cities. The prime focus of JNNURM is stimulating efficiency in urban infrastructure and service delivery mechanisms, community participation, and accountability of ULBs/ parastatal agencies towards citizens.

**Objectives of JNNURM**:

- ☐ Focused attention to integrated development of infrastructure services in cities covered under the Mission;
- ☐ Establishment of linkages between asset-creation and asset-management through a slew of reforms for long-term project sustainability;
- ☐ Ensuring adequate funds to meet the deficiencies in urban infrastructural services;
- ☐ Planned development of identified cities including peri-urban areas, outgrowths and urban corridors leading to dispersed urbanization;
- ☐ Scale-up delivery of civic amenities and provision of utilities with emphasis on universal access to the urban poor;
- ☐ Special focus on urban renewal programme for the old city areas to reduce congestion; and
- ☐ Provision of basic services to the urban poor including security of tenure at affordable prices, improved housing, water supply and sanitation, and ensuring delivery of other existing universal services of the government for education, health and social security.

**Scope of the Mission:**

- ☐ Sub-Mission for Urban Infrastructure and Governance:

This will be administered by the Ministry of Urban Development through the Sub- Mission Directorate for Urban Infrastructure and Governance. The main thrust of the Sub-Mission will be on infrastructure projects relating to water supply and sanitation, sewerage, solid waste management, road network, urban transport and redevelopment of old city areas with a view to upgrading infrastructure therein, shifting industrial and commercial establishments to conforming areas, etc.

- ☐ Sub-Mission for Basic Services to the Urban Poor:

This will be administered by the Ministry of Urban Employment and Poverty Alleviation through the Sub-Mission Directorate for Basic Services to the Urban Poor. The main thrust of the Sub-Mission will be on integrated development of slums through projects for providing shelter, basic services and other related civic amenities with a view to providing utilities to the urban poor.

### 1.2.4 Rajiv Awas Yojana (RAY)

The Government has initiated a new scheme called Rajiv Awas Yojana (RAY) for the slum dwellers and the urban poor. This scheme aims at providing Central support to States that are willing to assign property rights to slum dwellers. The Government's effort would be to create a Slum-free India through the implementation of RAY.

The Ministry of Housing and Urban Poverty Alleviation (MoHUPA) has prepared *Guidelines for Slum Free City Planning* to assist the preparatory activities under RAY and this has been circulated to all States/UTs. RAY calls for a multi-pronged approach focusing on the following aspects:

- ☐ Bringing existing slums within the formal system and enabling them to avail the same level of basic amenities as the rest of the town/city.
- ☐ Redressing the failures of the formal system that lead to the creation of slums; and
- ☐ Tackling the shortages of urban land and housing that keep shelter out of reach of the urban poor and force them to resort to extra-legal solutions in a bid to retain their sources of livelihood and employment.

Under the Slum Free City Planning guidelines, there is a requirement for the Urban Local Bodies (ULBs) to build an inventory of existing spatial data available with various agencies. Often ULBs, other than metropolitan cities, do not have centralized spatial data. Under RAY, it is planned to have 'Technical Cell', which will have responsibilities to coordinate and collect data from state governments, NRSC/ISRO,

Survey of India, National Informatics Centre (NIC) etc. If the city base map is not available, a base map of the city would be generated using standard guidelines set forth under the project.

As given in the Slum Free City Planning (SFCP) guidelines, the preparation of Slum-free City Plan will broadly involve survey of all slums – notified and non-notified; mapping of slums using the state-of-art technology; integration of geo-spatial and socio-economic data; and identification of development model proposed for each slum. To achieve these things, a systematic approach is essential which will be useful for various other developmental planning initiatives for the urban poor. The present technical manual details the steps to be followed for slum mapping using satellite data, GPS, Total Station Survey in preparing GIS database, MIS development of non-spatial data collected and integration of GIS with MIS to enable generating Plan of Action (PoA) for slum free cities.

RAY envisages that each State would prepare a State Slum-free Plan of Action (POA). The preparation of legislation for assignment of property rights to slum dwellers would be the first step for State POA. The POA would need to be in two parts,

Part-1 regarding the upgradation of existing slums and Part-2 regarding the action to prevent new slums; In Part-1 the State would need to survey and map all exiting slums in selected cities proposed by the State for coverage under RAY. In Part-2 the Plan would need to assess the rate of growth of the city with a 20 year perspective, and based on the numbers specify the actions proposed to be taken to obtain commensurate lands or virtual lands and promote the construction of affordable EWS houses so as to stay abreast of the demand. This part would need also to make necessary legislative and administrative changes to enable urban land expansion, and in town planning regulations to legislate reservations for EWS/LIG housing in all new developments.

Slum-free City Cell in Urban Local Body headed by the Municipal Commissioner/Executive Officer will be primarily responsible for the preparation of Slum-free City Plans based on guidelines provided by the concerned State Government and support extended by the Nodal Agency for Rajiv Awas Yojana at the State level.

### 1.2.5 13th Central Finance Commission (CFC)

Importantly, the report of 13th CFC released in February 2010 recommended general performance grants and special area performance grants to be linked to performance of ULBs. Moreover, allocations to ULBs would now be linked to divisible pool replacing the previous ad-hoc allocation. Grants to the tune of Rs. 23,111 crores have been allocated to ULBs for the period 2010-15, a four-fold growth over the 12th CFC allocation.

The 13th CFC recommends state governments and ULBs to focus on improved property tax revenues, urban service standards, strengthened local body framework, improved municipal accounting, introduce system of independent ombudsmen, and put in place a system of electronic transfer of grants to ULBs among other things.

## 1.3 Objectives of Agra City Sanitation Plan

The City Sanitation Plan (CSP) is aimed at developing and maintaining a clean, safe and pleasant physical environment in Agra city to promote social, economic and physical well-being of all sections of the population. It encompasses plan of action for achieving 100% sanitation in the city of Agra through demand generation and awareness campaign, sustainable technology selection, construction and maintenance of sanitary

**PRINCIPAL COMPONENTS OF CITY-WIDE APPROACH –**

- ☐ Collection and sanitary disposal of wastes, including solid wastes, liquid wastes, excreta, industrial wastes, clinical and other hazardous wastes;
- ☐ Collection and management of storm water drainage;
- ☐ Cleansing of thoroughfares, markets and other public spaces;
- ☐ Environmental sanitation education;
- ☐ Inspection and enforcement of sanitary regulations;
- ☐ Monitoring the observance of environmental standards

infrastructure, provision of services, O&M issues, institutional roles and responsibilities, public education, community and individual action, regulation and legislation.

## 1.4 City Sanitation Planning and Research Methodology

CSP tries to detail out how the city plan is to deliver the sanitary outcomes defined in NUSP and state strategy, in coordination with other line departments to ensure a well collaborated approach engaging all stakeholders including governmental and non-governmental civic service providers. The scope of CSPs broadly encompass following major tasks:

### 1.4.1 City Sanitation Task Force (CSTF)

The first step in making the cities 100% sanitized is to elevate the consciousness about sanitation in the mind of municipal agencies, government agencies and most importantly, amongst the people of the city. As per the requirement of CSP, major role is to be played by the members of institutions, organizations, individuals, NGOs, academics, journals, local councilors, industry owners, consultants, representatives of private sector, etc. Constitution of CSTF is facilitated by drawing members from these groups in consensus with Agra Nagar Nigam (ANN) who will be constantly supporting the CSP preparation by analyzing the strengths and competencies required to overcome the current situation and for better sanitation facilities.

For this purpose, CSTF has to be constituted in the ULB and it has to organize a multi-stakeholder, multi-party meeting in the preparatory stage, and take a formal resolution to make the city 100% sanitized. CSTF has been constituted by ANN. (***Please refer to Annexure 1 for the policy paper on the formalization of CSTF for city of Agra***)

The roles and responsibilities of CSTF will include**:**

- ☐ Launching the City 100% Sanitation Campaign
- ☐ Generating awareness
- ☐ Approving materials and progress reports
- ☐ Approving the City Sanitation Plan
- ☐ Providing overall guidance
- ☐ Fixing of responsibilities on a permanent basis.

#### Task 1. CSTF MEMBERS

The City Sanitation Task Force (CSTF) plays a very important part in the formulation and implementation of the CSP in a city. The importance of CSTF and their functions were clearly portrayed to the ANN authorities. As per the guidelines of NUSP 2008, the ANN constituted the CSTF for the city of Agra. (***Please refer to Annexure 2 for the list of CSTF members for Agra city***).

#### Task 2. CSTF Sensitization cum Orientation Workshop

With this background knowledge, a ANN level sensitization cum orientation workshop involving ANN officials and identified stakeholders was organised on 31 December 2010. It was attended by the Additional Municipal Commissioner, other ANN officials from various departments, and the other concerned stakeholders.

The purpose of the workshop was to highlight the need to engage with issues relating to sanitation access and arrangement especially in slums; awareness generation for changed behaviour and practices; community participation and mobilization to accord sanitation priority at all levels from policy to action on ground; and a number of technical, institutional and financial issues to be addressed in CSP and its various steps of preparation.

### 1.4.2 Collection of Secondary Data

Secondary data collection and review of available information from various sources has been conducted as per the underlying objectives of CSP. The officials of ANN, ADA, UP Jal Nigam, Jal Sansthan, DUDA and other parastatal agencies shall be duly involved in the validation process. The following steps define the process of secondary data collection -

#### Task 1. Preparatory Work (Profiling Of ANN)

As a preparatory work, a preliminary profiling of ANN will be undertaken using SLB indicators and City Sanitation Rating to highlight the open defecation free (ODF) status, sanitation situation, health indicators and current projects. This will also be strengthen the further investigation by transect walks, field visits and primary data collection.

#### Task 2. Review/Study of The Current Practices

This includes a review of sector strategies in water, sanitation and solid waste management at state and city level. DPRs prepared on these sectors will be studied in detail and analysed. Also regional and state urban strategies to know the dynamics of urbanisation pattern will be studied and examined in details.

#### TASK 3. Condition Assessment

Choices of toilet in the city and their effectiveness along with pictures on super structure, below ground, design models and materials used for different uses like residential, industries, public spaces and new areas.

#### Task 4. Ward Profiling as Per City Sanitation Ranking Parameters

City as a number of spatial units will look at indicators pertaining to the practice of open defecation, access to sanitation (individual, community and public), collection, treatment and disposal of solid and liquid wastes, proper upkeep and maintenance of the sanitation infrastructure, clear institutional roles and responsibilities and improvements in health and environment as per the “City Sanitation Rating”.

### 1.4.3 Primary Data Collection and Sampling

Data collection is facilitated to a limited extent through rapid field surveys, sample surveys, case studies, consultations, transect walks, FGDs, etc., to validate and supplement the secondary data. The data will be collected as per formats/templates and questionnaires after brief orientation to the stakeholders. Random stratified sampling in typical cases (slums, schools, wards commercial places, public latrines, surface drains, solid waste arrangements, industries, health and educational institutions etc.) evenly distributed all over the city to cover all representative types of situations. (***Please refer to Annexure 3 for the survey templates***)

#### Task 1. Sample survey results for the basic services

***Purpose:*** The objective of conducting the sample field survey was to assess the services at the customer level / field level and validate the information given by the officials.

***Methodology:*** Samples were taken across the different parts of the city to validate the information. The distribution of the samples is given in the table as follows.

***Areas covered:*** The survey covered spatially all parts of the city, but the main focus was given to the following areas -

| ACTIVITIES | FOCUSED AREAS | TOOLS | SAMPLING | SAMPLE SIZE |
|---|---|---|---|---|
| Household survey of residential & slum areas | Household level | Questionnaire | Random Sampling | 800 HHs |
| CNA through Focused Group Discussions | Slum areas, residential areas, elected representatives, and other potential areas | Check list | Random Sampling | 12 – 15 FGDs |

| ACTIVITIES | FOCUSED AREAS | TOOLS | SAMPLING | SAMPLE SIZE |
|---|---|---|---|---|
| Institutions | Collector office, ANN office, Bus & Rail station | Questionnaire | Random Sampling | 10 (in Nos) |
| Community Toilets | All potential areas | Questionnaire | Random Sampling | 50 – 100% |
| Public Toilets | All potential areas | Questionnaire | Random Sampling | 50 – 100% |
| Hospitals | All Hospitals with 100+ beds or 50 – 100 beds | Questionnaire | Random Sampling | 10 – 15 (in Nos) |
| School Sanitation | Govt Primary, Secondary, High schools | Questionnaire | Random Sampling | 50 – 100%; 10% (>10 lakh) |
| Slaughter Houses | Potential areas | Questionnaire | Random Sampling | 2 – 3 (in Nos) |
| Commercial/ market areas | Potential areas (target groups include both shopkeeper & customers) | Questionnaire | Random Sampling | 10 – 15 (in Nos) |
| Industries | Potential areas | Questionnaire | Random Sampling | 5 – 10 (in Nos) |
| Secondary Data | - | Check list | - | - |
| Water Bodies | Potential areas | Questionnaire | Random Sampling | 50 – 100% |

### Task 2. Field Reconnaissance & Transact Walk

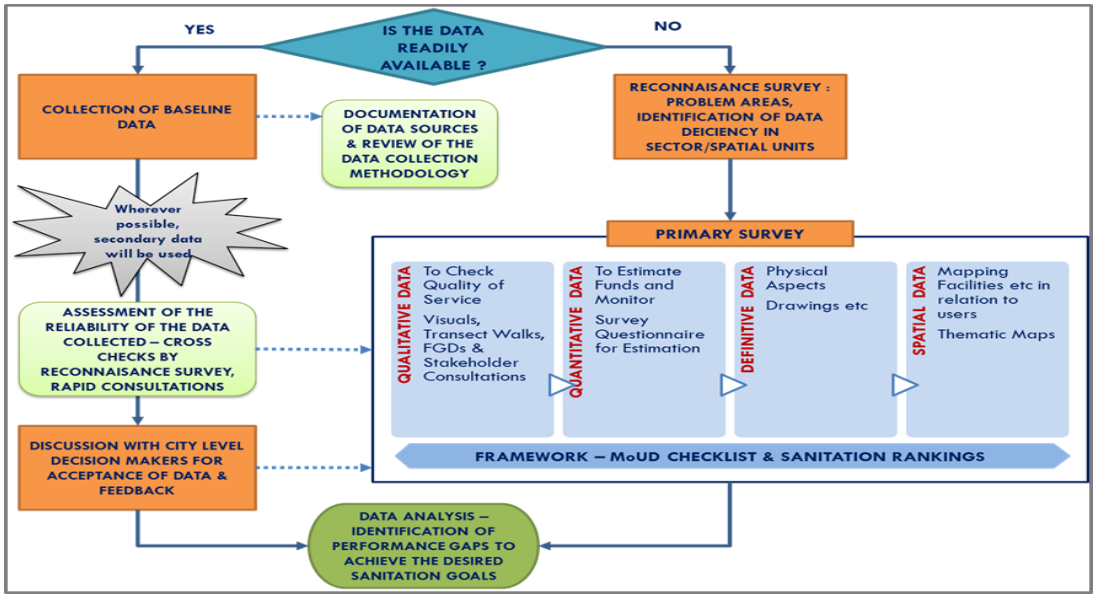
ASCI team oganized city wide field reconnaissance and tranacst walks along with ANN officials and other stakeholders to gauze and access the first hand sanitation situation of Agra city.

#### 1.4.3.1 RESEARCH TECHNIQUES

TABLE 1-5: REASEARCH TOOLS FOR RECONNAISANCE SURVEY

| TASKS | RESEARCH TOOLS |
|---|---|
| Social and environmental issues | Literature Review /Baseline Survey /Case Studies Consultations/FGDs |
| Policies, acts, operational procedures to address, mitigate and manage the social and environmental issues | Literature Review /Survey/FGDs/Case studies/Discussions /Stakeholder Consultations |
| CAN: Perception on sanitation, its maintenance and investment (Analysis of data), mitigate adverse/negative impacts | Literature Review /Secondary Information Review / Case Studies /Rapid survey data Analysis /FGDs /Stakeholder Consultations |
| Existing institutional arrangements in managing and mitigating social and environmental issues | Literature Review /FGDs /Stakeholder Consultations/ Survey Data Analysis |

#### 1.4.3.1.1 Process Followed for Data Assimilation:



### 1.4.4 Situation Analysis and Mapping Current Status

The Situation Analysis, prepared by taking into consideration the ground realities, local conditions, and assessment of the present sanitation situation has been undertaken and broad framework is indicated below:

TABLE 1-6: BROAD FRAMEWORK FOR SITUATION ANALYSIS

| SECTORS | SPATIAL UNTIS | FINANCIAL MECHANISM | INSTITUTIONAL SET-UP |
|---|---|---|---|
| **Service levels and benchmarks for:** | Household Sanitation Slums | Cost Recovery–Policy–Tariffs–Collections– | Institutional Arrangement – Policies, Plans, implementation, management. |
| **Sewerage and sanitation** | Public Sanitary Conveniences | Budget Transfers. | Staffing, |
| **Solid Waste Management** | School Sanitation | PPPs. | Organization & Competence |
| **Water Supply** | Institutional Sanitation Map spatially | Study of current programmes (SJSRY, ILCS, etc.) | |
| **Storm Water and Drainage** | Any town specific areas. | | |

***Tools Used: Data Templates, Survey Formats, Transect Walks along with schedules of interviews (Slum, industrial areas, water bodies), FGDs, Technical Analysis, Impact, Indicators, Stakeholder Consultations at City level, etc***

#### Task 1. Problem Analysis and Assessment of Options

Followed by situational analysis, problem and challenges have been identified in coverage, access, treatment and disposal, institutional, financial, social and cultural aspects and capacity concerns. Comprehensive range of sanitation and wastewater management options have been reviewed including but not limited to industrial and municipal sewerage; the sewage treatment options considered have varied from conventional and low cost options to centralized and decentralized systems, with both separate and combined effluent disposal options, and separate programs for schools, public toilets, sanitation in slums, community-based NGO-supported programs etc. have also been given a special thrust.

The purpose of options analysis is to identify plausible and sustainable technical, financial and institutional solutions and will consider (i) unit cost per beneficiary, (ii) maximizing both human and environmental benefits, (iii) sustainability, (iv) a long term plan, (v) government policy including land use zoning, (vi) piloting new approaches, (vii) beneficiary participation, (viii) wastewater as a resource, (ix) lessons learned from the past and last but not the least (x) political commitment.

#### Task 2. Communication Gap and Needs Assessment

IEC needs assessment will be carried out and broad communication strategy is developed in consultation with the ULB officials and other stakeholders.

#### Task 3. Developing a Situation Analysis Report

The situation analysis, prepared by taking into consideration the ground realities, local conditions, and assessment of the present sanitation situation. It will include inputs from all the above activities with the details of existing household sanitation arrangements, public sanitary conveniences, wastewater disposal, solid waste management and water supply. The report will also include an analysis of the ULB legal framework and byelaws, financial analysis of the ULB, data on key public and environmental health, user charges, willingness to pay, etc.

### 1.4.5 Developing Agra CSP

Having completed above steps, CSP has been formulated to articulate Sanitation Goals, specific quantifications both in terms of technical, capacities and financials based on stakeholder consultations and the analysis of choices made depending on costs of capital investments, operation and maintenance, monitoring, and evaluation.

Project priorities for sanitation need to consider:

- ☐ Serving the Unserved Urban Poor
- ☐ Serving the Unserved Schools
- ☐ Serving the Unserved Public Areas
- ☐ Institutional capacity building for sustainability and environmental monitoring
- ☐ Grant elements for demonstration pilot projects for eco-sanitation (private
- ☐ developers)
- ☐ Rehabilitation of existing facilities.
- ☐ Improvement of existing sanitation (septic tank sludge and effluent treatment).
- ☐ Extension of existing sewerage and sewage treatment (as a last priority).

#### Task 1. Formulation of Vision

This involves understanding the major aspirations with respect to urban development in the State through consultations and building an overarching vision that may be appropriate to the articulations. This involves following:

- ☐ Secondary information, data analysis and report review
- ☐ Brainstorming with key stakeholders and focus groups
- ☐ Understanding visions of concerned sectors and other constituents e.g., cities and development agencies and concerned authorities.

#### Task 2. Development of Strategy

This involves understanding the major issues of the sector, priorities laid down and an assessment of how the current arrangements are working with respect to urban development in the city. Also, the key strengths, major weaknesses, potential opportunities as well as likely threats would also be analysed to move towards the identification of the action areas/intervention areas that form the strategy development. This involves:

- ☐ Completion of information analysis, even with quick estimates, and review of current policies and priorities
- ☐ Consultations with key stakeholders/ focus groups concerning
- ☐ Detailed discussion with departments/ agencies/ cities/ authorities

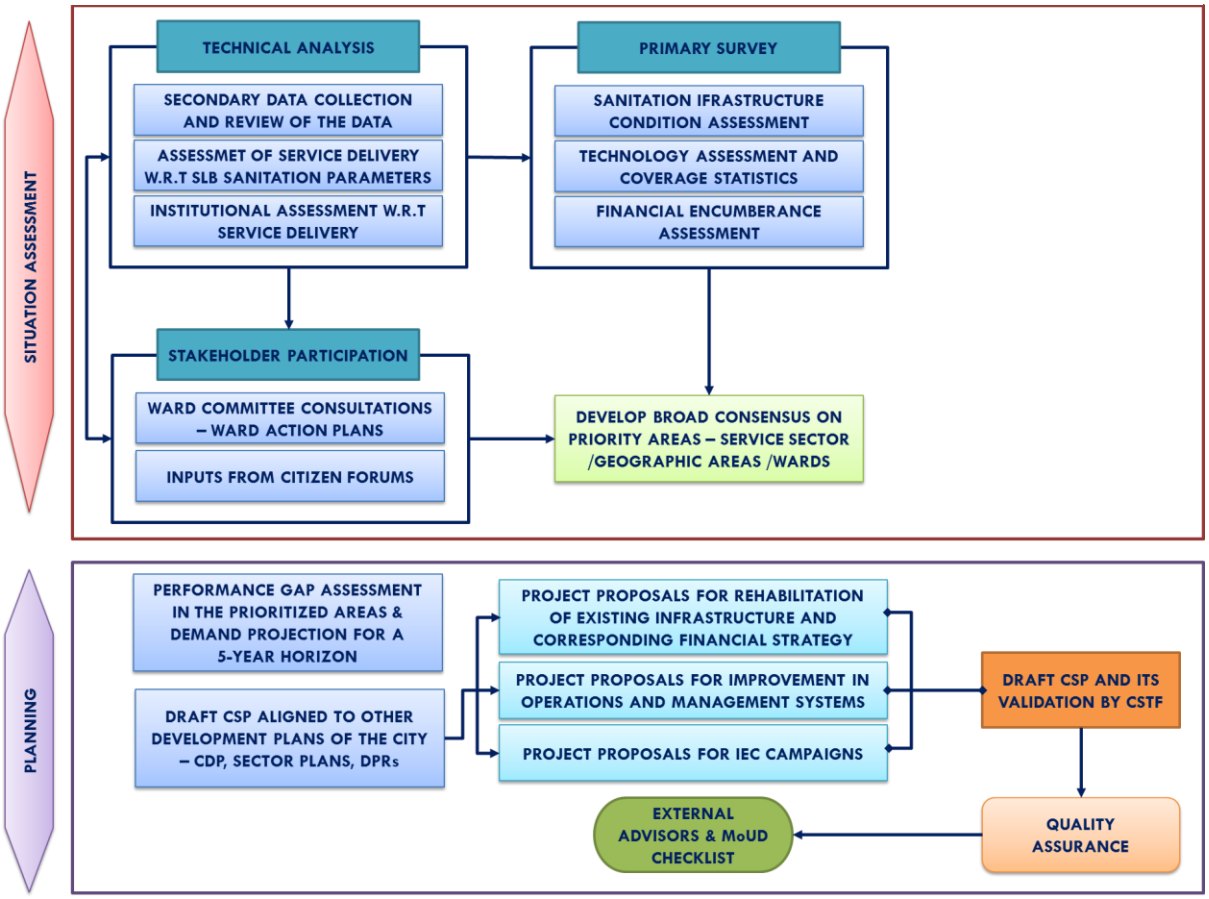
#### Task 3. Preparation of Draft CSP

Finalization of CSP along with recommendations based on the situation and solutions for making city open defecation free and totally sanitized, public toilet and community toilets models and operational models; proto - type design recommendation for all typical situations, waste disposal mechanisms, starters for sewerage layouts and estimation of requirement in terms of capacities, quantity and finances.

#### Task 4. Preparation of Implementation Road Map

This involves identifying and documenting interventions for the improvement of sanitation. The cost estimates of such interventions; the institutional responsibility as well as broad timelines for implementation will be indicated in the CSP

**FIGURE 1-2: ESSENTIAL COMPONENTS OF CSP**




## 1.5 .Contents of the Report

The report has two major sections –

I. The Situational Analysis (***Chapter 1 to Chapter 6***)
II. The Sanitation Strategies (***Chapter 7***)

The former section deals with depicting the city and its present status with regards to sanitation. The aim is to highlight the existing conditions regarding access and coverage of sanitary facilities, identify the gaps and striking issues, and understand the behavioral aspects of various sections of the society. This section is covered from Chapter 1 to Chapter 5.

The later section thereafter provides strategies and solutions to bridge the identified gaps, mitigate the existing issues, and provide ways and means to aid the sustenance of the existing and proposed strategies and projects. There have been presented in Chapter 6.

I. The Situational Analysis

**Chapter 1** gives insight into the NUSP and the sanitation ranking of cities thereafter an introduction to CSP process, its background, and the objectives behind it. This is followed by the step-by-step methodology of the CSP process, as well as the status of the CSP for the particular city. The process of collection of baseline information both primary and secondary has been explained at length. Later half of Chapter presents a review of the policies & programmes that are prevalent and followed in the state for the improvement of access and coverage of sanitary facilities while developing the sanitation conditions in the urban areas.

**Chapter 2** deals with the City Profile where the various aspects of the city are discussed in order to get a broad overview of the city itself. Aspects such as location, regional linkages, demography, economic, land use and housing profiles, the urban governance, the slums and squatter settlements are discussed.

**Chapter 3** is presented in two sections - ***Section A*** highlights the prevailing sanitation conditions of the city in the sectors of water supply, sewerage system, solid waste management and storm water drainage system as part of the primary data, compiled from the various surveys conducted in the city. It contains zone wise analysis of the data. ***Section B*** highlights the service profile of the sectors of water supply, sewerage system, solid waste management and storm water drainage system based on the secondary sources of information. The performance of each of the sectors is evaluated through Service Level Benchmarking (SLB) indicators, and projections are also made for the future years.

**Chapter 4** aims to evaluate the institutional capacity and the financial structure, to assess the capacity of ANN along with its associated organizations to cater to the sanitation needs of the city, with regards to both adequate qualified personnel and adequate financial resources.

**Chapter 5** identifies the gaps and issues in access, coverage and service delivery within each sector, the problem areas are clearly demarcated.

**Chapter 6** brings out the need assessment for the Information, Education and Communication (IEC) and awareness campaign in the city.

### II. Sanitation Strategy

**Chapter 7** presents the strategies – ***Section A*** presents the technological strategies and ***Section B*** demonstrates the respective financial strategies. The chapter provides the vision for the CSP and its goals, and the basic guiding principles on which the strategies are based. Thereafter, strategies have been provided to improve coverage and access to sanitation facilities, to implement effectively the various proposals, and options and mechanisms for effectively financing the strategies and proposals along with proper phasing mechanism.

# CHAPTER 2. PROFILE OF AGRA CITY

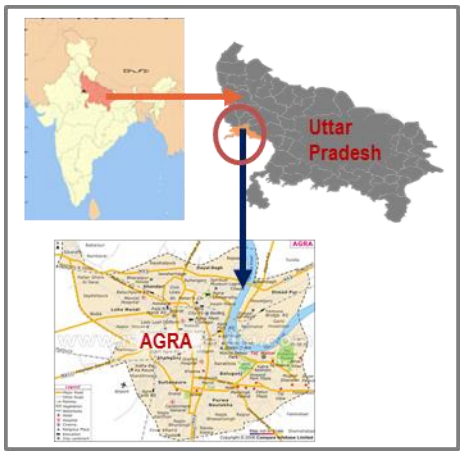
Topics of Discussion

- Location and Regional Linkages
- Physical Characteristics
- Demography

## 2.1 Location and Regional Linkages

### 2.1.1 Location

Agra the erstwhile capital of Hindustan, is a city on the banks of the Yamuna in the northern state of Uttar Pradesh, India, 363 Km (226 mi) west of state capital, Lucknow and 200 kilometers (124 mi) south from national capital Delhi. The city of Agra is situated on the right bank of river Yamuna downstream of Delhi and Mathura at 27° -10' N latitude and 78° - 02' E longitude.




Agra achieved fame as the capital of the Mughal emperors and remains a major tourist destination because of its many splendid Mughal-era buildings, most notably the Taj Mahal, Agra Fort and Fatehpur Sikri, all three of which are UNESCO Sites. Agra is ranked amongst the most outstanding historic cities in the world and certainly best known tourist destinations in India.

Agra has an extremely strategic location on the confluence of three distinct geo-physical regions namely the plain of Uttar Pradesh, the plateau of Madhya Pradesh and the desert of Rajasthan. The city also falls in the center of the four-culture areas- Braj, Bundelkhand, Rajputana and western U.P. Both these factors have played significant roles in shaping the life and history of the city

Being centrally located on the national map, Agra forms an important regional urban center. All traffic, whether by rail or road going south invariably passes through Agra, thus making it a major transport node at the regional level as well as at the national level. This has also led to an extremely rapid and haphazard growth pattern.

**Table 2-1: Demographic Profile - Agra City**

| CATEGORY | YEAR 2011 | YEAR 2014 | REMARKS |
|---|---|---|---|
| **POPULATION** | 1574542 | 1651442 | % of Population in Slum Areas – 66% -(As per SLB Agra )<br>% of Population in Non-Slum Areas – 34% ( Estimates as per SLB Agra) |
| **HOUSEHOLDS** | 221423 | 257580 | No. of Households in Slum Areas – 1,31,797<br>No. of Households in Non-Slum Areas – 89,626-(per SLB Agra Estimates) |
| **FAMILY SIZE (AVG.)** | 7.5 | 6 | |
| **NO. OF SLUM AREAS** | 378 | 378 | |
| **AREA** | 141 sq.km | 141 sq.km | Average Density – 11167 persons/ sq.km; More in case of slum areas |

*Source: Census 2011/ANN*

### 2.1.2 Metropolitan Region Area

Agra Metropolitan Areas Agra comprises of Agra, Azizpur, Dayalbagh, Dehtora, Deoretha, Dhanauli, Kalwari, Kaulakha, Nainana Jat, Nainana-Brahman, Rohta, Swamibagh. Administrative zone boundaries are given in the map.

### 2.1.3 Economy

Nearly five centuries ago, Agra was the commercial nerve centre of Mughal Empire. Due to the presence of the Taj Mahal and other historic monuments, it has a tourism industry as well royal crafts like Pietra Dura, marble inlay and carpets

Today 40% of the population depends largely on agriculture and others on the leather and footwear business and iron foundries. Agra is the second most self-employed in India in 2007, behind Varanasi, followed by Bhopal, Indore and Patna. According to the National Sample Survey Organization, in 1999-2000, 431 of every 1,000 employed males were self-employed in the city, which grew to 603 per 1,000 in 2004-05. Tourism contributes to the economy of Agra. Agra is home to Asia's largest spa called Kaya Kalp — The Royal Spa, at the Hotel Mughal in Agra.

The city has many industries. Agra has Uttar Pradesh's first plant biotech company Biotech located near the Taj. It is one of the largest plant tissue culture laboratories in North India with a production capacity of 2 million plants annually.

Agra has garment manufacturers and exporters, and an automobile industry. Auto companies include Anil Diesels, Harvest Group of Industries, Indian Agriculture and Automobile Corporation (IAAC) and Malloys India.

There are about 7000 small scale industrial units. Agra city is known for leather goods, carpets, handicrafts, Zari Zardozi, Marvel and stone carving and inlay work. Agra is known for its sweets (Petha and Gajak) and Snacks (Dalmoth). Some of the leading manufacturers, exporter and sellers of leather in Agra are Hindustan Rubber and Plastic Industries, Polyplast Industries, Royal International, Eskay Sales Corporation, Best Buy, Bandejjia Traders and Expomore.

Carpet making was introduced to the city by Moghul Emperor Babur and since then this art has flourished. Some leading exporters of carpets in Agra are Karan Exports, The Rug Factory, Agarwal Brothers, Rugs International, Floor Artists Inc.

The city center place at Agra (Kinari Bazar) has jewellery and garments shops. The silver and gold jewellery hub is at Choube Ji Ka Fatak. Agra has Transformer manufacturers. The Shah Market area is an electronics market while Sanjay Place is the trade center of Agra

## 2.2 Physical Characteristics

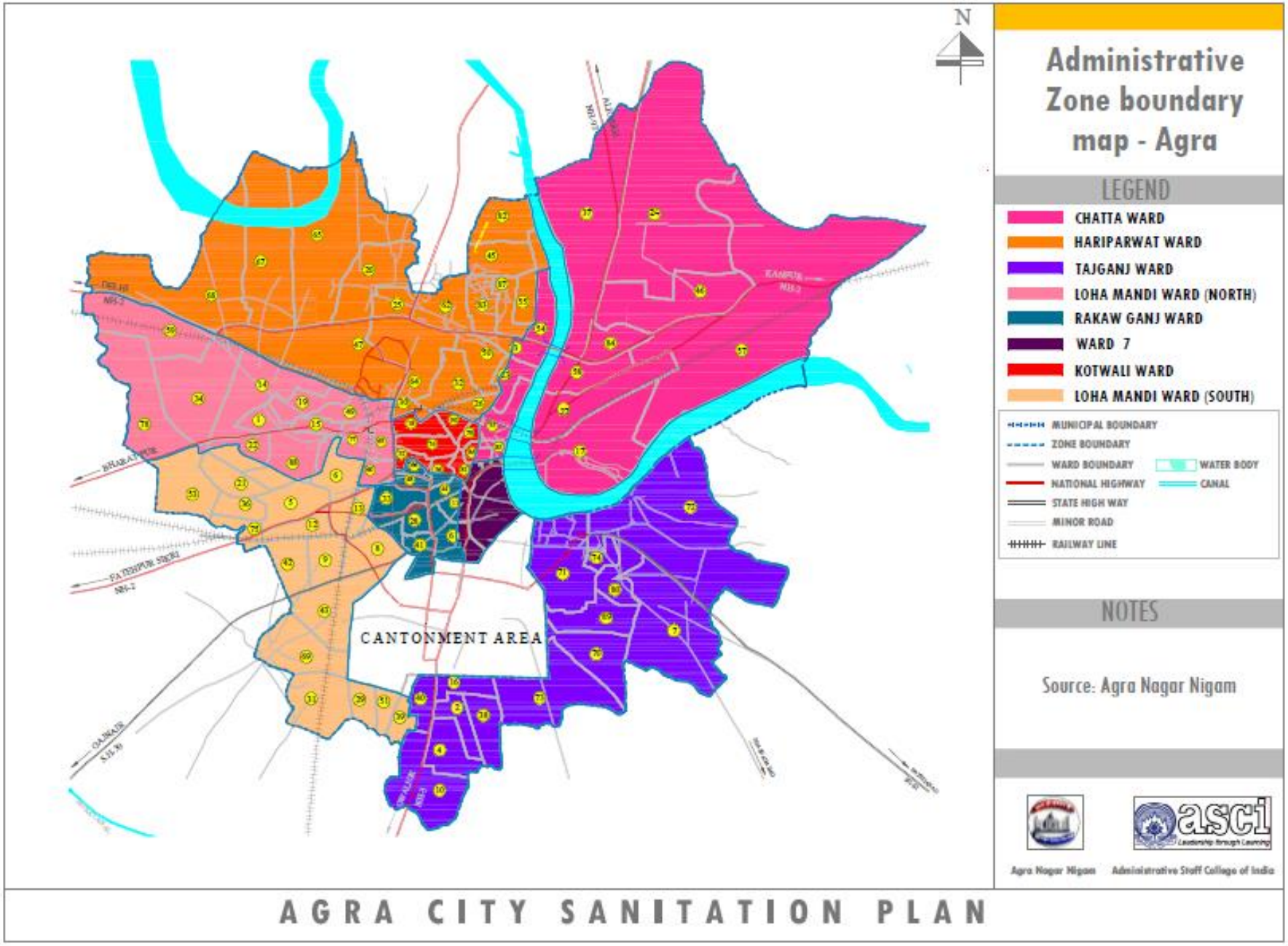
### 2.2.1 Climate

The maximum temperature of Agra rises to 47° C during peak summer season and drops down to minimum of 3° C during the winter season. Agra city lies in a moderate to high rainfall region with an average yearly rainfall of about 686 mm. The maximum and minimum rainfall recorded by Indian Meteorological department, Agra is 286.0mm (1939) and 32.5mm (1944) for 24 hours respectively between 1930 and 1997 (67 years).

The monsoons generally set in the month of July and continue until the month of September. The monsoons in Agra are marked with heavy rain falls. The humidity in the air tends to get high and may feel very uncomfortable. The city of Agra receives an average rainfall of about 660 millimetres (26 inches) on a yearly basis.

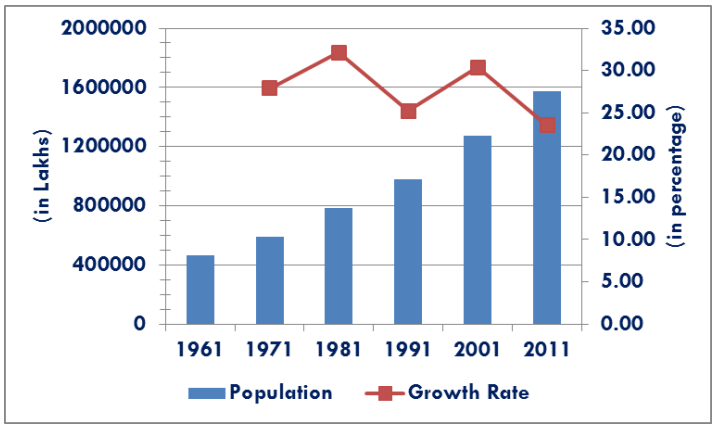
### 2.2.2 Geology & Geography

The river Yamuna enters the city from the north-east corner, flows towards south for some distance and then turns towards east. The general slope is from west to east in CIS-Yamuna area on the right bank of the river Yamuna. The high flood level of Agra City is 154.76m at Jawahar Bridge. The city stretches for about 9.0 km along the Yamuna river. The major part of the city is on the Western side of Yamuna and has grown beyond the river on the eastern side and is called the Trans Yamuna area while the original part is called as CIS Yamuna. The type of soil in Agra city is sandy


N
Administrative Zone boundary map - Agra
LEGEND
CHATTA WARD
HARIPARWAT WARD
TAJGANJ WARD
LOHA MANDI WARD (NORTH)
RAKAW GANJ WARD
WARD 7
KOTWALI WARD
LOHA MANDI WARD (SOUTH)
MUNICIPAL BOUNDARY
ZONE BOUNDARY
WARD BOUNDARY
WATER BODY
NATIONAL HIGHWAY
CANAL
STATE HIGH WAY
MINOR ROAD
RAILWAY LINE
NOTES
Source: Agra Nagar Nigam
CANTONMENT AREA
Agra Nagar Nigam
Administrative Staff College of India
AGRA CITY SANITATION PLAN

## 2.3 Demography

### 2.3.1 Population Growth and Trends




Agra is one of the most populous cities in Uttar Pradesh and the 19th most populous in India

As per provisional reports of Census India, population of Agra in 2011 is 1,574,542; of which male and female are 849,771 and 724,771 respectively.

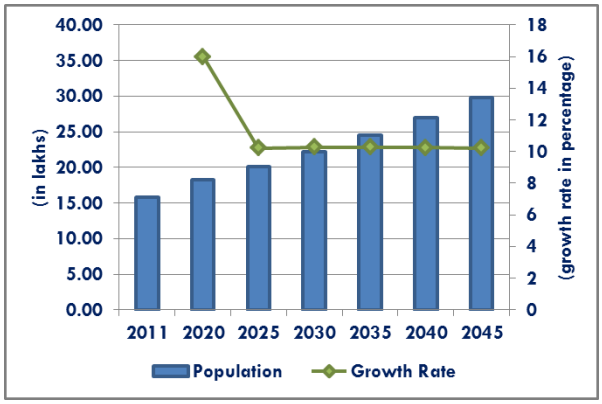
The total numbers of households by 2011 are 2, 50,000.The sex ratio of Agra city is 853 per 1000 males

FIGURE 2-1: POPULATION AND GROWTH RATE TREND - AGRA CITY

### 2.3.2 Population Projections

In the context of the City Sanitation Plan, population estimation and projection are being carried out with the following objectives: (1) to obtain a realistic estimate of the total current population in the city and the spatial distribution of the same through empirical methods; (2) to take informed strategic decisions on provision of sanitation infrastructure and services for the city as a whole and for different parts of the city; (3) In taking strategic decisions, to strive for a reasonable balance between the risks of adequacy and viability in the future.

FIGURE 2-2: POPULATION PROJECTS - AGRA CITY




As an initial exercise, the population for 2011 is taken from the census data. The population projections are made for the years 2012 – 2045. It is assumed that efforts shall be made by the city administration to achieve a lower decadal growth rate for the years 2021-2045. The ultimate goal shall be to achieve a steady decadal growth rate of 2% with the underlying objective to stabilize and sustain the growth of the city. The results are tabulated below.

TABLE 2-2: INFRASTRUCTURE DEMAND CORRESPONDING TO PROJECTED POPULATIONS - AGRA CITY

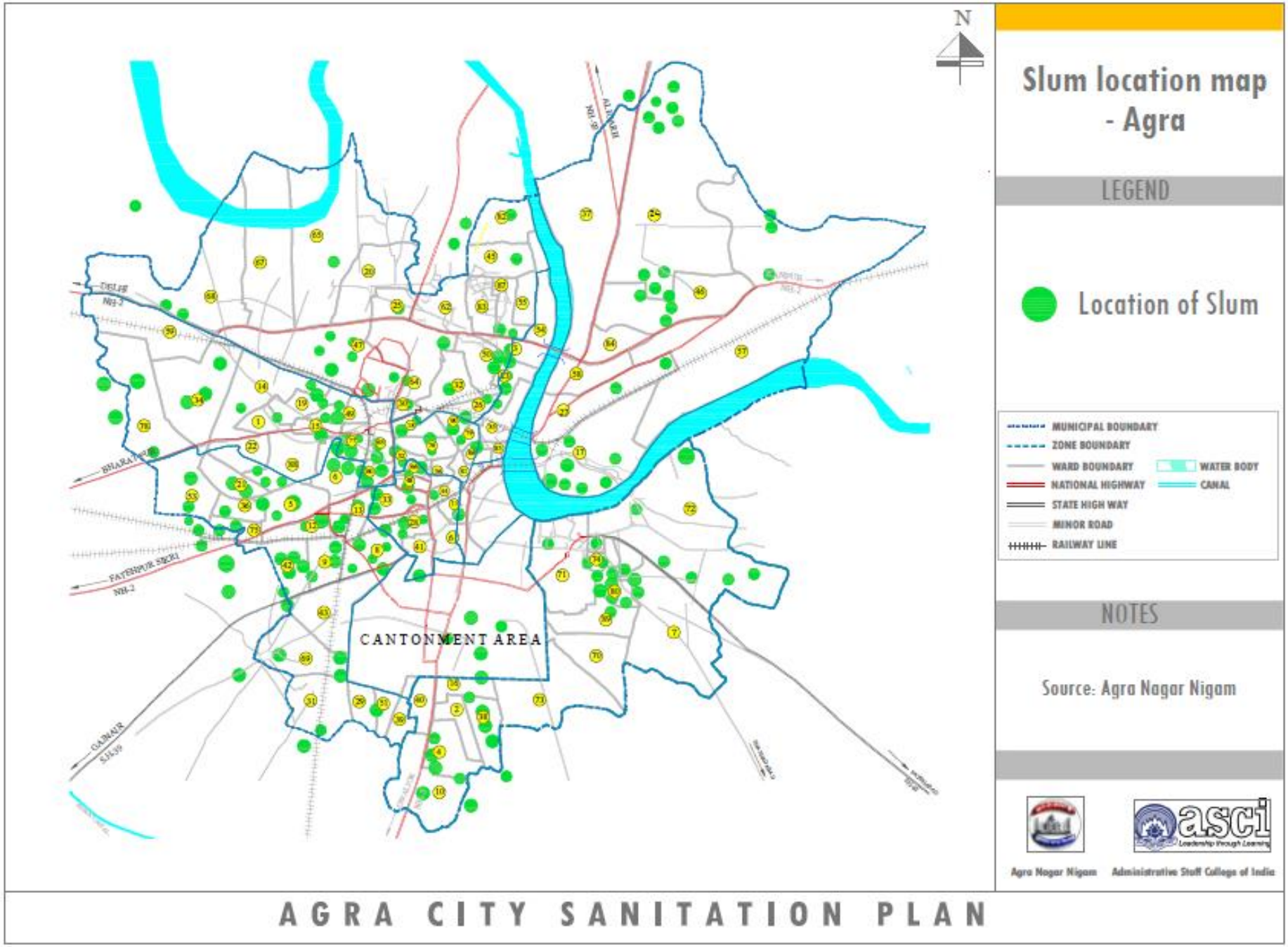
| YEAR | 2011 | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|---|
| PROJECTED POPULATION (IN LAKHS) | 12.94 | 14.60 | 15.41 | 31.82 | 32.59 | 33.78 | 34.60 |
| GROWTH RATE (IN PERCENTAGE) | 0.78 | 3.13 | 2.42 | 3.65 | 2.42 | 3.65 | 2.42 |
| WATER DEMAND AT CONSUMER END (MLD) | 419.42 | 449.56 | 460.45 | 477.27 | 488.83 | 506.70 | 518.97 |
| SEWAGE GENERATION (MLD) | 335.54 | 359.65 | 368.36 | 381.82 | 391.07 | 405.36 | 415.17 |
| SOLID WASTE GENERATION (METRIC TONNE) | 1258.27 | 1348.68 | 1381.34 | 1431.82 | 1466.50 | 1520.09 | 1556.90 |

The infrastructure demand corresponding to the projected populations have also been computed at the city level. The per capita demand of water as per the recommendations in CPHEEO manual has been considered at 150 lpcd and the corresponding sewerage generation is estimated at 80% of the water consumption; while the per capita solid waste generation is assumed as 0.45 kg/per capita/per day.

### 2.3.3 Urban Poor

The focused discussions with various stakeholders of the city reveal that poverty levels are quite high in Agra City; however, recent studies are unavailable to accurately assess the extent of poverty levels in Agra. The total number of slums in Agra are 378 (***Please refer to Annexure 4 for the list of slums in Agra City***). As per the Census 2001, the total slum population in the city is 1, 21,761. The percentage of slum population in the city is 9.5 per cent of the total population, which is less than the percentage of slum population to total urban population of the state (12.7 per cent). But the present slum population is much more than the city population and it is about 9, 07,540 - which is about 60% of the total city population. As per DUDA (2001) there are 252 slum pockets with a population of the order of 5.5 lakh i.e. about 44 per cent of the total population. The current statistics show that there are about 378 notified slum pockets with a population of the order 9.07 lakh i.e. about 60% of the total population and 147 un-notified slum pockets which further more adds slum population to the existing slum population. Slum Locations in the city are given in the map below.

The household (HH) size in slums works out to be 6.05, which is more than the HH size of the total population (6.00). The sex ratio in the slums (850) is more than that of the total population (846) whereas the literacy rate is 51.32 per cent, which is very less than the total literate population (60.14 per cent). Out of a total number of 90 wards in the city, more than 50 no. of wards have slums. The slum population in the wards varies from 1.5 per cent to maximum of 95.85 per cent. Ward nos. 11 and 17 near Taj Nagar and Trans Yamuna have more than 50 percent of the population as slum population. About more than 25 thousand families are estimated to be living below poverty line in Agra city.


N
Slum location map - Agra
LEGEND
Location of Slum
MUNICIPAL BOUNDARY
ZONE BOUNDARY
WARD BOUNDARY
WATER BODY
NATIONAL HIGHWAY
CANAL
STATE HIGH WAY
MINOR ROAD
RAILWAY LINE
NOTES
Source: Agra Nagar Nigam
CANTONMENT AREA
Agra Nagar Nigam
Administrative Staff College of India
AGRA CITY SANITATION PLAN

# CHAPTER 3. SANITATION SITUATION ANALYSIS

Topics of Discussion

- Secondary Data Analysis
- Primary Data Analysis
- Ward Level Sanitation Analysis

The primary and secondary surveys have indicated that like most of the other municipalities, there is a large gap between the level of infrastructure service requirement for the city to cater to the demands of the proliferating population and the actual service level prevailing in the city. Besides the accessibility deficiencies, there is also lack of operation and maintenance systems for the existing infrastructure facilities and services resulting in the deterioration of the existing services and facilities further worsening the sanitation conditions within the city limits. The city being a location to world's industrial center also adds to the burden to existing infrastructure; additionally, it also houses high population and high percentage share of slum population resulting in more unhygienic and unhealthy pockets of areas in and around the city limits.

The following sections present the qualitative and quantitative aspects of the sanitation in the city within the sectors of – (a) ***water supply*** with prime focus on the quality of water supply at the consumer end, (b) ***access to toilets***, (c) ***sewerage management***, (d) ***storm water management,*** and (e) ***solid waste management***.

# SECTION A: SECONDARY DATA ANALYSIS

## 3.1 Water Supply Management Assessment

The Service Level Benchmarks (SLB) established by the Ministry of Urban Development, Government of India, for the sector of Water Supply attempts to compare the service levels against the nine (9) key parameters as indicated in the spider chart. The spider chart demonstrates the desired level of service in the water supply sector against the nine (9) key parameters vis-à-vis the existing level of service.

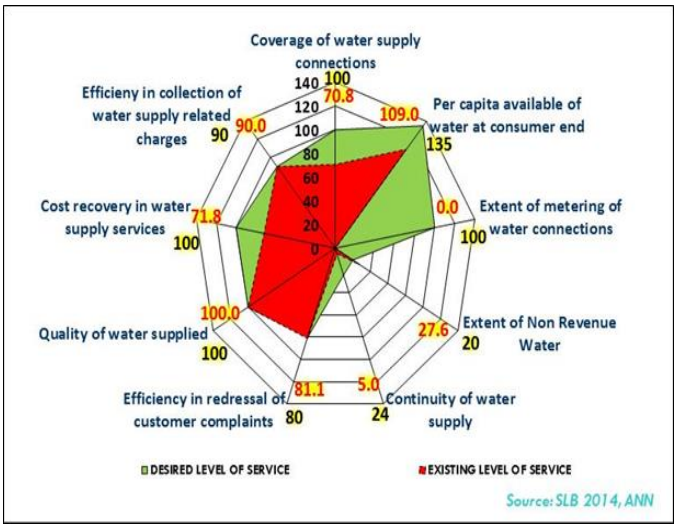



**FIGURE 3-1: SLB FOR WATER SUPPLY SECTOR - AGRA CITY**

The spider chart denotes that the city administration needs to strengthen its efforts to improve the extent of metering of water connections and further employ measures to reduce the extent of non-revenue water. The continuity of water supply is also an area of concern. The per capita supply of water is not as per the benchmarking, and it is however encouraging to note that the quality of water supplied measures up to the required standards; additionally the ULB has been successful in its attempts of cost-recovery, collection of water-supply related charges and the efficiency in redressal of customer complaints.

### 3.1.1 Quantitative Statistics - Water Supply and Demand

Section 2.2.8.3 of the CPHEEO Manual recommends a water consumption requirement of 135 lpcd for residential and non-residential users (non-residential includes retail non-domestic consumption such as commercial development, but does not include non-residential bulk consumers like large-scale industries, industrial estates, large institutions, etc.). Considering the population in 2011 for the city of Agra and the CPHEEO recommendation, the water demand for the city of Agra is estimated at 225 MLD, while the supply of water at the consumer end is 140.6 MLD (*Source: Agra Nagar Nigam*) corresponding to a consumption rate of 93.71 lpcd.

**TABLE 3-1: WATER SUPPLY-DEMAND STATISTICS – AGRA CITY**

| WATER DEMAND (MLD) | WATER SUPPLY (MLD) | REMARKS |
|---|---|---|
| 225 | 140.6 | *Source for water supply figures is Agra Nagar Nigam* |

#### 3.1.1.1 SOURCES OF WATER SUPPLY

The main source of surface water in the city is Yamuna river which enters the town from northeast corner, flow towards south of the city for some distance and then turns towards left. There is extreme shortage of raw water in the river Yamuna during summers, the lowest discharge has been observed as 101.7 MLD. Out of this discharge the average summer draw of raw water is of the order of 99 MLD. Due to high pollution level in Yamuna water the demand of drinking water of Agra, which is presently 142 cusecs and projected to 276 cusecs in the year 2036 could not be met from this source. Foreseeing the shortfall in River Yamuna, the Central Govt. has earmarked 140 cusecs raw water for Agra and 10 cusecs from Tehri reservoir. This 150 cusecs raw water will be conveyed upto Palra fall of Upper Ganga canal through its system and then it has to be brought to Agra. This will meet the raw water requirement upto 2011, by which raw water quality in Yamuna River is expected to improve considerably and further requirement will be met again from the river.

The total amount of water available to the distribution system from these two surface water sources is 160 MLD while no water is drawn from ground.

**TABLE 3-2: SOURCES OF RAW WATER - AGRA CITY**

| SOURCE OF WATER | VOLUME OF WATER SOURCED (MLD) | REMARKS |
|---|---|---|
| Surface Water | 160 | |
| Ganga | 140 | |
| Yamuna | 20 | |

*Source: Agra Nagar Nigam*

#### 3.1.1.2 COVERAGE OF WATER SUPPLY SERVICES

The total water supply installed capacity of treatment plants for surface water sources is 369 MLD but only 270 MLD of water is being produced from surface water sources. There is no extraction of water from ground. The distribution system is in need of improvement.

**TABLE 3-3: WATER SUPPLY COVERAGE DETAILS - AGRA CITY**

| | |
|---|---|
| Water Supply Zones in the City | 25 |
| Properties with Water Supply Connections | 187595 (70.8%) |
| Households Served with Water Supply | 182270 |
| Total Volume of Water Produced | 290 MLD |
| Total Volume of Water Billed | 210 MLD |
| Extent of Non-Revenue Water | 27.59% |

*Source: SLB 2014 Agra*

Presently more than **twenty-five zones** have been set up, based on topography & operational convenience, to cover the entire master plan area for the design stage of 2001, incorporating all the existing zonal works. Following are the existing zone: ***Hariparbat, Lohamandi, Maithan, Chatta, Kotwali, Rakabganj, Tajganj-I, Kandhari, Sikandra-I, Shahganj-I, Cantt.zone, Trans Yamuna I, Trans Yamuna II, Ghatwasan I, Ghatwasan II, Swami Bagh, Dayal Bagh I, Swami Bagh & Dayal Bagh II, Sikandra II, Bodla I, Bodla II, Bodla III, Shahganj II, Shahganj III, Tajganj II & Tajganj III***.

In most of the areas of Nagar Nigam water distribution system is available but still in some wards like Sikandra-II, Bodla-II, Shahganj-III, Tajganj-II, III, Trans Yamuna-II & Ghatwasan-II no water supply network is available. Water requirement in these areas is met by tube wells and hand pumps. There are about **4017 stand posts and about 4598 hand pumps in the city**. These areas are facing acute water shortage so there is an urgent need for the augmentation of water distribution network of these areas. Besides this consumers are getting water for **5 hrs per day, both in the morning and evening.** It is also relevant to highlight the statistic that the continuity of water supply is a mere 6 hours per day. The non-revenue water is estimated at about 28.15

The transmission mains carry water from the source i.e. Yamuna to the water treatment plants and subsequently towards the Master Balancing Reservoirs for further distribution to the consumers. Presently there are two water works namely Jeoni Mandi water treatment plant and Sikandara water treatment plant. Both the treatment plants are giving a final output of about 270 MLD, details given as under and are catering to three water supply zones including the cantonment area. The installed capacity of Treatment plants for surface water sources is 270 MLD with volume of water produced through surface water sources is 235 MLD – this shows that the per capita supply of water is about 150 lpcd with at-least 15% loss in transmission.

**Water Works–I (Jeoni Mandi)** is a Raw Water Pumping plant having capacity of 260 MLD. This raw water pumped through Water Mains of 1500 m to WTP having capacity of 250 MLD, which is giving final output of 180 MLD. The storage capacity for this treated water is 35 ml.

**Water Works–II (Sikandara)** is a Raw Water Pumping plant having capacity of 158 MLD. This raw water is pumped through Water Mains of 1450 m to Water Treatment Plant (WTP) having capacity of 144 MLD, which is giving final output of 90 MLD. The storage capacity for this treated water is 5 ml. The total storage capacity available within Agra is about 48200 KL comprising of 12 nos. of reservoirs. Further this water is distributed to Agra city through distribution network of 1100 km length of pipes with diameter ranging from 80 mm to 800 mm of CI, RCC, MS and PSC pipes.

### 3.1.2 Qualitative Statistics – Water Supply

The increased pollution load has impaired the river water quality to such an extent that the pre-chlorination dose as high as 20mg/l is necessary to bring down the coliform count within the acceptable limits formulated by the CPHEEO, Govt. of India. The water quality of river Yamuna is far from satisfactory as per CPCB norms. The water quality is as under.

**TABLE 3-4: WATER QUALITY ANALYSIS RESULTS - AGRA CITY**

| PARAMETER | OBSERVATION | CPCB STANDARD | REMARKS |
|---|---|---|---|
| Color (Hazen Unit) | 300 - 400 | - | - |
| Ph | 7.8 - 9.5 | 6.5 – 8.5 | - |
| Chemical Oxygen Demand (C.O.D) | 5.0 – 35.0 | 3.0 | 12 Times |
| Biochemical Oxygen Demand (B.O.D) | 38.0 – 110.0 | 10.0 | 11 Times |
| Oxygen (D.O.) minimum | 0 – 12.0 | 4.0 | 4 Lt. g.l |
| Most Probable Number (MPN) Index / 100 ML | 4x104–240x104 | 5000 | 50 Times |
| Fecal Colifarm / 100 ML | 11x103 – 18x103 | 2000 | 9 Times |
| Total Ammonic Nitrogen | 4.4 – 40.0 | 1.0 | 40 Times |

*Source: Agra Jal Kal*

## 3.2 Sewerage Management and Access to Toilets Assessment

The Service Level Benchmarks (SLB) established by the Ministry of Urban Development, Government of India, for the sector of Sewerage and Access to Toilets attempts to compare the service levels against the nine (9) key parameters as indicated in the spider chart. The spider charts demonstrates the desired level of service in the sewerage sector and access to toilets against the nine (9) key parameters vis-à-vis the existing level of service. The spider chart denotes that the coverage of the sewerage network is a mere one-fifth of the required level and requires a remarkable augmentation in order to serve the city to the desired standards; and the collection efficiency is also very low. The major issue for the ANN is the inadequacy of the current treatment capacity (68.2%) however; quality of the sewage treatment is meeting the required standards. The extent of cost recovery in sewage management and the efficiency in redressal of customer complaints are still an area of major concern, while efficiency in collection of sewage charges has been fairly good.

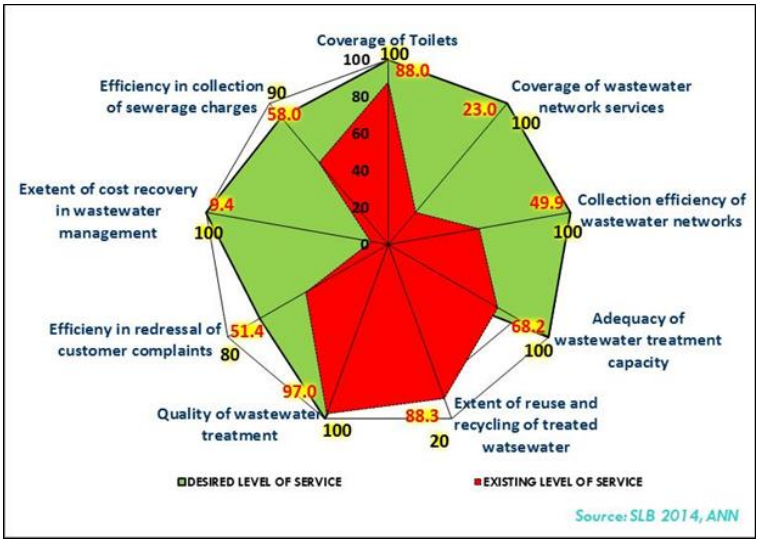



**FIGURE 3-4: SLB FOR SEWERAGE AND SANITATION SECTOR - AGRA CITY**

The coverage of toilets in the city is encouraging with 88% of the households with an individual toilet.

### 3.2.1 Sewage Generation

Sewage generation depends on the water supplied and it is generally considered as eighty percent (80%) of the water supply. It is essential to look at the water supply situation within Agra Nagar Nigam to assess sewage generation.

Table 3-4 presents the sewage generated in the city considering the water supply/consumption situation at various levels –

**TABLE 3-5: SEWAGE GENERATION ESTIMATE - AGRA CITY**

| | VOLUME OF WATER CONSUMED (MLD) | VOLUME OF SEWAGE GENERATED (MLD) |
|---|---|---|
| **Domestic Connections** | 144 | 115.2 |
| **Non Domestic Connections** | 10 | 8 |
| **Public Taps** | 20 | 16 |
| **Other Connections** | 40 | 32 |
| **Total** | 214 | 171.2 |

*Source: Agra Nagar Nigam*

### 3.2.2 Sewage Collection and Conveyance

In most of the zones of Agra city, sewer lines have not been laid except for certain parts of in old city area, which were laid in the year 1976. The existing system is spread over the area of 1400 hectares translating into 17% of the total city area but devoid of proper house connection and mostly the sewage goes into the open drains.

The system is badly silted, choked and damaged at number of places an overloaded due to the growth of population in the city. Improper means of disposals of wastewater has also resulted in environmental pollution and creates unhygienic conditions. In urban areas, a large population is not covered by safe sanitation facilities due to lack of well-established sewerage system.

The city of Agra has underground sewerage system, which is operated and maintained by the Jal Sansthan. Planning, construction and commission of the projects related to sewerage system is under the purview of Jal Nigam. NEERI, Nagpur prepared sewerage Master Plan for the city in 2002. This Master Plan divides the city into 25 sewerage zones, regrouped in 8 sewerage districts on the basis of topography and physical barriers like railway lines, river, national highway etc. –

**TABLE 3-6: SEWERAGE DISTRICT ZONES - AGRA CITY**

| SEWERAGE DISTRICT | AREA COVERED |
|---|---|
| TAJGANJ DISTRICT | TajGanj I, II and Iii zones |
| NORTHERN SEWERAGE DISTRICT | Dayalbagh, parts of Sikandara I, Sikandara II, Khandari, and Ghatwasan II zones |
| EASTERN SEWERAGE DISTRICT | Transyamuna-I and Transyamuna-II |
| WESTERN SEWERAGE DISTRICT | Bodla-I, Bodla-II, Bodla-III, Shahganj-III and parts of Lohamandi, Sikandara-I, Sikandara-II, Shahganj-I and Shahganj-II |
| SOUTHERN-I SEWERAGE DISTRICT | Bundukatra and part of Shahganj-I |
| SOUTHERN-II SEWERAGE DISTRICT | part of Shahganj-II. |
| CENTRAL SEWERAGE DISTRICT | Ghatwasan-I, Kotwali, Maithan, Hariparbat, Chhata, Rakabganj and parts old Khandari, Ghatwasan-II and Lohamandi |
| CANTONMENT | Cantonment Area |

*Source: ANN*

### 3.2.3 Sewerage Treatment and Disposal

Three Sewage Treatment Plants (STPs) were built under Yamuna Action Plan Phase I. The STPs at Burhi ka Nagla (2.25 MLD) and Peela Khar (10 MLD) are made to perform beyond capacity, but still treat only 10% of the sewage they receive. Meanwhile, the Dhandupura STP (78 MLD) remains underutilized. Besides effluent from these STPs do not conform to CPCB discharge standards. The adequacy of sewerage treatment plant is only about 14% since the total installed capacity of secondary treatment plant is about 90.25 MLD and the total waste water generated within the city is about 644 MLD.

The treated sewage is recycled and reused, however, the extent of reuse and recycling of sewerage is only 84% of the treated water. The volume of treated waste water available for reuse after secondary treatment that confirms to discharge compliance is 66.00 MLD.

### 3.2.4 Access to Toilets Assessment

Agra Nagar Nigam has revealed that the total number of individual toilets in Agra City is 228643 and the reported coverage of individual toilets within the city is about 88%. The access to community toilets is reported at 15% and the usage of community toilets is very prevalent in the slum areas. There are 117 community toilets in Agra (***Please refer to Annexure 5 for the list of Community Toilets in the city***) and the construction agencies are listed as below –

1. Sulabh International
2. Bhangi Mukthi Sansthan, Agra
3. Renewal Engg, Muzzafarnagar
4. Sri O P Sharma, Contractor, Agra
5. NEDA
6. Lok Seva Sansthan, Lucknow
7. Shobhit Social Welfare Society
8. Nagla Teja Seva Samiti, Agra
9. Bhudevi Mahila and Bal Vikas Sikkshan Sansthan
10. Gayathri Maa Bal VidyaMadir Samiti, Agra
11. Brij, Mohan, Contractor, Aligarh

### 3.2.5 Ongoing Interventions for Sewerage

| DETAILS OF PROJECT | COMPONENTS | AREAS COVERED | PROGRESS | PENDING WORKS |
|---|---|---|---|---|
| **Sewerage Project 68.46 kms sewer line Cost - 2162.2 Lakhs** | **Northern and Western Zone Branch & Lateral Sewer Lines** | | | |
| | Package I – 14.2 kms sewer line | Kamla Nagar, Karma Yogi, Shanti nagar, Subhash nagar, TejNagar, Manoharpur | Completed | NA |
| | Package II – 8.74 kms sewer line | Dayal Bagh, Central Hindi Sansthan Road, Amar Vihar Colony | Completed | NA |
| | Package III – 20.34 kms sewer line | Heerabagh, Pushpanjali Enclave, Sarlabagh, Nagla Bhuri, Nagla Padhi | Completed | NA |
| | Package IV – 12.38 kms sewer line | Aajampada, Neelgiri Colony, Balajipuram, Panchsheel, Dhouretha, Sainik Vihar, Jaynagar | Completed | NA |
| | Package V – 12.8 kms sewer line | Manas Nagar, Maruthi State, Albathiya, Kedar Nagar, New Colony, Subhash Nagar | Completed | NA |
| **Sewer System 96.50 kms sewer line Cost - 19592 Lakhs** | **Sewer System in Central Zone** | | | |
| | Construction of new / rehabilitation of sewer line; Pumping Station, Rising Main incl E&M works | sub Balkheswar Zone | sewer line - 60.27 kms laid Pumping Station - 55% completed | 36.23 kms sewer line yet to be laid |
| | Construction of new / rehabilitation of sewer line incl E&M works | Balkheswar and Khairati Tola SPS sub zone | SPS Renovation - 65% completed | |
| | Package B1 – 7.23 kms Sewerline Rising Main 2265 m | Shaheed Nagar, Dhandu Pura; Rising Mains in Tajganj Zone | Completed | NA |
| | Package B2 - 26.72 kms sewer line | Nagla Mewati Sub Zone | Completed | NA |
| | Package B3 – 12 kms sewer line | Kolhai sub zone | Completed | NA |
| | Package B4 – 24 MLD STP | DhandhuPura | 80% Completed | 20% Works remaining |
| | Package B5 – E&M Works | Tajganj Zone | 99% Completed | |

*Source: Agra Nagar Nigam*

## 3.3 Storm Water Management Assessment

The total length of Road network in Agra city is about 1728 km and total length of pucca covered drains is about 1060 km, which is coming to about 61.34% coverage of storm water drainage network. The drainage system of Agra was laid about 55 years back and drains are in bad condition. The system comprises hierarchy of natural and man-made drains that ultimately discharge surface run off and sewage to River Yamuna because at most part of the city there is no sewerage system. Natural nalas are the main carriers of the storm water.–

**Primary and Secondary Drains**

U.P. Jal Nigam prepared Agra storm water PFR with drainage system designed on basis of macro level planning. The information of drains above 60 cm width was collected and mapped in the study area of 15807 ha. For this purpose city was divided into two major zones. CIS Yamuna and TRANS Yamuna based on major physical boundary River Yamuna. Drains along with their catchment area were marked. The CIS and Trans Yamuna area is further divided into 11 drainage zones

TABLE 3-7: DRAINAGE ZONE-WISE DISTRIBUTION OF STORM WATER DRAINAGE NETWORK - AGRA CITY

| NAME OF ZONE / DETAILS | EXISTING MAIN DRAIN | AREA COVERED (HA.) | AREA LEFT FOR FUTURE DEVELOPMENT (HA.) |
|---|---|---|---|
| **Zone I (Karamyogi)** | Karamyogi Nalla<br>Anurag Nagar Drain<br>Rajwaha Drain<br>Balkeshwar Nalla | 375.67 | 88.86 |
| **Zone II (Dayal Bagh)** | Nalla Nagla Bopdi | 2436.5 | Nil |
| **Zone III (Shastripuram)** | Bapu Nagar Nalla<br>Bi-pur Nala | 2436.5 | Nil |
| **Zone IV (City)** | Water Works Drain<br>Krishna Colony Nalla<br>Vedant (Paliwal) Drain<br>Bhairon Nalla<br>Khoja Nalla<br>Pipe Mandi Nalla | 937.40 | Nil |
| **Zone V (Mantola)** | Mantola | 3785.00 | Nil |
| **Zone VI (Taj)** | Nil | 931.01 | Nil |
| **Zone VII (Kheria Air Base)** | Nil | 2629.08 | 1500 |
| **Zone VIII (Naripura & Dewri Road)** | Nil | 1971.5 | Nil |
| **Zone IX (Taj Nagri Phase- II)** | Nil | 935.45 | Nil |
| **Zone X (Foundry Nagar)** | Ram Bagh Nalla<br>Foundry Nagar Nalla (new drain already constructed)<br>Etamad-ud-Daulah Drain<br>Moti Mahal Nalla<br>Ram Bagh Chauraha Drains<br>Yamuna Bridge Station Drain | 786.67 | 181.81 |
| **Zone XI (Peelakhar)** | Pilakhar Nalla<br>Naunihai Industrial Drain<br>Kalindi Vihar Drain (newly constructed drain) | 505.90 | Nil |

*Source: Agra Nagar Nigam*

The table above shows the existing main drains in each of the eleven zones with the area covered and the area left for future development. It can be seen that in Zones II, III, IV, V, VI, VIII, IX and XI there is no area left for future development whereas in the remaining zones an area of about 1770 ha. is left for future development. There are about twenty-five major drains in CIS and Trans Yamuna areas, which directly falls into the river Yamuna and there are about thirty-eight secondary drains. Mantola nallah is the longest

nallah of the city and covers around one third of the city catchments. Primary and secondary drains/nalas are of mixed type i.e. kutcha and pucca. These drains/nalas are mainly made in brick masonry without plaster and some portion in stone masonry. These drains are heavily silted and broken in many places and are in very bad conditions. (***The lengths of primary and secondary drains are given in Annexure.6***)

**Territory Storm water Drainage**: There are not much tertiary drains in Agra. Tertiary drains are roadside drains, which are missing in majority portion of Agra. These drains are pucca drains (lined in brick and stones masonry).

In addition to the above mentioned status, it is also important to analyze the outlet points of these drains –

**TABLE 3-8: ANALYSIS OF OUTLET POINTS OF DRAINS - AGRA CITY**

| S#. | DRAIN NAME | COVERAGE AREAS | DISCHARGE POINTS |
|---|---|---|---|
| **KACHHA DRAINS -CIS-YAMUNA** | | | |
| 1. | Rajwaha | Rajwada, Sita Ram Colony, New Adarsh Nagar, Ganga Gauri colony, Balkeshwar Road | Routed to STP of capacity 78MLD (Dhandpura STP) and finally discharged into Yamuna river |
| 2. | Balkeshwar | Nagala Thipri, Lohiya Nagar, Balkeshwar Road Nagar, | |
| 3. | Water Works | Kaushal Pur, Bhagwan Crossing, Indra Puri, Suresh Nagar, Nehru Nagar, Mughal Road, Karbala, Nagla Bihari, parts of Kamla Nagar, Sultan Ganj, Langre Ki Chauk, Jeoni Ma, Water works Chauraha crossing | |
| 4. | Krishna Colony | Patel Nagar Road, Laxmi Mill Crossing Krishna colony and Jeoni Mandi | Directly into river |
| 5. | Paliwal | Jewamo Mandi, Bhairon Bazaar, Yamuna Kinara Road | |
| 6. | Bhairon | Nagla Beni Prasad, Gandhi Nagar, Valmiki Basti, Paliwal park Road, Moti LL Nehru Road, Old Vijay Nagar, Ambedkar Nagar, Peer Kalyani, Railway Maal Godam, Wazeerpura Road, Sanjay Place Road, Chimman Lal road, Free Ganj, Ghas Ki Mandi Road, Madar Gate, Belan Ganj, Bhairon Bazaar | Pumped from Bhairon Sewage pumping station into Yamuna river |
| 7. | Belaganj | Joins bhairon Gunj | |
| 8. | Khoja | Jeen Khana, Kala Mahal, Gulab Khana, Kotwali, Gali, Kacheri Ghat, Drum Mandi, Baans Darwaza, Belan Ganj, Chatta Bazaar | Directly into river |
| 9. | Papal Mandi | Maal Ka Bazaar, Peepal Mandi, Ram Chand Gupta Road, Namak Ki Mandi, Daresi, Fountain Chauraha, Chatta Road | |
| 11. | Taj West Gate | Taj Tourist Shopping Complex, Taj Mahal Parking, Sham Shan Ghat, Udhyan nursery | |
| 12. | Taj East Gate | Rajpur, Shamshabad Road, Vashistpuram, Kalindi Vihar Road, Bank Colony, Bagh Rajpur, Pakki Sarai, Lacchipura, Shaheed nagar, Kareem Nagar, Gobar Chauki, Harjupura, Gummat, Purani Mandi, Taj Ganj, Navada, Impeypura, Bagichi Patira, Park Tola, Basai Kalan, Marutam Nagar, Billochpura Tajganj, Telipara, Kohai, Taj East Gate Road | |
| 13. | Mantola | Bichpuri Road, Maghatai Village, Pakka Bagh, Amarapura, Bharatpur road, Manish Nagar colony, Bodla Sarai, Bodla Chauraha, Awas Vikas colony, Kishorpura, Hanuman Nagr, Bhim Nagar, Gadhi Bhadoria, Gopal Pura, Khatena, Alam Ganj, Nauvasta, Sirki Mandi, Gokul Pura, Shankar Garh, Ram nagar ki | Directly into river. |

| S#. | DRAIN NAME | COVERAGE AREAS | DISCHARGE POINTS |
|---|---|---|---|
| | | puliya, Kothi Meena Bazaar, Saket colony, Nai Ki Mandi, Chungi quarters, Mantola area, Hing Ki Mandi, Teela Gaj singh, Mahavir Cinema, Jama Mazjid, Dholi Khar etc. | |
| 14. | Sikkandara | Sikkandara area, Bain Ka bazaar, Gurudwara. | Into river through Kakraita forest |
| 15. | Arjun Nagar | Azampada, Nagla Prithvi, Kedar Nagar puliya, Fatehpur sikhri, Gyaspura, Arjun nagar, Bara Khamba, Sona Nagar, Ajit Nagar, VIP Road, Shyam Nagar, Kheria Road, Kishan Garh, Nagla Chaua, FCI, Sarai Khwaza, Idgah railway station, Idgah colony, Namner Road, Mustafa Quarters area, Prithvi Raj Road, Sultanpura, Cantt. Station Road, Chippitola, Dholikhar. | Disposal into Mantola drain. |
| **KACHHA DRAINS-TRANS-YAMUNA** | | | |
| 16. | Pilakhar | Balaji Nagar, Mahavir Nagar, Mandi Samiti, Peela Khar, Nagla Bihari, Shadara Road, Nunhai link Road. | Routed into STP of capacity 10MLD (Pilakhar STP) and finally and discharged into river |
| 17. | Industrial Estate | Nunhai Road, Industrial Estate | |
| 18. | Motimahal | Motimahal and immediate surrounding areas | Directly into the river. |
| 19. | Ram Bagh | Foundary nagar, Naraich, Agra Hathras Road and Trans-Yamuna colony. | Into STP of capacity 10MLD (Pilakhar STP) and discharged into Yamuna river |
| 20. | Naunihai | Nunhai Industrial estate and surrounding areas | |
| **CONSTRUCTED DRAINS** | | | |
| 21. | Etamad-ud-daula | Nagla Balchand, Naval Ganj, Etmad-ud-daula road, Katra Wazir Khan, Ram Bagh Chauraha Road, Moti Bagh, Seeta Pur. | |

*Source: Agra Nagar Nigam*

**Water Logging Areas:** Agra city witnesses water logging in 26 areas within the city perimeter primarily owing to the topography of the city that records a variation in ground level between 170 m to 150 m; and aggravating the situation is the silting of the drain, unlined drains, dumping of debris and garbage into the open drains & nallah, the roads being below the drains top level which cause the overflow from drains to fill the roads and the low lying areas; the increased impervious areas also add to the worsening of the situation. The water-logged areas (26 numbers) of the city during the rains are: -

1. Sur Sadan & Ram Nagar
2. Vijay Nagar
3. Khandari Chauraha
4. RBS College
5. Nadia Katra
6. Loha Mandi/ Anand Nagar
7. Bhim Nagar
8. Mental Hospital
9. Bipur Bazar Sikandra
10. Kedar Nagar
11. St. John's Chauraha
12. Belanganj Railway yard
13. Mughal Road
14. MALL Road
15. Naripura Road
16. Mustafa Quarters.
17. Seolajat
18. Gopalpura
19. Behind 509 Army Base Workshop
20. Kotli Bagichi & Dewri Road.
21. Subhash Bazar
22. Agra Aligarh Road
23. Etamad-Uddaula Area
24. Naunihai Area
25. Tehri Bagia
26. Hamid Nagar Talaiya

### 3.3.1 Ongoing Interventions for Drainage System

Storm water drainage scheme, which is under execution, is under Taj Trapezium Zone (TTZ) programme. Project for providing drainage system in Sikandra, navalganj, Bhim nagar and Mustfa quarters areas of the city, costing Rs. 5.65 crores. TTZ project was sanctioned by M.M.B. Physical progress worth Rs. 4.42 core has been achieved and the remaining is under progress. Additionally an amount of Rs.0.95 crores has also been sanctioned by M.M.B. for desilting and repairing of four drains namely Paliwal park drain, Mantoal drain, Bhario drain and Taj East Gate drain.

| DETAILS OF PROJECT | COMPONENTS | NOTES |
|---|---|---|
| **Taj Trapezium Zone Drainage Scheme**<br>**Cost – Rs 5.65 Crores** | Drainage System in Sikandra, navalganj, Bhim nagar and Mustfa Quarters Areas | Physical progress worth Rs 4.42 crores |
| **Additional Sanction**<br>**Cost – Rs 0.95 crores** | Desilting and repair of 4 drains - Paliwal park drain, Mantoal drain, Bhario drain and Taj East Gate drain | |

## 3.4 Solid Waste Management Assessment

The Service Level Benchmarks (SLB) established by the Ministry of Urban Development, Government of India, for the sector of Solid Waste attempts to compare the service levels against the eight (8) key parameters as indicated in the spider chart. The spider charts demonstrates the desired level of service in the solid waste sector against the eight (8) key parameters vis-à-vis the existing level of service.

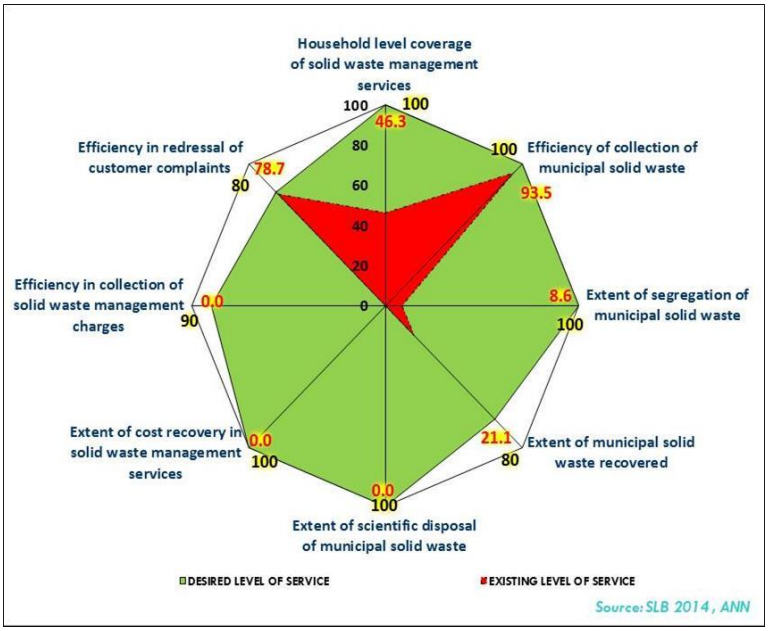



**FIGURE 3-5: SLB FOR SOLID WASTE MANAGEMENT SECTOR - AGRA CITY**

The spider chart denotes that there is merely 46.3% of the household level coverage of solid waste management services, although the efficiency of collection of municipal solid waste is very remarkable 93.5%. Agra Nagar Nigam is required to adopt measures to improve the extent of segregation of waste at source and also the extent of recovery of municipal solid waste. The major areas of concern for the city administration are the cost recovery and efficiency in collection of solid waste management charges and it is also alarming to note that the city lacks scientific disposal mechanism for the municipal solid waste.

### 3.4.1 Solid Waste Generation

The total solid waste generated in the city per ANN is ***824 metric tonnes per day***, translating to ***550 grams per capita per day*** which is higher than the standard/norms prescribed in the Manual on Municipal Solid Waste Management; Ministry of Urban Development & Poverty Alleviation, Government of India;

2000[1] (). The major source of waste generation in the city is the domestic waste and the major waste generation points in the city are Kotwali, Noori gate, and Lohamandi.

**TABLE 3-9: GENERATION OF MUNICIPAL SOLID WASTE - AGRA CITY**

| SOURCE OF SOLID WASTE | SOLID WASTE GENERATED (MT) | % of Total |
|---|---|---|
| Households | 395 | 48 |
| Street Sweepings | 40 | 5 |
| Hotels and Restaurants | 39 | 5 |
| Markets (vegetable markets, mandis etc) | 27 | 3 |
| Commercial Establishments (Institutions etc) | 49 | 6 |
| Other Sources (Construction Debris, Horticulture Waste etc) | 276 | 33 |
| **Total** | **824** | **100** |

*Source: Agra Nagar Nigam*

**Domestic Waste:** The domestic waste is the major source of waste generation in the city. The major waste generation points in the city are Kotwali, Noori gate, Lohamandi. The weighted average house hold waste generation comes to 346 gms/person/day.

**Waste from Commercial Establishments:** There are more than 50000 shops & commercial establishment registered at Nagar Nigam. The commercial areas identified in Agra city are situated throughout the city and include Sanjay Palace, Bhagwan Talkies chaurah, Bijlighar chaurah, Naiki Mandi, Rakabganj, Dayal Bagh Road, Bhagirath Marg etc. These areas are mixed zones comprising of commercial (shops and markets) and residential areas as well as hotels and restaurants. MSW generated from commercial establishment is more recyclable and inert waste compared to organic waste. However a bulk waste like carton etc. is recycled at source and does not add on to total MSW generation.

**Waste from Hotels/ Restaurants/ Banquet Hall:** The waste from these establishments mostly includes left-over food and disposable crockery.

**Industrial Establishments:** There are various small scale and cottage industries in Agra city. Based on observations made by the survey team about these industries, the MSW is primarily generated from Petha and Footwear unit. There are around 500 Petha industry units and are mostly located at Noori Darwaza and Raja Mandi .The Petha waste is biodegradable and about 50% is eaten up by grazing animals. However significant amount of waste is thrown in nallah and nearby secondary collection points. Petha waste includes large quantity of vegetable waste mainly peelings, seeds and fleshy part around the seeds. The situation is worst in the Petha industry area, as the Petha waste attracts flies, mosquitoes and strays

Pigs grazing on the biodegradable petha waste

The solid waste dumped in open areas attracting flies/mosquitoes

too. In some areas the garbage waste is recklessly burnt in open dump yards placed on the main highway road. The total petha waste generated is approximately 39 MT/ Day

The leather and rubber trimming from footwear industry is accounted largely at Mantola, Dholikhar, Khattipara, Azamganj, Gobarchowki, pankisarai, Nai ki Mandi, Shakuntla Nagar, Raj Nagar, khaitana road, gopal pura, Nand pura, Devi road, Mohan pura, Budhvihar, Tila Nand Ram, Kajipara and many other

[1] The norm for the per capita generation is 270 grams per capita per day for cities with population in between 10 lakh and 20 lakh

places. Waste from Large leather and Rubber industry is not prominent but job works done by individuals for larger establishment which are mainly done at cottage level does not practice recycling rather throw waste in open areas or nalas. It was also observed that accumulated waste at open dump or dustbins was burnt in order to reduce the volume when it remains unattended for several days. The total leather and rubber waste estimated at secondary collection point is approximately 80 MT/ Day

**Bio Medical Waste[2]:** There are about 127 private hospitals and about 101 government hospitals and medical offices in the city. The total bed strength reported is about 8000. The medical establishments in Agra city generates approximately 16 MT/ Day waste of which about 8.5 MT/ Day goes to Municipal stream and rest is Bio-medical waste.

**Drain Silt**: There are 25 major drains and 38 secondary drains within the city. The major portions of the drain silt are generated due to the dumping of the household sweepings/ part of the street sweeping in the small drain flowing across the various streets and gullies. The construction and other debris lying alongside the drains also contribute to the drain silts. The drain silt typically comprises dust, household waste, sweepings, construction waste etc. and constitutes about 11.5% percent of the MSW generated in Agra. The total waste estimated from drain silt is 92 MT/day and the average waste generation per km of road length is 112 kgs/ km considering a total road length of 1050 km

**Construction and Demolition Sites**: This waste varies from time to time depending up on the construction or demolition activities in Agra city. A major portion of this waste is generally used in reconstruction activities or for filling up of the low lying areas or kutcha road. Major portion of such waste is dumped at open dump sites and dustbins designated for MSW collection by Nagar Nigam. About 16.1% percent of this waste is collected at these sites and become a part of MSW, disposed-off by ANN. Out of this about 20 MT is being disposed off directly by private operators. Standard practices for disposal of construction waste in Agra city are lacking.

**Recyclables:** The average composition of recyclable waste comprises of paper, textiles, plastics, leather and rubber, glass and metal. Most of the value added recyclable is sold directly to Kabadiwallas. The rag picker community removes most of these recyclables. However the waste from Leather and rubber trimming is not reused and finally dumped in the secondary collection point or find its place in nallas resulting in chocking of drains

#### 3.4.1.1 SLAUGHTER HOUSE WASTE[3]

There is one authorized slaughter house located at Chalesar, Kuber pur in Jamunapar Sanitary ward. Many other unauthorized locations exist in Kajipara, Mantola, Sayedpara, Rawatpara, Mundapara, Khatipara etc. The waste from slaughter houses (skin, horns, and bones) is sold to processing or recycling units, from where it is exported and the remaining waste such as flesh cuttings, gobar etc are thrown away for Nagar Nigam to collect in the respective areas. Waste are also thrown away in various drains like Mantola nalah, Dhakran nallah etc.

[2] According to the CPHEEO guidelines the waste generation by medical institution will be around 1.34 kg/bed/ day of which 75% will be non- infectious i.e., municipal solid waste and 25% will be biomedical waste

[3] The solid waste of slaughter houses can be broadly classified into two categories i.e., vegetable matter such as rumen, stomach and intestine contents, dung, agriculture residues etc., and animal matter like inedible offals, tissues, meat trimmings, waste and condemned meat, bones etc.,. Slaughter house waste contains mostly biodegradable matter


#### 3.4.1.1.1 Ongoing Intervention

ANN is in the process of the preparation of a DPR for slaughter house waste management

### 3.4.2 Solid Waste Segregation

Segregation of waste at source is not practiced in Agra city as per the records of ANN. As per the secondary survey, there are no transfer stations in Agra city wherein waste is segregated before dumping at the final disposal site.

Almost 75-80 per cent of the hospitals segregate the waste while the waste from rest of the hospitals gets mixed with the municipal solid waste. There are a number of notices issued by ANN, Agra Development Authority (ADA) and District Collector to these hospitals regarding the segregation and safe disposal of the hospital waste. ANN is setting up a common facility for treatment of bio-medical waste from hospitals and medical institutions in the city.

### 3.4.3 Solid Waste Collection and Transportation

Household level waste collection is not organized in Agra city. The households and shops do not store the waste at source and most of the waste is thrown on the streets, treating streets as receptacles of waste which has resulted in unhygienic conditions in the city. Owing to the current unhygienic practices, there is a need to sensitize people to change their habit so as to store waste at source, dispose-off the wastes as per the directions of ANN.

#### 3.4.3.1 PRIMARY COLLECTION

The primary collection of waste refers to door to door collection of waste or collection of wastes in the community waste bins either by the resident themselves or by the sanitary workers. Organized arrangement for door-to-door collection of waste is established in 68 wards of the city by the private operator/concessionaire, appointed by ANN under the JNNURM project of Integrated Solid Waste Management. However, the door to door collection has been suspended since September, 2012 by the private concessionaire. Currently, ANN is managing the waste collection through its sanitary workers. Community bins are also not available at convenient locations for depositing the waste. This waste is transported to the secondary waste collection centers by Rickshaw trolley. Currently, ANN is not levying any charges on households for collection of MSW by ANN.

As a general practice, the major portion of residents belonging to the residential establishments dump their household waste outside their homes and in some cases in dustbin (if available), or on the streets (open dumps) or in the drains running in front of the house. The waste from restaurants and shops is also deposited on the streets or thrown into the nalas, open drains, open spaces etc.

The karamcharis / operators collect waste from the various lanes and drains and dump it in the vacant plots or in the open dumps. It was also observed that the condition around the bins is unhygienic and unaesthetic.

The waste from the Petha industry areas like Noorganj is also not collected on daily basis As per National Solid Waste Association of India; the segregation of waste is starting in Ram Nagar and Surya Nagar areas.

#### 3.4.3.1.1 Street Sweeping

The street sweeping operations are inefficient in the city. While one worker sweeps the road, cleans the small drains, a second worker picks up the sweeping, which are kept in heaps by the first one. The sweeping is collected in the traditional wheel barrow which is taken to waste storage points and put either on ground or manually transferred to the dumper placer containers. The total length of roads in the city is 1724 km and each sweeper is entrusted 300-500 metres road length for street sweeping. The working hours of sweepers are 7 hours per day and the work is not carried out on Sundays.

Sweepers are given containerized handcarts and wheelbarrows. There are approximately 800 wheelbarrows and 10 handcarts. For sweeping of streets, sweepers are paid at the rate of Rs.15 per month for buying of the brooms. The brooms used are usually short handled. The various equipments provided to the sweepers are ghamela, spade and collection trays. Besides, the ANN has private sweepers engaged by the contractors in Tajganj ward at the 1 km periphery of Taj Mahal. In some parts of Tajganj ward the street sweeping is being privatized.

### 3.4.3.2 SECONDARY COLLECTION

As part of the secondary collection system, there are about 561 waste storage depots in the city and out of which 225 are the open storage points causing nuisance and unsanitary conditions. The distribution of temporary waste storage point is non-uniform in the city.

**TABLE 3-10: DETAILS OF WASTE STORAGE DEPOTS**

| S# | TYPE OF WASTE STORAGE DEPOT | NUMBER |
|---|---|---|
| 1 | Open Waste Storage Depots | 225 |
| 2 | Masonry Waste Storage Depots | 86 |
| 3 | Dumper Placer Container - 8 cms | 150 |
| 4 | Dumper Placer Container – 4.5 cms | 100 |
| | Total | 561 |

*Source: ANN*

The open transportation system is adopted for carrying solid waste from the temporary storage points to the disposal site. Waste is collected from various temporary storage points and open waste storage depots and loaded to the transport vehicle manually. Manual loading is time consuming and thus reduces the efficiency of the vehicles and manpower deployed for the purpose. The waste is not transported from all the storage points. In some areas like Hariparbat- III, only 22 per cent of the total waste stored in the containers is transported to the disposal site. Further, manual handling of wastes poses threat to the health of Sanitary Workers, as the waste is highly contaminated


TABLE 3-11: WASTE TRANSPORTATION STATISTICS

| VEHICLES | NUMBER OF VEHICLES |
|---|---|
| Tipper – Large | 15 |
| Tipper – Small | 12 |
| Dumper – 8 cu.m | 20 |
| Tractor with Trailer | 15 |
| Total | 62 |

*Source: ANN*

The transport fleet efficiency is only 60 per cent owing to the lack of routine maintenance and repairs leading to frequent breakdowns and shorter life span of the vehicles. About 325MT of waste is transported per day, of the total waste generated in the city (824MT). This backlog creates unsanitary conditions



Under the JNNURM Integrated Solid Waste Management Project, the following equipment and vehicles have been procured to manage the waste collection in the city –

TABLE 3-12: LIST OF EQUIPMENT/VEHICLES PROCURED UNDER JNNURM

| ITEM | CAPACITY | QUANTITY | REMARKS |
|---|---|---|---|
| Metal Bin | 1100 Liter | 855 | |
| Metal Bin | 600 Liter | 400 | |
| Twin Ltr Bin | 150 Liter | 200 | |
| Plastic Container | 30 Liter | 800 | |
| Plastc Bins | | 64000 | |
| Shovels | | 100 | |
| Dust Pan | | 100 | |
| Hand Carts | | 4 | |
| Cycle Rickshaw | | 8 | |
| RC Vehicle | 8 cu.m | 3 | |
| RC Vehicle | 14 cu.m | 3 | |
| RC Compactor | 14 cu.m | 7 | |
| Cattle Lifting Vehicle | | 2 | |
| TATA Ace | 1.7 cu.m | 22 | |

*Source: ANN*

The secondary collection operations have been suspended by the private concessionaire owing to certain unresolved issues with the contract.

### 3.4.4 Solid Waste Treatment and Disposal

The main objective of treatment and disposal is to clear waste from the disposal site in a scientific and environmentally friendly manner with little or no serious implication on the health and hygiene of the micro and macro environment. It is the responsibility of the local body to ensure safe disposal of the wastes generated within its jurisdiction.

The entire waste, which is collected, is taken for dumping to the disposal site at Shahdara near Jarnah nallah on Agra-Firozabad road. The site has also been exhausted and it is quite alarming to note that the vehicles are dumping the waste along the road margins. The disposal is carried out following the method of crude dumping where the waste is neither spread nor covered. In some areas the garbage waste is recklessly burnt in open dump yards placed on the main highway road.

Under JNNURM Integrated Solid Waste Management Project sanctioned in August, 2010, the scientific landfill site is being developed and the works are about 90% complete. The first phase of processing plant with a capacity of 500 TPD has been operational since September, 2011; however, the operations have been suspended since September 2012.

#### 3.4.4.1 ONGOING INTERVENTIONS IN SOLID WASTE MANAGEMENT

| Details of Project | Total Project Cost (Rs in Lakhs) | Total Fund Utilized Rs (in Lakhs) | Components of Project | Progress in Work | Pending Works | Remarks |
|---|---|---|---|---|---|---|
| Integrated Solid Waste Management | 3083.99 | 2015.52 | | | | *18 acres of land to be provided yet* |
| | | | Equipment | Complete | | |
| | | | Vehicles | Complete | | |
| | | | Sanitary Landfill | 90% | | |
| | | | Processing Plant | Ist Phase Complete (500 TPD) | | *Operationalized in September 2012* |
| | | | Drainage system | 20% | 80% | *To be completed when remaining land is awarded* |
| | | | Inner Roads | 80% | 20% | |

Source: ANN

# SECTION B: PRIMARY DATA ANALYSIS

An extensive survey has been conducted, which included primary household surveys, focused group discussions and field visit surveys that are primarily conducted to understand the existing situation of sanitation at household levels both in slum and non-slum areas and identify the key issues and gaps in the sanitation facilities at this level. Surveys have been conducted in the commercial / market areas /schools /institutional areas as well with respect to sanitation services.

According to census 2011, the numbers of slums that are notified are about 378 in number that spread across the city with a population measuring to 40% of the total city population (5,86,000). In addition to these notified slums there are 295 non notified slums that are categorized in low income groups (LIG) in Agra. The non-slum population in Agra constitutes the population spread across HIG, MIG and LIG (inclusive of on-slum) areas. The number of households in slum areas is about 97,667 and those in non-slum areas is 1,46,666 while the population of the city is 14.66 Lakhs.

## 3.5 Sewerage Management and Access to Toilets Assessment

### 3.5.1 Sewerage Management

The different types of individual toilet facilities in Agra city are Gaddewali [4], pour flush toilets, and Kuddi[5].. Kuddi toilets are very prevalent in old Agra areas and the Muslim dominated areas also have large number of similar kind of facilities. Gaddewali is also prevalent in places where there is availability of ample space.

#### 3.5.1.1 SEPTAGE MANAGEMENT

The primary surveys have revealed that approximately 75%of the community toilets are connected to septic tanks as a waste water disposal mechanism, and the sludge that is collected into septic tanks is disposed-off improperly. 80% of the septic tanks are in broken status or over flowing. The table below presents the fecal sludge management situation in the city –

| FECAL SLUDGE MANAGEMENT COMPONENT | CAUSES | PROBLEMS | CONSEQUENCES |
|---|---|---|---|
| ***Emptying + collection*** | | | |
| **Technical** | • Limited or no accessibility to pits<br>• Inappropriate emptying equipment<br>• Manual, non-mechanized emptying | • Overflowing pits<br>• Emptying frequency often very low<br>• Informal or emergency emptying of pits and indiscriminate disposal of FS | ***At neighbourhood level, mainly health hazards from openly dumped FS and through use of contaminated water*** |
| **Institutional/Financial** | • Poor service management<br>• Low affordability of users for service<br>• Lack of information (e.g. on how septic tanks work)<br>• Lack of regulatory framework to adopt the design/construction & management guidelines | | |
| ***Transport*** | | | |
| **Technical** | • Lack of suitable & adequate number of transportation vehicles | • Collectors dump FS in an uncontrolled manner at the shortest possible distance from where FS was collected | ***At municipal level, mainly:***<br>***-Pollution of surface and (shallow) Groundwater***<br>***- Health hazards from use of contaminated surface water (e.g. for vegetable irrigation)*** |
| **Institutional** | • Lack of urban planning - lack of suitable disposal or treatment sites at short distance from the area of FS collection<br>• Lack of involvement of private sector service providers | | |

[4] Gaddewali is a soak pit toilet. A pit like structure is built with measuring 4X4 or 4X6 structure closed by a slab. This gets filled generally in a year or two and is cleaned by the municipal vehicle (sludge sucking machine) and emptied into bigger nalas. This service is rendered on the payment basis

[5] Kuddi is a small structure built on bricks and is directly connected to an open nallah

| FECAL SLUDGE MANAGEMENT COMPONENT | CAUSES | PROBLEMS | CONSEQUENCES |
|---|---|---|---|
| | • Lack of suitable incentive and sanctions structure | | |
| ***Treatment*** | | | |
| **Technical** | • Lack of proven and appropriate treatment options | • Fecal sludge is dumped untreated | ***At municipal level, mainly health hazards through use of contaminated water sources and water pollution*** |
| **Financial/economic** | • Fecal sludge treatment exists but private collectors avoid the paying of treatment fees | | |
| **Institutional/Financial** | • Lack of effective cost recovery<br>• Lack of urban planning<br>• Lack of information | • Non-availability of suitable treatment sites<br>• Discharge of untreated fecal sludge haphazardly | |
| ***Disposal*** | | | |
| **Institutional** | • Lack of implementation of fecal sludge treatment schemes and designation of suitable treatment sites;<br>• Lack of sensitization of public on the adverse impacts of the unhygienic practices<br>• -Lack of promotion and marketing of bio-solids produced in FS treatment | • Indiscriminate dumping of untreated fecal sludge<br>• High-quality bio-solids remain unused and need to be land filled | ***Water pollution and risks to public health and depletion of soil organic fraction and deterioration of soil productivity*** |

## 3.5.2 Access to Toilets

### 3.5.2.1 INDIVIDUAL TOILETS

The primary survey analysis reveals that about 80% of the non-slum households have access to individual toilets. 2.7 Lakh population (30% households) in the non-slum areas have gaddewali type of toilets, while yet another 2.7 lakh population (30% households) have pour flush toilets and about 1.8 lakh population (5% of households) have kuddi toilets.

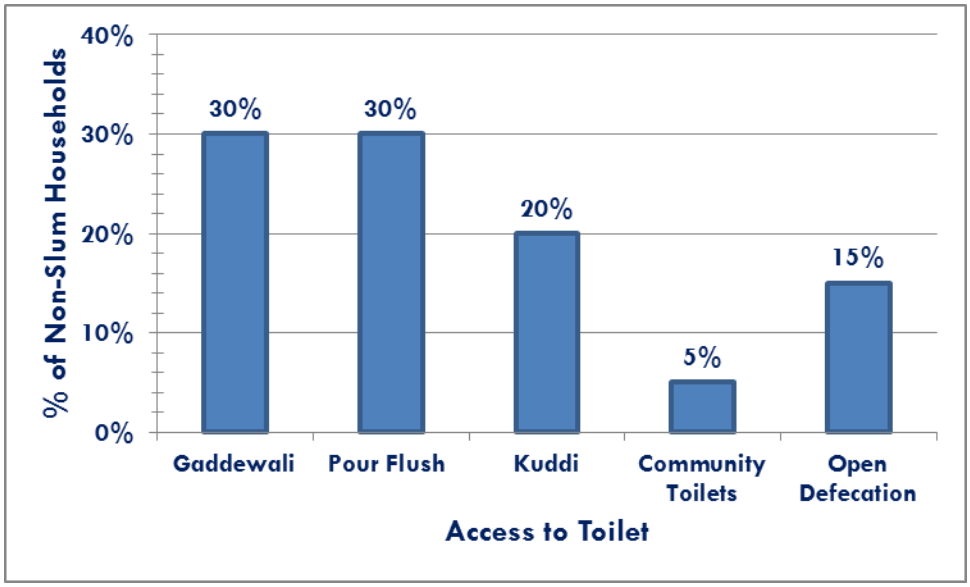


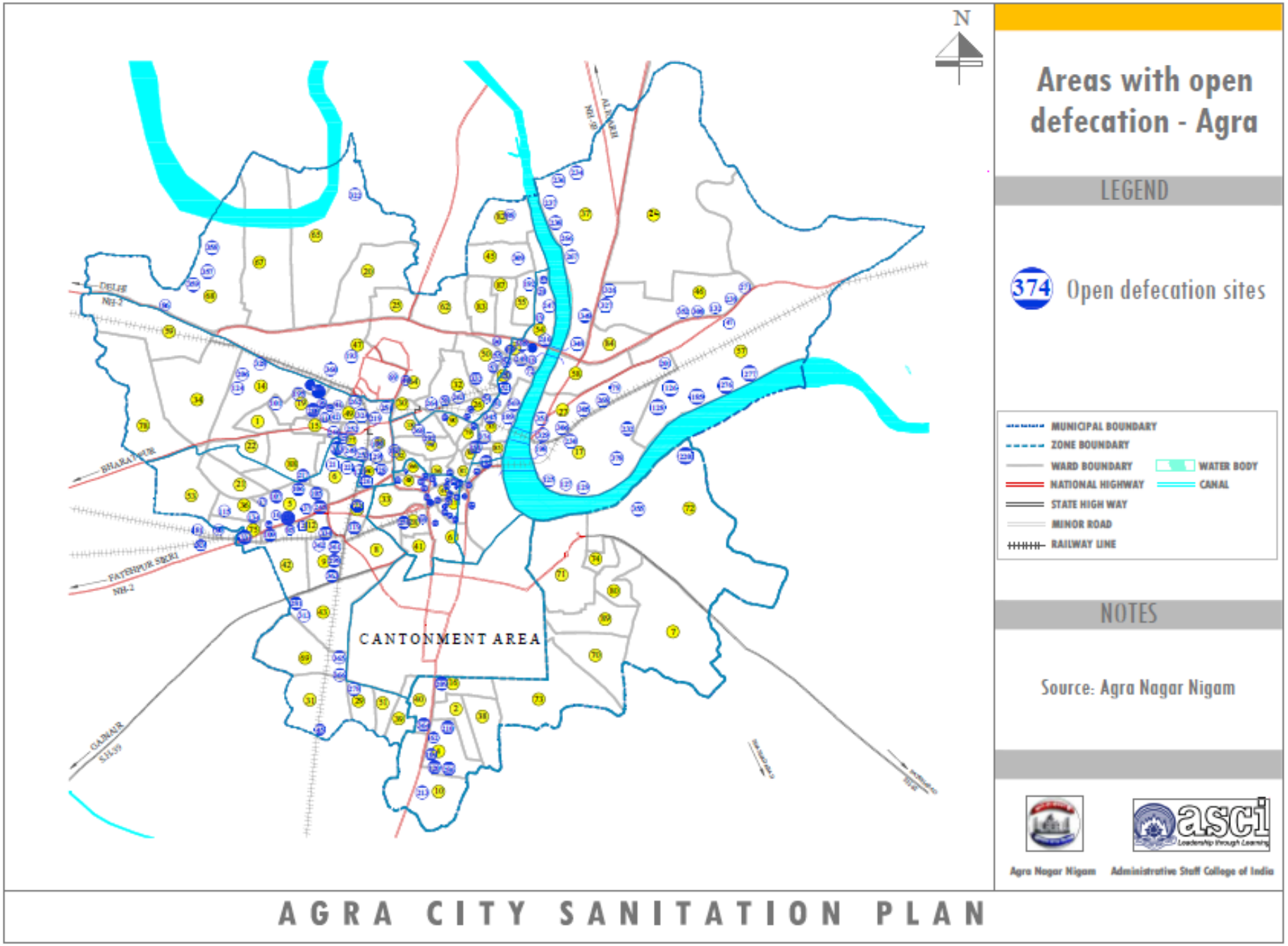

FIGURE 3-6: PERCENTAGE DISTRIBUTION OF NON-SLUM HOUSEHOLDS PER TYPE OF TOILETS

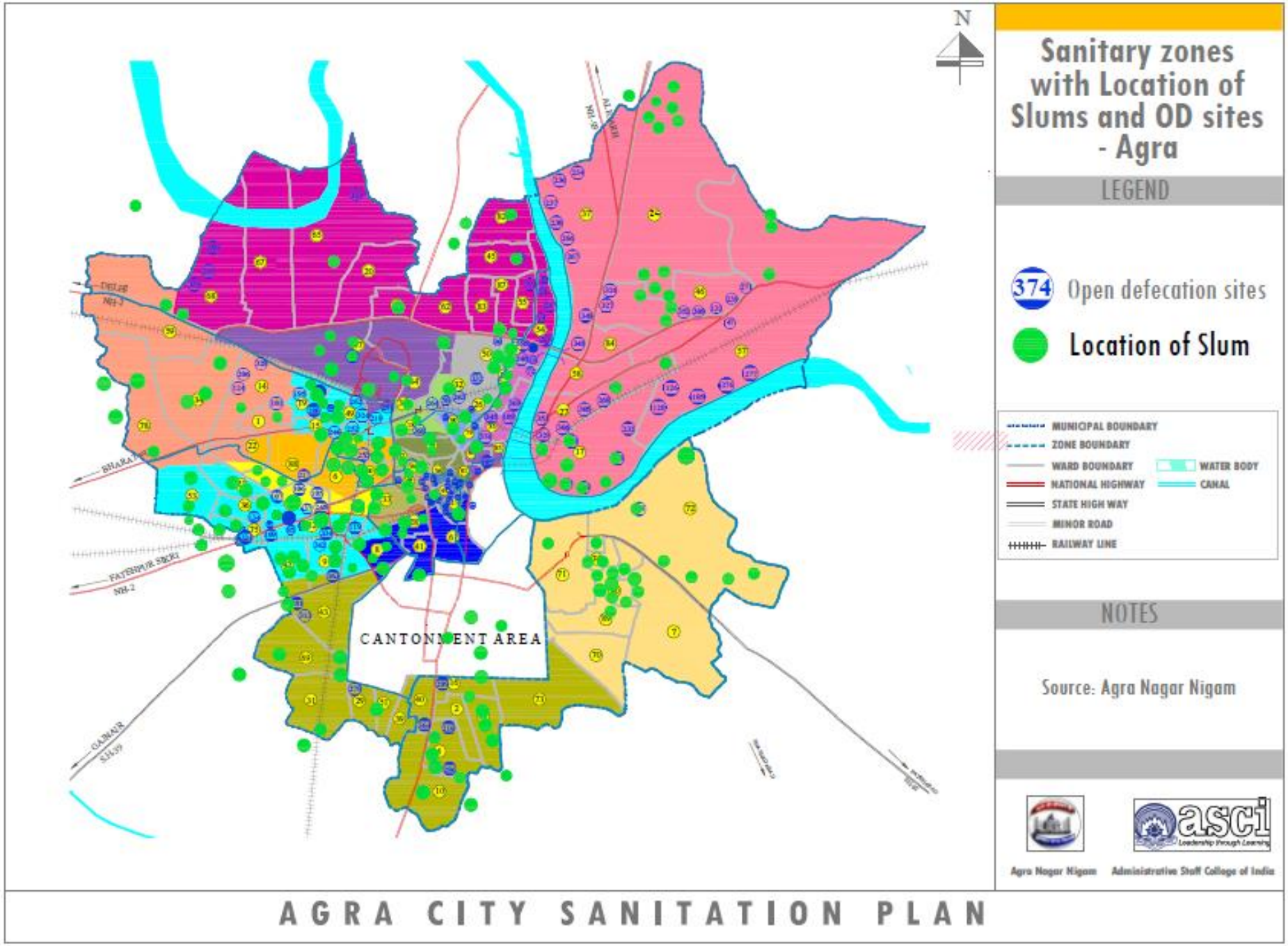
There is about 15% of the total number of households that do not have any kind of access to toilets i.e. about 22 thousands of households i.e. about 1.32 lakh of population in non-slum areas defecate in the open. This is owing to the presence of non-notified slums / low income group households/ population categories into non slum regions and location of low income groups along Yamuna River

Further considering the sanitation facilities in slum areas, it has been observed that the access to individual toilets is very poor and the usage of community toilets is very prevalent in slum areas. The different types of toilets at individual level in slum areas that are most prevalent are pour flush toilets, Kuddi, Gaddewali/ soak pit and community toilets.. The pour flush type of toilets at individual level includes the individual toilets provided by ILCS, BSUP, Vambey and Kanchiraman. The below is the list of individual toilets provided by each agency at slum household level.

| | | | |
|---|---|---|---|
| ILCS – 1750 | BSUP – 1200 | Vambey – 1500 | Kanchiraman – 1500 |

The total percentage share of slum households having access to pour flush toilets are about 22%. In addition to this, there are about 12% of individual households having access to private soak pits and about 20% of the total slum households have access to Kuddi type of toilets. About 26% of the slum population defecates in the open. Open Defecation sites and slum have demarcated in the given map.


N
Areas with open defecation - Agra
LEGEND
374 Open defecation sites
MUNICIPAL BOUNDARY
ZONE BOUNDARY
WARD BOUNDARY
WATER BODY
NATIONAL HIGHWAY
CANAL
STATE HIGH WAY
MINOR ROAD
RAILWAY LINE
NOTES
Source: Agra Nagar Nigam
Agra Nagar Nigam
Administrative Staff College of India
CANTONMENT AREA
DELHI NH-2
BHARATPUR
FATEHPUR SIKRI NH-2
GWALIOR S.H.39
AGRA CITY SANITATION PLAN


N
Sanitary zones with Location of Slums and OD sites - Agra
LEGEND
374 Open defecation sites
Location of Slum
MUNICIPAL BOUNDARY
ZONE BOUNDARY
WARD BOUNDARY
WATER BODY
NATIONAL HIGHWAY
CANAL
STATE HIGH WAY
MINOR ROAD
RAILWAY LINE
NOTES
Source: Agra Nagar Nigam
Agra Nagar Nigam
Administrative Staff College of India
CANTONMENT AREA
AGRA CITY SANITATION PLAN

### 3.5.2.2 COMMUNITY TOILETS

#### 3.5.2.2.1 Access

The primary survey findings have established that nearly 20 – 25% of the total households uses community toilets. There are about 117 community toilets with about 96% of them located in slum areas and the rest in non-slum regions i.e. in low income group areas (non-notified slums).

Further to this, from the primary survey analysis and field verification the total number of seats available in any community toilet, on an average, is about 20 seats. And the total number of users per day per seat is about 35 persons. This shows that the total numbers of persons dependent on community toilets are about 82000.

In addition to the above mentioned analysis, the primary survey results also focused on type of latrine available in these community toilets. It is alarming to note that 33% of the community toilets in Agra city are still in the categories of service latrines; Un-improved pit latrines and the dry-pit latrines. These conventional types of latrines pose issues of fecal sludge and effluent waste management thereby creating unhygienic conditions

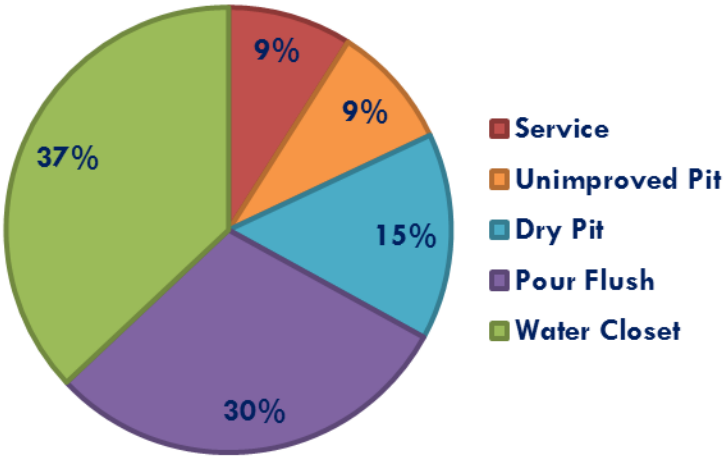



FIGURE 3-7: TYPE OF LATRINES - COMMUNITY TOILETS

#### 3.5.2.2.2 Condition of Toilets

The primary survey analysis demonstrates that about 50% of the available community toilets are in bad state. The infrastructure facilities in most of these toilets are in broken condition; however, due to absence of sanitation facilities at household level the people are still dependent upon these community toilets which suffer from inefficent operation and maintenance of these toilets

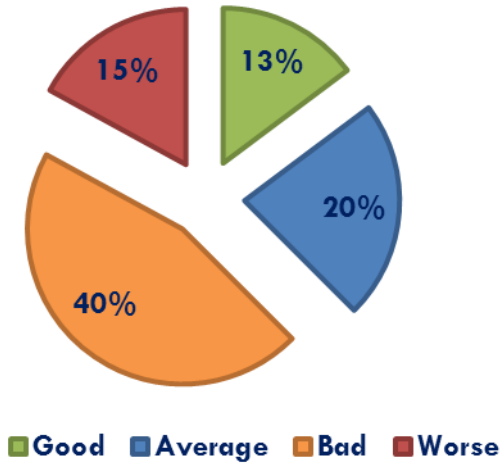



FIGURE 3-8: PERCENTAGE OF COMMUNITY TOILETS - CONDITION-WISE

Bad Condition of Community Toilets

#### 3.5.2.2.3 Operation & Maintenance of Toilets

The operation and maintenance (O&M) of the community toilets is an adhoc process and is not institutionalized in the city of Agra. Moreover, the responsibility of O&M is dispensed amongst several government bodies, private agencies and NGOs – SISSA, ANN, DUDA, Jal Nigam, NEDA, Nagla Teja etc. It has been recorded during the primary surveys that SISSA and NEDA have good O&M systems in place and all the community toilets in their jurisdiction are in good state

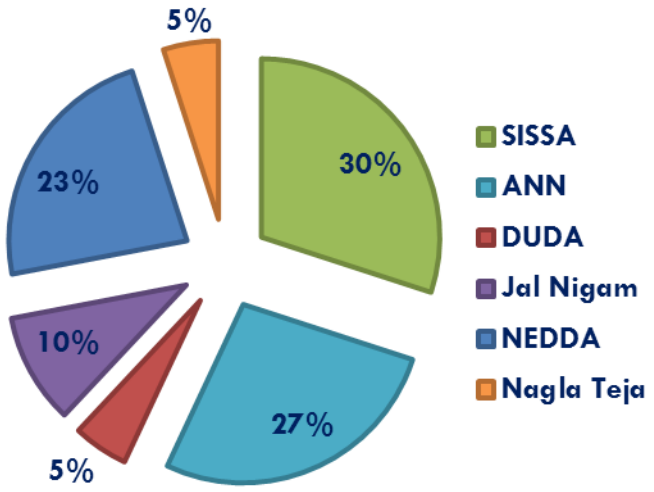



FIGURE 3-9: AGENCIES INVOLVEMENT IN O&M OF COMMUNITY TOILETS

#### 3.5.2.2.3.1 Cleaning of the Toilets

The primary survey analysis indicates that about 40% of the community toilets are cleaned regularly i.e. at least once a day. Further, about 15% of them are cleaned at least once a week. And about 45% of them are not at all cleaned.

Owing to heavy traffic of users due to limited number of community toilets in certain areas, even the frequent cleaning does not ensure the desired standards of hygiene

#### 3.5.2.2.3.2 Fecal Sludge and Effluent Management

The analysis on the access to a system for the collection of the fecal sludge and effluent reveals that about 75% of the community toilet facilities are connected to septic tanks, and the fecal sludge collected from the septic tanks by the municipalities or private sludge sucking machine is emptied into the open nallahs which ultimately lead into Yamuna river. Manual scavenging is still practiced in the city and approximately 5% of the community toilets are managed through it. The surveys also indicate the bad condition of the septic tanks; approximately 80% of the septic tanks are broken and they are overflowing creating unhygienic conditions. This shows that there is a serious problem of fecal sludge management of the community toilets.

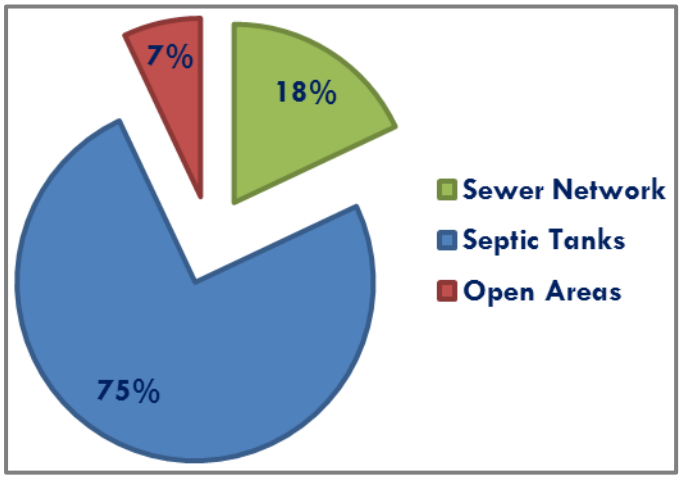



FIGURE 3-10: FECAL SLUDGE MANAGEMENT - COMMUNITY TOILETS

In addition to the above mentioned sludge management, there is also effluent waste that is generated from the community toilets which also require proper disposal mechanisms. The analysis shows that about 98% of the community toilets have no proper effluent waste management. The effluent is discharged into open drains.

## 3.5.2.3 TOILETS AT COMMERCIAL AND MARKET PLACES

### 3.5.2.3.1 Access to Toilets

The primary survey analysis shows that only 55% of the commercial/ market places provide some kind of toilet facilities within the complex and 45% of them do not maintain any toilet facilities. The analysis shows that within 57% of the commercial/ market places with toilet facilities, the number of seats range between 1-5.and within 38% of the commercial/ market places with toilet facilities, the number of seats range from 6-10. 5% of the commercial places have only urinals in their complex/ shop.

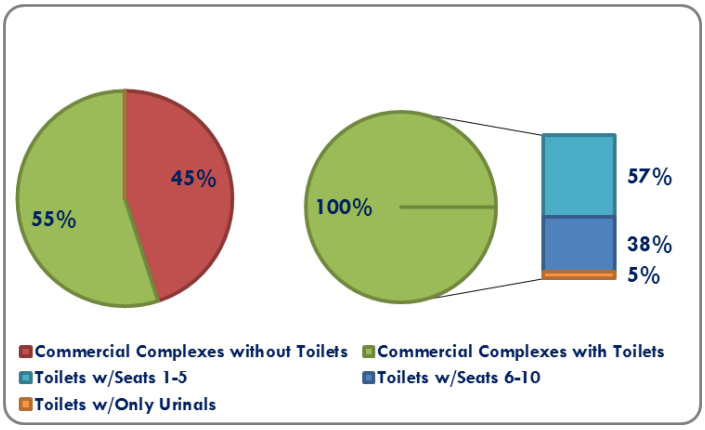



FIGURE 3-11: TOILETS IN COMMERCIAL COMPLEXES

The total number of seats available in the toilets is inadequate when compared to the total number of workers and customers in these commercial and market places driving the workers/customers to use public/community toilets as well as defecate in the open. It can be inferred that there is certain dependency on public toilets/community toilets while there is observance of open defecation practices as well in these areas.

### 3.5.2.3.2 Condition of Toilets

The surveys established the bad condition of toilets which force the workers to utilize the public toilets or defecate in the open. Even the customers prefer to use the public toilets than use the complex toilets owing to the bad condition of toilets.

### 3.5.2.3.3 Operation and Maintenance of Toilets

#### 3.5.2.3.3.1 Fecal Sludge Management

The survey analysis indicates that 70% of the commercial complex toilets are connected to septic tanks for their sludge management. The sludge that is accumulated in these tanks is cleared once in every 9 months by the municipality or private vehicle and the waste is disposed off into the open nallas. Further to this, it was noticed that there are very few toilets connected to sewer lines and the remaining toilets discharged the effluent and disposed the sludge directly into the open drains. Hence, there is an urgent need for the provision of proper disposal system in these commercial areas and market places..

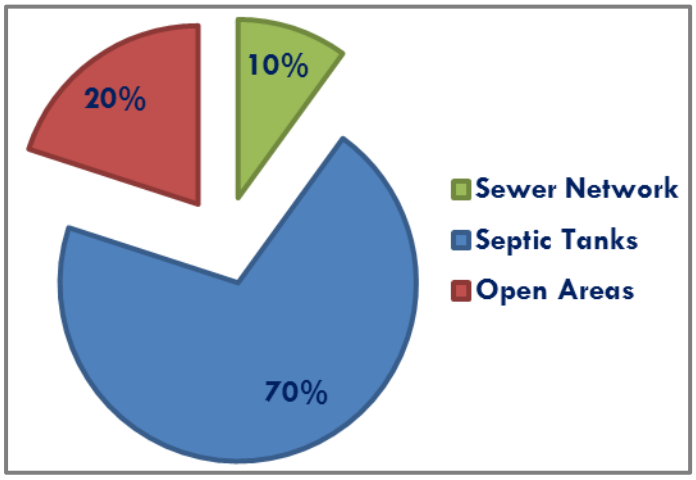



FIGURE 3-12: FECAL SLUDGE MANAGEMENT - TOILETS IN COMMERCIAL COMPLEXES

#### 3.5.2.3.3.2 Payment Arrangements

The surveys show that only a fewer amount of shopkeepers/workers who are willing to pay any amount for the use of toilets. Further, it is also analyzed in case of willingness to pay; the respondent's preferred monthly passes to pay-per-use i.e. about 65% of the respondents are willing to take monthly passes for using the public toilets (who do not have any access to toilets). 70% of them have indicated that the acceptable charges for the monthly passes would be INR 20–30 per month and about 20% have expressed their willingness to pay only less than INR 20 per month and the remaining 10% of the shopkeepers/workers are willing to take monthly passes ranging in between INR 30–40 per month.

The survey analysis further shows that only a mere 39% of the customers and visitors are willing to pay for the usage of toilets and the indicative amounts are INR 2–3 per usage.

### 3.5.2.4 TOILETS IN THE INSTITUTIONS

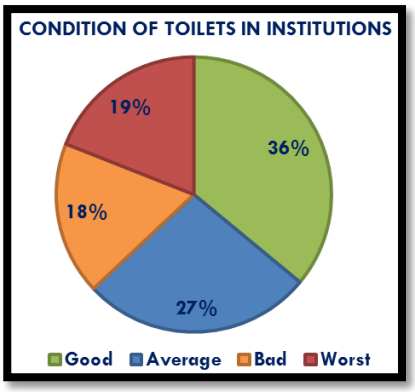
Institutional buildings constitute one of the potential area where the provision of toilets is a must. The floating population in the buildings such as B.S.A office, Sadar Tahasil, D.M office, J.S.P Sansthan, R.B.S College – (B.E.D), Agra Nagar Nigam, K.M.I (B.R.A University), I.S.B.T Bus stand, Bijili Ghar Bus Stand and so on., is very high. There is some provision of toilets to general public in all these public institution buildings, but the Bijili Ghar Bus Stand and eth Sadar Tahasil building do not have any kind of sanitary facilities either for employees or for the general public within the building premises. In addition to these two institutional buildings, ITI building also lacks toilet facilities. It is also important to understand the present condition of existing toilets at these public buildings.

#### 3.5.2.4.1 Access to Toilets

There is some provision of toilets to general public in all these public institution buildings; In addition to provision of sanitary facilities to general public, toilets are also provided to employees in all these institutional buildings. The provision of toilets are provided both to male and female category separately with sufficient number of seats i.e. on an average, ranging from 10 – 15 seats for male category and 5 – 10 for seats for female category

#### 3.5.2.4.2 Condition of Toilets

The analysis results show that the toilets in 53% of the institutional buildings are in fairly good condition. However, the toilets in the remaining 47% are in bad condition while in 19% of the institutions, the toilets are in unusable condition even though the usages of these toilets are very high. In spite of the bad conditions of these toilets, public still use them in case of emergency due to lack of alternate toilet facilities in nearby premises.




#### 3.5.2.4.3 Operation and Maintenance of Toilets

##### 3.5.2.4.3.1 Supporting Infrastructure

The analysis shows that all the toilets are facilitated with water supply, doors and buckets; but, there are only 70% of the institutional toilets with electricity connections. The source of water facilities in these toilets are mainly overhead tanks i.e. municipal water and ground water.

##### 3.5.2.4.3.2 Cleaning of the Toilets

The field studies and discussions revealed that only 70% of the toilets are maintained well with good and frequent cleaning practices while 30% of the toilets are not maintained as per the desired standards.

### 3.5.2.5 TOILETS AT SCHOOLS

Assessment of school sanitation should be sectors where the considered a priority activity. The primary survey has been conducted at school level to understand the sanitary conditions of schools (***Please refer to Annexure 7 for the list of schools surveyed***). It is interesting to note that the student population is dominated by the majority strength of boys when compared to girls, while the teacher's population witnesses a greater strength of female teachers than male teachers, so is the case of working population at schools which is dominated by female workers. The provision of separate toilets and the seat availability should be proportionate to the male and female populations.

#### 3.5.2.5.1 Access to Toilets

The analysis shows that 85% of the schools provide separate toilet facilities for the girl students/female teachers and 80% of the schools have provision for the boy students/male teachers. The student/teacher population of the remaining 15% of the schools that do not have any kind of toilet facilities resort to open defecation


#### 3.5.2.5.2 Condition of Toilets

The primary survey analysis shows that there are about 90% of the schools with toilets are in working conditions. The field analysis and survey results show that the non-functionality of the school's toilet can be categorized as damaged doors, no ventilation and the toilet itself is in dilapidated state. These are the observed problems that make the available toilets unusable

#### 3.5.2.5.3 Operation and Maintenance of Toilets

##### 3.5.2.5.3.1 Supporting Infrastructure

Field studies have indicated that toilets in 40% of the schools with toilets have electricity connections and 70% of the schools with toilets have functional water connections. 38% of the schools have wash basin facilities in the toilets.

The sources of water supply that cater to the needs in the school are bore wells, tankers and municipal water. The analysis shows that about 55% of the schools depend upon bore well as the prime source of water supply and about 28% on municipal water. There are about 16% of schools who do have any kind of source of water supply. Alternatively, all the school students generally bring water from home and about 80% of them go to neighbors in case of emergency. 90% of them do have some kind of storage facilities in the schools; however, 10% of the schools have no water storage facilities. The different types of water storage facilities in schools are overhead tanks, underground sumps and filling of barrels/drums.

##### 3.5.2.5.3.2 Cleaning of Toilets

The survey analysis and field verifications show that 84% of the functional school toilets are cleaned at regular intervals and it is ensured that they are cleaned at least once in a day. There is lack of regular cleaning practice in the remaining 16% of the toilets.

##### 3.5.2.5.3.3 Budget Allocation

The field survey analysis has revealed that nearly 80% of the school's O&M is carried out by the school employees themselves and the rest is taken care by the government. Further, the amount allocated for the

O&M of school by government is in the range of INR 3500 – 5000 per annum. However, the budget allocation is not exclusive for the toilets maintenance, rather includes the overall school maintenance which barely meets the requirements for any kind of developments or improvements of toilet facilities in these schools.

Based on the above mentioned budget allocation and responsible agents for O&M, there are about 85% of the schools who could facilitate few improvements to the toilets during the last 3 years. The improvements executed have been related to fixing up the doors, fixing up the water connection, painting of walls and doors, flooring, and cleaning at regular intervals. The field investigations have established that majority of schools with toilets have further improvements to be executed to avoid further damage.

## 3.6 Assessment of Water Bodies

This section discusses the impact of urbanization on the natural environment with special focus on water bodies and the resulting deterioration in urban environment quality perceived in the city.

The main source of water for Agra town is River Yamuna. River Yamuna water is however highly polluted, hence it is first treated and then supplied for drinking purposes through the existing water works and the associated distribution system. River Yamuna , which serves as a sewage conduit for towns along its banks, remains seriously polluted even after the implementation of the Yamuna Action Plan Phase-I. The following below shows the pollution level of Yamuna River.

| PARAMETERS | CPCB STANDARDS OF RAW WATER SOURCE FOR PUBLIC USE AS PER IS: 1982 | 2002 | | 2003 | | 2004 | | 2005 | | 2008 (TILL APRIL) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MIN. | MAX. | MIN. | MAX. | MIN. | MAX. | MIN. | MAX. | MIN. | MAX. |
| PH | 6.5 - 8.2 | 7.9 | 9.4 | 7.3 | 9.5 | 7.8 | 9.4 | 7.1 | 9.1 | 9.8 | 10.12 |
| D.O. | >4 mg/l | 0 | 16.5 | 1 | 15 | 1.5 | 14.8 | 2.6 | 12.8 | 4 | 15.8 |
| B.O.D | <3 mg/l | 4.2 | 32 | 4 | 26 | 6 | 28 | 2.2 | 38 | 3.2 | 40 |
| C.O.D | <10 mg/l | 14.7 | 102 | 21.6 | 68 | 20 | 64 | 20 | 72 | 30 | 72 |
| AMMONIA | <1.0 mg/l | - | - | - | - | 4.4 | 40 | 0.6 | 40 | 14 | 42 |
| CHLORINE DEMAND | | 6.2 | 56.7 | 9.2 | 47.2 | 13.2 | 134 | 7.5 | 141 | 59.7 | 125 |
| MPN INDEX/100 ML | ≤5000 | $120*10^3$ | $2400*10^3$ | $70*10^3$ | $310*10^3$ | $110*10^3$ | $240*10^3$ | $7*10^3$ | $160*10^3$ | $10*10^3$ | $180*10^3$ |

Nagar nigam has 41 listed pokhars/ponds (***Refer to Annexure 8***) of different sizes. These water bodies comprising an area of about 0.45 sq.km (41.45 bighas) are spread in four revenue wards namely Lohamandi, Hariparvat, Chatta and Tajganj. Revenue wards in central and south-western area of nagar nigam are almost devoid of water bodies. Out of these 41 water bodies 13 ponds have either been fully or partly encroached or filled by earth. Example of such natural ponds are Tota ka Taal, Guru ka Taal. 28 ponds comprising 0.37 sq.km (34 bighas) are still available in the pond form itself. There is urgent need of protection / beautification / conservation of 36 (including the 8 partly filled ones) ponds. Water bodies also exist in Paliwal Park and Sardar Patel Park

In addition to the surface water being polluted, the ground water is also being polluted due improper usage and over exploitation. The western parts of Uttar Pradesh are characterized by deeper water levels ranging from more than 30mbgl, as noticed in most part including Agra. The water levels have shown a declining trend over the last two decades due to over exploitation of the ground water resource. The water level declining trends in these blocks are about 30 to 55cm/year in either pre or post monsoon period or both. Based on the draft report by the Central Ground water Board, U.P. Northern region the available ground water resource in Agra was 109269.50 ha.m. There are some places identified by the department for rain water harvesting in the city

**TABLE 3-13: AREAS IDENTIFIED FOR RAIN WATER HARVESTING - AGRA CITY**

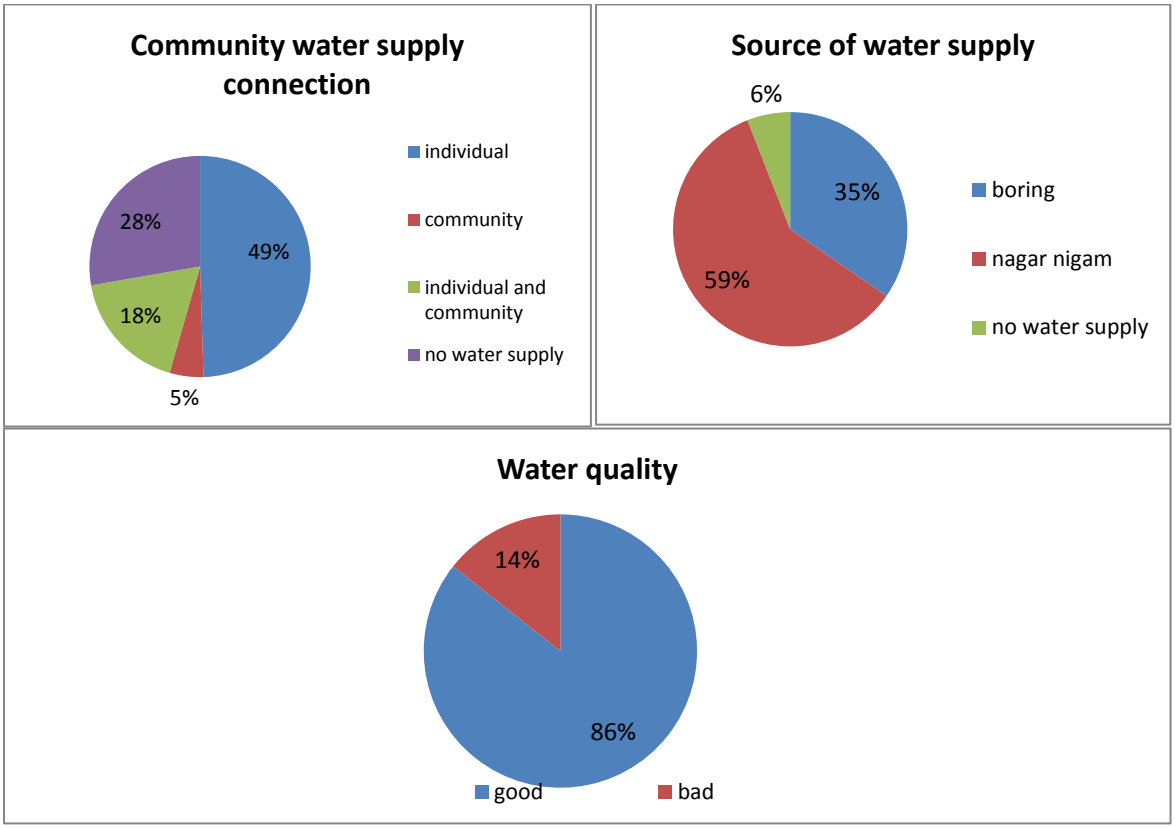
| NAME OF ZONE | AREA COVERED (HA) | AREA FOR WATER HARVESTING (HA) | PLACE / LOCATION |
|---|---|---|---|
| ZONE I (KARMYOGI) | 375.67 | Nil | Nil |
| ZONE II (DAYAL BAGH) | 2436.5 | 100.42 | Dayal Bagh |
| ZONE III (SHASHTRIPURAM) | 2436.5 | 4.72 | Guru Ka Taal |
| | - | 63.66 | Sikandra Tomb |
| | 136.37 | 45 | Sikandra road drain / Mathura road drain |
| ZONE IV (CITY) | 937.40 | 2.33 | Paliwal Park |
| | - | 19.75 | District Jail |
| | - | 13.0 | Van Chetna Kendra |
| | - | 17.57 | RBS Agriculture College |
| ZONE V (MANTOLA) | 37.85 | 7.85 | Sardar Patel Park |
| | - | 35.46 | Fort |
| | - | 7.16 | St. Joseph Girls College |
| | - | 517.00 | 509 Army Base |
| | - | 13.66 | Agra Club, Stadium, CTO, GPO |
| ZONE VI (TAJ) | 931.01 | 76.07 | Taj and adjoining area |
| ZONE VII (KHERIA AIR BASE) | 2629.08 | 891.08 | Air Base |
| ZONE VIII (NARIPURA & DEWARI ROAD) | 1971.5 | 115/112.59 | Dewri Road Drain / COD |
| ZONE IX (TAJ NAGRI PHASE II) | 935.45 | Nil | Nil |
| ZONE X (FOUNDRY NAGAR | 786.67 | Nil | Nil |
| ZONE XI (PEELAKHAR) | 505.9 | Nil | Nil |

*Source: ANN*

# SECTION C WARD LEVEL SANITATION ANALYSIS

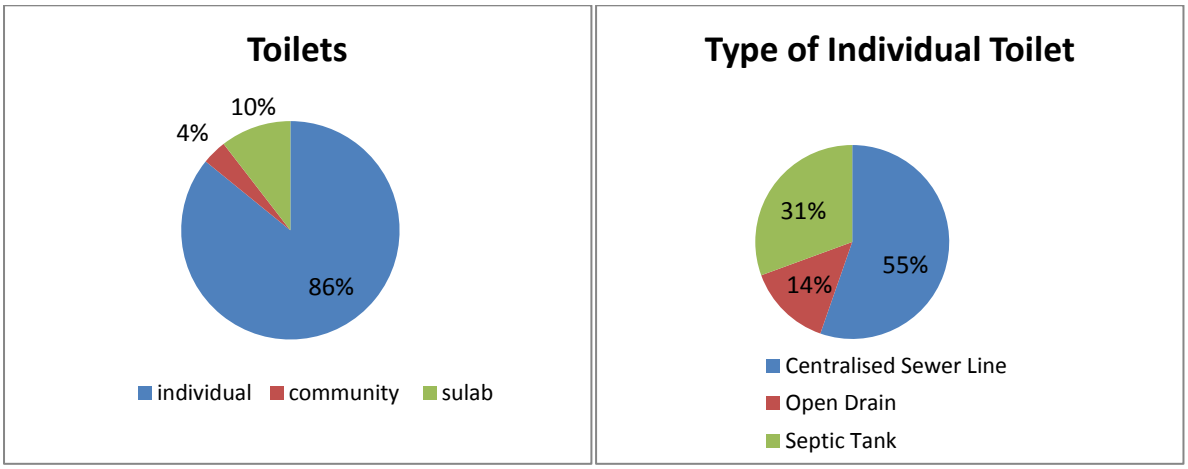
## 3.7 Water supply

As per the survey analysis the city of Agra had 50% of its households are having individual water supply connection and 5% of the households are using community water taps while 18% of the households having access to both individual and community and 28% of the households are not having any access to water supply, however 59% of the city's water supply is from Nagar Nigam of Agra while 35% of the water supply is from borings, 86% of the people which are having access to water supply are satisfied with water quality



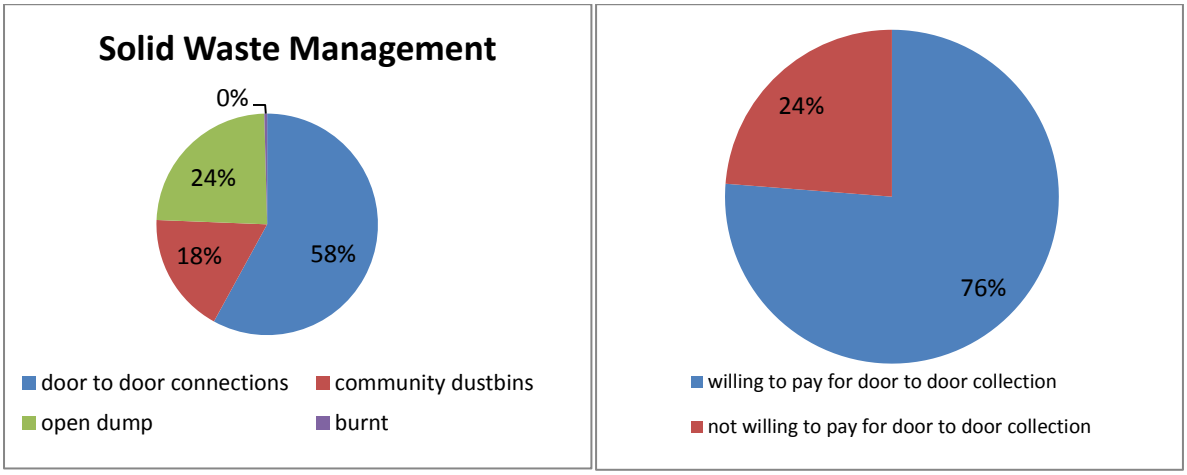

## 3.8 Toilets

As per ward survey analysis about 55% of the households which are having individual toilets are using the Centralized Sewer System While only 31% of the households are using the septic tanks and 14% of the households are using the open drains



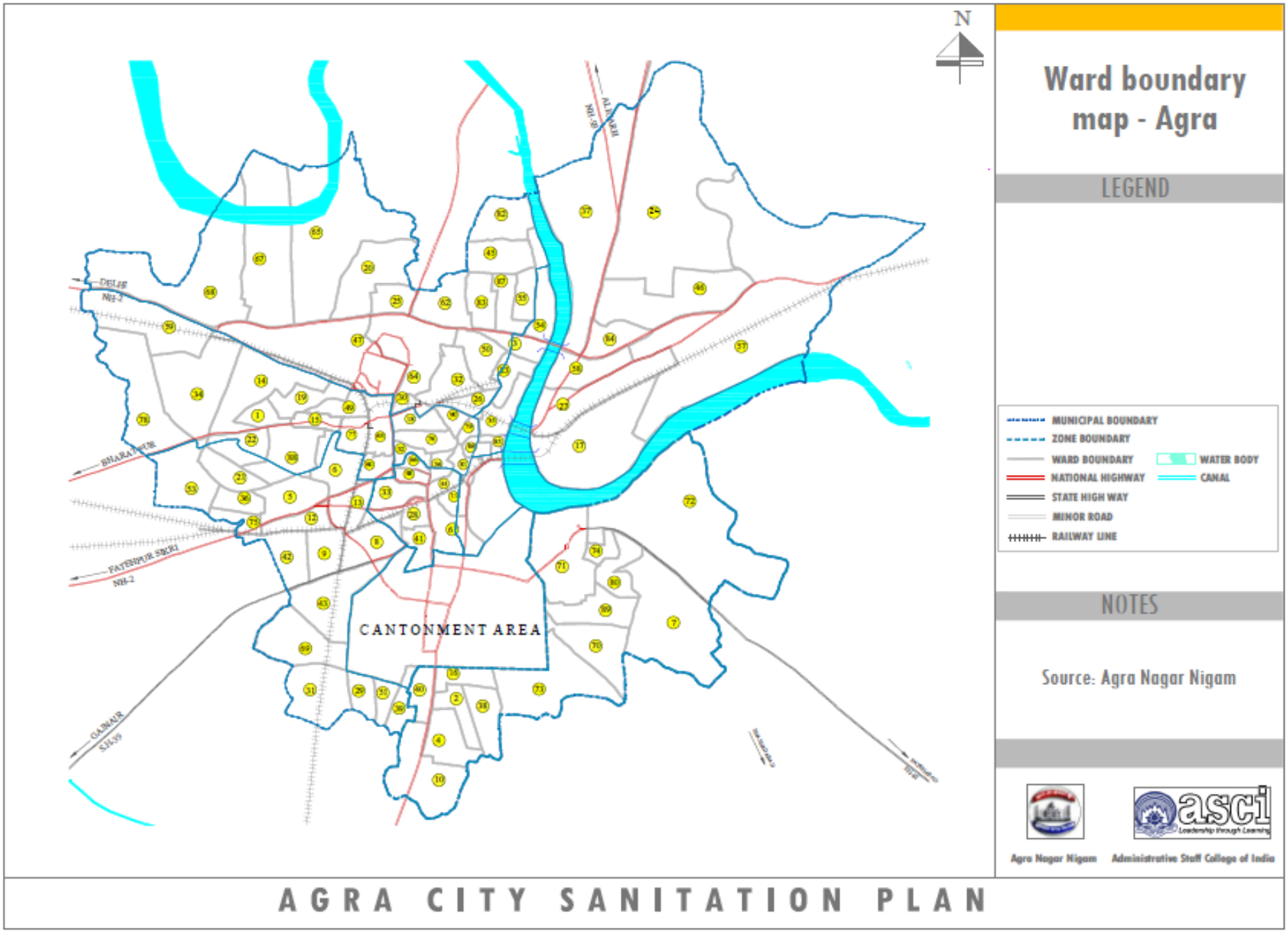
## 3.9 Solid Waste Management

As per the survey analysis 58% of households in Agra city are using the door to door solid waste collection and 18% of the households are dumping the solid waste on the sides of the roads




For further information please refer detail ward analysis given in separate Annexure document

And also ward boundaries are given in the below map-


N
Ward boundary map - Agra
LEGEND
MUNICIPAL BOUNDARY
ZONE BOUNDARY
WARD BOUNDARY
WATER BODY
NATIONAL HIGHWAY
CANAL
STATE HIGH WAY
MINOR ROAD
RAILWAY LINE
NOTES
Source: Agra Nagar Nigam
CANTONMENT AREA
DELHI NH-2
BHARATPUR
FATEHPUR SIKRI NH-2
GWALIOR
HERITAGE
Agra Nagar Nigam
Administrative Staff College of India
AGRA CITY SANITATION PLAN

# CHAPTER 4. INSTITUTIONAL AND FINANCIAL ANALYSIS

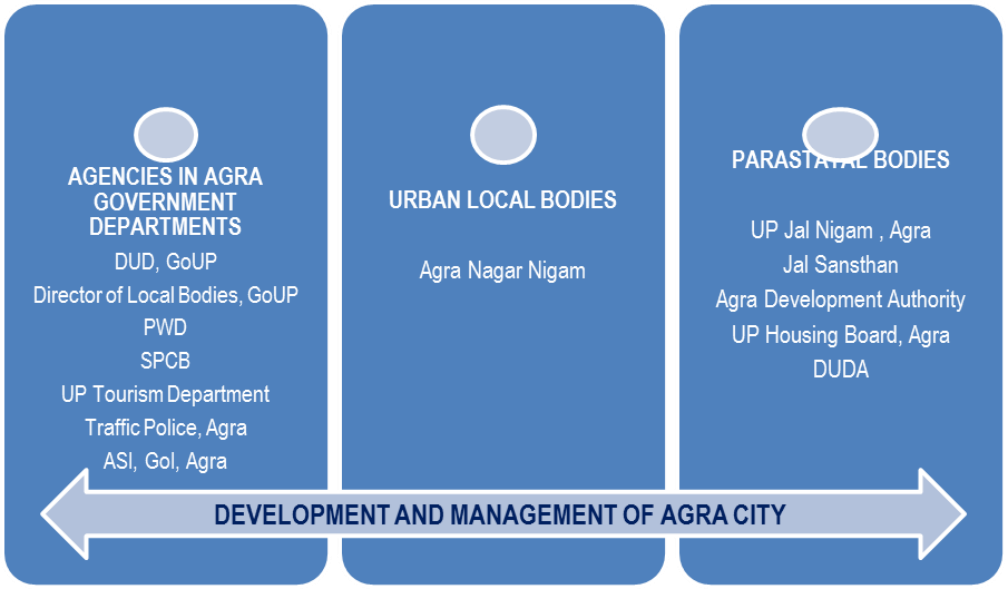
Topics of Discussion

- Institutional Capacity Assessment
- Financial Assessment

## 4.1 Institutional Capacity Assessment

In Agra, the growth in urban population from 1991-2011 as well as the rising tourist population has put tremendous pressure on urban infrastructure demand such as water supply, sewerage and access to toilets, storm water, solid waste etc. Urban areas are the engines of economic growth. The quality of civic infrastructure and civic services has a critical bearing on economic development of the city and the state as a whole. The 74th amendment to the constitution devolved the role of management and development of the city to the elected representatives of the city through the city's Urban Local Body (ULBs). Hence the ULBs are both the custodians of civil infrastructure and providers of civic services. Thus, ULBs are catalysts of economic growth of a city.

The civic administration in the city of Agra is in the jurisdiction of the Agra Nagar Nigam. However, the management of a large city like Agra is a complex task and several institutions and parastatals are involved in it. Some of these have been established through acts of the state legislature while the others are a part of the state government administrative machinery.




The primary responsibility of providing water supply and sanitation rests with state government and more specifically with municipal government. UP Jal Sansthan (UJS) deals with water supply and sewerage system while Agra Nagar Nigam (ANN) deals with social infrastructure such as education, public health and medical services.

### 4.1.1 Functions of Local and Parastatal Bodies

The UP Municipal Corporation Adhiniyam, 1959 as amended from time to time provides for majority of the function listed in the 12th schedule of the constitution. Few major functions are listed below -

- Urban planning including town Planning
- Regulation of land-use and construction of buildings
- Planning for economic and social development

- Water Supply for domestic, industrial and commercial purposes
- Public health, sanitation, conservancy and solid waste management
- Urban forestry, protection of the environment and promotion of ecological aspects
- Safeguarding the interests of weaker sections of the society, Slum improvement and up gradation
- Provision of Urban amenities and facilities such as parks, gardens, playgrounds
- Promotion of cultural, educational and aesthetics aspects
- Public amenities including street lighting, parking lots, bus stops and Public Conveniences
- Regulation of slaughter houses and tanneries
- Roads and Bridges

#### 4.1.1.1 AGRA NAGAR NIGAM (ANN)

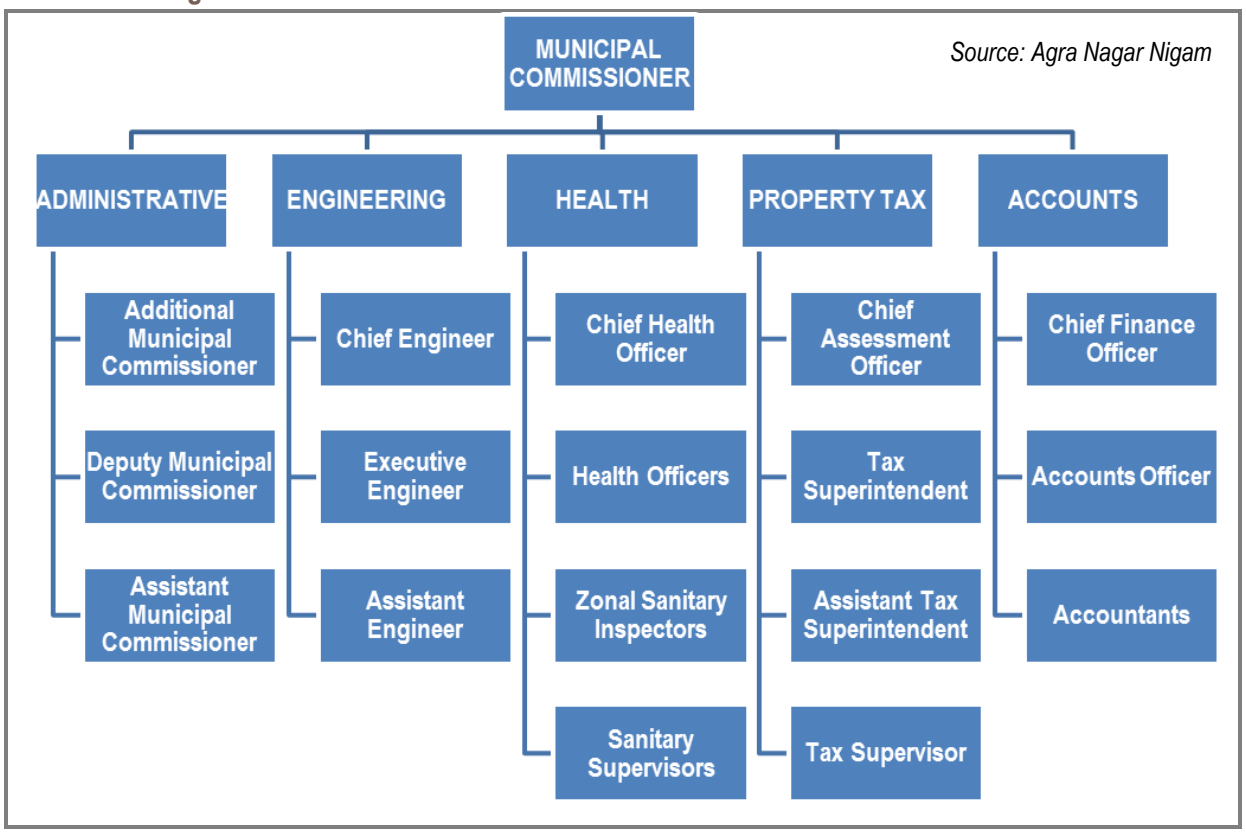
ANN is administered under the Uttar Pradesh Municipal Corporation Adhiniyam, 1959; The Corporation has a democratically elected leadership from the constituencies within the geographic jurisdiction of the corporation boundaries. The Act has been amended in 1994 by UP Act 12 of 1994, UP Act 26 of 1995 and incorporates the amendments made in 74th CAA, 1992 including the functions given in 12th schedule of the constitution.

The city has 40 tax wards within 4 administrative zones; the city is divided into 90 electoral wards and 20 sanitary wards for the management of the sanitation service delivery.

| | ADMINISTRATIVE ZONE | NO. OF TAX WARDS |
|---|---|---|
| Z-1 | HARIPARWAT | 19 |
| Z-2 | HARIPARWAT-TAJGANJ | 15 |
| Z-3 | LOHAMANDI | 28 |
| Z-4 | CHATTA | 28 |

*Source: ANN*

##### 4.1.1.1.1 Organizational Structure



#### 4.1.1.1.2 Functions of ANN

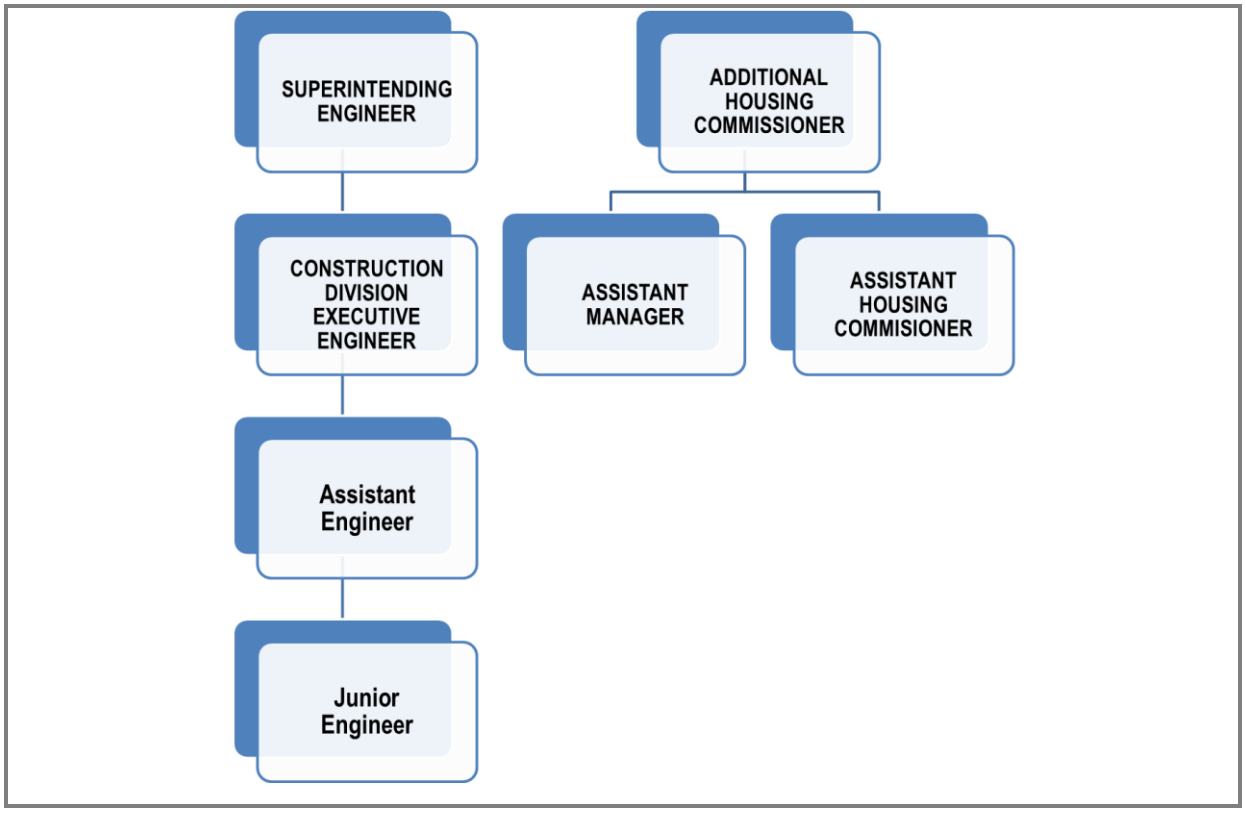
The duties and powers of the Corporation and Corporation authorities are detailed in Sections 114 of the said Act. The major functions being performed by ANN currently are –

- Public health, sanitation, conservancy and solid waste management
- Urban poverty alleviation
- Provision and maintenance of urban amenities and facilities such as parks, gardens, playgrounds.
- Provide and maintain the lighting of the public streets, corporation markets, and public buildings and other Places vested in the corporation
- Maintenance of ambulance services
- Registration of vital statistics including births and deaths.
- Regulation of slaughter houses and tanneries
- Operation and Maintenance of burial grounds, cremation grounds, etc.

***Though Water Supply and sewerage are also obligatory functions of Municipal Corporation as per the 12th schedule of 74th Constitutional Amendment Act (CAA), in the case of city of Agra they are looked after by Jal Nigam and Jal Sansthan.***

### 4.1.1.2 .UP HOUSING AND DEVELOPMENT BOARD

U.P. Housing and Development Board was set up under the Act of 1965 in April 1966. It has been established to implement the various housing and development schemes in a planned way under the guidelines established by the state level and national level residential policy and programmes.



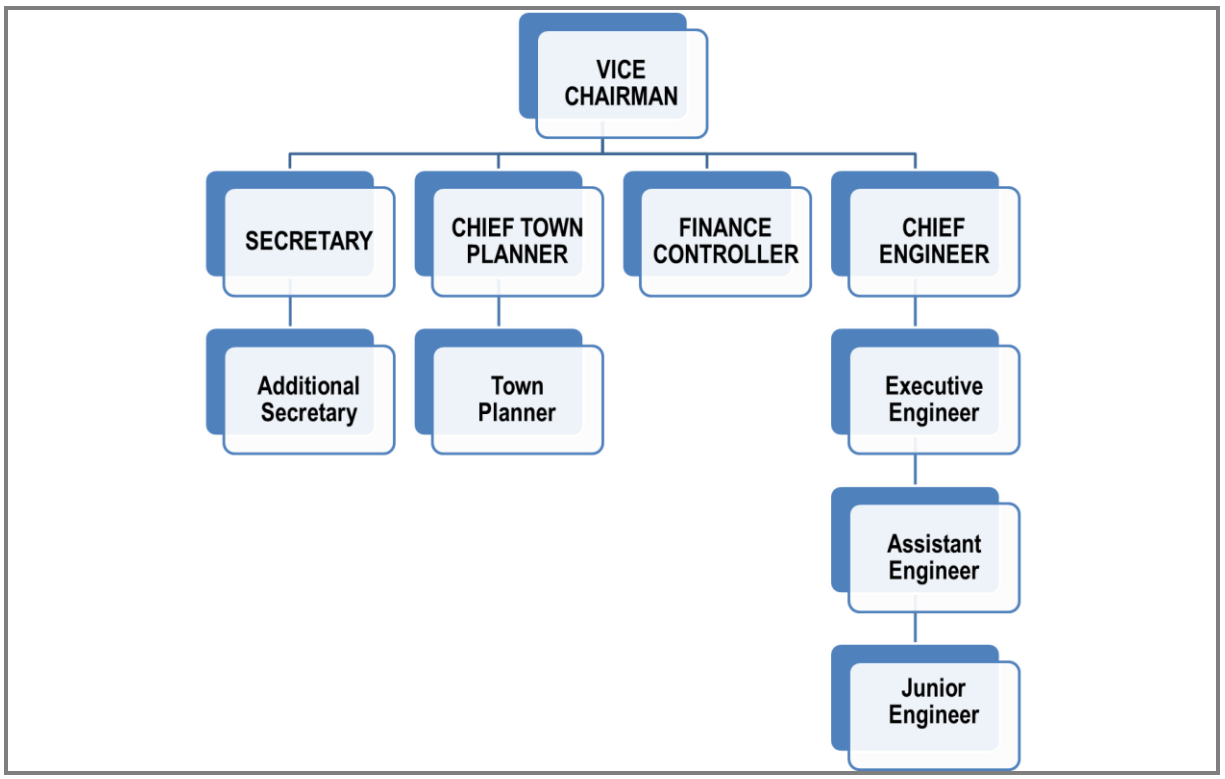

The main objectives of UP Housing and Development Board are to:

- Make the plan for all residence related activities in the urban areas and to get them implemented fast and in effective way;
- Receive grant and loan from central and state government, commercial bank, financial organizations, public bodies etc;
- Acquire the land and construct roads, electricity, water supply, and other urban facilities and to arrange and distribute the land and constructed houses according to the demand from registered people;

- Make special arrangement for the houses for the backward class and scheduled caste and tribe, security workers and freedom fighters.

#### 4.1.1.3 AGRA DEVELOPMENT AUTHORITY (ADA)

The State Government established the Agra Development Authority (ADA) in 1974. It's the largest body of its kind in Uttar Pradesh (UP). It has been responsible since its inception for providing infrastructure related development to the city of Agra corresponding to the city expansion.

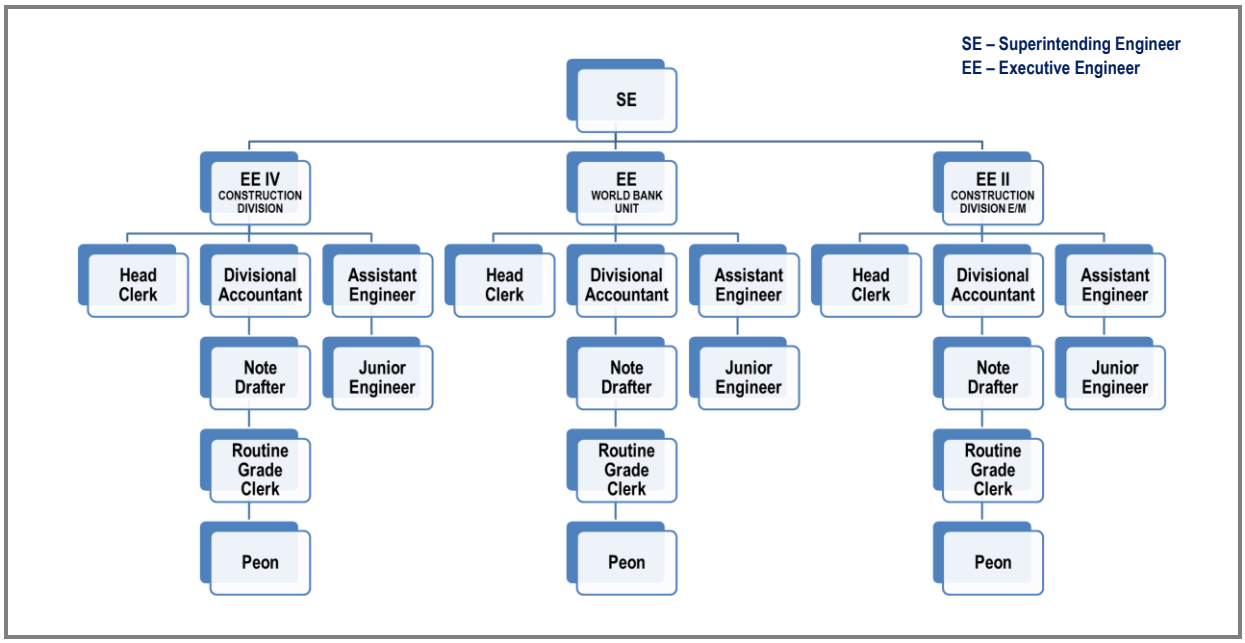



The major functions of ADA are summarized below –

- Overall development of city
- Making & implementation of Master Plan
- Planning for infrastructure for ADA colonies and its construction
- Zoning of the city
- Maintenance of ADA colonies till their handing over to ANN

#### 4.1.1.4 UP JAL NIGAM

Jal Nigam was formed in 1927 to undertake responsibility for the water supply and sewage disposal of the State. Later in 1975 this department was transformed into Uttar Pradesh Jal Nigam under the Uttar Pradesh Water Supply and Sewerage Act, 1975. Under the Uttar Pradesh Water Supply and Sewerage Act, 1975, UP Jal Nigam has to carry out the functions of - **(a)** preparation, execution, and promotion of water supply and sewerage schemes, **(b)** preparation, execution and promotion of state plans for water supply, sewerage and drainage and **(c)** to establish standards for water supply and sewerage in the state.




### 4.1.2 Overlap of Institutional Responsibilities

The multiplicity of organizations involved in providing urban services makes the management of affairs of the city highly complex. It becomes essential to define the roles and responsibilities of each of the Agencies very clearly.

The inter-relationships of various departments play an important role in the good quality of services deliverability to the community /citizens of the city. Moreover, overlapping of some of the functions requires a high level of coordination. The following table indicates the service-wise planning, implementation and operation and maintenance function being carried out by various agencies involved in providing services in Agra city.

**TABLE 4-1: OVERLAP OF RESPONSIBILITIES - AGRA CITY**

| SECTOR | PLANNING | IMPLEMENTATION | OPERATION AND MAINTENANCE |
|---|---|---|---|
| **Land Use/ Master Plan/ Building Byelaws** | ADA | ADA | ADA |
| **Water Supply** | UPJN/ ADA/ UPHB for colonies developed by them/ DUDA for slum areas | AJS/ UPJN/ DUDA for slum areas | AJS/ UPJN |
| **Sewerage** | | AJS/ UPJN | AJS/ UPJN |
| **Roads/Bridges/Flyovers/RoB** | PWD,ADA,ANN | ANN/ADA/PWD/ Housing Board/UPSIDC | ANN/ADA/PWD/ Housing Board/UPSIDC |
| **Multilevel Parking** | | ANN/Traffic Police | ANN/Traffic Police/RTO |
| **Traffic Control And Management Systems City Public Transportation** | SP Traffic, RTA,ANN | | |
| **Street Lighting** | ANN | ANN | ANN |
| **Storm Water Drainage** | ANN | ANN | ANN |
| **Solid Waste Management** | ANN | ANN | ANN |
| **Parks/Playground/Golf Course/Beautification Of Road Intersections/Urban Forest** | ANN, Forest ,ADA,UPHB | ANN /ADA/Housing Board/Forest | ANN/ADA/Housing Board/Forest |
| **Air, Water And Noise Pollution Control** | SPCB | Pollution Control Board | Pollution Control Board |
| **Slum Development** | CDO,ANN,DUDA | DUDA/ADA | DUDA |
| **Urban Poverty Programme** | ANN,DUDA | DUDA | DUDA |
| **Housing Or Ews** | | ADA/Housing Board, | ADA/Housing Board, |

| SECTOR | PLANNING | IMPLEMENTATION | OPERATION AND MAINTENANCE |
|---|---|---|---|
| | | DUDA | DUDA |
| **Public Conveyance** | | R.T.O | R.T.O |
| **Heritage Building Conservation** | ANN, Archaeological Department | Archaeological Department/ANN | Archaeological Department/ANN |

*Source: ANN*

The table clearly indicates that several services are being provided by more than a single agency which increases the complexity of the service deliverability mechanism. The resulting unavoidable delays due to the lack of coordination and the inordinate delays in transfer of assets to the concerning agencies for the continuity in the service create a major roadblock in the development and operation and maintenance of the sanitation infrastructure.

### 4.1.3 Sector-Wise Staff Assessment

The human resource statistics have been furnished by the City Engineers of the respective departments. The human resource requirements vary from department to department.

#### 4.1.3.1 WATER SUPPLY SECTOR

UP Jal Nigam is responsible for the planning, design and construction/development of the assets in the water supply sector, while Agra Jal Sansthan (AJS) is responsible for the operation and maintenance of the assets. It has been reported that the existing human resource strength in the Engineering department is rather dismal whereas the other functionary roles are well equipped. It has also been reported that the senior management positions are filled as per the requirement which enables continuous administration and service delivery

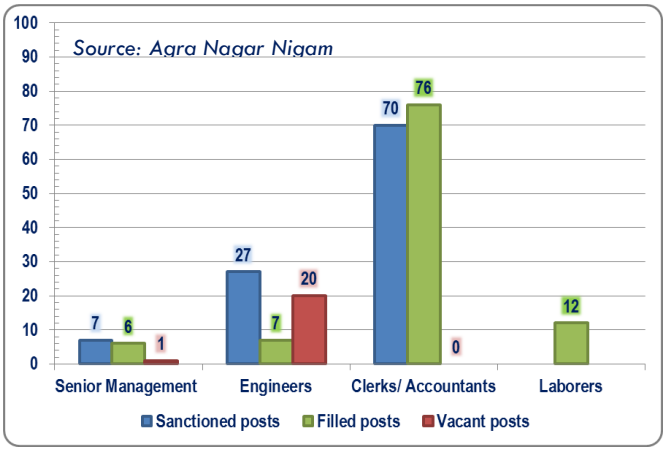



**FIGURE 4-1: STAFF ASSESMENT - WATER SUPPLY SECTOR**

management. However, it was observed that the capacities of the existing staff have need of enhancement in order to handle the responsibilities of their roles and dispense their duties per the mandate

#### 4.1.3.2 SEWERAGE AND DRAINAGE SECTOR

UP Jal Nigam is responsible for the planning, design and construction/development of the assets in the sewerage and drainage sector, while Agra Jal Sansthan (AJS) is responsible for the operation and maintenance of the assets.

ANN has reported that all the sanctioned posts against the staff positions in the department have been filled satisfying the requirement of the human resource strength. However, as experienced in the water supply sector, the capacities of the existing staff have need of enhancement in order to handle the responsibilities of their roles and dispense their duties per the mandate.

#### 4.1.3.3 SOLID WASTE MANAGEMENT (SWM) SECTOR

The solid waste management is the responsibility of the Health Department of Nagar Nigam whereas Engineering Department assists in the procurement of the vehicles, equipment and developing the landfill site, etc. The Chief Health Officer is responsible for the waste management in the city. The Health Department has total employee strength of 2299 out of which 2090 (90.9%) are the sanitary workers.

For effective implementation of MSW rules[6], ANN got the detailed project report prepared by US EPA and Clean Technology initiative. As per the proposal of above study on decentralization of administration and interdepartmental co-ordination the requirement of the estimated staff shall be much less than the existing staff.

TABLE 4-2: EXISTING STAFF - SWM SECTOR

| S.# | DESIGNATION | NUMBER |
|---|---|---|
| 1. | Chief Health Officer | 1 |
| 2. | Senior Health Officer | 1 |
| 3. | Additional Health Officer | 1 |
| 4. | Zonal Sanitary Inspector | 0 |
| 5. | Chief Sanitary Inspector | 2 |
| 6. | Sanitary Inspector | 24 |
| 7. | Sanitary Supervisor | 87 |
| 8. | Workers | 2023 |
| 9. | Driver | 84 |

*Source: SLB 2014 / ANN*

## 4.2 Municipal Finance Assessment

### 4.2.1 Receipts of Agra Nagar Nigam

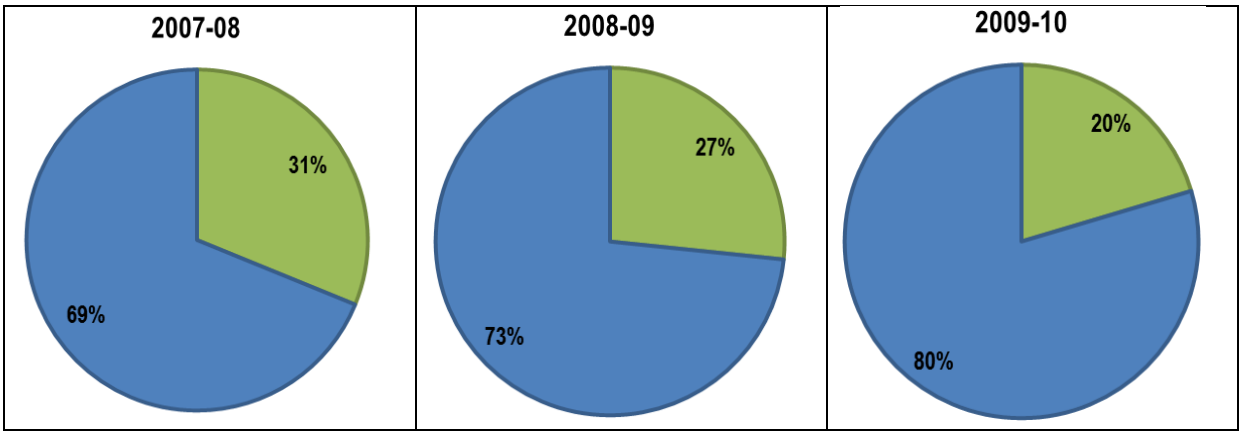
The total income of Agra Nagar Nigam from all sources has not witnessed any substantial increase from 2007-08 to 2010-11.

TABLE 4-3: SOURCE OF TOTAL INCOME - AGRA NAGAR NIGAM

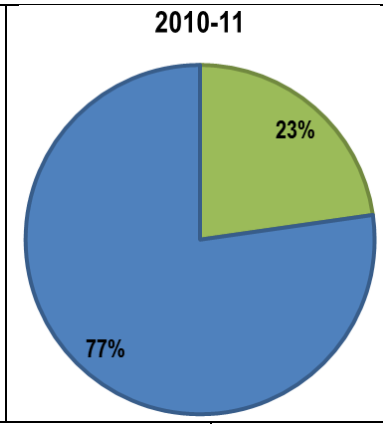
| SOURCE OF INCOME (Rs in Crores) | 2007 -08 | 2008 -09 | 2009 -10 | 2010-11 |
|---|---|---|---|---|
| **Own Source Receipts** | | | | |
| **Tax Revenue** | 36.47 | 18.60 | 20.38 | 24.68 |
| **Non-Tax Revenue** | 9.37 | 13.82 | 13.00 | 10.58 |
| **Grants** | 101.20 | 89.24 | 130.33 | 119.78 |
| **Loans** | | | | |
| **Total Income** | **147.04** | **121.66** | **163.72** | **155.04** |
| **Opening Balance** | 35.02 | 90.73 | 71.21 | 32.00 |
| **Grand Total** | **374.94** | **366.47** | **432.03** | **377.35** |

*Source: Agra Nagar Nigam*

FIGURE 4-2: SHARE OF COMPONENTS IN THE TOTAL INCOME - ANN




[6] All municipal authorities in the country were expected to complete the implementation of Municipal Solid Waste Handling and Management rules 2000 by December 2003




Source: Agra Nagar Nigam

OWN SOURCE RECEIPTS | GRANTS

As is evident from Fig 4-12, the own source receipts of ANN contribute insignificantly towards the total income. ANN relies heavily on the grants to meet the expenses. The revenue income in the past years has been low compared to the revenue expenditure yielding overall annual deficits resulting in a weak credit rating for ANN.

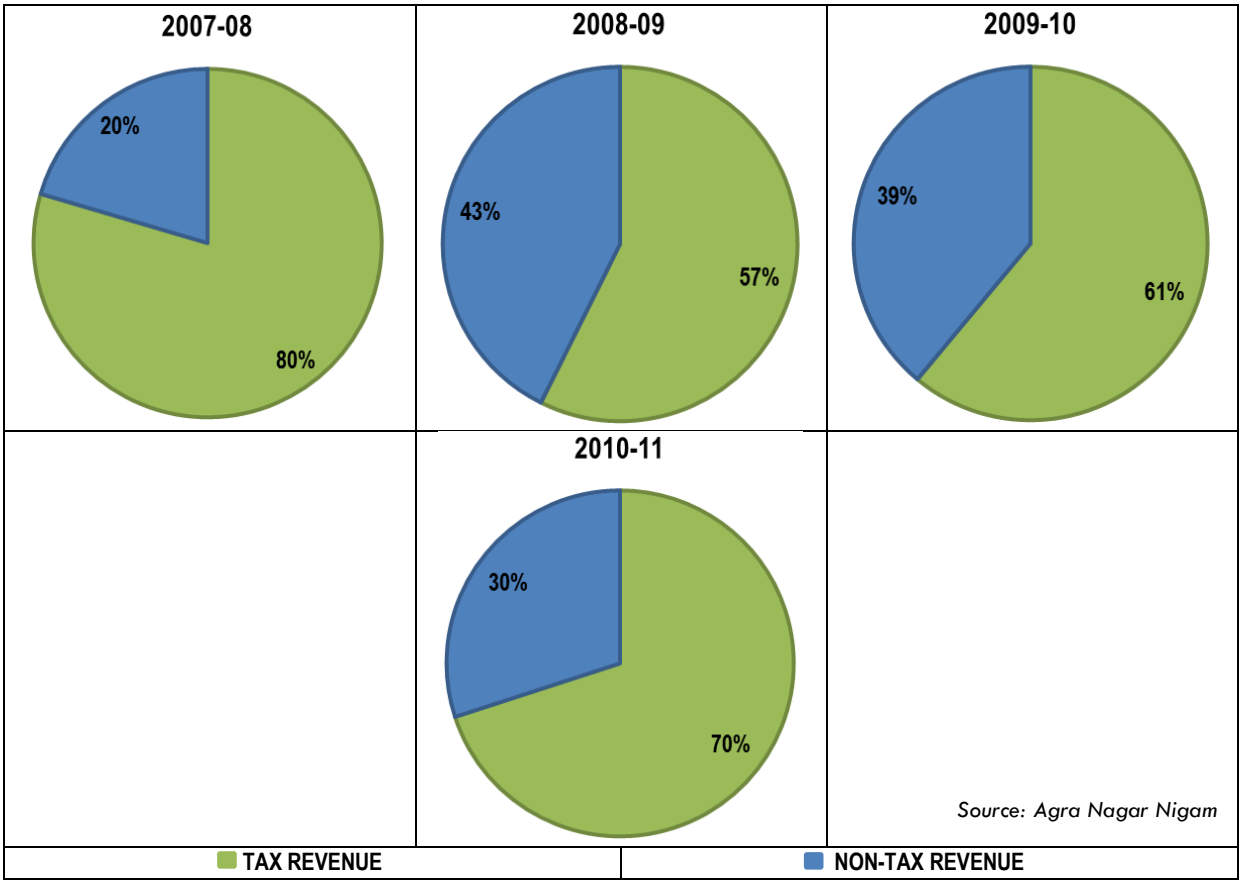
Reinforcing measures are vital to augment the own source receipts to ensure good credit rating for ANN and make the municipal finance systems more robust.

### 4.2.1.1 OWN SOURCE RECEIPT

ANNs' own source receipts have been fluctuating through the period 2007-11, however there was a dip in the receipts in the year 2008-09.**TABLE 4-4: OWN SOURCE RECEIPTS - AGRA NAGAR NIGAM**

| SOURCE OF ANN INCOME | 2007-08 | 2008-09 | 2009-10 | 2010-11 |
|---|---|---|---|---|
| Non-Tax Revenue | 9.37 | 13.82 | 13.00 | 10.58 |
| Tax-Revenue | 36.47 | 18.60 | 20.38 | 24.68 |
| Total Income from Own Sources | 45.84 | 32.42 | 33.39 | 35.26 |
| *Source: Agra Nagar Nigam* | | | | |

**TABLE 4-5: SHARE OF TAX AND NON-TAX REVENUE IN OWN SOURCE RECEIPTS OF ANN**




### 4.2.1.2 GRANTS

Grants are broadly categorized as plan funds and non-plan funds.

**TABLE 4-6: SOURCE OF GRANTS - AGRA NAGAR NIGAM**

| SOURCE OF GRANTS | 2007-08 | 2008-09 | 2009-10 | 2010-11 |
|---|---|---|---|---|
| **Plan Funds (Rs in Crores)** | | | | |
| ***12th FC*** | 6.60 | 4.40 | 4.26 | 4.50 |
| **Non-Plan Funds (Rs in Crores)** | | | | |
| ***State FC*** | 83.63 | 58.82 | 66.66 | 65.00 |
| **Development Funds – *JNNURM*** | 10.97 | 26.02 | 59.41 | 45.00 |
| *Source: Agra Nagar Nigam* | | | | |

Plan Funds comprising of 12th finance commission (FC) and non-plan funds comprising of the grants from State FC and JNNURM funds have collectively constituted a major portion of the grants during the years 2007-08 and 2008-09, JNNURM funds constitute a significant share of the development funds during the year 2009-10.

### 4.2.2 Expenses of Agra Nagar Nigam

The total expenditure has increased from 44 Crores in 2007-08 to 107 Crores in 2010-11.

## 4.3 Sector-Wise Cost Recovery Assessment

### 4.3.1 Water Supply Sector

The total cost recovery in water supply services is reported at 100% by the ANN officials; however, the collection efficiency of water supply related charges is stated to be approximately 86%.

**TABLE 4-7: COST RECOVERY IN WATER SUPPLY SERVICES – OPERATING EXPENSES**

| FINANCIAL INFORMATION - OPERATING EXPENSES (IN LAKHS) | |
|---|---|
| Regular Staff and administration | 855.60 |
| Outsourced/Contract Staff Costs | 58.80 |
| Electricity Charges/Fuel Costs | 22.54 |
| Chemical Costs | 595.78 |
| Repairs/Maintenance Costs | 88.09 |
| Bulk (Raw/Treated) Water Charges | |
| Other Costs | 75.75 |
| Total Operating Expenditure | 1696.56 |

*Source: Agra Nagar Nigam*

**TABLE 4-8: COST RECOVERY IN WATER SUPPLY SERVICES – OPERATING REVENUE**

| FINANCIAL INFORMATION - OPERATING REVENUES (IN LAKHS) | |
|---|---|
| Arrears at the beginning of previous year (2009-10) | 389.88 |
| Revenue demand from user charges | 2846.60 |
| Revenue demand from tax/cess - Water Service only | |
| Revenue demand from other revenues (eg. connection costs/Donations etc) | 85.92 |
| Total Revenue Demand for previous year | 2932.52 |

*Source: Agra Nagar Nigam*

**TABLE 4-9: COST RECOVERY IN WATER SUPPLY SERVICES – COLLECTION EFFICIENCY (IN LAKHS)**

| TOTAL REVENUE DEMAND FOR PREVIOUS YEAR (FROM USER CHARGES, TAXES ETC) | 2932.52 |
|---|---|
| Collection against arrears (2009-10) | 399.43 |
| Collection against the current demand of previous year (2009-10) | 2350.56 |

*Source: Agra Nagar Nigam*

### 4.3.2 Sewerage and Drainage Sector

The total cost recovery in sewerage service is about 2.8%. Further, the collection efficiency in sewerage related charges is about 52%. The following table illustrates the details of operating expenses and revenues in sewerage and drainage sector.

**TABLE 4-10: COST RECOVERY IN SEWERAGE & DRAINAGE SERVICES – OPERATING EXPENSES**

| FINANCIAL INFORMATION - OPERATING EXPENSES (IN LAKHS) | |
|---|---|
| Regular Staff and administration | 831.51 |
| Outsourced/Contract Staff Costs | |
| Electricity Charges/Fuel Costs | 427.97 |
| Chemical Costs | |
| Repairs/Maintenance Costs | 5131.82 |
| Other Costs | 16.25 |
| Total Annual Operating Expenditure | 6407.55 |

*Source: Agra Nagar Nigam*

TABLE 4-11: COST RECOVERY IN SEWERAGE AND DRAINAGESERVICES – OPERATING REVENUE

| ARREARS AT THE BEGINNING OF PREVIOUS YEAR (IN LAKHS) | 205.49 |
|---|---|
| Revenue demand from user charges - sewerage only | 179.20 |
| Revenue demand from tax/cess - sewerage only | |
| Revenue demand from other sources (eg. connection costs/donations etc.) | |
| Total Revenue Demand of the previous year (Current Demand of previous year) | 179.90 |

*Source: Agra Nagar Nigam*

TABLE 4-12: COST RECOVERY IN SEWRAGE AND DRAINAGE SERVICES – COLLECTION EFFICIENCY (IN LAKHS)

| TOTAL REVENUE DEMAND FOR PREVIOUS YEAR (FROM USER CHARGES, TAXES ETC) | 179.90 |
|---|---|
| Collection against arrears (2009-10) | 36.94 |
| Collection against the current demand of previous year (2009-10) | 93.83 |

*Source: Agra Nagar Nigam*

# CHAPTER 5. INFRASTRUCTURE AND SERVICES GAP ASSESSMENT

## Topics of Discussion

- Gap Assessment – Sewerage
  - Identification of Problem Areas
- Gap Assessment – Access to Toilets
  - Identification of Problem Areas
- Gap Assessment – Storm Water Management
  - Identification of Problem Areas
- Gap Assessment – Solid Waste Management
  - Identification of Problem Areas

The Service Level Benchmarks (SLB) established by Ministry of Urban Development, Government of India shall enable the comparison of the existing levels of service and hence ascertain the performance gaps. In addition to the SLBs' certain established norms and specification in the specific sectors and few assumptions based on best practices shall be considered to establish the infrastructure gaps; the primary and secondary data analysis shall facilitate the performance gap assessment. The gap assessment shall help the authorities to introduce improvements through the sharing of information and best practices, ultimately resulting in creation and sustenance of better services to the citizens

## 5.1 Performance Gap Assessment – Sewerage

### 5.1.1 Premises for Infrastructure and Performance Gap Assessment

The table below shall represent the norms, specifications and the assumptions employed in the determination of the infrastructure gaps –

TABLE 5-1: LIST OF NORMS. STANDARDS AND SPECIFICATIONS - SEWERAGE MANAGEMENT

| COMPONENT | NORM/SPECIFICATION/ ASSUMPTION | REMARKS |
|---|---|---|
| Sewerage Management System | | |
| Coverage | 100% | SLB, MoUD, GoI |
| Wastewater Collection | | |
| Connections | 1 per household | Every household /property should be connected to a sewerage system |
| Street Collection Sewers | 1.50m per household | Best Management Practices |
| Grit/Grease Trap | I per property | Best Management Practices |
| Wastewater Conveyance System | | |
| Branch Sewers | 0.75m per household | Best Management Practices |
| Trunk Sewers | 0.40m per household | Best Management Practices |
| Wastewater Treatment and Disposal | | |
| Adequacy of waste water treatment capacity | 100% | SLB, MoUD, GoI |
| Quality of waste water treatment | 100% | SLB, MoUD, GoI |
| Extent of reuse and recycling of waste water | 20% | SLB, MoUD, GoI |
| Disposal into rivers / natural water bodies | 80% | |
| Septage Clearance | | |
| No. of septic tanks cleared per vehicle per day | 3 tanks per day per vehicle | Best Management Practices |
| Frequency of septage clearance | Once in 5 years | Best Management Practices |
| Septage Treatment and Disposal | | |

| COMPONENT | NORM/SPECIFICATION/ ASSUMPTION | REMARKS |
|---|---|---|
| Sludge drying beds area | 225 sq.m | Best Design Practices |
| Thickness of Liquid sludge | 20 cm | Best Design Practices |
| Sludge volume per bed | 45 cum | Best Design Practices |
| Septage drying cycle | 10 days | Best Management Practices |

*Source: MoUD, GoI*

**TABLE 5-2: GENERAL DISCHARGE STANDARDS**

| PARAMETER | INLAND SURFACE WATER | PUBLIC SEWERS | LAND FOR IRRIGATION | MARINE/COASTAL AREAS |
|---|---|---|---|---|
| **Colour and Odour** | ++ | | ++ | ++ |
| **Suspended solids mg/l, max.** | 100 | 600 | 200 | For cooling water effluent 10 per cent above total suspended matter of influent. |
| **pH value** | 5.5 to 9.0 | 5.5 to 9.0 | 5.5 to 9.0 | 5.5 to 9.0 |
| **Temperature** | shall not exceed 5oC above the receiving water temperature | | | shall not exceed 5oC above the receiving water temperature |
| **Oil and grease, mg/l max,** | 10 | 20 | 10 | 20 |
| **Total residual chlorine, mg/l max** | 1 | - | - | 1 |
| **Ammonical nitrogen (as N),mg/l, max.** | 50 | 50 | - | 50 |
| **Total kjeldahl nitrogen (as N);mg/l, max. mg/l, max.** | 100 | - | - | 100 |
| **Free ammonia (as NH3), mg/l, max.** | 5 | - | - | 5 |
| **BOD, mg/l, max.** | 30 | 350 | 100 | 100 |
| **COD, mg/l, max.** | 250 | - | - | 250 |
| **Bio-assay test** | 90% survival of fish after 96 hours in 100% effluent | 90% survival of fish after 96 hours in 100% effluent | 90% survival of fish after 96 hours in 100% effluent | 90% survival of fish after 96 hours in 100% effluent |

*Source: CPCB*

### 5.1.2 Existing Situation of Service Delivery and Gap Assessment

#### 5.1.2.1 COLLECTION OF WASTE WATER

***Interpretation:*** ***It is evident that the present central collection system does not serve the entire area of the city; it is roughly estimated that only 23 % of the properties are connected to the sewerage network system.***

***80% of the 117 community toilets are connected to septic tanks and the septic tanks do not fulfill the requirement of the sewerage management system as stipulated in the CPHEEO manual on sewerage and sewage treatment and additionally the condition of 80% of the septic tanks are in a dilapidated condition; there is no established fecal sludge management process/service***

***The ongoing sewerage projects undertaken under the JNNURM will ensure 80% collection network and 20% collection still requires to be provided besides providing last mile household/property connections.***

#### 5.1.2.2 CONVEYANCE OF WASTE WATER

***Interpretation:*** ***only 43% of total waste water generated in the city is conveyed through the central conveyance system to the sewage treatment plants and about 57% sewage generated in the city is disposed in open drains / areas and eventually the rivers, resulting in environmental and health hazards.***

#### 5.1.2.3 TREATMENT AND DISPOSAL OF WASTE WATER

***Interpretation:*** ***The city lacks an adequate treatment and ultimate disposal system. Currently, the collective treatment capacities of the STP's in the city is only 51% of the required capacity.***

***About 23% of the waste water reaching the STPs is recycled and reused in the city. The inadequacy of treatment and disposal system has resulted in pollution of land, natural water bodies and ground water.***

#### 5.1.2.4 INSTITUTIONAL ASSESSMENT

##### 5.1.2.4.1 Organizational Structure

***Interpretation:*** ***Non-compliance to best management practices and occupational health and safety rules; lack of training, regular vacancies in ANN department are evidently the major issues.***

##### 5.1.2.4.2 Functional Assessment

***Interpretation:*** ***Qualified staff is inadequate to design and sustain the existing systems; Support systems are rather weak in assessing the appropriateness of the system and do not well-equip ANN to meet the challenges posed by the system;***

***Weak coordination among the ANN, Jal Sansthan and Jal Nigam involved in the development of asset (Jal Nigam), and the operations and management (Jal Sansthan – ANN) also poses a severe challenge which results in the accountability issues.***

***The limited capacity of ANN reflects in the absence of community engagement and participatory means in the planning, operations and management of the sewerage management system / service.***

#### 5.1.2.5 REGULATORY AND GOVERNANCE ASSESSMENT

***Interpretation:*** ***Initiatives to introduce municipal bye-laws, building codes that shall ensure the best-management practices at the citizens' level need to be geared; Lack of committees / community-government collaborations with representation from pro-poor and community at large with gender empowerment that shall provide inputs for planning with inclusive approach and monitor the implementation on a periodic basis***

### 5.1.3 Overview of Performance Gap Assessment – Sewerage Management

**TABLE 5-3: OVERVIEW OF PERFORMANCE GAP ASSESSMENT - SEWERAGE MANAGEMENT**

| COMPONENT OF SERVICE | DESIRED SERVICE DELIVERY | EXISTING SERVICE DELIVERY |
|---|---|---|
| Coverage of Sewer Network | 100% of City Area | 21.4% |
| Compliance of Septic Tanks to CPHEEO Standards | 100% | Data Not Available |
| Conveyance of Waste Water | 100% | 43% |
| Treatment Capacity of STPs | 100% | 52% |
| Reuse/recycle of waste water | 20% | 23% |

*Source: ANN*

### 5.1.4 Identification of Critical Problem Areas

*CRITICAL PROBLEM AREA 1* – The available centralized sewer line network, cumulative of old and new network, is sufficient to achieve 80% coverage (connections to properties); however, only 21.4% coverage is reported. The last mile connectivity is a challenge

*CRITICAL PROBLEM AREA 2* – The sub-standard operation & maintenance of the sewer network results in the deterioration of condition of the sewer lines and hence their efficiencies. This also translates into high O&M expenditures

*CRITICAL PROBLEM AREA 3* – Adverse risk to public health due to improper septic tanks and septage management leading to contamination of water bodies/water supply distribution system and incidences of water borne diseases

## 5.2 Performance Gap Assessment – Access to Toilets

### 5.2.1 Premises for Infrastructure and Performance Gap Assessment

The table below shall represent the norms, specifications and the assumptions employed in the determination of the infrastructure gaps –

**TABLE 5-4: LIST OF NORMS, SPECIFICATIONS AND ASSUMPTIONS – ACCESS TO TOILETS SECTOR**

| COMPONENT | NORM / SPECIFICATION / ASSUMPTION | REMARKS |
|---|---|---|
| Household Sanitation | | |
| Coverage | 100% | SLB, MoUD, GoI |
| Toilet Connected to Sewer / Septic Tank | 1 per household | Best Management Practices |
| Community Toilets | | |
| Accessibility | 24X7 | SLB, MoUD, GoI |
| Toilet Seats, if not used in the night | 1 seat per 50 users | Guidelines for Community Toilets, Ministry of Urban Development |
| Toilet Seats, if used round the clock | 1 seat per 35 users* | |
| Bathing Units | 1 unit per 50 users | Guidelines for Community Toilets, Ministry of Urban Affairs & Employment |
| Urinal Units | 1 unit per 200-300 users | |
| Clothes Washing Area | 4-5m2 per 10 toilet seats | |
| Public Toilets | | |
| Toilet Seats | 1 seat per 100 users | Guidelines for Community Toilets, Ministry of Urban Development |
| Bathing Units, not used in the night | 1 unit per 50 users | |
| Bathing Units, if used round the clock | 1 unit per 70 users | |
| Urinal Units, not used in the night | 1 unit per 200-300 users | |
| Urinal Units, if used round the clock | 1 unit per 300-500 users | |
| Clothes Washing Area, not used in the night | 4-5m2 per 10 toilet seats | |
| Clothes Washing Area, if used round the clock | 4-5m2 per 30 toilet seats | |

### 5.2.2 Existing Situation of Service Delivery and Gap Assessment

#### 5.2.2.1 COVERAGE

***Interpretation*: It is established that in Agra city, 88% of population has access to individual toilets. However, 15% of the population uses the community toilets.**

***Around 55% of the market/commercial areas have toilet facilities; and 80% of the schools have toilet facilities.***

#### 5.2.2.1.1 Open Defecation

***Interpretation:*** ***It is established that in Agra city, 15% of the non-slum population defecates in the open and about 26% of the slum population defecates in the open.***

### 5.2.2.2 CONDITION OF TOILETS

***Interpretation:*** ***It is reported that 15% of the total individual toilets (all in the slum and LIG areas) are in unusable condition; 20% of the community / public toilets are in average condition, while 40% are in bad condition and 13% of the community toilets are in good condition.***

### 5.2.2.3 INSTITUTIONAL ASSESSMENT

#### 5.2.2.3.1 Organizational Structure

***Interpretation:*** ***Lack of an organizational unit dedicated to the sector of access to sanitation.***

### 5.2.2.4 FUNCTIONAL ASSESSMENT

#### 5.2.2.4.1 Inadequacy of Qualified Staff

***Interpretation:*** ***Qualified Staff is inadequate to design and sustain the existing systems.***

#### 5.2.2.4.2 Overlap of Responsibilities

Weak coordination among the various departments involved in the construction and operations and management also poses a severe challenge to ANN, which results in the absence of accountability. Proper devolution of responsibilities is greatly hindered as well.

#### 5.2.2.4.3 Limited Community Engagement

***Interpretation:*** ***the public outreach and education programs are deficient.***

### 5.2.2.5 REGULATORY AND GOVERNANCE ASSESSMENT

#### 5.2.2.5.1 Lack of Initiatives

***Interpretation:*** ***Initiatives to introduce municipal bye-laws, building codes that shall enforce performance standards for the new development are lacking; Citywide design guidelines of the order of toilet design manual, sustainable sanitation technologies manual & water conservation manual are not mandated yet! Laws imposing sanitation/septage management is not enforced yet stringently***

## 5.2.3 Overview of Performance Gap Assessment – Access to Toilets

**TABLE 5-5: OVERVIEW OF PERFORMANCE ASSESSMENT - ACCESS TO TOILETS**

| COMPONENT OF SERVICE | DESIRED SERVICE DELIVERY | EXISTING SERVICE DELIVERY |
|---|---|---|
| **Coverage of Toilets** | | |
| **Individual** | 1 toilet per every household | 0.88 toilet per every household |
| **Community** | 1 seat per every 35 users | 1 seat per every 50 users |
| **Public Toilets in Commercial/Market Areas** | 1 seat per every 100 users | 1 seat per every 250 users |
| **Condition of Toilets** | | |
| **Individual** | 100% in working condition | 80% in working condition |
| **Community** | 100% in working condition | 33% in working condition |
| **Public Toilets in Commercial/Market Areas** | 100% in working condition | 50% in working condition |
| **Toilets in Schools** | 100% in working condition | 90% in working condition |

*Source: CPHEEO*

### 5.2.4 Identification of Critical Problem Areas – Access to Toilets

***CRITICAL PROBLEM AREA 4*** – Open Defecation with adverse impacts on health and environment despite 87% coverage of toilets (individual toilets) and 15% of the population's access to community toilets. The poor operation and maintenance has been the underlying cause.

*CRITICAL PROBLEM AREA 5* – There are only 11 numbers of public toilets with a **floating population of** 1 – 1.5 Lakhs affecting the aesthetics and hygiene of tourist locations, commercial and market areas; the operation and maintenance of the existing toilets is also a challenge

## 5.3 Performance Gap Assessment – Storm Water Management

### 5.3.1 Premises for Infrastructure and Performance Gap Assessment

The table below shall represent the norms, specifications and the assumptions employed in the determination of the infrastructure gaps –

**TABLE 5-6: LIST OF NORMS, STANDARDS AND SPECIFICATIONS - STORM WATER MANAGEMENT**

| COMPONENT | NORM / SPECIFICATION / ASSUMPTION | Existing Level | REMARKS |
|---|---|---|---|
| Coverage of drainage network | 100% | 56 | Service Level Benchmarking, MoUD, GoI |
| Incidence of water logging / flooding | 0 | 26 | Service Level Benchmarking, MoUD, GoI |

### 5.3.2 Existing Situation of Service Delivery and Gap Assessment

#### 5.3.2.1 COVERAGE

***Interpretation: The storm water drainage network coverage in the city is 61% and the length of the road network in the city measures to 1728 km and the length of the pucca covered drains measures to 1060 km.***

#### 5.3.2.2 CONDITION OF DRAIN NETWORK

***Interpretation: The storm water drains are choked due to indiscriminate dumping of domestic solid waste and waste from the leather and petha industries; the storm drains are also the predominant carriers of sewage and waste water generated in the city. This results in the deterioration of the condition of the drains. The capacity of the drains to carry the storm water is also impeded due to the sewage and the solid waste filling the storm water drains in several location of the city, eventually leading to water logging and flooding in these areas.***

#### 5.3.2.3 INCIDENCES OF WATER LOGGING/FLOODING

***Interpretation: 14 incidences of water logging / flooding are observed in the entire city.***

#### 5.3.2.4 INSTITUTIONAL ASSESSMENT

##### 5.3.2.4.1 Organizational Structure

***Interpretation: Lack of an organizational unit dedicated to the sector of storm water***

#### 5.3.2.5 FUNCTIONAL ASSESSMENT

##### 5.3.2.5.1 Inadequacy of Qualified Staff

***Interpretation**: Qualified Staff is inadequate to design and sustain the existing systems.*

#### 5.3.2.5.2 Limited Community Engagement

***Interpretation**: the public outreach and education programs are deficient.*

#### 5.3.2.6 REGULATORY AND GOVERNANCE ASSESSMENT

#### 5.3.2.6.1 Lack of Initiatives

***Interpretation**: Initiatives to introduce municipal bye-laws, building codes that shall enforce performance standards for the new development are lacking; Citywide design guidelines of the order of source control measures, rain water harvesting, sustainable storm water management technologies manual & water conservation manual are not mandated yet!*

### 5.3.3 Overview of Performance Gap Assessment – Storm Water Management

**TABLE 5-7: OVERVIEW OF PERFORMANCE GAP ASSESSMENT – STORM WATER MANAGEMENT**

| COMPONENT OF SERVICE | DESIRED SERVICE DELIVERY | EXISTING SERVICE DELIVERY |
|---|---|---|
| Coverage of Drainage Network | 100% | 61% |
| Incidences of Water Logging / Flooding | 0 | 14 |

### 5.3.4 Identification of Critical Problem Areas

***CRITICAL PROBLEM AREA 6*** – Inadequate protective works for storm water drainage network to prevent the dumping of solid and liquid waste leading to water logging areas

***CRITICAL PROBLEM AREA 7*** – Inadequate coverage and standardized operation and maintenance procedures

## 5.4 Performance Gap Assessment – Solid Waste Management

### 5.4.1 Premises for Infrastructure and Performance Gap Assessment

The table below shall represent the norms, specifications and the assumptions employed in the determination of the infrastructure gaps –

**TABLE 5-8: LIST OF NORMS, STANDARDS AND SPECIFICATIONS - SOLID WASTE MANAGEMENT**

| COMPONENT | NORM / SPECIFICATION / ASSUMPTION | REMARKS |
|---|---|---|
| **PROCESSES** | | |
| Household Coverage of Solid Waste Management Services | 100% | Service Level Benchmarking, MoUD, GoI |
| Efficiency of collection of municipal solid waste | 100% | Service Level Benchmarking, MoUD, GoI |
| Extent of segregation of municipal solid waste | 100% | Service Level Benchmarking, MoUD, GoI |
| Extent of municipal solid waste recovered/recycled | 80% | Service Level Benchmarking, MoUD, GoI |
| Extent of scientific disposal of municipal solid waste | 100% | Service Level Benchmarking, MoUD, GoI |
| Extend of processing and treatment of MSW | 100% | Service Level Benchmarking, MoUD, GoI |
| Area with Door to Door Collection (DTDC) service | 100% | Best Design & Management Practices |

| COMPONENT | NORM / SPECIFICATION / ASSUMPTION | REMARKS |
|---|---|---|
| Area under DTDC through motorized vehicles | 60% | Best Design & Management Practices |
| Area with Community Bins for collection of waste | 100% | Best Design & Management Practices |
| No. of Pushcarts for DTDC | 5 in 1000 HHs | Best Design & Management Practices |
| No. of Cycle Rickshaws for DTDC | 5 in 1000 HHs | Best Design & Management Practices |
| No. of Auto Tippers | 1 in 800 HHs | Best Design & Management Practices |
| No. of Containers (3.0 cum capacity) | 2.5 per 1000 HHs | Best Design & Management Practices |
| No of Containers (4.5 cum capacity) | 1.5 per 1000 HHs | Best Design & Management Practices |
| Area under street sweeping | 100% | Best Design & Management Practices |
| No. of Handcarts in use for collection of Street Sweepings | 2.4 per km of road | Best Design & Management Practices |
| No of Covered Containers | 100% | Best Design & Management Practices |
| No of covered transportation vehicles | 100% | Best Design & Management Practices |
| Waste dumped in open environment | 0% | Best Design & Management Practices |
| COST RECOVERY | | |
| Extent of cost recovery in SWM services | 100% | Service Level Benchmarking, MoUD, GoI |
| Efficiency in collection of SWM charges | 90% | Service Level Benchmarking, MoUD, GoI |
| CUSTOMER SERVICE | | |
| Efficiency in redressal of customer complaints | 80% | Service Level Benchmarking, MoUD, GoI |

### 5.4.2 Existing Situation of Service Delivery and Gap Assessment

#### 5.4.2.1 SEGREGATION OF WASTE

***Interpretation: Segregation of waste at source is not practiced in the city of Agra***

#### 5.4.2.2 HOUSEHOLD COVERAGE

***Interpretation: 46% of the households are covered by the solid waste management services; but currently the services are suspended***

#### 5.4.2.3 COLLECTION EFFICIENCY OF THE WASTE

***Interpretation: 93% collection efficiency is reported for the city of Agra; however the ground reality is quite different and only 40%collection efficiency is achieved by ULB***

#### 5.4.2.4 TREATMENT AND DISPOSAL

***Interpretation: Agra City has treatment facility of capacity 550 TPD municipal waste constructed in phase I of the JNNURM project on Integrated Solid Waste Management, which is deficient by 250 TPD***

***The entire waste that is collected at the treatment facility is processed for waste recovery and reuse – RDF and electricity generation being the important components; however the operations are currently suspended***

#### 5.4.2.5 INSTITUTIONAL ASSESSMENT

##### 5.4.2.5.1 Organizational Structure

***Interpretation: Lack of an organizational unit dedicated to the sector of solid waste management***

#### 5.4.2.6 FUNCTIONAL ASSESSMENT

##### 5.4.2.6.1 Inadequacy of Qualified Staff

***Interpretation: Qualified Staff is inadequate to design and sustain the existing systems.***

##### 5.4.2.6.2 Limited Community Engagement

***Interpretation: the public outreach and education programs are deficient.***

#### 5.4.2.7 REGULATORY AND GOVERNANCE ASSESSMENT

##### 5.4.2.7.1 Lack of Initiatives

***Interpretation: Initiatives to introduce municipal bye-laws, building codes and regulatory measures that shall ensure and enforce performance standards for the existing and new development are lacking;***

### 5.4.3 Overview of Performance Gap Assessment – Solid Waste Management

**TABLE 5-9: OVERVIEW OF PERFORMANCE GAP ASSESSMENT – SOLID WASTE MANAGEMENT**

| COMPONENT OF SERVICE | DESIRED SERVICE DELIVERY | EXISTING SERVICE DELIVERY |
|---|---|---|
| Household Coverage | 100% | 46.3% |
| Segregation at Source | 100% | 8.6% |
| Collection Efficiency | 100% | 93.5% |
| Extent of Reuse and Recovery | 80% | 21.1% |
| Extent of Treatment | 100% | 0% |
| Extent of Scientific Disposal | 100% | 0% |
| Cost Recovery | | |
| Extent of Cost Recovery | 100% | 0% |
| Efficiency of Collection of Charges | 90% | 0% |
| Customer Service | | |
| Efficiency in redressal of customer complaints | 80% | 78.7% |

*Source: SLB 2014, ANN*

### 5.4.4 Identification of Critical Problem Areas

***CRITICAL PROBLEM AREA 8*** – The household coverage of solid waste management services as well as the overall collection efficiency is inadequate and deficient

***CRITICAL PROBLEM AREA 9*** – The solid waste management services are inadequate in the industrial areas as well as the public areas resulting in adverse health and environmental impacts;

# CHAPTER 6. IEC AND AWARENESS CAMPAIGN

## 6.1 Introduction

Information, Education and Communication (IEC) & Communication strategy are integral to the core issue of developing the city sanitation plan. In fact it will lead to development of robust yet effective awareness and communication strategy for promoting hygiene & sanitation in the city to trigger behavior change and demand for sanitation. The strategy will aim for citizen participation in improving city sanitation specifically reaching out to the slum dwellers and urban poor in the city. It will evolve a method, tools & techniques, and use of various media (interpersonal, print, electronic, folk) including advocacy with opinion leaders NGOs/CBOs and other stakeholders to deliver awareness strategy in the city. The experience of previous awareness programmes organized in the city has also been taken into account to integrate the innovative ideas and strategies used.

## 6.2 Objectives

The objective of IEC & Communication Strategy is to evolve an effective plan of sustainable programmes for capacity building and sensitization of implementers, education and enhanced awareness for stakeholders specifically citizens regarding sanitation activities in Agra City. The strategy is designed to:

- Strengthening CSP implementation by Agra Nagar Nigam (ANN) through training and capacity building;
- Evolve methodology to sensitize public for adopting water wastage minimization, segregation & management and open defecation free practices through IEC campaign.

By working at both the levels mentioned above a culture of communications and consultations is fostered leading to participation

## 6.3 Communication Methodology

Water and sanitation services in UP cities face specific challenges. Agra is an industrial center. A major issue in Agra is the floating population. Migrants come and live in Agra for varying periods of time. Water and sanitation challenges faced by the city due to massive influx of people list high among the concerns expressed by citizens; These pose challenges to the city administration with respect to toilets, solid waste management and water supply. National sanitation rankings survey has ranked Agra within the top 10 cities of India. However, this cannot conceal the major challenges in water and sanitation that the city faces. There is much scope for improvement. It was found that communication is a crucial element in improving service delivery standards. However, apart from educating citizens on health and hygiene, improving municipal processes by way of citizen consultation and participation remains a necessary goal. Without citizen inputs right from the design stage implementation of water and sanitation projets risk failure;

Communication needs assessment identified three stages for implementation of Information, Education and Communication strategy for improvement in water and sanitation services – (1) Awareness, (2) Process and (3) Compliance.

While it is generally understood that these stages would lead to better citizen participation in the schemes, it is in fact imperative for all stakeholders to be appraised of them from their own specific stand points. Awareness includes an understanding of health and hygiene related education specifically directed towards slums. Equally important is an awareness of municipal leaders about the problems face by all the residents including slum and middle class households, sanitation workers. This awareness is generally taken for granted. Here, we propose that open and specific appraisals be carried out without assuming too much of prior knowledge regarding sanitation issues. Next is to create processes which are essential to maintain improved services. These could include citizen participation in community toilet maintenance, outsourcing of operations and maintenance to private partners in public toilets, solid waste management and establishing citizen grievance resolution systems to name a few.

***A consolidation of these gains can only occur when all stakeholders comply with the rules. As system of 'incentivizing' desirable behaviors and weeding out undesirable behaviors must be developed, these programmes, processes and goals will be set by the urban local body.***

The key idea is to carry out a needs assessment within the existing infrastructure as well as the strategy to go with expansion of infrastructure. Following steps were identified before visiting the field:

- Identifying stakeholder groups and available channels of communication
- Focus Group Discussions, Interviews, Transect Walks.
- Topic Guides prepared for each stakeholder group.
- Data Collection. Field assessment of communications needs was carried out.

These methods helped the author evolve a case study approach towards communication needs assessment for Agra. Case study approach offers the best possible method for evolving Information, Education and Communications strategy for the city concerned. As the city is large a random sample based survey will cost a lot and will be labor intensive - Such as survey is likely to conceal extreme situations within a large city. A case study approach utilizing information sampling can reveal much more through discussions with citizens on the margins and those on the frontlines of implementation.

☐ **Stakeholders:** Opinion leaders to be targeted as a high influence group both for interviews and implementation of communications strategies.

- Key officials-Commissioners, sanitation inspectors, medical/health officers,
- Corporators, Community elders,
- City media: newspapers reporters,
- RWA office bearers,
- NGOs,
- Safai karamcharies union office bearers,
- Heads of Commercial establishments and shopkeepers, including public Places such as bus stands
- Slum /LIG/MIG/HIG areas residents
- School student, teachers, employees etc.
- Hospital employees and doctors

Residents, establishments and ANN officials; Resident include all those living within city municipal limits; they can be classified as HIG, MIG, LIG and slum dwellers. Shop keepers and commercial establishments constitute a separate group especially for generation of market and industrial waste.

☐ FGDs, Transect Walks, Interview/Discussion: In Agra city, 12 focus group discussions (FGDs) and various transect walks with slum residents in various parts of the city were conducted. Interview and discussions included officials from various departments, councilors, elected Member of Parliament, residents in middle class areas, sanitation workers, NGOs involved in water and sanitation sector, shopkeepers, media persons etc. Locations for FGDs must be selected to represent the variety of samples. Slum locations can be classified based on local knowledge. Generally, slums in outskirts and those in interiors offer two different typologies. Some cities have old town areas with predominantly Muslim populations- this represents diversity in terms of demography. Similarly there are slum with predominant SC or ST populations. Slums along railway lines and those along riverbeds form an essential typology. Vicinity to industry constitutes another significant parameter.

## 6.4 Probes for Field Trip and FGD

☐ **Residents Including Slum Residents**

- Awareness regarding Health and Hygiene: The current practices and awareness regarding ill-effects of lack of sanitation
- ODF, Hand washing, SWM, water logging, community and individual toilet use etc
- Awareness regarding government policies for improving water and sanitation: NUSP, SUDA, DUDA, Sources and channels of such knowledge and communication
- Awareness regarding technical options such as Toilet options
- Willingness to upgrade: financial and behavioral constraints
- Participation in any public awareness campaign regarding sanitation, Agencies that carried the campaign and learnings from the campaign
- Activities of local SHG's and other community organization, areas of engagement, in non-slum areas - check for RWAs
- Media consumption patterns reading newspapers, Cable TV etc (also in non-slum areas)
- Information regarding demography of the slum, Quality of water supply (also in non-slum areas), (To be gathered from surveys)
- Complaint resolution system: complaints and mechanisms of resolution, how do they deal with water and sanitation crisis, approaching local corporators, complain to ANN, extent of satisfaction with current arrangement of civic services.

☐ **ANN Officials**

- Role envisaged for communication for implementing CSP
- Channels of communication are at ULB's disposal, Extent to which these channels are being exploited
- Technological options, geographic and infrastructural issues involved in implementing Water and Sanitation schemes
- M&E, feedback, support, rewards: Maintenance of citizen grievance records, discernible patterns in complaints, efficiency of complaint redressal
- Details of any specific communication campaign being take up, Content, Channels used, budget allocated, awareness regarding multiplying message through media
- Kinds of training are given to safaikaramcharies for safe disposal of waste etc and their satisfaction at what has been provided

☐ **Commercial Establishment And Public Places**

- Observation regarding sanitation is these Places
- Practices involved in disposal of commercial waste such as segregation, shopkeeper participation
- O&M, regular upkeep of public Places
- Major Complaints, redressal mechanisms, willingness to participate
- Residents often refer to Agra city as 'the armpit of Uttar Pradesh' due to widespread pollution.
- Agra is an industrial city with hazardous waste producing tanneries and plastic industry.

## 6.5 Problem Analysis

### 6.5.1 Open Defecation:

A glaring example of a sustained IEC campaign bearing fruit can be found in the Kuchpura area. Women's and youth groups formed with the help of a local NGO CARE have been working for several years to raise awareness about ill effects of open defecation. Open defecation as a result has been limited in this area. Groups formed by girls perform street plays to raise awareness of the community about health and hygiene issues.

### 6.5.2 Community Toilets

Community toilets need better operations and maintenance. Most of the community toilets in the city are plagued with issues like dilapidated condition with crumbling building, leaking septic tanks, broken seats, and broken doors, with no water or electricity or maintenance person. The areas with sub-standard community toilets are – Nala Budhan Syed, Nagla Fakir Chand, New Raj Nagar near Normal School, Sunderban Tola in Nai Abadi and Nagla Gangaram. Open defecation sites and garbage dumps in proximity of community toilets are a common sight. In Nala Budhan Syed pig keepers tie pigs in and around such defunct toilets. It is essential to classify toilets based on the survey results to devise a plan of action. Broadly, the toilets would need the following measures. In worst case scenario this may require rebuilding the entire toilets complex. Generally, deteriorating infrastructure such as cracks in septic tanks, broken seats and doors need to be repaired. Operation and Maintenance of toilets assumes significance in the context of promoting toilet usage. Where the toilets are not maintained well people tend to go back to the habit of open defecation. Cleaner community toilets with community participation in maintenance of toilets and its operations will help better toilet usage. An IEC campaign involving local NGOs, SHGs etc is required.

### 6.5.3 Public Toilets:

In terms of the infrastructure, the public toilets are in a good condition especially when compared to community toilets; however, they are inadequate in number compared to the demand based on the visitors' footfall. However, most of the 11 public toilets in Agra built on its main roads are not operational through the day. Some operators complain lack of public use forcing them to keep in shut while some others do not seem to have a maintenance person. Operation and maintenance issues need to be sorted out by the municipality. Interestingly some community and public toilets have condom vending machines.

### 6.5.4 Underground Sewerage System

Underground sewerage system is plagued by problems especially in slum areas. For example in the Nala Budhan Syed area underground sewage system is dysfunctional and no connection has been given. There are internal and external engineering issues. Externally these line need to be connected to STP. Internally the lanes and by lanes in slums are so small that it is very difficult to lay the line with so many bends. Even if these are laid the line will be prone to frequent clogging. Municipal officials insist that these lines cannot be connected to houses. Clogging of UGS will become a regular maintenance problem for them

### 6.5.5 Solid Waste Management:

Solid waste management is one area where Agra can make gains. Agra's public places, markets are marked by the unsanitary welcome they offer to the tourists. Garbage collection points are typically overflowing garbage. Local shopkeepers burn the waste generated by them at the source. Solid waste management has been awarded to a private concessionaire under a BOOT project, but there is still a wide gap in waste being generated and being safely disposed

### 6.5.6 Water Supply:

Public support is important to control leakages. In areas such as Kuchpura connection taken directly from the raising mains caters to entire communities. There is ample scope for public awareness, as most people don't seem to bother as of now. Due to supply shortages Hand pumps have been provided by the Municipal Corporation are preferred over supply water for drinking purposes. Illegal connection and resultant leakages in the pipeline are very common that it has the effect of supplying contaminated water to Agra. In such a scenario it is not unusual that people of Agra do not drink the supply water. They take water from hand pumps to drink and from the piped supply for domestic use.

### 6.5.7 Other issues:

#### 6.5.7.1 COMMERCIAL AREAS

Commercial areas and markets are lacking in toilets. Several shop complexes share a common toilet facility. Sweeping is regular on daily basis but waste piles up fast in the busy commercial streets. Shops in Noori Darwaza and Nala Mantola area are coexisting with peta industries and shoe factories. This poses a major challenge for solid waste management

#### 6.5.7.2 PETA INDUSTRIES

Agra ka peta is a famous sweet. Peta industry is a thriving business that is located in Noori Darwaza area generates lot of solid and liquid waste. Most peta shops are also factories where peta is both made and sold. Noori Darwaza's intermediate dump is water logged upto 2-3 feet with the waste water from peta factories. The peta market is very dirty and non-peta stores want peta shops to be moved out.

As per Supreme Court directive peta industries in the Noori Darwaza area have to be relocated to the outskirts. An area named Petanagar has been earmarked and necessary infrastructural provisions keeping in view needs of the peta industry such as water supply have been laid. To encourage migration of factories Municipal Corporation is levying monthly user charge of Rs3000 on the factories within the city. Some of the biggest hospitals such as SN Hospital and TB Hospital in Agra are in the areas adjoining peta factories and tanneries and unsanitary conditions in this area are posing a threat to vulnerable patients

#### 6.5.7.3 SHOE FACTORIES

Unlike the waste generated from peta industry which is organic and hence bio-degradable in nature tanneries produce non-degradable contaminating waste. Nala Mantola area is home to several shoe factories in Agra. The nala in the middle of this area has 2-3 feet leather waste floating in it. The leather waste is burnt and the intoxicating fumes have to be put out by residents living over the shops. The nala is cleaned by municipality at irregular intervals such as once in a year before the id festival. As of now several truck loads of waste has piled up on the nala. There is a danger that stakeholder consultation in this area might lead to friction between the various stakeholders.

## 6.6 Sanitation Consciousness – Current Status of Services and Behaviours

As noted in the methodology section slum locations can be classified based on local knowledge. Generally, slums in outskirts and those in interiors offer two different typologies. Some cities have old town areas with predominantly Muslim populations- this represents diversity in terms of demography. Similarly there are slums with predominant SC or ST populations especially in the outskirts of Agra. Slums along railway lines and those along riverbeds such as Nallas Budhan Syed and New Rajnagar respectively form an essential typology. Vicinity to industry such as leather industry in the Mantola area constitutes another significant parameter. Based on these typologies we have identified the following stakeholder groups and their behavioral patterns –

| STAKEHOLDER GROUPS | AREAS OF HABITATION | SOCIO-CULTURAL/BEHAVIOURAL PATTERNS |
|---|---|---|
| **SLUMS OUTSKIRTS** | Eg. Kuchpura, Marwadi Basti. Other areas as marked on the map | Open defecation is prevalent. |
| | | In villages on the Heritage walk route where NGOs such as CARE have been working for several years there is perceptible change in people's behaviour. Street plays involving children have been staged as means of educating people about toilet use, hand wash, segregation of waste etc. Some households do defecate in open but not out of free will. |
| | | Some houses in this area have not been given permission to build toilets especially if they are in the close vicinity of historic monuments as laid out by Archeological Survey of India rules. In other areas such as for instance Marwadi Basti open defecation is practiced widely. |
| | | Most community toilets in these areas are in a state of neglect and have fallen to disuse. |
| | | There is no provision of door to door collection but residents throw garbage in municipal intermediate points or in the open. areas |
| | | People by and large have tapped into the water supply rising main. All such villages have access to water 24 hours but these connections are illegal. |

| STAKEHOLDER GROUPS | AREAS OF HABITATION | SOCIO-CULTURAL/BEHAVIOURAL PATTERNS |
|---|---|---|
| **SLUMS INNER CITY** | Nala Budhan Syed, Tela Gaj Singh, Nagla Fakir Chand, New Rajnagar, Nagala Gangaram and other such areas as marked on the map. | This area is marked with community toilets with several operation and maintenance challenges. |
| | | Open defecation by children in drains and open spaces is common. |
| | | Water Scarcity and poor state of community toilets forces elders also to defecate in open but, it is not very common. Some toilets do not have water of electricity connection with broken toilet seats force people to defecate in vicinity. |
| | | People are in some ways constrained in going out to defecate in the inner city areas. Open areas such as designated Public Park lands have become open defecation spots. |
| | | Some community toilets near railway line leave overflowing waste from septic tanks into open drains. Slums along the railway line have serious and peculiar problems. People defecating along the railway line are prone to significant risks. Some people in the area especially elderly have lost their lives and limbs in the process. |
| | | Community toilets in inner city slums are by and large in a state of neglect. Some fall in disuse soon after building. Pigs stray in and around community toilets. |
| | | Hygiene and sanitation awareness of residents is good. Open defecation is looked down upon. |
| | | UGD lines have been laid but not connected to STP and hence in a state of disuse. The narrow alleys pose a challenge as once connected these are likely to clog the network regularly. |
| **SHOPKEEPERS** | Commercial Areas/Public Places: Hingi Mandi Noori Darwaza, Mantola and other areas on map | Agra is commercial and tourist town. It is know for peta and leather works. Both these industries are sources of pollution. |
| | | Peta waste mainly organic and waste water flows throw the Noori Darwaza area. Municipal garbage point is knee deep in water and pigs can be seen around the area. Most shopkeepers express willingness to invest upto Rs20,000 to buy and use garbage processing units which leave out water. |
| | | Most shopkeepers complain about the waste generated by peta factories and want their relocation to the designated Peta Nagar. Peta shop keepers are willing to pay the user fee of Rs 3000 towards garbage disposal as required by the new municipal rules. |
| | | Tanneries produce non-degradable contaminating waste. Nala Mantola area is home to several shoe factories in Agra that has 2-3 feet leather waste floating in the nala which is doused and the intoxicating fumes have to be put out by residents living over the shops. |
| | | Slaughter houses in this area throw animal waste in the same nala. The nala is cleaned by municipality at irregular intervals such as once in a year before the Id festival. Tensions are running high in this area and bringing stakeholders together need preparation |
| **HIG RESIDENTS** | Areas locatable on map | Residents of this area have UGD connections. |
| | | Irregular water supply is a major issue for the residents. |
| | | Some recent surveys have been undertaken to monitor water supply quality and quantity in this area. |
| **LIG RESIDENTS** | All other Residential areas. Eg Vazirpur. | Marked by individual toilets, regular sweeping of street, occasional clearing of drains. |
| | | Residents tend to install motors to draw up water to first and second floors. These motors are attached directly to the supply pipe posing problems to those down the line. |
| **MUNICIPAL OFFICIALS** | City Wide | Fogging activities are being taken up in malaria prone areas. |
| | | Officials should call meetings with SLFs and shopkeepers specially butchers to raise awareness about hygiene and to promote safe practices. |
| | | Municipal officials need help to enhance their capacities for better implementation of projects. |
| | | A better co-ordination between various departments such as water department is required. |
| | | New public toilets on the main roads are falling into disuse- municipality needs to look into this. |

## 6.7 Messages for Stakeholders

National Urban Sanitation Policy 2008, by the Ministry of Urban Development, Government of India has outlined constitution, roles and responsibilities of City Sanitation Task Forces envisaging multi-stakeholder involvement. Some eminent persons from the city (from fields of academics, NGOs, media, art, business etc.) could be included into this task force. At a more micro level, creation of Ward Sanitation Action Committees headed by corporators of the concerned wards and comprising members from ULBs, office bearers of RWAs, safai karamcharies is recommended. The messages that need to be put across to the stakeholders are presented Table 6-2 below –

| TARGET AUDIENCE | MESSAGES/THEMES | CHANNELS OF COMMUNICATION |
|---|---|---|
| **Councilors/Commissioner/Engineers** | Sanitary use of Community Toilets | Organise walk to the zonal office programme to dispel mistrust specially for the slum residents, |
| | Status of Community toilets | |
| | How the toilets should be designed for social acceptance? | |
| | Promoting Septic tank latrines in slums | Council meeting, CSP workshops, |
| | How to ensure compliance from people, Rewards/Punishments | Newspaper Advt calling for meeting/ participating in walks |
| | Better implementation of sanitation projects | Press Conference-sharing the goals and plan of action for CSP with press persons |
| | Safe handling of garbage by Sanitation workers | Short Films on best practices |
| **Councillors, Office Bearers Slum Resident Federations representing Slums in Inner City** | Consultations on preventing open defecation | Organise walk to the zonal office programme with local councillor or officials, RWA Meeting (with the local councillor) |
| | Improved sanitation and hygienic practices in community toilets, hand washing | |
| | Safe disposal of Human Excreta | |
| | Contamination due to Fecal Matter | |
| | Do not burn garbage | |
| | Segregation of household waste, and disposal in designated bins | |
| | Health and hygiene | |
| | Diarrhea, GE, Malaria, Scabies | |
| | Consultation on problems with current toilets, taking stock of the community toilets status | Door to door campaign |
| | Consultation of water supply situation | Newspaper Advt calling for meeting |
| | Consultation on Environmental sanitation | Press Conference |
| | Consultation on expectations from Municipality | Short Films on best practices |
| **Councillors, Office Bearers Slum Resident Federations Representing Slums in City Outskirts** | Consultation on land tenure, voter ID card address related issues | Organise walk to the zonal office programme with local councillor or officials, |
| | Consultation on problems with community toilets, household toilets, hand washing, | |
| | Improved sanitation and hygienic practices in community toilets | |
| | Health Risks due to open defecation | |
| | Toilet options two pit, septic tank | RWA Meeting with local councilor and zonal officials |
| | Safe disposal of Human Excreta | Door to door campaign |
| | Health and hygiene, Diarrhea, GE, Malaria, Scabies | Newspaper Advt calling for meeting/ seeking participation in the walks |
| | Consultation of water scarcity, water quality problems | Press Conference |
| | Consultation on expectations form Municipality and how they could be met | Short Films on best practices |
| **Office Bearers of Residents Welfare Association Middleclass** | Consultation on problems with community toilets | RWA Meetings with concerned officials, |
| | Consultation on septic tank cleaning | |

| TARGET AUDIENCE | MESSAGES/THEMES | CHANNELS OF COMMUNICATION |
|---|---|---|
| **Localities** | Consultation on Environmental sanitation | Door to door campaigning |
| | Consultation of water supply situation | Newspaper Advt calling for meeting |
| | Consultation of willingness to pay for tricycles etc | Press Conference |
| | Consultation on expectations form Municipality | Short educational videos etc |
| **Water and Sanitation Officials** | Display numbers of responsible officials esp. Sanitation Inspectors prominently in their Zones | Printed pamphlets given with newspapers, newspaper advertisements, painting on Elevated/underground reservoirs |
| | Establish grievance redressal mechanism. | Print the phone numbers of responsible officials on the municipal garbage tractors |
| | Emphasis on time bound resolution of public grievances | |
| **Water and Sanitation Workers** | Importance of safe handling of waste | Meetings and workshops to include Parivartan and A2Z employees along with Municipal workers |
| | Do not burn garbage | |
| | Do not dump Garbage on roads leading to dump yard | |
| | Educating people on waste segregation | |
| **Shopkeepers/Commercial/Industrial/ Slaughterhouses** | Do not dump garbage in by-lanes | Meeting of the local shopkeeper associations to sort out the problems among themselves, meeting with municipal officials and councillors. |
| | If you need to dispose hazardous waste call the municipality and ask for a tractor. | |
| | Slaughter house waste disposal consolations | |
| | | Specific meetings with tanneries and tanneries on waste disposal |
| **City Wide** | Keep house and neighborhood Clean | Road Side Billboards |
| | Keep your community toilets clean | |
| | Boil/Filter the Water before drinking | News Paper, radio and TV Ads |
| | Wash your hands before and after eating/drinking | City Cable |
| | Don't allow mosquitoes to breed in your neighborhood | Press conference |
| | Immunize Children | Know your city and heritage walks |
| | Don't share clothes of persons infected with skin diseases | Short films for screening in Theatres etc. |

*Source: ASCI primary survey*

# CHAPTER 7. SECTOR SPECIFIC AND CITY-LEVEL STRATEGIES

## Topics of Discussion

- City-Level Vision and Goals of Agra CSP
- City-Level Problem Areas, Strategy and Recommendations
- City-Level Action Plans
  - Technology
  - Finance
  - Institution & Governance
  - Capacity Enhancement and Awareness
  - Inclusiveness

The key challenge that the cities face in the process of the preparation of the CSP is developing a implementation strategy to promote sustainable sanitation infrastructure. The development of the implementation strategy entails detailed planning; initiatives supported by incentives, guidance system / sound financial systems; innovations; context specific sustainable solutions, prioritization; supportive context; community engagement models, and most importantly, the ownership and leadership from the city administrators.

***The prime responsibility of implementation of the CSP rests with Agra Nagar Nigam (ANN), however, it is imperative that ANN shall engineer and institutionalize the collaborative efforts of all stakeholders involved to help achieve the defined goals as part of the implementation strategy.***

The implementation strategy is evolved based on the detailed analysis of the situation in the major sectors of sanitation namely, (a) sewerage; (b) access to sanitation – toilets; (c) storm water and (d) solid waste (***please refer to Chapters 3 and 4***). The sanitation mapping, initial and final analysis of the baseline data, and projection of demand for various sanitation services in the defined sectors (please refer to Status Report) have helped identify the level of deficiency in respect of sanitation in Agra. A broad city level strategy for implementation of the City Sanitation Plan for Agra is outlined along the five strategic intervention areas, namely, (1) Technology Options; (2) Financial Options; (3) Institutional and Governance Options; (4) Capacity Enhancement and Awareness Generation Options; and (5) Inclusive Approach.

## 7.1 Vision and Goals of Agra CSP

***Vision Statement*** **- "Agra shall be environmentally safe and totally sanitized & liveable city so as to ensure good public health standards, human dignity, and privacy for all citizens"**

The broad goals for Agra City shall reflect thus -

- ***Goal 1*** *- The entire population of the city shall have access to toilets in the form of either individual toilets, shared toilets or community toilets, with adequate water supply by 2019;*
- ***Goal 2 -*** *All major public places shall have adequate number of public toilets in fully serviceable condition by the year 2019;*
- ***Goal 3 -*** *The quality of drinking water shall be improved and the entire population shall have access to quality drinking water by the year 2019;*
- ***Goal 4 -*** *All the households shall be connected to the sewerage network, centralized or decentralized by the year 2016*
- ***Goal 5 –*** *All the waste water generated in the city shall be collected and conveyed through an appropriate sewer network to treatment plants, treated to acceptable quality levels and disposed, recycled or reused by the year 2016;*

- ***Goal 6 -*** *All households as well as non-residential users shall have access either to a door-to-door collection of garbage or to a secondary collection facility within easy accessible distance by the year 2016;*
- ***Goal 7 -*** *All the solid waste generated in the city shall be segregated, collected, transported and either processed for reuse or disposed of in a sanitary landfill by the year 2016;*
- ***Goal 8 -*** *The entire sanitation system as visualized above is socially, environmentally and economically sustainable and effectively managed by a capable team in the municipality, maintaining adequate standards of safety for the workers;*

### 7.1.1 Guiding Principles

The guiding principles for the realization of the vision and hence the defined goals as articulated above are enumerated below –

- ☐ Equity
- ☐ Sustainability – Technical, Financial, and Environmental
- ☐ Transparency
- ☐ Local Adaptability
- ☐ Improved Public Heath
- ☐ Inclusiveness

### 7.1.2 Framework

The National Urban Sanitation Policy, Uttar Pradesh Urban Sanitation Strategy, and the National Rating and Award Scheme for Sanitation for Indian Cities by Government of India, provide a good framework for defining the guidelines to prepare the City Sanitation Plan and its implementation strategy.

| INDICATORS AS PER NUSP | GUIDELINES FOR CSP |
|---|---|
| **OUTPUT RELATED** | Proposals to provide safe access to household sanitation and serve entire population by toilets<br>Proposals for safe disposal of waste water, storm water and solid waste<br>Proposals to meet the national standards for safe disposal of liquid and solid wastes |
| **PROCESS RELATED** | Proposals to ensure the efficient design of the system in conformity with applicable rules and regulations<br>Proposals to ensure clear devolution of responsibility and accountability in the institutional system<br>Proposals to ensure competent documentation of the operational and monitoring systems<br>Proposals to ensure the formulation of prudent sanctions for deviances / violations of the system both at individual / institutional level and ensure the enactment |
| **OUTCOME RELATED** | Proposals to ensure the systems facilitate and sustain good public health and environmental conditions |

### 7.1.3 Timeline

The system shall be designed under the broad framework as per the guidelines for a design period of 30 years; however, the planning shall entail the implementation of the design in phases to meet the ultimate goals of the CSP.

The phased approach aims to navigate through the challenges posed by the limitations in investments, institutional capacities, and community engagement in a proficient manner. The phases and the corresponding timelines are defined as stated below –

**TABLE 7-1: PHASES AND TIMELINES FOR A CITY SANITATION STRATEGY**

| PHASE | YEAR |
|---|---|
| **IMMEDIATE TERM** | 2014 - 2016 |
| **SHORT-TERM** | 2014 - 2019 |
| **MID-TERM** | 2014 - 2034 |
| **LONG-TERM** | 2014 - 2044 |

TABLE 7-2: ASSUMPTIONS FOR STRATEGIC PLANNING

| PHASE/YEAR | | |
|---|---|---|
| **SHORT-TERM 2014 - 2019** | **MID-TERM 2020 - 2034** | **LONG-TERM 2035 - 2044** |
| Efforts initiated to eradicate slums and award land tenure and achievement of eradication of slums and award of lan-tenure - regular small houses replace slum settlements | Regular Houses for all | Regular Houses for all |
| Efforts initiated towards public outreach and education and 80% Literacy rate is achieved | 90% Literacy rate is achieved | 95% Literacy rate is achieved |
| Efforts initiated to generate awareness campaigns to promote better hygiene and sanitation practices and Citizens adopt the better hygiene and sanitation practices | Citizens adopt the better hygiene and sanitation practices and sustain the systems | Citizens adopt the better hygiene and sanitation practices and sustain the systems |
| Efforts initiated to regularize the particpatory planning and budgeting and participatory planning institutionalized | Participatory planning institutionalized | Participatory planning institutionalized |
| Efforts Initiated to enhance employement rates through local adaptivity and productivity and 70% of the population is employed and has regular income | 90% of the population is employed and has regular income | 100% of the population is employed and has regular income |
| Efforts initiated to promote 3R Principle - Reduce, Reuse and Recycle and citizens adopt the 3R Principle - Reduce, Reuse and Recycle in all sectors | Water Conservation practices are prevalent; Storm Water Source Control Mechanisms are regularized; Reduction/Reuse/Recycle of liquid/solid waste is achieved | Water Conservation practices are prevalent; Storm Water Source Control Mechanisms are regularized; Reduction/Reuse/Recycle of liquid/solid waste is achieved |
| Efforts initiated to provide 135 lpcd water supply to all citizens and water connections to all has been achieved and 135 lpcd water supply is also achieved | Water connections to all has been achieved and 135 lpcd water supply is also achieved | Water connections to all has been achieved and 135 lpcd water supply is also achieved |

## 7.2 City-Level Critical Problem Areas, Strategy and Recommendations

### 7.2.1 Sewerage Management

#### 7.2.1.1 CRITICAL PROBLEM AREAS

- ☐ **CRITICAL PROBLEM AREA 1** – The available centralized sewer line network, cumulative of old and new network, is sufficient to achieve 77% coverage (connections to properties); however, only 23% coverage is reported. The last mile connectivity is a challenge
- ☐ **CRITICAL PROBLEM AREA 2** – The sub-standard operation & maintenance of the sewer network results in the deterioration of condition of the sewer lines and hence their efficiencies. This also translates into high O&M expenditures
- ☐ **CRITICAL PROBLEM AREA 3** – Adverse risk to public health due to improper septic tanks and septage management leading to contamination of water bodies/water supply distribution system and incidences of water borne diseases

### 7.2.1.2 STRATEGY

Based on the comprehensive situation analysis executed for the city within the sewerage sector and the identified gaps in the level of service delivery, the targets for service delivery are set across the planning horizon of 30 yrs. Based on the existing sanitation situation, demographic profile of the city including the population density patterns, the socio-economic profile, the topography, and the financial aspects of ANN, the targets are set for the immediate, short-term, mid-term and long-term phases of the city sanitation planning.

**TABLE 7-3: TARGETS FOR SERVICE DELIVERY LEVELS IN SEWERAGE MANAGEMENT SECTOR**

| COMPONENT OF SERVICE | DESIRED LEVEL OF SERVICE DELIVERY | EXISTING LEVEL OF SERVICE DELIVERY | TARGETS FOR SERVICE DELIVERY LEVELS | | | |
|---|---|---|---|---|---|---|
| | | | 2014-2016 | 2014-2019 | 2014-2034 | 2014-2044 |
| **Collection of Waste Water** | | | | | | |
| **Coverage of Sewer Network (% of household connections)** | **100%** | 23% | 80% | 100% (Demand until 2018) | 100% (Demand until 2033) | 100% (Demand until 2043) |
| **Compliance of Septage Management to CPHEEO Standards** | **100%** | 0% | 50% | 100% (Demand until 2018) | 100% (Demand until 2033) | 100% (Demand until 2043) |
| **Conveyance of Waste Water** | **100%** | 49.9% | 80% | 100% (Demand until 2018) | 100% (Demand until 2033) | 100% (Demand until 2043) |
| **Treatment Capacity of STPs** | **100%** | 68.2% | 80% | 100% (Demand until 2018) | 100% (Demand until 2033) | 100% (Demand until 2043) |
| **Cost Recovery** | | | | | | |
| **Extent of Cost Recovery** | **100%** | 9.4% | 40% | 80% | 100% | 100% |
| **Efficiency in Collection of Sewage Charges** | **90%** | 58% | 90% | 90% | 90% | 90% |
| **Customer Service** | | | | | | |
| **Efficiency in redressal of customer complaints** | **80%** | 51.4% | 80% | 80% | 80% | 80% |

The strategy adopted to achieve the aforementioned targets in the service delivery shall include the restoration of the existing sewerage network system for use in the immediate phase while engaging in the assessment of further requirement in both the sewer network coverage and treatment and disposal systems. The possibility of a judicious blend of centralized and decentralized systems to meet the demands of the city shall be thoroughly investigated. The technology and service delivery options shall be designed to ensure the sewerage is managed efficiently through the entire cycle of operations originating at the generation of wastewater and culminating in the ultimate disposal. (***Please refer to Annexure 9 for the O&M procedures and systems***).

All stages of the complete cycle are carefully planned to extend services to the entire city population cutting across all sections of the society and all levels of the settlements. The several options are designed with a focus on energy efficiency and overall sustainability of the system, keeping in mind the existing limitations of technical, financial and social capacities of ANN. The service delivery options shall enmesh the community participation and NGO involvement to complement ANN capacities.

Given the fact that the city is largely characterized by population with a low awareness in terms of the available sewerage management services and also the adverse impacts of the current malpractices leading to disintegration of health and environment; hence the proposals shall bear in mind the requirement for generation of awareness in the community alongside the provision for educating theses masses. This approach shall ensure sustainability of the proposed systems. (*please refer to Chapter 6 for awareness generation strategy)*

#### 7.2.1.2.1 Design Premises

The proposals shall be based on the following parameters –

- ☐ Projected Populations and
- ☐ Projected Households,
- ☐ Existing Situation vis-à-vis the Key Issues at Ward Level
- ☐ Projected Sewerage Generation7
- ☐ Existing Institutional Capacities
- ☐ Existing Financial Capacities

Table 6.4 represents the design inputs for the development of the sewerage management system with respect to the projected populations considering the growth and development patterns within the city –

**TABLE 7-4: DESIGN INPUTS - SEWERAGE MANAGEMENT SYSTEM**

| YEAR | TOTAL POPULATION | WATER DEMAND (MLD) @ 150 LPCD | SEWERAGE GENERATION (MLD) @ 80% OF WATER DEMAND |
|---|---|---|---|
| **2015** | 19,73,390 | 296.01 | 236.81 |
| **2020** | 21,44,764 | 321.71 | 257.37 |
| **2025** | 23,33,535 | 350.03 | 280.02 |
| **2030** | 25,41,320 | 381.20 | 304.96 |
| **2035** | 27,69,944 | 415.49 | 332.39 |
| **2040** | 30,21,470 | 453.22 | 362.58 |
| **2045** | 32,98,228 | 494.73 | 395.79 |

#### 7.2.1.2.2 Design Phases

| PHASE | DESIGN COMPONENTS |
|---|---|
| **IMMEDIATE-TERM (2014-2016)** | Connections to the households;<br>Initiate primary collection and conveyance system ;<br>Initiate septage management system |
| **SHORT-TERM (2014-2019)** | Finalize collections to households and the conveyance system<br>Intermittent decentralized waste water treatment systems for existing waste generation;<br>Finalize decentralized waste water treatment systems if found feasible<br>Finalize Treatment and Disposal Processes<br>Finalize Septage Treatment & Disposal Processes |
| **MID-TERM (2014-2034)** | Augmentation of the system to meet the demands of the growing population<br>Replacements of components and operation & maintenance |
| **LONG-TERM (2014-2044)** | Augmentation of the system to meet the demands of the growing population<br>Replacements of components and operation & maintenance |

### 7.2.1.3 RECOMMENDATIONS

#### 7.2.1.3.1 Solution for the Critical Problems 1&2 – 'The last mile connectivity challenge and the operation & maintenance drawbacks'

***Immediate Action Directives***

- ☐ In order to achieve the last mile connectivity, as an immediate measure it is recommended that ANN in consultation with Jal Sansthan release a notification for the household connections process initiation. The notification shall include the following information –
    - The work schedule and the time schedules for the phase-wise connection process. The details of the administrative zones and the sanitary wards with respect to the phases of work shall be provided as well.

[7] The sporadic maximum sewage contributions from the floating population as tourists in the city, are considered and compounded with the regular city-level sewage quantities towards peak load considerations for design purposes. The proposed system shall provide for the buffer capacity to address the intermittent extreme waste loads.

- The details of the sewerage management system including the length of sewer lines, capacity of STP serving the area with a note detailing the benefits of the system for the community;
- The connection process/mechanism details
- The connection fee details
- The helpline[8] details including the number(s) and the concerned officials'/support staff information

☐ ANN shall initiate the IEC campaigns to generate awareness amongst residents of the existing sewerage system and their benefits. The IEC shall also aim at enhancing the willingness of the households to connect to the network.

☐ As an integral part of the IEC campaign, ANN and Jal Sansthan shall hold a series of public meetings with the several stakeholders / target groups to reinforce the willingness of households to connect to the system and also gain their agreement on the connection fees. The officials may also disseminate ***incentive schemes*** for the citizens to catalyze the connection process

☐ In order to ensure proper connectivity, ANN and Jal Sansthan may provide support to the citizens by establishing a connection mechanism through a certified plumber

☐ ANN and Jal Sansthan shall initiate the connection process in the HIG and MIG areas and facilitate efficient collection of charges in order to provide cross-subsidy to the citizens in the LIG and slum areas .

☐ ANN in consultation with Jal Sansthan and UP Jal Nigam shall release a '***tender***' requesting expression of interest and subsequent award of the contract of operationalizing the connection process including the IEC campaigns; operation and maintenance (O&M) of the existing sewerage network and pumping stations and STP to a ***Private Service Provider*** (PSP) in PPP mode. The scope of the PSP shall include –

- Maintenance of the sewerage network;
- Operation and maintenance of the pumping stations;
- Survey for identification of the households without connections;
- Development of a GIS based information system to award unique IDs to all assets of the sewerage management system in synchronization with the property tax based household IDs in consultation with ANN and Jal Sansthan;
- Development and continuous updation of the sewerage system maps in 1:2,000 scale following NUIS standards; and
- Operationalize household connection process – work closely with Jal Sansthan & ANN and connect the households to the sewer network taking the services of the certified plumber.
- Conduct the trainings and certification of the plumbers to meet the demands of the connection process
- Train the ANN team w.r.t the O&M of the sewerage system
- Develop and assist the ANN in institutionalizing the O&M Manual
- Develop the O&M plans at the sanitary ward level

***Administrative and Regulatory Measures***

☐ **Institutionalizing of the Household Connection Mechanism**–The connection will be undertaken by certified plumper, who is authorized by ANN. Training courses for the plumber is to be organized by ANN with the support of the private partner appointed vide a competitive bidding process at the end of which the '***certification and license***' shall be provided.

☐ **Institutionalizing Monitoring and Evaluation (M&E) Mechanisms** – M&E mechanisms for the design implementation/asset development as well as operation & maintenance of the assets shall be developed under the technical wing of ANN supported by a dedicated team of engineers and laborers to handle the O&M of the system.

[8] ANN shall establish a helpline in the Agra Jal Kal (KJK) section to enable a timely redressal of residents' concerns or queries with respect to the household connections.

'***Training and certification***' of the technical team and laborers shall be organized by ANN which shall include the use of sophisticated instrumentation required for the O&M (***Please refer to Annexure 9 for details***).

- ☐ **Develop and Regularize Municipal Bye-Law**– Municipal Bye-Laws or Building Codes shall be introduced to make connectivity mandatory for grounds situated in a defined distance from the next sewer line. Grounds, with exceeding distance maybe allowed installing onsite systems. Connectivity applies for all black or grey water outlets.
- ☐ **Develop and Conduct Awareness Generation Campaigns**– Campaigns shall be conducted to propagate the benefits of better hygienic and sanitation practices and also advocate the efficiency and benefits of the sewerage management systems designed for the community. Through the campaigns, ANN shall encourage the residents to connect to the existing and proposed network through financially sustainable mechanisms and cross-subsidy mechanisms;
- ☐ **Ring Fence Sector Specific Budgets**–Budgets shall be established and the dedicated Sewerage Sectoral Unit under the Sanitation Department shall develop the costs and the tariff structures in consultation with the Finance & Accounts Department and the Strategic Communications Cell (working closely with the communities) in order to promote efficient '***cost recovery mechanisms***'. '***Impact benefit tax***' is also proposed to be levied upon regularization of services.
- ☐ **Establish Connection Fee** – Each ground will be provided with a nominal connection fee, which is to be reinvested into the system for capital investment and not for O&M cost. Connection for lower income groups/slum dwellers shall be subsidized.
- ☐ **Regularize Incentive Mechanism** – Incentive Mechanisms shall be institutionalized in order to motivate both the citizens and ward corporators and councilors to improve the sanitation situation in their respective localities.

#### 7.2.1.3.2 Solution for the Critical Problem 3 – 'Adverse risk to public health due to improper and non-compliant septic tanks and septage management leading to contamination of water bodies/water supply distribution system and incidences of water borne diseases'

***Immediate Action Directives***

- ☐ ANN shall facilitate the IEC campaigns to educate the residents on the benefits of compliance of septic tanks to the prescribed guidelines by CPHEEO.
- ☐ Through the IEC campaigns ANN shall disseminate the incentive mechanisms for compliance to standards.

***Feasibility Study***

In order to establish a sustainable septage clearance and management system for the city, a study shall be conducted to assess the possibility of integrating the septage management into the sewerage or the solid waste management system. It may be recommended to strategize the management separately for the existing and the future septic tanks.

'Premises' – The septage clearance from the ***existing septic tanks*** shall be integrated with the solid waste management primary collection system and the septage either disposed to the solid waste management facility or the STP site. The septage treatment again shall be integrated either with the solid waste treatment or the sewerage treatment process.

'Premises' – The septage clearance from the ***future septic tanks*** shall be integrated into the sewerage network system, while the septage treatment shall be integrated either with the solid waste treatment or the sewerage treatment process.

The scope of the feasibility study shall include –

- o Assessment of the sanitary ward wise demand for desludging facilities and the feasibility of separation of black and grey water;
- o Assessment of the septage characteristics in sanitary ward-wise and sewerage zone-wise manner in the city so its potential of integration into sewerage treatment or solid waste treatment may be established;

- Assessment of the potential of use of septic tanks as interceptor tanks for the sewerage systems – assess the design options of septic tanks for the new constructions so connection to the sewer network is feasible;
- Assessment of the potential of the waste to energy options to ascertain the viability of the integration of septage treatment into the sewerage or solid waste treatment process
- Assessment of the vehicle options to collect septage along with solid waste to make the system more financially viable and sustainable.

***DPR***

☐ Based on the findings of the feasibility study, ANN may release a notice to invite expression of interest to prepare a DPR for the – (**a**) rehabilitative and up-gradation works of the existing septic tanks and (**b**) planning and design of the new septage management system[9] that shall integrate the septage management with either sewerage or solid waste management. The scope shall include – (**1**) Procedures for rehabilitation of septic tanks to arrest seepage as well as upgradation into interceptor tanks to integrate into proposed off-site sewerage system , (**2**) develop design guidelines for the septic tanks to be adopted by the city so septage management system including clearance & treatment gradually can be integrated into the future/proposed off-site sewerage system(s) or solid waste systems, (**3**) develop GIS based asset registry system for septage management in synchronization with the property tax system and the computerized maintenance management plan coupled with comprehensive M&E system - this system shall track all maintenance activities in addition to facilitating a central repository of areas of complaints and general maintenance;

***Administrative and Regulatory Measures***

☐ **Develop and Conduct Awareness Generation Campaigns**– Campaigns shall be developed and conducted to propagate the benefits of integration of the existing septic tanks into the off-site sewerage systems so it may increase the acceptance of the procedures by the community and their willingness to pay for the management services may be reinforced;

☐ **Regularize Municipal Bye-Laws and Building Codes** – Municipal bye-laws and building codes shall be developed and enforcing mechanism shall be institutionalized by ANN to promote sustainable septage management system for the city. The directive shall (**1**) mandate the stringent compliance mechanism for the design of septic tanks along with the approval of new constructions; (**2**) Regulatory oversight mechanisms to penalize the citizens violating the establishing regulation and standards; (**3**) Approve construction of septic tanks only if CPHEEO guidelines are followed (certification/approval mechanism), which include - (**i**) includes only the discharge of black water (toilets), (**ii**) does not exceed population density of 300 capita/hectare, (**iii**) exclude use of soak pits in areas with impermeable soil, hardrock or high groundwater table.

☐ **Institutionalize Incentive Schemes**–Incentives shall be introduced in the form of property tax rebates in order to achieve connectivity (can be linked with sewerage issue!)

### 7.2.2 Access to Toilets

#### 7.2.2.1 CRITICAL PROBLEM AREAS

☐ CRITICAL PROBLEM AREA 4 – Open Defecation with adverse impacts on health and environment despite 88% coverage of toilets (individual toilets) and 15% of the population's access to community toilets. The poor operation and maintenance has been the underlying cause.

☐ CRITICAL PROBLEM AREA 5 – There are only 11 numbers of public toilets with a floating population of 1 – 1.5 Lakhs affecting the aesthetics and hygiene of tourist locations, commercial and market areas**;** the operation and maintenance of the existing toilets is also a challenge

#### 7.2.2.2 STRATEGY

Based on the comprehensive situation analysis executed for the city within the access to toilet sector and the identified gaps in the level of service delivery, the targets for service delivery are set across the planning horizon of 30 yrs. Based on the existing sanitation situation, demographic profile of the city including the population density

[9] Annexure 13 provides literature on septage management practices and design guidelines

patterns, the socio-economic profile, the topography, and the financial aspects of ANN, the targets are set for the immediate, short-term, mid-term and long-term phases of the city sanitation planning.

The strategy adopted to achieve the assigned targets in the service delivery, as per Table 7-5, shall include the rehabilitation and upgradation of the existing sanitary facilities for use in the immediate phase while engaging in the assessment of further requirement in the individual and community category as well as toilets in municipal schools, commercial and market areas.

**TABLE 7-5: TARGETS FOR SERVICE DELIVERY LEVELS IN ACCESS TO TOILETS SECTOR**

| COMPONENT OF SERVICE | DESIRED SERVICE DELIVERY | EXISTING SERVICE DELIVERY | TARGETS FOR SERVICE DELIVERY LEVELS | | | |
|---|---|---|---|---|---|---|
| | | | 2014-2016 | 2014-2019 | 2014-2034 | 2014-2044 |
| **Coverage of Toilets** | | | | | | |
| **Individual Toilets (toilets per every household)** | 1 | 0.88 | 0.75 | 1 | 1 | 1 |
| **Community Toilets (seat per every user)** | 1 in 35 | 1 in 50 | 1in 40 | 1 in 35 | 1 in 35 | 1 in 35 |
| **Public Toilets (seat per every user)** | 1 in 100 | 1 in 250 | 1 in 175 | 1 in 100 | 1 in 100 | 1 in 100 |
| **Condition of Toilets** | | | | | | |
| **Individual Toilets (% in working condition)** | 100% | 80% | 100% | 100% | 100% | 100% |
| **Community Toilets (% in working condition)** | 100% | 71% | 85% | 100% | 100% | 100% |
| **Public Toilets in (% in working condition)** | 100% | 50% | 75% | 100% | 100% | 100% |
| **Toilets in Schools (% in working condition)** | 100% | 90% | 95% | 100% | 100% | 100% |

Given the fact that the city is largely characterized by population with a low awareness in terms of the available sanitation services and also the adverse impacts of the current malpractices leading to disintegration of health and environment; hence the proposals shall bear in mind the requirement for generation of awareness in the community. This approach shall ensure sustainability of the proposed systems. (*please refer to Chapter 6 for awareness generation strategy)*

#### 7.2.2.2.1 Design Premises

The proposals shall be based on the following parameters –

- ☐ The Population Densities
- ☐ Development Pattern of the City – Present & Future Land-Use
- ☐ Opportunities of means of livelihood
- ☐ Existing Institutional Capacities
- ☐ Existing Financial Capacities
- ☐ Existing Situation vis-à-vis the Key Issues at Ward Level

Based on the primary survey and the focus group discussions conducted in the slum areas the following assumptions have been defined to strategize the improvement of access to toilets –

**TABLE 7-6: ASSUMPTIONS FOR PROVISION OF TOILET FACILITIES IN SLUM AREAS**

| PERCENTAGE OF HOUSEHOLDS WITHOUT ACCESS TO TOILETS | STRATEGY |
|---|---|
| **30%** | Develop individual toilets w/support of different schemes ILCS/RAY/BSUP |
| **20%** | Develop shared toilets - 1 toilet amongst 5 households; where land availability is a constraint |
| **20%** | Willing to develop individual toilets if assured water supply / sewerage management |
| **30%** | Develop tiered Community Toilet Complexes - 1 seat per every 35 users; with multi-utility of the multi-level development |

Based on the above assumptions, the design inputs for the interventions to improve the access to toilets in the city of Agra are presented in Table 7-7 –

**TABLE 7-7: DESIGN INPUTS - ACCESS TO TOILETS STRATEGY**

| | NON-SLUM AREAS | SLUM AREAS |
|---|---|---|
| **Population** | 879600 | 586400 |
| **Households** | 146600 | 97667 |
| **Households without access to toilets** | - | 29312 |
| **No. of individual toilets required (50% of total requirement)** | - | 14656 |
| **No. of shared toilets required (1 in 5 Households)** | NA | 1152 |
| **No. of CTCs required (15-seater: 1 seat in 35 users)** | NA | 17 |

#### 7.2.2.2.2 Design Considerations

The various boundary conditions that influence the design of the community toilets and enhance the acceptability levels amongst the community and also promote sustainability of the developed assets and the overall sanitation system are presented below –

- ☐ Location
  - Proximity to settlements – preferably 100-200 m
  - Visibility
  - Safety aspect
  - Near sewage lines
  - Co-location – compatible use
- ☐ Signage
  - Directional and Labelling
- ☐ Gender Sensitive Design
  - Women and children specific
- ☐ Disability Access
- ☐ Elderly User Access
- ☐ Well-lit / ventilated
- ☐ Environmentally Sustainable
  - Energy Considerations
    - High degree of natural lighting
    - Low energy light fittings
    - Use of solar power
    - Passive ventilation
    - Recycled, recyclable, renewable and locally sourced source materials
  - Water Considerations
    - Grey Water Flushing
    - Low-flow/water less urinals
    - Recycling of storm water for flushing

#### 7.2.2.2.3 Design Phases

**TABLE 7-8: DESIGN PHASES - ACCESS TO TOILETS SECTOR**

| PHASE | DESIGN COMPONENTS |
|---|---|
| **IMMEDIATE (2014-2016)** | Detailed survey of existing facilities to initiate rehabilitation and augmentation<br>Repairs and up gradation of the existing toilets;<br>Design & Construction of the new facilities in areas with no sanitation facilities<br>Initiation of septage management |
| **SHORT-TERM (2014-2019)** | 100% coverage and infrastructure development<br>Design of System to handle the human excreta |
| **MID-TERM (2014-2034)** | Finalization of septage management<br>Augmentation of the system to meet the demands f eth growing population<br>Repairs & Maintenance |
| **LONG-TERM (2014-2044)** | Augmentation of the system to meet the demands of the growing population<br>Repairs & Maintenance |

Recommendations

#### 7.2.2.2.4 Solution for the Critical Problem – 'Design and O&M drawbacks in individual and community toilets in urban poor areas leading to open defecation and eventual health and environmental risks'

***Immediate Action Directives***

- ☐ It is recommended to release a **notice to invite EoI** for the design, rehabilitation and upgradation of the existing toilet facilities on a Rehabilitate, Operate and Transfer (ROT) basis in People Public Private Participation (PPPP10) mode in the immediate phase with a horizon of year 2015 and the community toilet facilities in the listed wards (***Please refer to Annexure 5***) are in need of repairs and have inadequate capacity and design to handle the expected demand in the urban poor areas in compliance to established design guidelines by Ministry of Housing and Urban Poverty Alleviation and the design standards through relevant Government Orders. The scope shall also include the survey of the remaining city and ascertain the exact numbers and sanitary ward-wise location for rehabilitation and upgradation sanitation facilities
- ☐ Launch a pilot project for the usage of mobile toilets as (a) temporary solution for CTCs wherever in-situ development of slums or relocation of the community is planned under RAY or areas where land tenure issues are flagged, (b) seasonal need for additional toilet seats is prevalent in area with floating population and (c) place constraint does not allow any permanent solution. The project can be trialed in model Wards. ANN shall appoint a consultant to prepare the proposal for the pilot project. The consultant shall provide –
    - a need assessment at the outset
    - develops an Operator model and a Financial Model for the capital investment as well as O&M cost,
    - prepares a septage management plan (if direct connection to the sewerage system is not given); and
    - implements the Sanitary Ward level pilot project (subject to mutual agreement or may be contracted separately to an agency through tender process)

[10]In the PPPP mode, people shall be treated as customers rather than as beneficiaries and hence shall contribute towards both the capital and O&M investments as far as possible. People shall also be actively involved in the O&M activities leading to an enhanced sense of ownership and ultimate sustainability. The capital investment may also be in the form of labor, material as well.

***Feasibility Study***

- ☐ The feasibility study shall be conducted to ascertain the model of toilets to be adopted in the city to address the access to toilets issue. – shared/community/mobile. The scope shall include –(**1**) sanitary ward wise identification of demand for toilet facilities, (**2**) assessment of the land availability at household,/community/ward level in the areas which are prone to open defecation(**3**) assessment of opportunities for rain water harvesting systems and use of water thus tapped for operational & maintenance activities, (**4**) Based on the database of spatial distribution of inadequacy of the toilet facilities , (**5**) the willingness to pay by the community and their participation interest levels in the O&M of the sanitation facilities in order to develop operator and finance models

***DPR***

- ☐ Based on the findings of the feasibility study, ANN may release a notice to invite EoI to prepare DPR. It is recommended to evolve a city-wide strategy through DPR, yet the city-wide plan shall be broken down into packages to ensure phase-wise development in order to ease the financial burden. The DPR is detailed as under -

DPR for the construction works of new toilets which shall include – (**1**) Design of toilets as per the design guidelines by Ministry of Housing and Urban Poverty Alleviation and the design standards through relevant Government Orders, (**2**) Detailing the construction procedure of shared toilets, and community toilets (**3**) Design the fecal sludge management system including clearance & treatment gradually integrating into the future/proposed off-site sewerage system(s) (**4**) Develop asset registry for toilet management and the computerized maintenance management plan coupled with comprehensive M&E system –this system shall track all maintenance activities in addition to facilitating a central repository of areas of complaints and general maintenance

***Administrative & Regulatory Measures***

- ☐ It is recommended to '***establish a dedicated unit for Toilets Sector***' under the Sanitation Department to streamline the design, construction, operation & maintenance processes within the sector with regular O&M training programs for the both the ANN officials and O&M team and the community and regular helpline.
- ☐ **Develop and Conduct Awareness Generation Campaigns**– Campaigns shall be conducted to propagate the benefits of better hygienic and sanitation practices and encourage the residents to adopt toilet facilities through financially sustainable mechanisms and cross-subsidy mechanisms. Along the lines of the National School Sanitation Initiative (NSSI), the awareness campaigns to promote behavioral change shall lay emphasis on personal hygiene, proper sanitation, clean toilet habits, safe drinking water, separate toilets for girl child, disposal of waste water, human excreta disposal/toilets, waste water recycling, waterless urinals, waste segregation, and compositing, food hygiene and creation, and conservation of green spaces. Schools shall be adopted as the prime media for the campaign.
- ☐ **Regularize Municipal Bye-Laws and Building Codes**– Municipal bye-lwas and building codes shall be developed to encourage "Water Reuse Strategy," for utilization of the recycled water/waste water in the operation and maintenance of the toilet facilities; punitive measures shall be enforced to discourage the open defecation practices; Building codes enforced to adopt the prescribed design standards for toilets (***Please refer to Annexure 10 for sustainable development and management initiatives***)
- ☐ **Develop and Institutionalize MIS System**– ANN shall promote the documentation and mapping of the system. An asset register shall be maintained and the computerized maintenance management plan shall emphasize on the preventive and corrective maintenance; this system shall track all maintenance activities in addition to facilitating a central repository of areas of complaints and general maintenance;

***Financial Mechanism Interventions***

- ☐ **Institutionalize Sector Specific Budgets**– Budgets shall be established; and the dedicated Toilet Sector Unit under the Sanitation Department shall develop the costs and the tariff structures in consultation with the Finance & Accounts Department and the Strategic Communications Cell (working closely with the communities on area up gradation plans) in order to promote efficient cost recovery mechanisms;

☐ ANN shall assist in the construction of new shared toilets in densely populated areas at the rate of one (1) toilet for every five (5) households through micro-financing in areas lacking the basic services in the immediate and short-term phase with a horizon of year 2018;

#### 7.2.2.2.5 Solution for the Critical Problem – 'Design and O&M drawbacks in public toilets besides the inadequacy in the number of toilets vis-à-vis the floating population'

***Immediate Action Directives***

☐ It is recommended to release a ***notice to invite EoI*** for the design, rehabilitation and upgradation of the existing toilet facilities on a Rehabilitate, Operate and Transfer (ROT) basis in PPP mode in the immediate phase with a horizon of year 2015. The scope shall also include the survey of the remaining city and ascertain the exact numbers and sanitary ward-wise location for rehabilitation and upgradation sanitation facilities

☐ Launch a pilot project for the multi-level multi-utility public toilet developments. The project can be trialed in heavy tourist footfall areas. The PT complex shall also house tourist information centres, utility centres like ATMs, Bill payment centres, Rail & Air booking centres, convenience stores for tourists. The income from the rents may be utilized for maintenance of the toilets besides the user collection charges. The toilets designs could be state of eth art high end models. ANN shall appoint a consultant through competitive bidding process to prepare the proposal for the pilot project. The consultant shall provide –

- a need assessment at the outset
- develops an Operator model and a Financial Model for the capital investment as well as O&M cost,
- prepares a septage management plan (if direct connection to the sewerage system is not given); and
- implements the Sanitary Ward level pilot project (subject to mutual agreement or may be contracted separately to an agency through tender process)

***DPR***

☐ Based on the findings of the pilot project implementation, ANN may release a notice to invite EoI to prepare DPR. It is recommended to evolve a city-wide strategy through DPR, yet the city-wide plan shall be broken down into packages to ensure phase-wise development in order to ease the financial burden. The DPR is detailed as under -

DPR for the construction works of new toilets which shall include – (**1**) Design of toilets, (**2**) Detailing the construction procedure of multi-level, multi utility PT (**3**) Design the fecal sludge management system including clearance & treatment gradually integrating into the future/proposed off-site sewerage system(s) (**4**) Develop asset registry for toilet management and the computerized maintenance management plan coupled with comprehensive M&E system – this system shall track all maintenance activities in addition to facilitating a central repository of areas of complaints and general maintenance

***Administrative & Regulatory Measures***

☐ **Regularize Municipal Bye-Laws and Building Codes**– Municipal bye-lwas and building codes shall be developed to encourage "Water Reuse Strategy," for utilization of the recycled water/waste water in the operation and maintenance of the toilet facilities; punitive measures shall be enforced to discourage the open defecation practices; (***Please refer to Annexure 10 for sustainable development and management initiatives***)

☐ **Develop and Institutionalize MIS System**– ANN shall promote the documentation and mapping of the system. An asset register shall be maintained and the computerized maintenance management plan shall emphasize on the preventive and corrective maintenance; this system shall track all maintenance activities in addition to facilitating a central repository of areas of complaints and general maintenance;

***Financial Mechanism Interventions***

☐ **Institutionalize Sector Specific Budgets**– Budgets shall be established; and the dedicated Toilet Sector Unit under the Sanitation Department shall develop the costs and the tariff structures in consultation with the Finance & Accounts Department and the Strategic Communications Cell (working closely with the communities on area up gradation plans) in order to promote efficient cost recovery mechanisms;

### 7.2.3 Storm Water Management Sector

#### 7.2.3.1 CRITICAL PROBLEM AREAS

- ☐ CRITICAL PROBLEM AREA 6 – Inadequate protective works for storm water drainage network to prevent the dumping of solid and liquid waste leading to water logging areas
- ☐ CRITICAL PROBLEM AREA 7 – Inadequate coverage and standardized operation and maintenance procedures

#### 7.2.3.2 STRATEGY

Based on the comprehensive situation analysis executed for the city within the storm water management sector and the identified gaps in the level of service delivery, the targets for service delivery are set across the planning horizon of 30 yrs. Based on the existing sanitation situation, demographic profile of the city including the population density patterns, the socio-economic profile, the topography, and the financial aspects of ANN, the targets are set for the immediate, short-term, mid-term and long-term phases of the city sanitation planning.

**TABLE 7-9: TARGETS FOR SERVICE DELIVERY LEVELS IN STORM WATER MANAGEMENT SECTOR**

| COMPONENT OF SERVICE | DESIRED SERVICE DELIVERY | EXISTING SERVICE DELIVERY | TARGETS FOR SERVICE DELIVERY LEVELS | | | |
|---|---|---|---|---|---|---|
| | | | 2014-2016 | 2014-2019 | 2014-2034 | 2014-2044 |
| **Coverage of Drainage Network** | 100% | 61.34% | 75% | 90% | 100% | 100% |
| **Incidences of Water Logging / Flooding** | 0 | 14 | 10 | 5 | 5 | 5 |

The strategy adopted to achieve the aforementioned targets in the service delivery shall include a decentralized approach to storm water management in addition to the centralized storm water drain network to manage the run-off. This approach entails the introduction of systems that temporarily store or permanently remove storm water from the location of rainfall on impervious areas. New and evolving methodologies involving 'source controls'[12], green infrastructure, rain water harvesting methodologies, low impact development and best management practices are recommended to be adopted.

The objective of the said approach is to reduce storm water flow into the centralized storm water drain system while increasing soil infiltration and pollutant removal, providing urban ecological restoration opportunities, and increasing overall green spaces within watersheds.*This shall facilitate the ground water recharge.* There are three major source control techniques – (**a**) detention, (**b**) retention, and (**c**) bioretention/biofiltration and available technological source control measures include blue roofs, rainwater harvesting, vegetated controls, permeable pavements, and green roofs. Each source control technique provides certain benefits that can be matched to the city's needs –

**TABLE 7-10: BENEFITS OF SOURCE CONTROL TECHNIQUES**

| BENEFITS | DETENTION | RETENTION | BIO-FILTRATION |
|---|---|---|---|
| **Reduces Drain Overflows** | X | X | X |
| **Reduces Potable Water Consumption** | | X | |
| **Reduces Flooding** | X | X | X |
| **Reduces Backups** | X | X | X |
| **Reduces Direct Discharges** | | X | X |
| **Reduces Strain on Drains** | X | X | X |

[12] 'Source Controls' is the term used to emphasize the location of the measure adopted to control the run-off at the place where runoff is generated.

Potential source control strategies and initiatives are listed as below –

**TABLE 7-11: SOURCE CONTROL STRATEGIES**

| |
|---|
| **BUILDINGS AND LOTS** |
| Performance Standards for New Development |
| Performance Standards for Existing Buildings |
| Low- and medium-density residential controls |
| **RIGHT OF WAY** |
| Road reconstruction design standards |
| Sidewalk design standards |
| Right of way buildout |
| **OPEN SPACE** |
| Green Infrastructure - green streets, rain gardens and swales |

**TABLE 7-12: SOURCE CONTROL INITIATIVES**

| STRATEGY | DESCRIPTION | EFFECT |
|---|---|---|
| **Blue Roof 2-in / 1-in Detention** | Install roof top detention systems | Cost Effective method to detain water |
| **Green Roof** | Install a green roof on at least 50 percent of a roof | Cost-effective storage or removal of runoff from new rooftops |
| **Rain Water Harvesting** | Methodologies to capture run-off | Cost-effective storage or removal of runoff from impervious surfaces |
| **Side walk Bio-filtration** | Vegetated Controls | Reduction in annual run-off from catchment area |
| **Greening of Parking Lots** | Implement vegetation and stormwater controls in new parking lots | Reduction in annual run-off from catchment area |
| **Porous Parking Lots** | Commercial and community facility parking lots to plant street trees and perimeter and interior landscaping that will detain water or infiltrate to the soil as feasible. | Retention of stormwater and reduction in run-off |
| **Porous Concrete Sidewalk** | Porous pavement on publicly-owned parking lots | Retention of stormwater and reduction in run-off |
| **Green Street** | New zoning amendment requires street tree plantings | Cost-effective infiltration of street stormwater |
| **Permeable Pavements** | Install and monitor porous pavement on publicly-owned lots and new construction of roads | Retention of stormwater and reduction in run-off |

### 7.2.3.3 RECOMMENDATIONS

#### 7.2.3.3.1 Solution for the Critical Problem – 'Inadequate storm water drainage network along with poor maintenance and non-integration of source control measures with the existing storm water drainage network leading to a considerable number of water logging areas and ultimately unhygienic condition'

***Immediate Action Directives***

- ☐ It is recommended that ANN coordinate with the sewerage & solid waste management department and prioritize the activity of prevention of indiscriminate dumping of solid waste and waste water discharge into the drains;
- ☐ It is recommended that ANN release a notice to invite EoI for the protective works of the storm water drains.
- ☐ It is recommended that ANN implement a pilot project to promote low impact development (LID) and 'wet weather green infrastructure13'. The pilot project shall address these concerns through a variety of techniques, including

[13] Green infrastructure is an approach that communities can choose to maintain healthy waters, provide multiple environmental benefits and support sustainable communities. Unlike single-purpose gray stormwater infrastructure, which uses pipes to dispose of rainwater, green infrastructure uses vegetation and soil to manage rainwater where it falls.

strategic site design, measures to control the sources of runoff, and thoughtful landscape planning. Considering a greater measure of the storm water management infrastructure is in need of replacement or repair and the communities are not equipped to financially support the development, ANN needs to consider resilient and affordable solutions that meet many objectives at once and green infrastructure is one such solution. (***Please refer to Annexure 11 for case studies and literature on green infrastructure and storm water management***)

***Feasibility Study***

- ☐ It is proposed to conduct a study to ascertain the feasibility of integrating the water bodies in the city into the future storm water drainage network system as rain water harvesting (RWH) structures to reduce the capacity requirement encumbrance on man-made drains as well as create a continuous drainage network;.
- ☐ It is also proposed to study the feasibility of constructing rain water harvesting structures / source controls in low-lying areas to address the storm water issue since the areas cannot be integrated into the surrounding drainage network owing to the undulating levels;
    - Conduct hydraulic modeling studies in few selected pilot areas of the city in order to improve the water retention potential within the city and decrease the run-off load for low lying areas as well as the downstream areas of river
    - Assessment of the following parameters with respect to water bodies and the low-lying areas – **(a)** water quality analysis **(b)** influent characteristics **(c)** ground infiltration characteristics and sub-strata soil investigations **(d)** sedimentation analysis
- ☐ It is proposed to study the techno-economic feasibility for developing the water-bodies as recreational facilities considering the importance of Agra as a strategic tourist location

***DPR***

- ☐ Based on the findings of the feasibility study, ANN may release a notice to invite expression of interest to prepare DPR. The scope shall include – (**1**) Design and construction works of new storm water drainage network along with protective works, (**2**) design and construction works of source controls in the low-lying areas(**3**) Design and construction works of recreational facilities – water bodies (**4**) Develop asset registry for storm water management and the computerized maintenance management plan coupled with comprehensive M&E system – this system shall track all maintenance activities in addition to facilitating a central repository of areas of complaints and general maintenance

***Administrative & Regulatory Measures***

- ☐ It is recommended to establish a dedicated unit for Storm Waste Sector under the Sanitation Department to streamline the design, construction, operation & maintenance processes within the sector; personnel management system & Sanitation worker's training program shall be implemented to conduct occupational safety and health training campaigns to educate the sanitary workers with respect to the benefits of adopting best operating practices;
- ☐ Municipal Bye-Laws shall be enforced to encourage the residents to adopt the practices of source control initiatives to promote reduce, reuse and recycle principle; Regulatory Mechanisms (polluter pays) shall be enforced to discourage open dumping of waste;
- ☐ Awareness generation campaigns shall be conducted to propagate the benefits of source control initiatives;
- ☐ ANN shall develop and institutionalize the MIS system to document and map the drainage network system. An asset register shall be maintained and the computerized maintenance management plan coupled with comprehensive M &E system shall emphasize on the preventive and corrective maintenance; this system shall track all maintenance activities in addition to facilitating a central repository of areas of complaints and general maintenance.

***Financial Mechanism Interventions***

- ☐ It is recommended to initiate incentives for adopting the source control initiatives;

By weaving natural processes into the built environment, green infrastructure provides not only stormwater management, but also flood mitigation, air quality management, and much more. (US EPA et al)

- ☐ Sector specific budgets shall be established; and the dedicated Storm Water Sectoral Unit under the Sanitation Department shall develop the costs and the tariff structures in consultation with the Finance & Accounts Department and the Strategic Communications Cell (working closely with the communities on area up gradation plans) in order to promote efficient cost recovery mechanisms. Impact benefit tax is also proposed to be levied on properties in areas where services are provided

### 7.2.4 Solid Waste Management

#### 7.2.4.1 CRITICAL PROBLEM AREA

- ☐ CRITICAL PROBLEM AREA 8 – The household coverage of solid waste management services as well as the overall collection efficiency is inadequate and deficient
- ☐ CRITICAL PROBLEM AREA 9 – The solid waste management services are inadequate in the industrial areas as well as the public areas (mainly the tourist locations) resulting in adverse health and environmental impacts

#### 7.2.4.2 STRATEGY

Based on the comprehensive situation analysis executed for the city within the sewerage sector and the identified gaps in the level of service delivery, the targets for service delivery are set across the planning horizon of 30 yrs. Based on the existing sanitation situation, demographic profile of the city including the population density patterns, the socio-economic profile, the topography, and the financial aspects of ANN, the targets are set for the immediate, short-term, mid-term and long-term phases of the city sanitation planning.

**TABLE 7-13: TARGETS FOR SERVICE DELIVERY LEVELS IN SOLID MANAGEMENT SECTOR**

| COMPONENT OF SERVICE | DESIRED LEVEL OF SERVICE DELIVERY | EXISTING LEVEL OF SERVICE DELIVERY | TARGETS FOR SERVICE DELIVERY LEVELS | | | |
|---|---|---|---|---|---|---|
| | | | 2014-2016 | 2014-2019 | 2014-2034 | 2014-2044 |
| **Household Coverage** | 100% | 46.3% | 75 | 100% (Demand until 2018) | 100% (Demand until 2033) | 100% (Demand until 2043) |
| **Segregation at Source** | 100% | 8.6% | 50% | 100% (Demand until 2018) | 100% (Demand until 2033) | 100% (Demand until 2043) |
| **Collection Efficiency of MSW** | 100% | 93.5% | 100% | 100% (Demand until 2018) | 100% (Demand until 2033) | 100% (Demand until 2043) |
| **Extent of Reuse & Recovery** | 80% | 21.1% | 40% | 100% (Demand until 2018) | 100% (Demand until 2033) | 100% (Demand until 2043) |
| **Extent of Treatment** | 100% | 69% | 90% | 100% (Demand until 2018) | 100% (Demand until 2033) | 100% (Demand until 2043) |
| **Extent of Scientific Disposal** | 100% | 0% | 100% | 100% (Demand until 2018) | 100% (Demand until 2033) | 100% (Demand until 2043) |
| **Cost Recovery** | | | | | | |
| **Extent of Cost Recovery** | 100% | 0% | 50% | 100% | 100% | 100% |
| **Efficiency in Collection of Sewage Charges** | 100% | 0% | 50%% | 100% | 100% | 100% |
| **Customer Service** | | | | | | |
| **Efficiency in redressal of customer complaints** | 80% | 78.7% | 80% | 80% | 80% | 80% |

The strategy adopted to achieve the aforementioned targets in the service delivery shall include the coverage of entire households in the city under the collection services – primary and secondary collection network. The cost

recovery mechanisms need to be strengthened. The service delivery options shall enmesh the community participation and NGO involvement to complement ANN capacities.

Given the fact that the city is largely characterized by population with a low awareness in terms of the available sewerage management services and also the adverse impacts of the current malpractices leading to disintegration of health and environment; hence the proposals shall bear in mind the requirement for generation of awareness in the community alongside the provision for educating theses masses. This approach shall ensure sustainability of the proposed systems. (*please refer to Chapter 6 for awareness generation strategy)*

#### 7.2.4.3 RECOMMENDATIONS

##### 7.2.4.3.1 Solution for the Critical Problem – 'The household coverage of solid waste management services as well as the overall collection efficiency is inadequate and deficient in urban poor areas leading to the dumping of solid waste in open areas and drains resulting in health and environmental risks'

***Immediate Action Directives***

- ☐ In order to achieve 100% coverage the private concessionaire who holds the contract for the city shall enforce measures to implement the services per the contract.
- ☐ IEC campaigns shall be initiated to promote segregation at source and also support the primary collection and secondary collection processes.

***Administrative and Regulatory Measures***

- ☐ It is recommended to establish a dedicated unit for Solid Waste Sector under the Sanitation Department to streamline the design, construction, operation & maintenance processes within the sector; personnel management system & Sanitation worker's training program shall be implemented to conduct occupational safety and health training campaigns to educate the sanitary workers with respect to the benefits of adopting best operating practices;
- ☐ Municipal Bye-Laws shall be developed to encourage the residents to adopt the practices of solid waste reduce, reuse and recycle; Regulatory Mechanisms (polluter pays) shall be enforced to discourage open dumping of waste;
- ☐ Awareness generation campaigns shall be conducted to propagate the benefits of better hygienic and sanitation practices and encourage the residents to adopt solid waste management systems through financially sustainable mechanisms and cross-subsidy mechanisms
- ☐ ANN shall develop and institutionalize the MIS system to document and map the collection & transportation system. An asset register shall be maintained and the computerized maintenance management plan coupled with comprehensive M &E system shall emphasize on the preventive and corrective maintenance; this system shall track all maintenance activities in addition to facilitating a central repository of areas of complaints and general maintenance.

***Financial Mechanism Interventions***

- ☐ It is recommended to initiate the CDM process to avail the CDM revenue benefits that shall substantially contribute towards both the O&M and Capital Investment recovery;
- ☐ Sector specific budgets shall be established; and the dedicated Solid Waste Sectoral Unit under the Sanitation Department shall develop the costs and the tariff structures in consultation with the Finance & Accounts Department and the Strategic Communications Cell (working closely with the communities on area up gradation plans) in order to foster efficient cost recovery mechanisms. Impact benefit tax is also proposed to be levied on properties where services are provided.

## 7.3 Action Plans

### 7.3.1 Technology Options

The technology and service delivery options shall be designed to ensure the sanitation services are managed efficiently through the entire cycle of operations. All stages of the complete cycle are carefully planned to extend services to the entire city population cutting across all sections of the society and all levels of the settlements. The several options are designed and phased keeping in mind the existing limitations of technical, financial and social capacities of ANN. The service delivery options shall enmesh the community participation and NGO involvement to complement the ANN capacities

**TABLE 7-14: TECHNOLOGY ACTION PLAN**

| PHASE | SEWERAGE | TOILETS | STORM WATER | SOLID WASTE | QULAITY OF WATER |
|---|---|---|---|---|---|
| **Immediate** 2014-2016 | ☐ Finalize the Connections to the Households;<br>☐ Initiation of Collection and Conveyance System ;<br>☐ Intermittent Measures for Septage Clearance<br>☐ Feasibility study for DEWATS as a permanent solution<br>☐ Intermittent DEWATS for existing waste generation areas served by Septic tanks;<br>☐ Finalize DEWATS if found feasible | ☐ Detailed Survey of existing facilities to initiate rehabilitation and up gradation<br>☐ Finalize the Repairs and up gradation of the existing toilets;<br>☐ Initiate the Design & Construction of the new facilities in areas with no sanitation facilities<br>☐ Initiation of phasing out of the septic tanks<br>☐ Initiate the Design of System to handle the human excreta | ☐ Finalize repairs and up gradation of the storm water drains in the flood prone areas;<br>☐ Initiate the source control strategies and initiatives<br>☐ Initiate the construction of the new drains;<br>☐ Initiate the procurement of the maintenance equipment and devices;<br>☐ Initiate the outfall drain structures / RWH structures / supporting activities | ☐ Finalize Primary Storage and Primary Collection System;<br>☐ Initiate Secondary Storage, Collection and Transport System;<br>☐ Initiate Sanitary Landfill for existing Waste and Treatment Facility;<br>☐ Initiate the Transfer Station | ☐ Detailed study to determine and map the contamination points / lengths<br>☐ Initiate the casing works for water supply pipes at the contamination points / lengths<br>☐ Initiate the shifting of the hand-pumps/stand-posts from the contaminations points<br>☐ Initiate training programs for household water purification mechanisms |

| PHASE | SEWERAGE | TOILETS | STORM WATER | SOLID WASTE | QULAITY OF WATER |
|---|---|---|---|---|---|
| **Short-Term** 2014 - 2019 | ☐ Finalization of collection & Conveyance System<br>☐ Initiate the Treatment and Disposal mechanisms – sewerage zone wise<br>☐ Intermittent arrangements for Septage Treatment & Disposal | ☐ Finalize 100% Coverage of toilets and supporting Infrastructure Development<br>☐ Finalize the System to handle the human excreta | ☐ Finalize and operationalize RWH structures / ground water recharge initiatives<br>☐ Finalize Construction Works<br>▪ Source Control Installations<br>▪ New Drains<br>▪ Outfall structures<br>☐ Finalize procurement of the maintenance equipment | ☐ Finalize Secondary Storage, Secondary Collection and Transport<br>☐ Finalize and operationalize the transfer station<br>☐ Finalize Construction Works<br>▪ Compost Plant<br>▪ Sanitary Landfill<br>☐ Finalize the Capping of Sanitary Landfill for existing Waste<br>☐ Initiate the operations of Integrated Solid Waste Management Facility (ISWM) | ☐ Finalize the casing works for water supply pipes at the contamination points / lengths<br>☐ Finalize the shifting of the hand-pumps/stand-posts from the contaminations points<br>☐ Initiate training programs for household water purification mechanisms<br>☐ Repairs and Mainatenance |
| **Mid-Term** 2014 – 2034 | ☐ Phasing out of Septic Tanks by institution of DEWATS / connections to central sewer system<br>☐ Augmentation of the system to meet the demands of the growing population<br>☐ Replacements/repairs of components & maintenance | ☐ Finalization of phasing out of Septic Tanks<br>☐ Augmentation of the system to meet the demands of the growing population<br>☐ Replacements/repairs of components & maintenance | ☐ Augmentation of the SDM system to meet the demands of developing city<br>☐ Replacements of components as per the maintenance plan | ☐ Augmentation of the MSW system to meet the demands of growing population<br>☐ Annual Phases of the ISWM facility<br>☐ Replacements of components as per the maintenance plan | ☐ Regular / Periodic / Preventive repairs and maintenance |
| **Long-Term** 2014 – 2044 | ☐ Augmentation of the system to meet the demands of the growing population<br>☐ Replacements/repairs of components & maintenance | ☐ Augmentation of the system to meet the demands of the growing population<br>☐ Replacements/repairs of components & maintenance | ☐ Augmentation of the SDM system to meet the demands of developing city<br>☐ Replacements of components as per the maintenance plan | ☐ Augmentation of the MSW system to meet the demands of growing population<br>☐ Finalization of the Annual Phases of the ISWM facility<br>☐ Replacements of components as per the maintenance plan | ☐ Regular / Periodic / Preventive repairs and maintenance |

### 7.3.2 Financial Options

The implementation of the City Sanitation Plan necessitates substantial financial resources and the corresponding strategic planning for resource generation. The financial strategy shall encompass Capital Investment Plan, Operations & Management (O&M) Expenditure Layout and the financial assessment for the critical support activities like Community Mobilization, Awareness Workshops and Capacity Enhancement to ensure sustainability of the planned sanitation services.

The strategy shall align itself along the paradigm that the resource generation shall broadly target the funds earmarked for water and sanitation development within ANN and the Chhattisgarh State Government budgets; however, it shall also access the funds from the 13th Finance Commission and other Center and State schemes for sanitation improvement.

#### 7.3.2.1 CAPITAL INVESTMENT PLAN

A conceptual capital investment plan is presented below which is corresponding to the strategic actions in the various sectors that are defined in the earlier sections. The unit rates considered for the calculation purposes are provided as ***Annexure 12***; This section outlines the annual capital expenditure (capex) required, *****An annual inflation factor of 5% is applied for all capital expenditure (from 2012-13 onwards)***

**TABLE 7-15: CAPITAL INVESTMENT PLAN**

| | | SHORT-TERM ACTION PLAN (2014-2019) | MID-TERM ACTION PLAN (2019-2033) | LONG-TERM ACTION PLAN (2034-2044) |
|---|---|---|---|---|
| *Population* | | *1788448* | *2275019* | *3110615* |
| *Incremental Population* | | | *486571* | *835596* |
| *Households* | | *357689* | *455003* | *622123* |
| *Incremental Households* | | | *97314* | *167120* |
| **NEW SERVICES** | | | | |
| **1** | **Household Toilets** | | | |
| | ***Strategy*** | ***Address the deficiency*** | ***Address the additional requirement for the incremental population*** | ***Address the additional requirement for the incremental population*** |
| | Individual Toilets | 34031 | 9519 | 2248 |
| | Shared Toilets | 22687 | 2094 | 450 |
| | ***Total Capital Investment Estimate*** | ***19851*** | ***763*** | ***666*** |
| **2** | **Community Toilets** | | | |
| | ***Strategy*** | ***Address the deficiency*** | ***Address the requirement for the incremental population*** | ***Address the requirement for the incremental population*** |
| | Community Toilet Complex (15 Seats) | 454 | 102 | 33 |
| | ***Total Capital Investment Estimate*** | ***6810*** | ***1530*** | ***495*** |
| **3** | **Public Toilets** | | | |
| | ***Strategy*** | ***Address the deficiency*** | ***Address the additional requirement for the incremental population*** | ***Address the additional requirement for the incremental population*** |
| | Public Toilet Complexes (15 Seats) | 80 | 75 | 100 |
| | ***Total Capital Investment Estimate*** | ***1200*** | ***1125*** | ***1500*** |
| | ***GRAND TOTAL CAPITAL INVESTMENT-TOILETS*** | ***27861*** | ***3418*** | ***2661*** |

| | | | | |
|---|---|---|---|---|
| **4** | **Centralized Sewerage System** | | | |
| | ***Strategy*** | ***Address the deficiency*** | ***Address the additional requirement for the incremental population*** | ***Address the additional requirement for the incremental population*** |
| ***a*** | Household Connections | ***405892*** | ***53235*** | ***29842*** |
| | ***Capital Investment Estimate*** | ***16236*** | ***2129*** | ***1194*** |
| **5** | **Decentralized Sewerage System -Water Bodies** | | | |
| | ***Strategy*** | ***Address the deficiency*** | ***Address the additional requirement for the incremental population*** | ***Address the additional requirement for the incremental population*** |
| ***a*** | *Interceptor Drains Network with Treatment* | 20 km | | |
| | ***Capital Investment Estimate*** | **1241** | | |
| ***b*** | Protection Works | *3 % of Sewer Network Estimate* | | |
| | ***Capital Investment Estimate*** | ***37*** | | |
| **6** | **Septage Management System** | | | |
| | ***Strategy*** | ***Address the deficiency*** | ***Address the additional requirement for the incremental population*** | ***Address the additional requirement for the incremental population*** |
| ***a*** | Vaccum Trucks | *75* | *8* | *5* |
| | ***Capital Investment Estimate*** | ***600*** | ***64*** | ***40*** |
| ***b*** | Septage Sludge Drying Beds | | | |
| | ***Capital Investment Estimate*** | | | |
| ***c*** | *Office and Ancillary Units* | *Lumpsum* | *Lumpsum* | *Lumpsum* |
| | ***Capital Investment Estimate*** | ***8*** | ***1*** | ***0.5*** |
| | ***GRAND TOTAL CAPITAL INVESTMENT-WASTE WATER*** | ***18122*** | ***2194*** | ***1234*** |
| **7** | **Storm Water Management System** | | | |
| | ***Strategy*** | ***Address the deficiency*** | ***Address the additional requirement for the incremental population*** | ***Address the additional requirement for the incremental population*** |
| ***a*** | Source Controls | | | |
| | ***Capital Investment Estimate*** | ***1686*** | **201** | **273** |
| ***b*** | Storm Water Drain Network | 800 km | 80 km | 90 km |
| | ***Capital Investment Estimate*** | **33720** | **4026** | **5463** |
| ***c*** | Supporting Infratsructure | Pumping Stations/Culverts/CD Works | | |
| | ***Capital Investment Estimate*** | **1686** | **201** | **273** |
| | ***GRAND TOTAL CAPITAL INVESTMENT-STORM WATER*** | ***37092*** | ***4428*** | ***6009*** |
| **8** | **Solid Waste Management System** | | | |
| | ***Strategy*** | ***Address the deficiency*** | ***Address the additional requirement for the incremental population*** | ***Address the additional requirement for the incremental population*** |
| ***a*** | Collection and Transportation | | | |
| | ***Capital Investment Estimate*** | ***567*** | ***2522*** | ***3689*** |

| | | | | |
|---|---|---|---|---|
| *b* | Transfer Station | | | |
| | ***Capital Investment Estimate*** | ***134*** | ***525*** | ***768*** |
| *g* | Supporting Infrastructure | | | |
| | ***Capital Investment Estimate*** | ***35*** | ***287*** | ***382*** |
| | ***GRAND TOTAL CAPITAL INVESTMENT-SOLID WASTE*** | ***736*** | ***3334*** | ***4839*** |
| **REHABILITATION/UPGRADATION SERVICES** | | | | |
| **1** | **Household Toilets** | | | |
| | ***Strategy*** | ***Address the deficiency - improve physical condition/upgrade to connection to Conventional Sewer*** | ***In the event of efficient O&M mechanism in place, no capital investment envisaged*** | ***In the event of efficient O&M mechanism in place, no capital investment envisaged*** |
| | Individual Toilets | 402 | | |
| | ***Total Capital Investment Estimate*** | ***261*** | | |
| **2** | **Community Toilets** | | | |
| | ***Strategy*** | ***Address the deficiency - improve physical condition/upgrade to connection to Conventional Sewer*** | ***In the event of efficient O&M mechanism in place, no capital investment envisaged*** | ***In the event of efficient O&M mechanism in place, no capital investment envisaged*** |
| | Community Toilets | 94 | | |
| | ***Total Capital Investment Estimate*** | ***470*** | | |
| **3** | **Public Toilets** | | | |
| | ***Strategy*** | ***Address the deficiency - improve physical condition/upgrade to connection to Conventional Sewer*** | ***In the event of efficient O&M mechanism in place, no capital investment envisaged*** | ***In the event of efficient O&M mechanism in place, no capital investment envisaged*** |
| | Public Toilets | 44 | | |
| | ***Total Capital Investment Estimate*** | ***220*** | | |
| **4** | **Centralized Sewerage System** | | | |
| | ***Strategy*** | ***Address the deficiency*** | ***In the event of efficient O&M mechanism in place, no capital investment envisaged*** | ***In the event of efficient O&M mechanism in place, no capital investment envisaged*** |
| *a* | | Lumpsum | | |
| | ***Total Capital Investment Estimate*** | ***100*** | | |

| 5 | **Storm Water Management System** | | | |
|---|---|---|---|---|
| | ***Strategy*** | ***Address the deficiency*** | ***In the event of efficient O&M mechanism in place, no capital investment envisaged*** | ***In the event of efficient O&M mechanism in place, no capital investment envisaged*** |
| ***a*** | Desilting and realignment of Drains | *45 km* | | |
| | *Capital Investment Estimate* | *1138* | | |
| ***b*** | Lining and Restructuring of Drains | *20 km* | | |
| | *Capital Investment Estimate* | *674* | | |
| | ***GRAND TOTAL CAPITAL INVESTMENT-STORM WATER*** | ***1812*** | | |
| | ***GRAND TOTAL CAPITAL INVESTMENT-CSP*** | **86674** | **13374** | **14743** |

### 7.3.2.2 OPERATIONS AND MANAGEMENT EXPENDITURE PLAN

In addition to the Capital Investment; recurring financial resources requirement is envisaged to support the O&M of the various sanitation service facilities. The O&M Expenditure layout is presented below; (***Please refer to Annexure 12 for the unit rate analysis for both the CAPEX and the O&M expenditure for all the sanitation service sectors***). The annual O&M inflation is taken at seven (7%) percent; all rates are as per 2011 rates for the tasks detailed in the unit rate analysis Annexure –

As can be assessed from Table, O&M expenditure for Centralized Sewer System and MSW Management System would be a significant burden on ANN's finances. It is evident that ANN would be demanded to introduce tariff structure and charge user fees for the various sanitation services that it would provide, as outlined in the CSP

### 7.3.2.3 COST RECOVERY OPTIONS

It is recommended to explore the possibility of levying user charges for the services, globally, user charges for sewerage disposal services are normally based on water charges (***Please refer to Annexure 14 for Water Tariff across India***), i.e., a set percentage of the water charge that has typically varied between 50-80% of user water charges. It is proposed that ANN shall levy a 50% sewage disposal surcharge to the user water charges. As regards MSW services, it is recommended that ANN levy a monthly user fee, this fee could vary for users belonging to various economic slab and would also depend on the land-use category. However, it is recommended that user charges for the urban poor shall be levied with effect from 2013-14, i.e., after Agra's citizens have witnessed a significant improvement in services. With the above indicated user charges, ANN would generate substantial revenue per annum, which shall enable ANN to support the O&M operations and in due course of time support capital expenditure program

It is further proposed that ANN shall investigate the possibility of a judicious alignment of impact benefit fee closely with expected property owner benefits. The total revenues thus generated shall aim to cover annual O&M expenditure, and also partly/substantially fund capital replacement in the long-term. The recommendations are presented thus –

**TABLE 7-16: PROPERTY BASED TAX OPTIONS**

| **PROPERTY BASED TAX** | | |
|---|---|---|
| | TAX ID | VALUE |
| 1 | Solid Waste Benefit Tax | 3% of Annual Ratable Value (ARV) of the Property |
| 2 | Drainage Benefit Tax | 3% of Annual Ratable Value (ARV) of the Property |

### 7.3.2.4 FINANCING SOURCES

It is established that Government of India (GoI) and Government of Uttar Pradesh (GoUP) are both open to financially supporting the implementation of City Sanitation Plans. The table below presents the several scenarios of financing sources and the options that may be explored with each of the source –

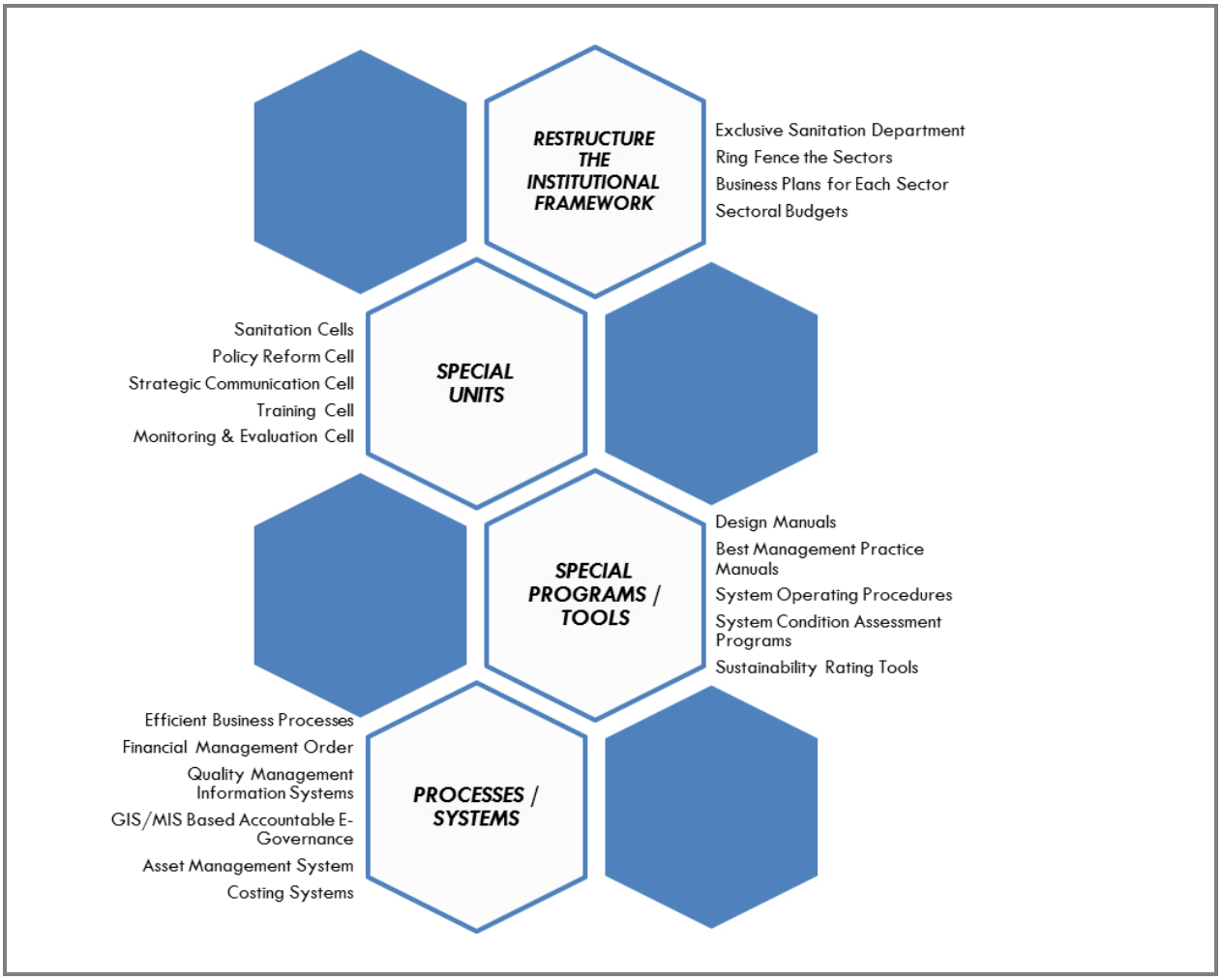
**TABLE 7-17: FINANCING SOURCE AND CORRESPONDING OPTIONS**

| FINANCING SOURCE | OPTIONS |
|---|---|
| **13TH FINANCE COMMISSION** | Pooling of the 13th Finance Commission Grants for Sanitation Services Improvement Projects; |
| **STATE FINANCE COMMISSION** | The grants from State Finance Commission support the operational revenue expenses of the corporation while funding the provision of basic services to Urban Population including urban poor; |
| **JAWAHARLAL NEHRU NATIONAL URBAN RENEWAL MISSION (JNNURM), GOI** | The Urban Infrastructure and Governance component of JNNURM has fund allocations for developing sanitation services. |
| **MINISTRY OF HOUSING AND URBAN POVERTY ALLEVIATION (MOHUPA)** | The construction of individual and shared toilets finds funding through the schemes of MoHUPA |
| **INTEGRATED LOW COST SANITATION (ILCS), MOHUPA** | Funding for the development of basic sanitation services - Central Contribution - 75% of Capital Expenditure; State Contribution - 15% of Capital Expenditure; Beneficiary - 10% of Capital Expenditure; Currently ILCS supports the construction of individual toilets for economically weaker sections of society. |
| **RAJIV AWAS YOJANA (RAY), MOHUPA** | RAY assures Central Grants for slum redevelopment and achieves basic sanitary services in an inclusive approach; the possibility of the financial support under the IHSDP/RAY schemes of GoI for waste water disposal and MSW within Agra's urban poor settlements may well be examined. |
| **SARVA SHIKSHA ABHIYAN (SSA), MINISTRY OF HUMAN RESOURCE DEVELOPMENT (MOHRD), GOI** | MoHRD is developing a manual on school sanitation under the SSA component. The SSA component has considerable funding for school sanitation. |
| **INTERNATIONAL DONORS/FUNDING AGENCIES** | Funding from World Bank, ADB, WWF and the likes shall be aimed at and considerable efforts made to bring in the funding to develop sanitation projects in an inclusive approach. |
| **URBAN LOCAL BODIES (ULB) EQUITY** | ULB shall earmark an explicit budget for the sanitation services improvement; It shall establish tariff structure for the sanitation services provided and levy sanitation cess as part of the property tax; the user charges and the sanitation cess revenues hall be directed to the sanitation department for utilization for funding sanitation improving projects in the long-term besides tackling the O&M costs. |
| **PUBLIC PRIVATE PARTNERSHIP (PPP)** | PPP shows greater promise in bringing in major capital investment and finances required to develop basic sanitation services for the urban population including the urban poor. The following PPP options shall be considered to employ their services appropriately - (a) service contracts; (b) performance-based service contract; (c) a management contract for operations and maintenance (O&M); (d) BOOT/BOT/ROT Contracts; (e)Joint Ventures between State Government/ULB and the private company. In the event of weak financial situation and greater financial burden on the Municipal Finances, PPP model shall be explored to support the equity contribution of ULB in the total capital expenditure. |
| **BENEFICIARY CONTRIBUTION - PUBLIC PRIVATE PEOPLE PARTNERSHIP (PPPP)** | PPPP shall be promoted as a sustainability model in order to garner support of the beneficiaries in both the capital investments and the O&M investments. This shall aim at increasing the sense of ownership and hence ensure sustainability of the services; In the event of weak financial situation and greater financial burden on the Municipal Finances, PPPP model shall be explored to support the equity contribution of ULB in the total capital expenditure. THis move shall be supported by reforms in the Governance structure that involves greater community participation and hence promote greater accountability and transparency. |
| **NGO** | NGO involvement shall be encouraged in the sanitation services sectors especially the access to toilets; Appropriate contract models shall be developed to attract their contributions in both the development and O&M activities. |

### 7.3.3 Institutional & Governance Options

The improvement in the urban infrastructure and hence the quality of urban life is explicitly associated with sound and reliable management and governance practices. The good management is facilitated by a committed and balanced institutional framework while the better governance practices stem from a persuasive policy framework.

**FIGURE 7-1: BROAD INSTRUMENTAL OUTCOMES - INSTITUTIONAL AND GOVERNANCE ACTION PLAN**




It is the goal of the CSP to recommend the promotion of institution structures that provide the platform for management efficiency and the development of the good governance framework that shall effect sustainable and inclusive infrastructure development.

The institutional and governance action plan that shall dictate the accountability of the institution in service delivery vide clear roles and responsibilities. The governance framework shall infuse more accountability, transparency and participatory planning. The following diagram illustrates the broad instrumental outcomes of the detailed action plan that follows –

**TABLE 7-18: INSTITUTIONAL AND GOVERNANCE ACTION PLAN**

| PHASE | COMPONENTS |
|---|---|
| **Short-Term 2014-2019** | ◘ Initiate the restructuring of the institutional framework as per the recommendation in the CSP with the help of institutional development expert and streamline the operations<br>◘ 'Ring Fence' the sectors (Water Supply & Sewerage, Solid Waste and Toilets) with supporting technical services and O&M units<br>✓ Establish Sectoral Budgets<br>✓ Create Business Plans for each sector<br>✓ Develop Costing systems (costs & tariff structures) in collaboration with the Finance & Accounts Department, Startegic Communication Cell working with communities<br>✓ Develop Asset Management system<br>◘ Establish a dedicated 'Policy Reforms' unit to continually implement policy reforms that will support accountable governance and regulatory oversight of the local bodies, service providers and the citizens as well to achieve sustainability of the ever dynamic infrastructure development<br>✓ Achieve the objectives of Model Municipal Law through incentivized transition plan resulting in devolution of fiscal powers and authority<br>✓ Achieve the E-Governance using GIS/MIS<br>✓ Sector Regulations – Quality & Fiscal Standards<br>✓ Enforcement Mechanisms - of rules, by-laws, municipal codes & building codes<br>◘ Revamp the business processes and the financial management order of the 'Finance & Accounts Department' by putting in place new accounting standards as per the directive of C&AG – 'Accounting and Budget Formats for Local Bodies'<br>✓ Implement Double Entry Accounting System (DEAAS)<br>✓ Revamp Audit & Account Procedures for each sector<br>✓ Adopt Budgeting and Accounting Formats for each sector<br>✓ Set up quality management information systems (MIS)<br>✓ Set up & develop contract management team<br>✓ Develop financial operating Plans (FOP) for each sector<br>✓ Develop the design manuals, best management practices (BMP) manual, system operating procedures, O&M Manuals, Condition Assessment Programs (CAPs'), sustainability rating tools for each sector in collaboration with the technical and O&M experts;<br>✓ Initiate the empanelment process for technical experts, third party technical review agencies to assist with the preparation of design manuals/BMP manual/O&M Manuals/SOP/CAP and periodic reviews of the efficiency of the systems<br>◘ Develop the strategic communication cell that shall ensure community participation and implement participatory planning –<br>✓ Confederate community representatives and link to city Ward committees;<br>✓ Form neighborhood groups;<br>✓ Organize focused group discussions regularly and steer meetings to plan area upgrading solutions;<br>✓ Promote community oversight committees and community contracting arrangements to involve the community in implementation activities – means of livelihood, sense of ownership and sustainability of systems in the corresponding areas;<br>✓ Pave way for community O&M systems;<br>✓ Promote system to utilize community to collect user charges;<br>◘ Establish Monitoring Cell and develop the M&E mechanisms and the coordination framework with parastatal and State agencies<br>◘ Establish the training cell and implement capacity enhancement strategy<br>✓ Establish Capacity, Management, Operation & maintenance Program (CMOM)<br>◘ Initiate the staffing plan for the various sectoral units through re-organization of existing staff, new-hires and transfers from state agencies –<br>✓ Fill the top hierarchical level of both the technical services and O&M unit<br>✓ Initiate the staffing upto 50% at the mid-hierarchical level and supplement with the private consultants<br>✓ Initiate the staffing upto 70% at the low-hierarchical level and supplement with the staff of the private service provider/concessionaire<br>◘ Complete the staffing plan for the Finance & Accounts departments –<br>✓ Financial Analyst<br>✓ Accounts Specialist |

| PHASE | COMPONENTS |
|---|---|
| | ✓ Tax Expert<br>✓ Public Finance & Legal Advisor – Financing arrangements/Concession Agreements<br>✓ Infrastructure Insurance Experts<br>✓ Micro-credit Product Development Specialists<br>◘ Complete the staffing plan for the Strategic Communication Cell –<br>✓ Social Development Experts<br>✓ Community Organizers<br>◘ Finalize the staffing plan for the Policy Reform unit –<br>✓ Planners<br>✓ Policy Advisors<br>✓ Legal Advisors / Retired Judges / Policy Analysts<br>◘ Finalize the staffing Plan for monitoring cell which will work with external sector specific experts and third party agencies<br>◘ Establish the sanitation cells at the city level as part of the state sanitation strategy |
| **Mid-Term 2020 - 2034** | ◘ Finalization of the staffing plan across all sectors and departments<br>◘ Review the procedures and implement amendments<br>◘ Review the Policy Reforms and implement amendments<br>◘ Reprocess the empanelment<br>◘ Review and update the various manuals and operating procedures<br>◘ Review and reengineer the M&E mechanisms |
| **Long-Term 2035 - 2044** | ◘ Finalization of Review and update mechanisms<br>◘ Finalization of successful Institutional Structure and business operations & processes<br>◘ Achievement of Municipal Model Law objectives in totality<br>◘ Successful implementation of City Financial Viability Mechanism<br>◘ Establishment of Participatory Planning Process<br>◘ Establishment of accountable governance framework |

### 7.3.4 Capacity Enhancement & Awareness Generation Options

The assessment of ANN institutional set up has identified a major shortfall both in terms of resources and staff skills. The deficiency necessitates a thorough planning to develop forceful mechanisms that will enhance the capacities of ANN.

Participation from stakeholders throughout the city ensures good governance by augmenting the limited capacity of ANN by community based resources; awareness generation campaigns shall impart the education and the knowledge sharing vital for local capacity building.

The action plan details the approaches and technologies adopted and the new roles and responsibilities defined to improve the service delivery system.

**TABLE 7-19: CAPACITY ENHANCEMENT ACTION PLAN**

| PHASE | CAPACITY ENHANCEMENT |
|---|---|
| **Short-term 2014-2019** | ◘ Establish HR Working Group and a State Level Steering Committee on Human Resource Development (HRD)<br>✓ Initiate the formation of HR Department, and design of HR Policies, Performance linked Incentive Programs; Induction Program;<br>✓ Finalize the Formulation of HR Policy for the ULB and Finalize the Induction Training Curriculum;<br>✓ Develop Staffing Plan & Strategy and initiate recruitment in accordance;<br>✓ Initiate the development of HR Information System<br>✓ Initiate the assessment of the training needs regularly and to develop training calendar and program to impart trainings to staff across all categories;<br>✓ Budget allocation for training and environmental activities;<br>✓ Initiate the creation of a training database capturing a record of the name, position and function of the employee as well as the content, duration and date of the training programme participated in including participant feedback about the relevance and efficiency of the course to the roles and responsibilities;<br>✓ To implement an internal and external communication protocol and train the ULB staff in accordance to the plan;<br>◘ Initiate the development of Knowledge Exchange Mechanism among cities using the web based knowledge platform |

| PHASE | CAPACITY ENHANCEMENT |
|---|---|
| | ◘ Environmental Awareness Workshop for the ULB staff and elected representatives resulting in identification and prioritisation of all environmental aspects;<br>◘ Prepare a City level Urban Management Plan;<br>✓ Training Programme and training on Urban Management for the ULB<br>✓ Establishment of a State level Urban Management Institute<br>◘ Monitoring of cities with the ICD |
| **Mid-Term**<br><br>**2020 - 2034** | ◘ Lateral recruitment of key positions<br>◘ Update and upgrade Training Calendar and Training Programs<br>◘ Update the HR Policies and Incentive programs<br>◘ Conduct Environmental Workshops<br>◘ Update the City level Urban Management Plan<br>◘ Update and upgrade Monitoring & Evaluation Systems |
| **Long-Term**<br><br>**2035 - 2044** | ◘ Lateral recruitment of key positions<br>◘ Update and upgrade Training Calendar and Training Programs<br>◘ Update the HR Policies and Incentive programs<br>◘ Conduct Environmental Workshops<br>◘ Update the City level Urban Management Plan<br>◘ Update and upgrade Monitoring & Evaluation Systems |

### 7.3.5 Inclusive Approach

Traditionally, the net of service providers has excluded the urban poor, weaker sections, migrants, and the like. The CSP shall advocate an approach that shall ensure infrastructure planning shall serve all irrespective of the diverse situation of income, education and use. Participatory Planning processes shall be emphasized upon as critical elements of the sanitation infrastructure planning. This shall provide a strong impetus to sustain projects. The approach shall ensure regular and meaningful community participation to foster community ownership and consensus

The action plan shall detail the propositioned approaches and corresponding mechanisms to achieve inclusiveness in infrastructure planning at the city-level –

**TABLE 7-20: INCLUSIVENESS APPROACH ACTION PLAN**

| PHASE | COMPONENTS |
|---|---|
| **SHORT-TERM 2014-2019** | ◘ Community Mobilization Strategy shall be defined by the Strategic Communication Cell, ANN;<br>◘ Implement the Community Mobilization Mechanism to enable the inclusion of the needs & demands of the community in the CSP –<br>✓ Transect Walks, Social Mapping and Ward & Slum Profiling;<br>✓ Social and Gender Audits;<br>✓ Confederating Community Groups & Linking to Ward Committees<br>✓ Development of a SHG for each ward<br>✓ Form Neighborhood Groups<br>◘ Initiate GIS based information management systems to create central repository of community ideas, needs and prioritization of projects information<br>◘ Institute Community Oversight Committees & Community Contracting Cell to involve communities in construction & O&M activities;<br>◘ Design & Implement Participatory Planning Process in line with the Participatory Law, JNNURM Reforms, MoUD;<br>✓ Initiate the institutionalization of the periodic meetings between Local Government and the community as part of participatory planning and review;<br>✓ Identify NGO's with community mobilization skills, planning & implementation experience and establish contracting mechanism to institutionalize their participation;<br>◘ Establish guidelines to translate the community participation into budget allocations and formalize the participatory budgeting;<br>✓ Allocate budgets to implement pilot scale projects with Community based organizations;<br>✓ Allocate budgets to establish and institutionalize CBOs'<br>◘ Initiate the development of microfinance model to enable the urban poor to extend services within their areas;<br>◘ Awareness Campaign to encourage households to invest in connections and in-situ work of basic services;<br>◘ SHG to help with group loans and savings accounts of individuals that serve as collaterals;<br>◘ NGO's and the Strategic Communication cell to help State owned Banks to establish community mobilization cells to help design interventions and ensure high repayment rates;<br>◘ Initiate the development of a revolving fund for poor through State Urban Infrastructure Fund to help with the micro-financing options;<br>✓ Establish Guidelines and Initiate the Microenterprise Models in the service delivery<br>✓ Provide Basic Services as microenterprises<br>◘ O&M shall be the SHG/CBO's responsibility - Livelihood Mechanism<br>◘ Cross-subsidy mechanisms to finalize the connection fees and tariff structures/user charges;<br>◘ Establish capacity building initiatives to train the communities in the construction and O&M of the facilities<br>◘ Citizen Report Cards and feedback mechanism to be institutionalized and formalized; |
| **Short-Term**<br><br>**2014 – 2019** | ◘ Finalize the Microfinance Model;<br>◘ Finalize the Microenterprise Model;<br>◘ Institutionalize the mechanisms of participatory planning and budgets;<br>◘ Establish the City Community Vocational Training Unit(s) engaging the skilled professionals from within community;<br>◘ Finalize GIS based information management systems to create central repository of community ideas, needs and prioritization of projects information<br>◘ Establish the Revolving Fund Mechanism |
| **Mid-Term** | ◘ Update and upgrade the mechanisms;<br>◘ Improve the participatory planning process & participatory budget mechanisms based on monitoring and |

| PHASE | COMPONENTS |
|---|---|
| 2020 - 2034 | evaluation;<br>◘ Review and reengineer the City Vocational Training Units and Curriculum; |
| Long-Term<br><br>2035 - 2044 | ◘ Update and upgrade the mechanisms;<br>◘ Improve the participatory planning process & participatory budget mechanisms based on monitoring and evaluation;<br>◘ Review and reengineer the City Vocational Training Units and Curriculum; Achievement of Municipal Model Law objectives in totality<br>◘ Successful implementation of City Financial Viability Mechanism<br>◘ Establishment of Participatory Planning Process<br>◘ Establishment of accountable governance framework |