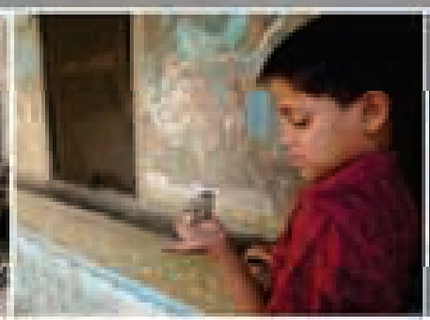
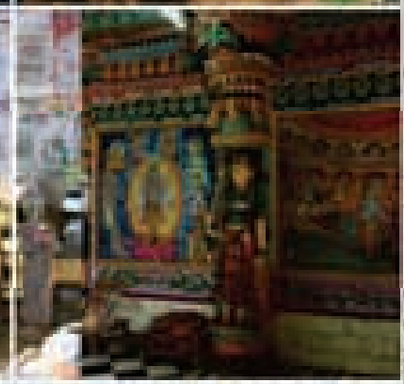







CITY SANITATION PLAN FOR RAIPUR




MESSAGE

FOREWORD

We are pleased to provide some introductory thoughts to this document, which arrives at an important turning point in the development phase of Raipur City. We would like to express our deep appreciation for the initiative and support given by GIZ in the preparation of the City Sanitation Plan. This document is a succinct overview of the City Sanitation Plan for Raipur City in order to recognize the stress areas in the sanitation sector and establish priorities in the intervention areas along the defined strategic guidelines.

City Sanitation Plan is a 30-year strategic framework to deliver on the long-term vision we have set for the sanitation sector in Raipur City. This framework forms the basis on which the City Administration will work with stakeholders - including other spheres of government, service providers and beneficiaries - in our common mission to overcome the vast gaps in sanitation services. The process culminating in this framework included in-depth research and wide-ranging consultation with city stakeholders. Building on the objectives set out in the National Urban Sanitation Policy of 2008, the technical team under GIZ conducted 6 months of data-driven research which resulted in the release of the preliminary draft 'Raipur Status Report' document for stakeholders' comment in August 2010. A two-month period allowing for stakeholders' comment and consultation followed. Post validation of the data presented in the preliminary draft, the draft 'City Sanitation Plan' was released in June 2011 followed by stakeholder consultations and subsequent finalization of the strategic framework. Today, we can confidently say that all interested parties had a meaningful opportunity to contribute to the adopted framework.

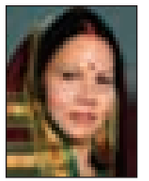
This document is not exclusive in the context of planning for the city because its formulation has been synergized with the elements of Raipur's City Development Plan. The strategic plan reflects the thoughts, feelings, ideas, and wants of the stakeholders of the city and moulds them along with the city's purpose, mission, and regulations into an integrated document. The final section of this document can serve as a guide to implementing process for the stakeholders. This document is not a static document as this can be quickly adjusted with additional scenarios that may occur. With this document, and with the community-defined commitments that lie behind it, we are enabled to establish a clear case for a strategic choice that presents itself in relation to a current or predicted sanitation gap, given the balanced view of the range of options available coupled with the timeframes within which each explicit strategic choice needs to be made.

We consider the evolving agenda based on the document to be ambitious, but achievable. The framework is ambitious because it puts forward an uncompromising vision of sanitation services which are in tune with the needs of our city and the real needs of community, whilst at the same time striving to come as close to financial self-sufficiency as possible. This means that sanitation sector must deliver improved basic services and better services to all users. Furthermore - since we are operating in a context of limited national resources – it also means that these objectives must be reached at the lowest possible system cost, that services must aim to be self-sustaining and that they must generate the necessary reinvestment to meet future customer requirements.

Ambitious though these goals may be, they are achievable because the framework is based on current realities and judiciously forecasted trends. It spells out the roles of government, private service providers and customers and sets clear targets. The role of city administration is to put appropriate institutions in place and define clear rules to regulate investment and operations in an attempt to achieve the agreed goals for the sanitation sector.

This strategic framework represents the first foundation of a new collective process which will breathe life into our long-term vision and strategy and will guide all our collective actions as we strive to meet the needs of the city and our community. Wide ownership of the process will ensure that the strategy remains dynamic and adaptable as it is continually enriched and enhanced by the experience of implementation. It is with a great deal of satisfaction that we declare this strategic framework to be the action agenda for the 'Sanitation Sector'. This agenda is the basis on which the initiatives must be evaluated, especially by the most important stakeholder in the sanitation sector - the informed and demanding customer.

The formal implementation of this agenda starts in earnest today with the release of this strategy document and continues for the next 30 years. Along the way we intend to address the national goals to which government is committed and meet the needs of the community we have chosen to prioritise.



(Kiranmayi Nayak)
Hon'ble Mayor, Raipur City

(Taran Prakash Sinha)
Worthy Municipal Commissioner, Raipur City

1. Introduction

Government of India launched National Urban Sanitation Policy (NUSP) in 2008 with the vision that – 'all Indian cities and towns become totally sanitized, healthy and liveable 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.'

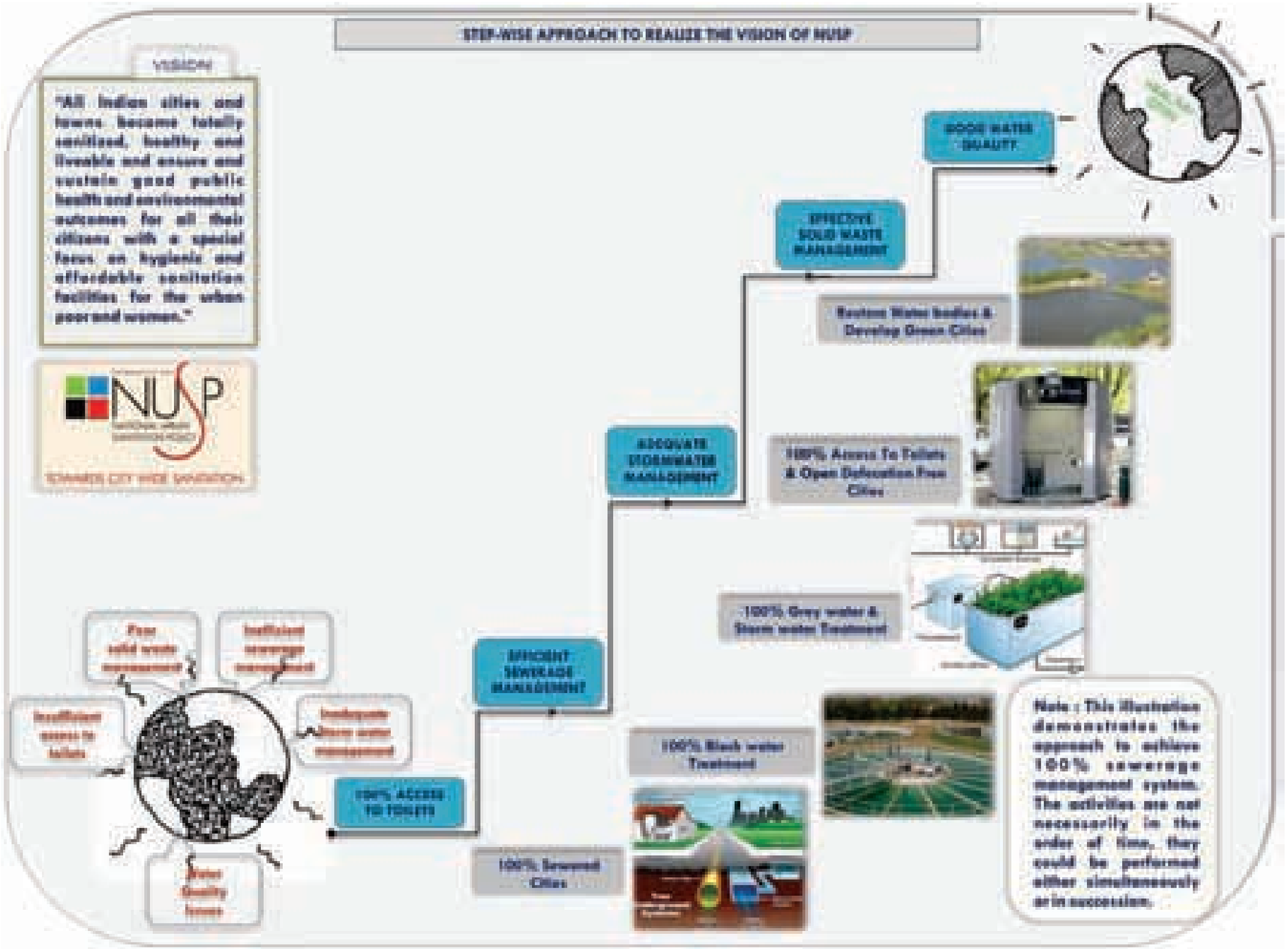
The overall goal of this policy is to transform India into 'community driven, totally 'sanitized', 'healthy' and 'liveable' cities and towns' while focusing on the specific goals of Generating Awareness & Promoting Behaviour Change; Achieving Open Defecation Free Cities and Integrating City Wide Sanitation.

In order to achieve the vision of NUSP, a set of key policy issues have been identified that must be addressed earnestly – poor awareness, social and occupation aspects of sanitation, fragmented institutional roles and responsibility, lack of an integrated city wide approach, limited technology choices, constrained access of sanitation for the un-served and the poor, and lack of demand responsiveness.

NUSP provides the draft framework that supports the states in developing their own '*State Sanitation Strategies*' to achieve the goals set out in NUSP. The state sanitation strategies shall be with respect to each of their unique sanitation, climate and physiographic factors, economic, social and political parameters and institutional variables. States will need to determine time-frames and deadlines to achieve the goals mentioned in the NUSP and will need to spell out a detailed roadmap, including the incremental targets for achievement of goals. All such steps are spelt out in and operationalized under the '*City Sanitation Plans*'. City Sanitation Plan is a planning document that shall achieve the step wise implementation of the goals spelt out in NUSP.

The vital step in accomplishing the objectives of CSP is to elevate the consciousness about sanitation in the minds of municipal agencies, government officials, and most importantly amongst people of the city. '*City Sanitation Task Force*' comprising of the representatives from the aforementioned sections in the city is the instrument for achieving the same. The CTF shall be the driving force behind the preparation of CSP as well as creating awareness amongst the city stakeholders.

Government of India has instituted award schemes at different levels to mobilize cities and their participation in the promotion of sanitation in urban areas per the guidelines of NUSP, and recognise the excellent performance in this area – *'National Awards'*, and *'Special and Honorary Awards'* at state level.

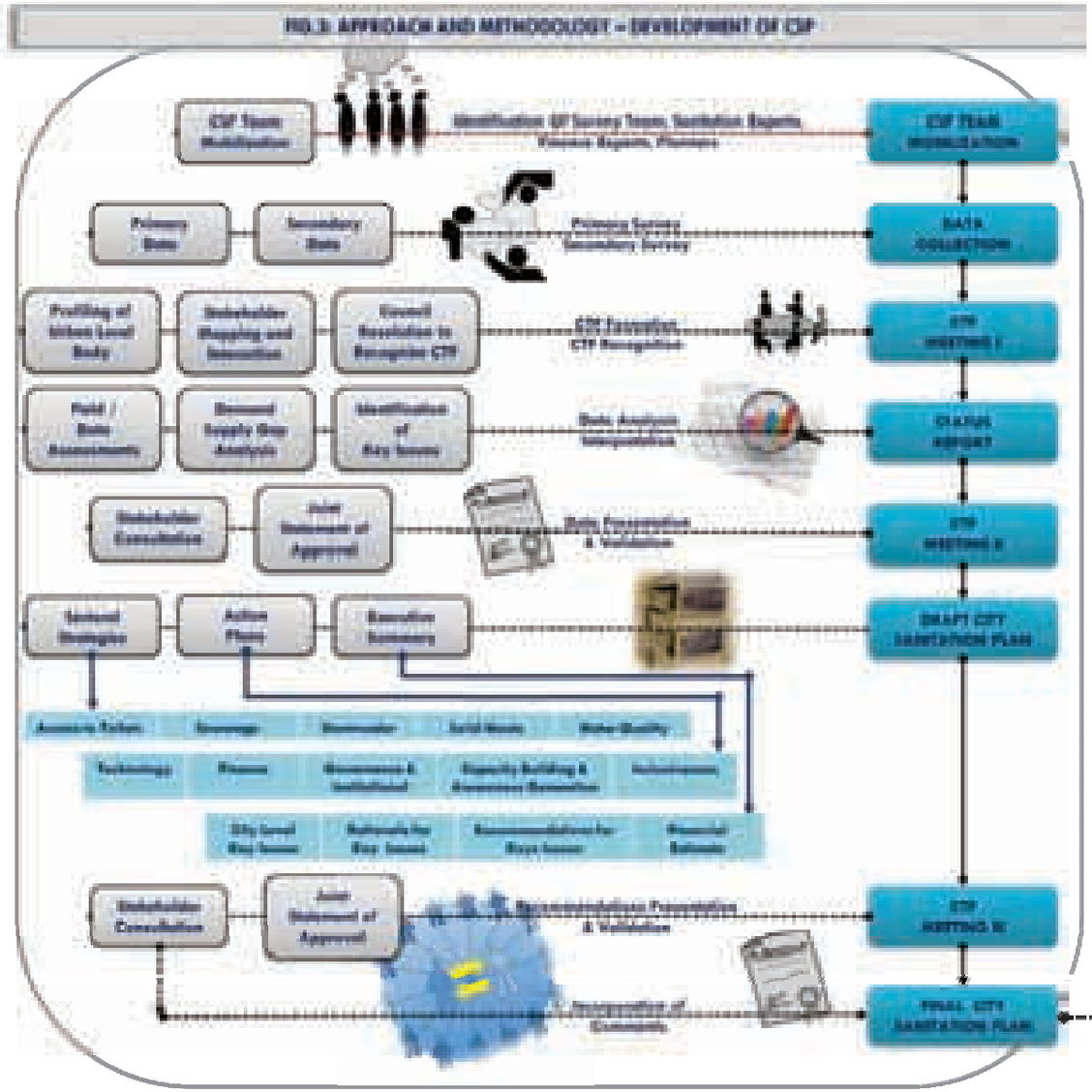

STEP-WISE APPROACH TO REALIZE THE VISION OF NUSP
VISION
"All Indian cities and towns became totally sanitized, healthy and liveable and ensure and sustain good public health and environmental outcomes for all their citizens with a special focus on hygienic and affordable sanitation facilities for the urban poor and women."
NUSP
TOWARDS CITY WIDE SANITATION
GOOD WATER QUALITY
EFFECTIVE SOLID WASTE MANAGEMENT
Restore Water bodies & Develop Green Cities
ADEQUATE STORMWATER MANAGEMENT
100% Access To Toilets & Open Defecation Free Cities
100% Grey water & Storm water Treatment
EFFICIENT SEWERAGE MANAGEMENT
100% Black water Treatment
100% Sewered Cities
100% ACCESS TO TOILETS
Poor solid waste management
Inefficient sewerage management
Inadequate storm water management
Inefficient access to toilets
Poor quality issues
Note : This illustration demonstrates the approach to achieve 100% sewerage management system. The activities are not necessarily in the order of time, they could be performed either simultaneously or in succession.

Raipur City is the capital of Chhattisgarh, formerly a part of Madhya Pradesh before Chhattisgarh was formed in November 2000. The city is administered by Raipur Municipal Corporation (RMC) and is also the headquarters of Raipur district. Raipur has 70 wards within 8 administrative zones; Raipur is located near the centre of a large plain, sometimes referred as the "rice bowl of India"

The traditional face of Raipur has changed as it transformed into a major regional, commercial and industrial destination subsequent to its institution as the State Capital. Additionally several villages have been added to the City; subsequently, it has witnessed a *'high growth rate in population which has not been matched with a corresponding sanitation infrastructure'*. The consequence – 'City plagued with sanitation problems as illustrated in the Fig.1'

Despite being a historically and archaeologically important city with several beautiful lakes and located in the fertile plains of Chhattisgarh region, Raipur is sadly categorized under 'critically polluted area' by Central pollution Control Board. In the sanitation ratings conducted as per National Urban Sanitation Policy (NUSP), Raipur ranked 274 out of 423 cities with a score of 30.8/100 and falls in the 'red category'.

The reason for this condition is the lack of sanitation infrastructure to meet the demands of the growing population, besides the lack of appropriate operation and maintenance systems for the existing sanitation infrastructure and the essential community awareness and support.



The approach and methodology adopted for the development of CSP is depicted in Fig.3

Input Variables

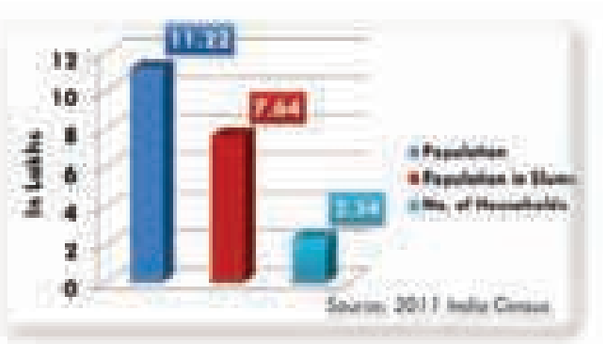
The City Sanitation Plan should include baseline information related to sanitation and sanitation related services in the city. It is required that all information cited will refer to the source of information in order to assure their quality and authenticity (Source reliability). The quality of the baseline information should be preferably from (a) Official documents, (b) Reports published by research Institutions/ Universities/Colleges, (c) Primary surveys (d) Individual Research (publications, etc.) and NGO reports.

The baseline information is primarily categorized into primary and secondary information. The primary information is gathered through a series of field surveys and the secondary information is consolidated from several available official documents/ reports/interviews/research publications.

The primary and secondary data together represent the following sets of information – (a) General Information – location, physical, demographical and land-use aspects of the city (b) Technical Information – water and sanitation infrastructure facilities and their current performance; (c) Institution and Governance – existing legislative framework, roles and responsibilities for urban infrastructure services; (d) Financial – urban finances on urban infrastructure services; (e) Capacity Enhancement – current capacities of the ULB and on-going activities for capacity enhancement; (f) Health and Hygiene – previous health hazards/epidemics related to sanitation and current health and hygiene practices.

1. PRESENT POPULATION

The jurisdiction of RMC has increased from 55 sq km to 142.28 sq km with the inclusion of 26 villages to RMC. This has resulted in a boost to growth rate with an increase of population from 7.59 Lakhs in 2001 to 11.22 Lakhs in 2011 per census. However, sanitation infrastructure development has not been corresponding to the population growth. It is further of great concern that nearly 68% of the population lives in slums.

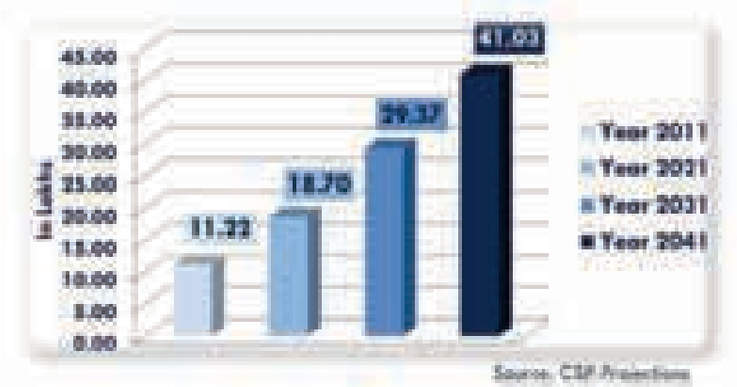


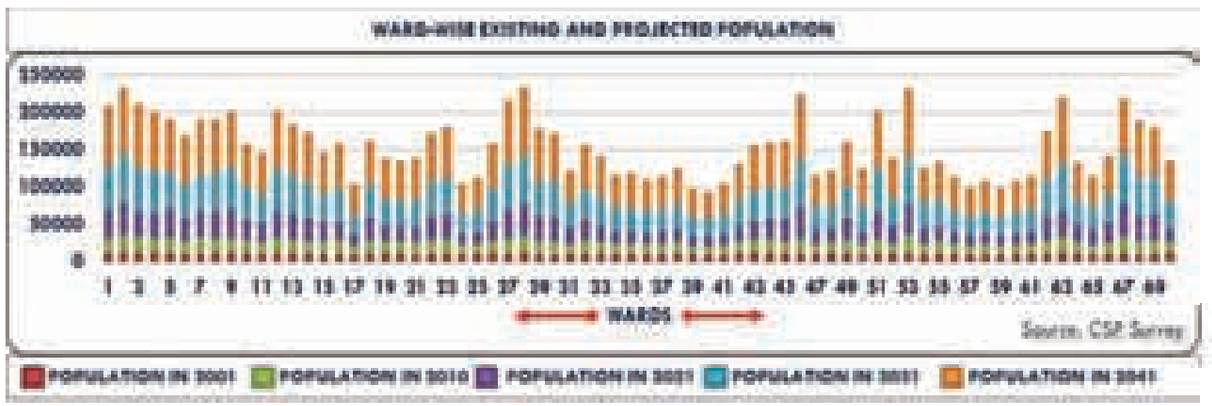
Ward-Wise Distribution – Future Population:

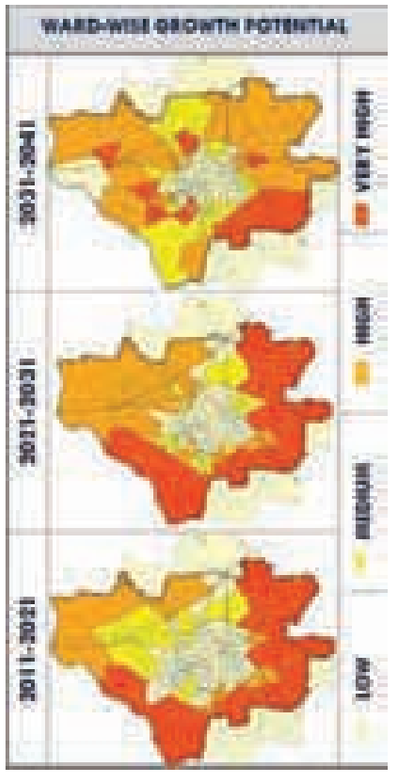
- Wards that are located towards the periphery and are experiencing growth in the current decade are assumed to have highest growth rate,
- The wards located in the centre of the city are considered to have less growth potential in the current decade 2011-2021
- The growth potential of peripheral wards continues to increase in the second decade due to the development pressure imparted by the location of Naya Raipur**.
- However after 2031, the growth pressure experienced by the peripheral wards would stabilize.

** *A new capital is proposed to be established in Naya Raipur (New Raipur) closer to the south eastern side of the city, this has given a considerable boost to the real estate developments.*

2. FUTURE POPULATION







ILLUSTRATIVE WARD PROFILING UTILIZING THE PRIMARY AND SECONDARY DATA

☐ **WARD 1[VEER SAVARKAR NAGAR]**

Key Map

Ward Land Use Map

Existing Population and Infrastructure Requirements

	Population	Water Utilization (MLD)	Sewage Generation (MLD)	Solid waste generation (Metric Ton)
Residential	20,706	1.91	1.53	4.15
Non-residential	54,925	0.19	0.15	1.53

*NOTES

This ward has predominantly agricultural, Logistics, Industrial, Residential, Commercial, markets, Dairy, Villages, and Water bodies

Projected Population and Infrastructure Requirements

	Population	Water Demand (MLD)	Sewage Generation (MLD)	Solid Waste Generation (Metric Ton)
2021	37,271	5.03	4.03	16.77
2031	66,624	8.99	7.20	29.98
2041	112,886	15.24	12.19	50.80

RANKING BASED ON NUSP OUTPUT INDICATORS | **OVERALL RANK**

No	OUTPUT RELATED INDICATORS	WARD LEVEL STATUS	Rank
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	CSP survey indicates that about 21% of the urban poor population resorts to open defecation and 79% of the urban poor population have access to individual toilets but some members still resort to open defecation.	
ii.	Access and use of toilets for floating and institutional populations adequate public sanitation facilities	As per CSP survey, 93% of the floating population (non-residential) has access to individual toilets and 5% of floating population resort to open defecation and the remaining 2% use community toilets.	
iii.	No open defecation visible	As per CSP survey, 13% of the population resorts to open defecation and about 50% have individual toilets but some members still resort to open defecation. About 37% have access to Individual toilets.	
iv.	Eliminate Manual Scavenging and provide personnel protection equipment to sanitary workers		
B	Proportion of total human excreta generation that is safely collected (6 points for 100%)	As per CSP survey, 23% of the total waste water is collected in the septic tank which is disposed as per discharge norms and about 55% of the total waste water is collected in the septic tank which is disposed directly into open nallas/drains and the remaining 22% of the total waste water is disposed off directly into the open drains/open nallas. .	
C	Proportion of total black waste water generation that is treated and safely disposed off (6 points for 100%)	23% of the waste water collected in the septic tank is probably treated.	
D	Proportion of total grey waste water generation that is treated and safely disposed off (3 points for 100%)	Grey and black water not segregated	
E	Proportion of treated water that is recycled and reused for non-potable applications	No water is recycled (Secondary data - DPR has been prepared by Meinhardt and been reviewed by GTZ)	
F	Proportion of total storm water and drainage that is efficiently and safely managed (3 points for 100%)		
G	Proportion of total solid waste generation that is regularly collected (4 points for 100%)	According to CSP survey 81% of the total solid waste is collected through door to door collection	
H	Proportion of total solid waste generation that is treated and safely disposed off (4 points for 100%)	Not applicable at ward level	
I	City wastes cause no adverse impacts on surrounding areas outside city limits (5 points for 100%)		

Note :Each ward is ranked for the NUSP parameters as per the conditions given below. Average of all the rated parameters gives the total ranking of the ward. The purpose of this ranking is to provide a basis for prioritizing investments. Wards ranked 4 will thus be highest priority for investment as they have the worst combination of problems.

RANKING LEGEND	1	Excellent Condition	2	Fair Condition	3	Moderate Condition	4	Poor Condition

RANKING METHODOLOGY

NO.	ITEM	SPECIAL CASES	RANK			
			1	2	3	4
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*	When there are no slums in the ward rank 1 is given	CSP survey suggests that more than 75% of slum HH use individual or community toilets and do not defecate in the open	CSP survey suggest that 50 to 75% of the slum HH use individual or community toilets	CSP survey suggests that 25 to 50% of the slum HH use individual or community toilets and defecate in the open.	CSP survey suggests that less than 25% of the slum HH use individual or community toilets and defecate in the open.
ii.	*Access and use of toilets for floating and institutional populations adequate public sanitation facilities*	Where floating population is negligible [land used by non-residential uses is minimal] rank 1 is given	CSP survey indicates that more than 75% of the floating population use individual or community toilets and do not defecate in the open	CSP survey suggests that 50 to 75% of the floating population use individual or community toilets	CSP survey suggests that 25 to 50 % of the floating population use individual or community toilets	CSP survey suggests that less than 25 % of the floating population use individual or community toilets
iii.	*No open defecation visible*		CSP survey suggest that there is no open defecation in the ward	CSP survey suggests that open defecation is less than 25%	CSP survey suggests that 25 to 50% of the people defecate in the open	CSP survey suggests that more than 50% of the people defecate in the open
iv.	*Eliminate Manual Scavenging and provide personnel protection equipment to sanitary workers*	Quantifiable data is not available and ranking is not included				
B	*Proportion of total human excreta generation that is safely collected (6 points for 100%)*		CSP survey suggest that more than 75% of the sewage is collected in either septic tanks or sewer lines	CSP survey suggest that 50 to 75% of the sewage is collected in either septic tanks or sewer lines	CSP survey suggest that 25 to 50% of the sewage is collected in either septic tanks or sewer lines	CSP survey suggest that 0 to 25% of the sewage is collected in either septic tanks or sewer lines
C	*Proportion of total black waste water generation that is treated and safely disposed off (6 points for 100%)*		CSP survey indicates that more than 75% of the waste water reaches septic tanks	CSP survey indicates that 50 to 75% of the waste water reaches septic tanks	CSP survey indicates that 25 to 50% of the waste water reaches septic tanks	CSP survey indicates that less than 25 % of the waste water reaches septic tanks
D	*Proportion of total grey waste water generation that is treated and safely disposed off (3 points for 100%)*	Grey and black water is not segregated. Ranking is included as part of parameter C for all wards				
E	*Proportion of treated water that is recycled and reused for non-potable applications*	No water is recycled (Secondary data - DPR has been prepared by Meinhardt and is being reviewed by GTZ)				
E	*Proportion of total storm water and drainage that is efficiently and safely managed (3 points for 100%)*		Score - 3	Score-2	Score-1.5	Score-1.0
F	*Proportion of total solid waste generation that is regularly collected (4 points for 100%)*		CSP survey indicates that more than 75% of the solid waste generated is collected in bins or through door to door collection	CSP survey indicates that 50 to 75% of the solid waste generated is collected in bins or through door to door collection	CSP survey indicates that 25 to 50% of the solid waste generated is collected in bins or through door to door collection	CSP survey indicates that less than 25% of the solid waste generated is collected in bins or through door to door collection
G	*Proportion of total solid waste generation that is treated and safely disposed off (4 points for 100%)*	Should be based on the secondary data - as of now Scientific management of Solid waste is not existing				
H	*City wastes cause no adverse impacts on surrounding areas outside city limits (5 points for 100%)*		Rank is 1 for at least 2 indicators [A(i), C & F]	Rank is 2 or better for at least 2 indicators [A(i), C & F]	Rank is 3 or better for at least 2 indicators [A(i), C & F]	Ranks other than conditions described in the others. [A(i), C & F]
RANKING LEGEND	**1**		**2**		**3**	**4**
OVERALL RANKING LEGEND	**Score-1 to 1.5**		**Score-1.5 to 2.5**		**Score-2.5 to 3.5**	**Score-3.5 to 4**

Status Indicators

The Service Level Benchmarks (SLB) established by Ministry of Urban Development, Government of India shall enable the comparison of the existing levels of service in various sectors against the defined key parameters; and hence ascertain the performance gaps. 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.

The eight key parameters thus identified for the purpose of service level benchmarking in the sectors of water supply, sewerage and solid waste are as state below – (a) coverage of service; (b) collection efficiency of service network; (c) adequacy of treatment systems; (d) quality of treatment systems; (e) extent of reuse and recycle of the solid waste generated/waste water; (f) efficiency in collection of service charges; (g) extent of cost recovery; and (h) efficiency in redressal of customer complaints.

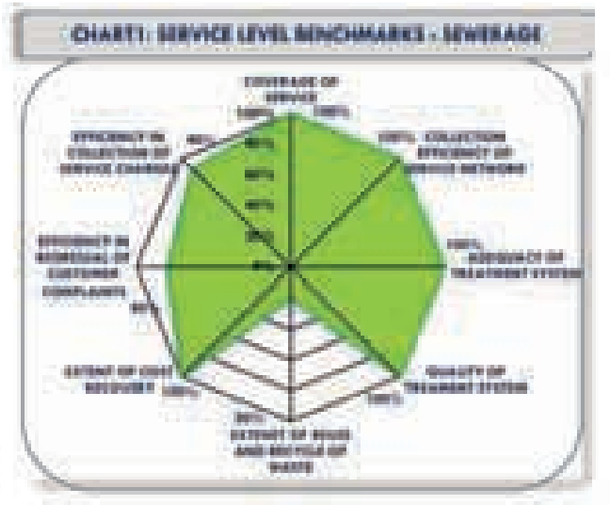
In addition to the service level benchmarking, Government of India has instituted the rating of cities based on urban sanitation indicators, under the guidelines of NUSP. The first round of rating of cities was conducted between December 2009 and April 2010 under the guidance of the National Advisory Group on Urban Sanitation. Each city has been scored under 19 indicators which are divided into three categories of 'Output' (50 points). 'Process' (30 points), and 'Outcome' (20 points) Cities need to utilize these results to prioritize the areas of improvement by developing and implementing city sanitation plans as well as raise the awareness of city stakeholders. This rating exercise also sets the baseline to measure the achievement in the future

SERVICE LEVEL BENCHMARKS

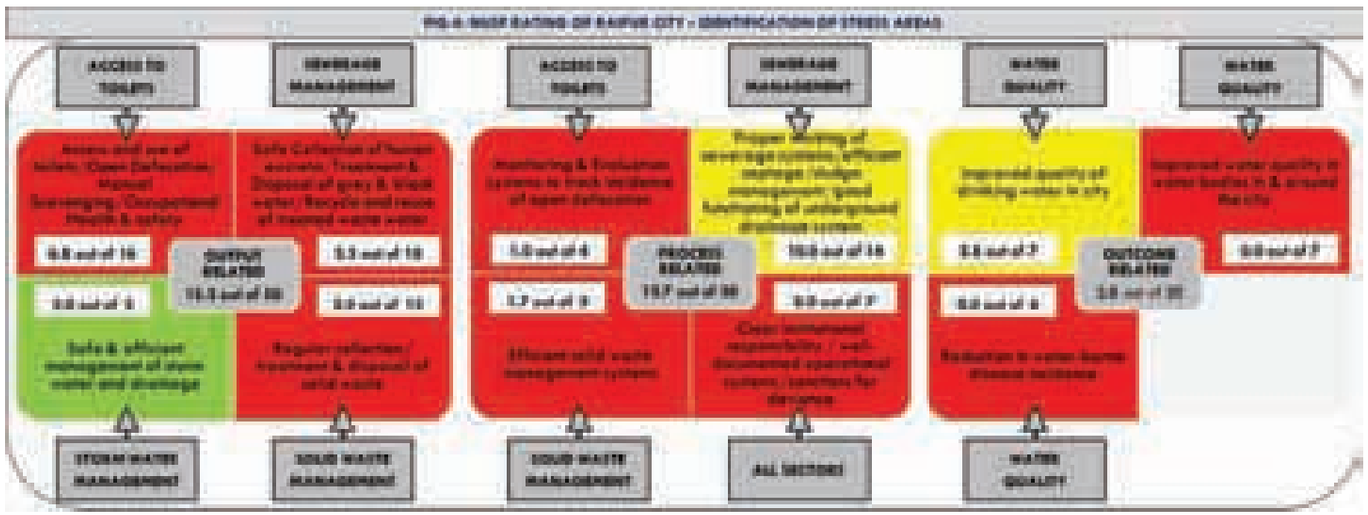
The Service Level Benchmarks (SLB) have been established for the sectors of Water Supply, Sewerage, Solid Waste and Storm Water. However, the attempt to compare the service levels against the 8 key parameters, as has been initiated only in the sectors of water supply, sewerage and solid waste, Chart 1 indicates the eight key parameters against which the service level benchmarking has been executed in the sewerage sector. The spider chart indicates the desired level of service in the sewerage sector against the eight key parameters.

The following sections present the assessment of the existing service in the aforementioned sectors vis-à-vis the desired level of service established by the Ministry of Urban Development, Government of India.

Comparison of existing levels of service in the storm water sector has been possible against 2 key parameters only.



RESULT FOR RAIPUR CITY ON NATIONAL URBAN SANITATION RATING



The rating as depicted in the figure below serves as baseline for an objective self-assessment of the cities from time to time, and highlights the stress areas in the sanitation sectors

1. ACCESS TO TOILETS

Access to toilets is a major issue amongst the low income groups especially the slum dwellers. The surveys reveal that very few have constructed individual toilets under the Integrated Low Cost Sanitation (ILCS) project and the rest of them either use community toilets or prefer to defecate in the open. However, the lack of water supply prevents the slum dwellers from using their individual toilets as well as adversely affects the operation & maintenance of community toilets resulting in high incidences of open defecation. Furthermore, waste water from the toilets are drained to a unlined pit and then into open drainages, nallas or lakes. In some of the slums, bathrooms were constructed at individual household level, directly on top of the open drainages or nallas. This leads to pollution & severe health impacts

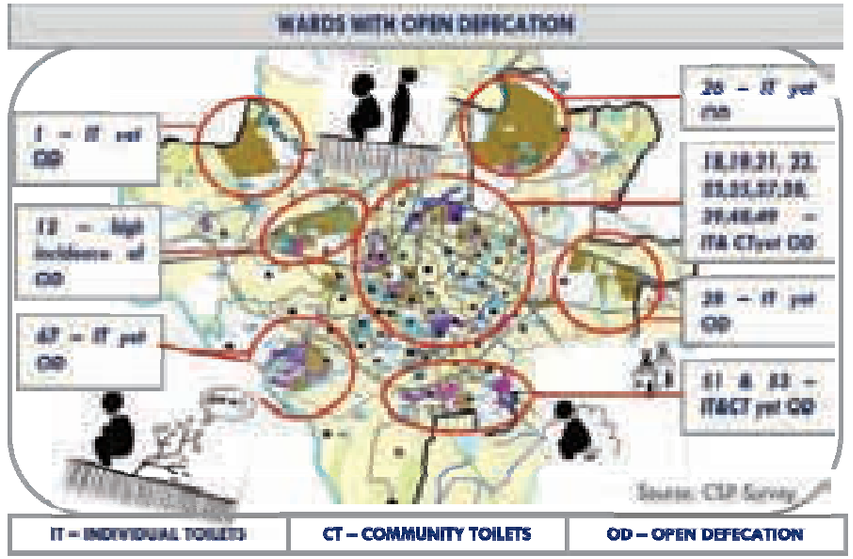
Key Issue 1 –

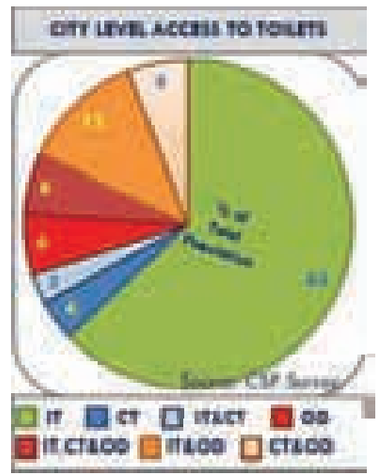
'Inadequate & deficiently designed, operated, & managed individual & community toilets in the urban poor areas resulting in open defecation & severe health impacts '

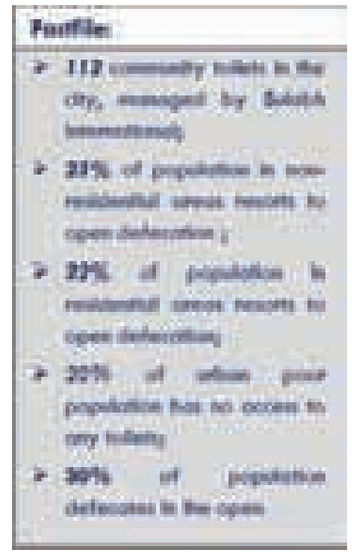
Access to community toilets is affected by the prevalent system of family card as well as the timings in force. The family card is issued at the rate of Rs. 35 per family per month limiting the use to 5 members only, If the family has more than 5 members, the children usually resort to defecate in the open. Additionally, during the peak times when it gets crowded, people resort to open defecation. At most locations, the community toilets open at 8:00 AM in the morning and closes by 8:00 PM in the night, forcing the urban poor to defecate in the open.

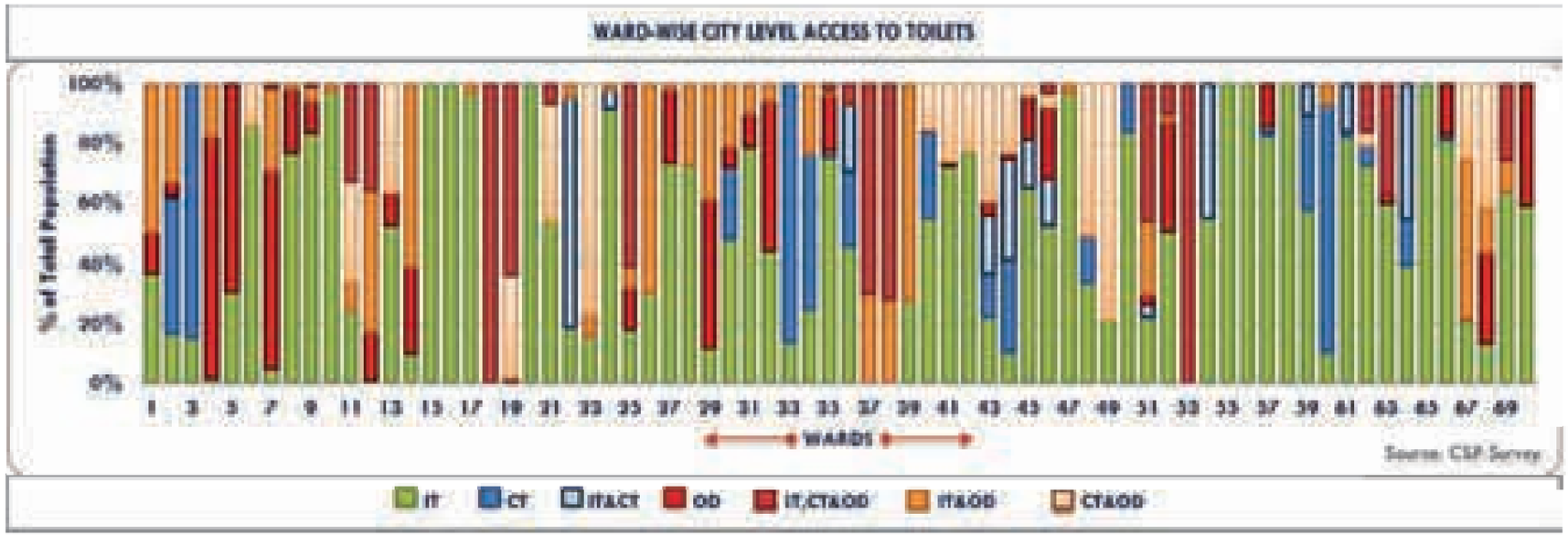
Key Issue 2 –

'Inadequate access to community toilets' resulting in open defecation & severe health impacts



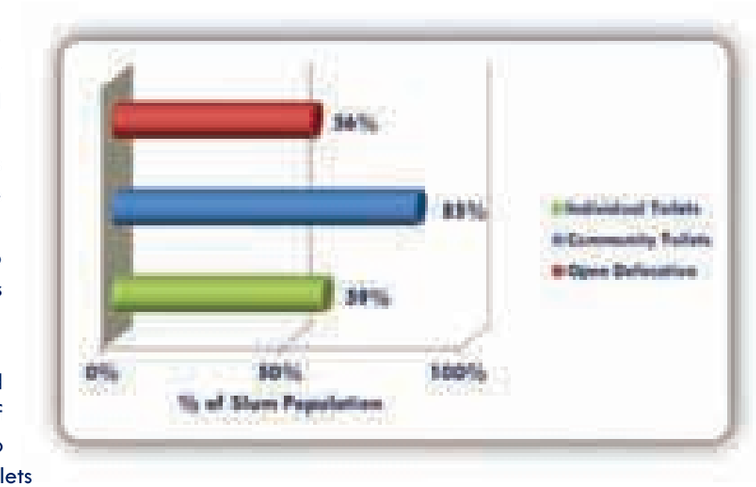


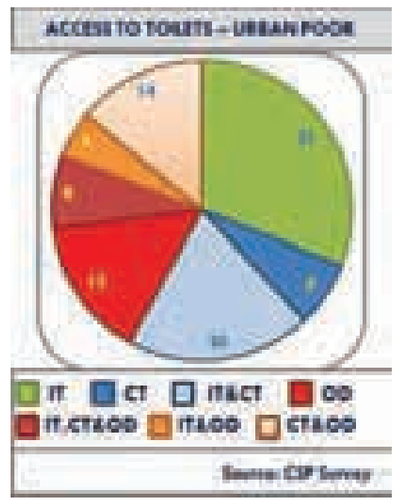




1A. URBAN POOR AND ACCESS TO TOILETS

85% of surveyed slums reported having access to a community toilet and 59% have individual toilets, but due to the poor condition and maintenance of these toilets majority of the population with access to toilets, resorts to open defecation. The restricted timings of access to community toilets also adds to the reasons of open defecation. Scarcity of water for the purposes of maintenance of these toilets renders them dysfunctional.

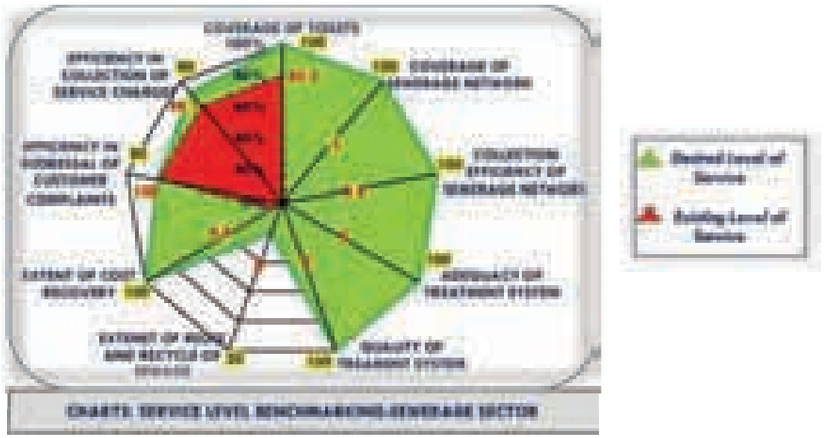




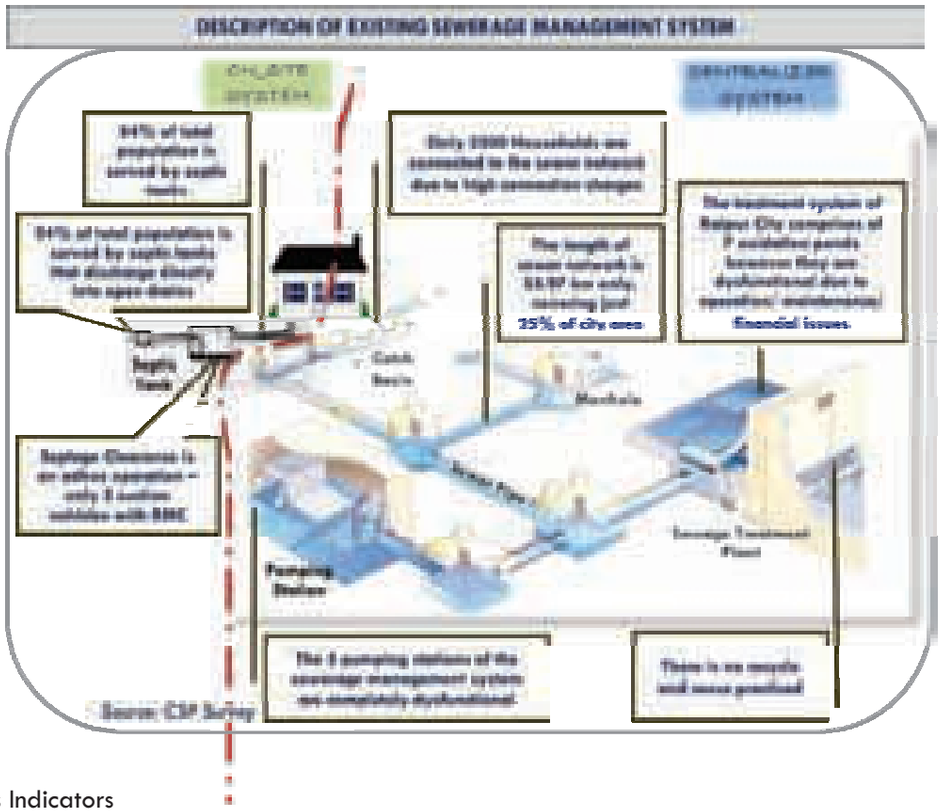
Poorly Maintained Community Toilet

Poorly maintained individual toilet

2. SEWERAGE MANAGEMENT



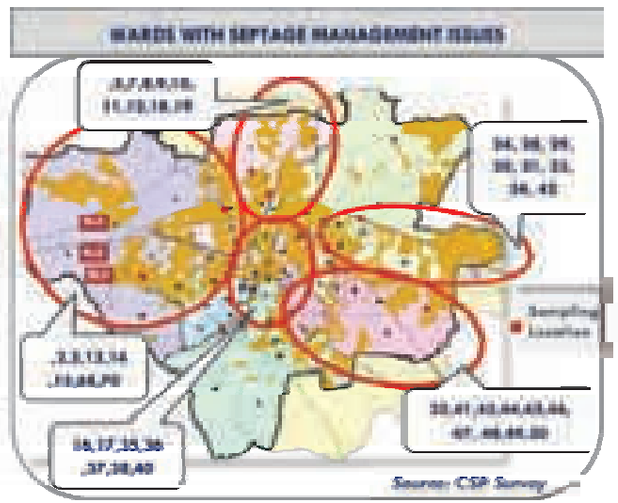
CHARTS: SERVICE LEVEL BENCHMARKING-SEWERAGE SECTOR



The sewage management system is deficient in city of Raipur which is evident from the fact that roughly 54% of the properties are connected to unscientifically designed septic tanks, part of which overflow into the open drains / areas ultimately draining into the natural water bodies and/or polluting the groundwater. Water quality samples in the affected areas show high levels of E-coli contamination (***40-2400 MPN***). There are approximately ***130000*** septic tanks in Raipur and only ***2*** suction lorries are available for service, thus greatly falling short of the requirement of about ***120*** suction lorries for efficient septage clearance. This leads to overflow of septage into open drains and open areas, adversely affecting public health.

Key Issue 3 – '

'Higher risk due to improper septic tanks and septage management leading to contamination of water bodies/water supply distribution system and incidences of water borne diseases'

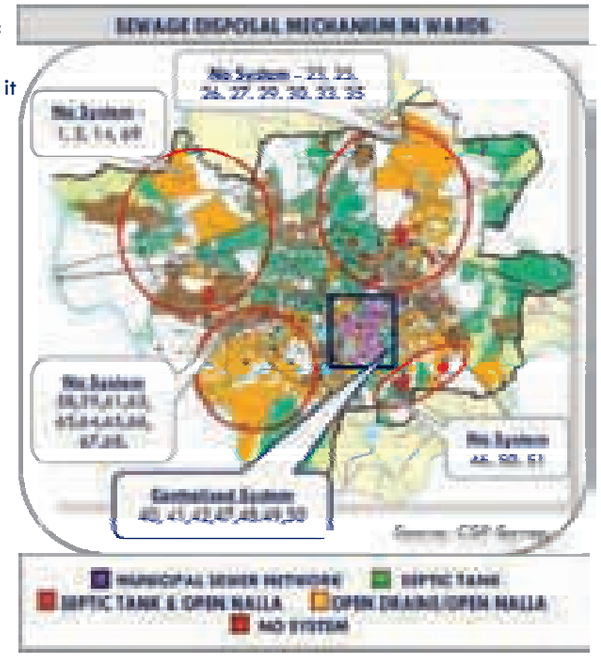


The conveyance network system has coverage of only 25%of the city area; Sewage disposal through centralized sewer is mainly prevalent in ward 47 and 48 whereas in other wards it is negligible. About 43% of the population in the city lacks any system of disposal of the sewage generated. The sewage is discharged into the open areas and open drains directly/indirectly.

Key Issue 4 –

'The coverage of centralized sewer network in Raipur is insufficient and the existing sewage treatment system consisting of 7 oxidation ponds is defunct and the total sewage generated in the city is untreated'

The oxidation ponds and pumping stations are dysfunctional and hence the sewage generated in the city remains untreated. The untreated sewage finds its way to the surface water and ground water, eventually. This results in pollution and has adverse impacts on public health

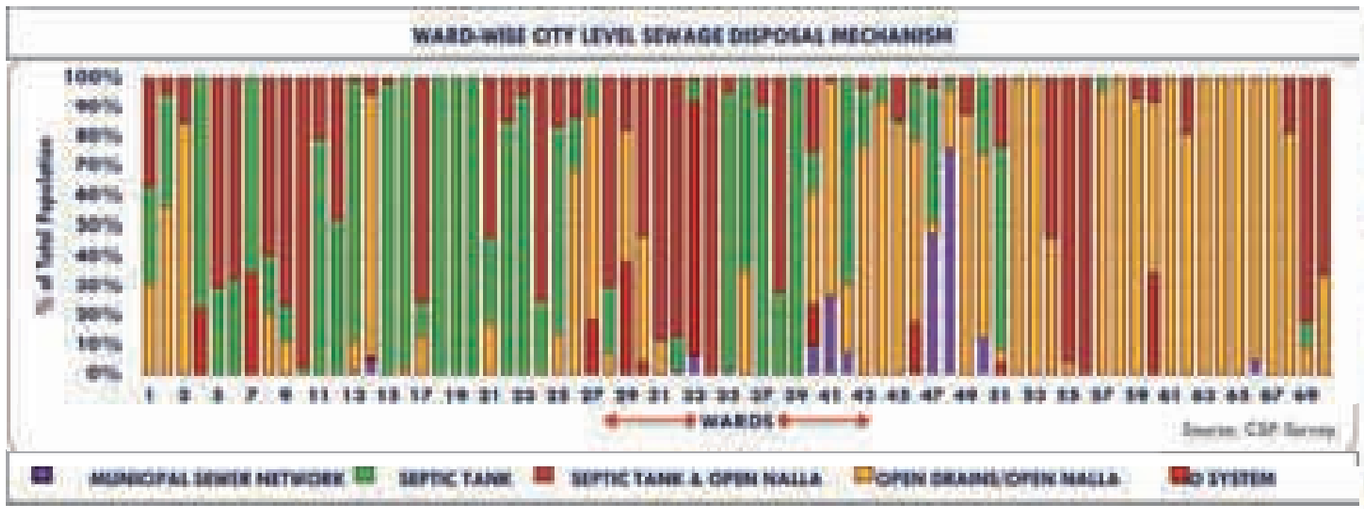


Factfile:

- **Sewer network length is *55.97* km**
- **Sewer network covers only *27* wards out of the total 70 wards – 25% of city area**
- **Only 10% of city area has access to sewerage network – 3% of the total population**
- **Only 3500 households out of the 2.38 Lakh households are connected to sewer network;**

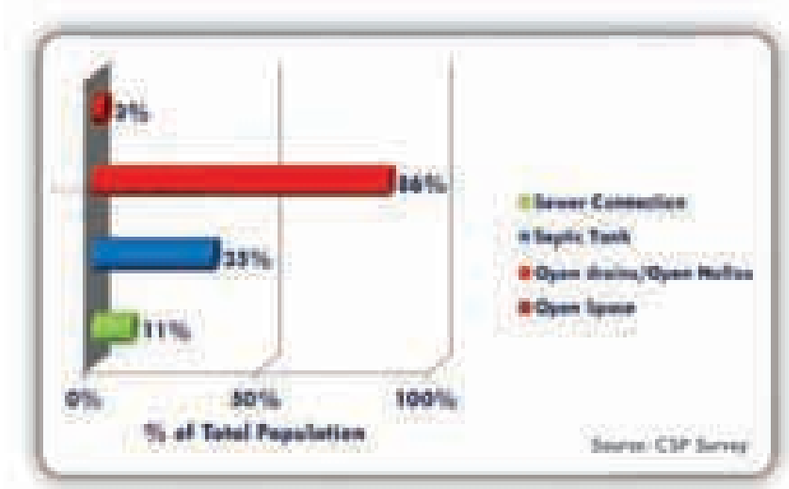
Ongoing Interventions:

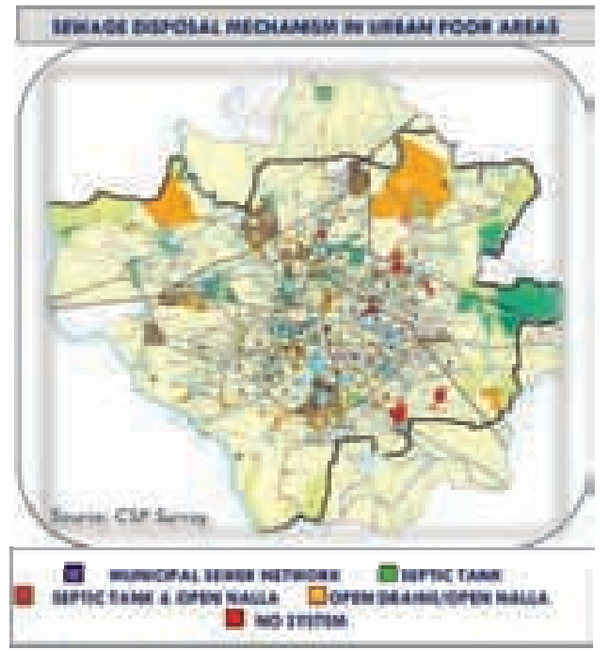
A comprehensive sewerage management Detailed Project Report (DPR) has been prepared by M/s Meinhardt India. It is currently being evaluated by the officials of RMC. RMC has requested the modification to DPR to incorporate their new paradigm shift in the approach to tackle the sewerage management issues vide adoption of combination of decentralized as well as centralized mode of sewerage management systems.



2A. URBAN POOR – SEWERAGE MANAGEMENT

Sewerage Management in the slums is a critical issue that needs immediate remedial action. The majority of waste water disposal happens through a network of surface drains in the slums; and eventually into a nalla, nearby open space, or water body. Even the urban poor households connected to septic tanks (35% of slum population) discharge the black water into open drains / open spaces, increasing the total figures of slum population discharging sewage into open areas to 86%. Stagnation of waste water is widespread, which encroaches upon the living and working areas of dwellers





Factfile:

- **89% of the urban poor population discharges the waste water in open drains / open areas, directly or indirectly**
- **Only 11% of urban poor population has access to sewer network**

3. SOLID WASTE MANAGEMENT

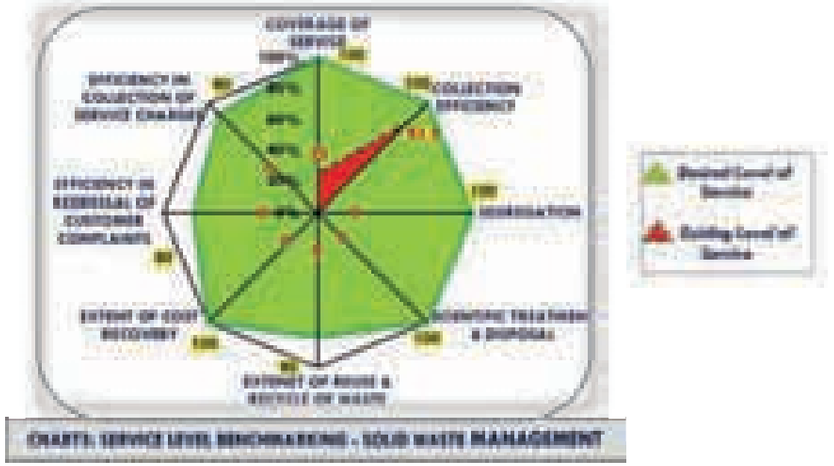
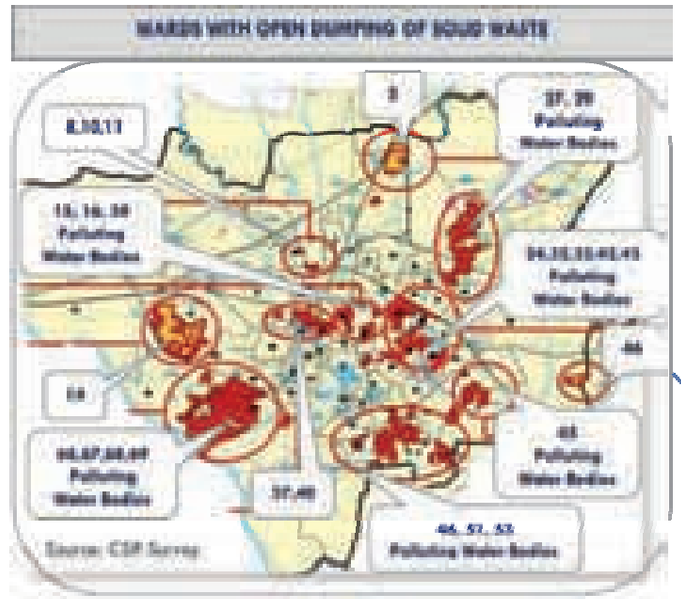


CHART: SERVICE LEVEL BENCHMARKING - SOLID WASTE MANAGEMENT

Solid waste management is one of the most prominent issues faced by RMC. Solid waste is generally disposed in the community bins, road side or dumped in the open space. Door to door collection (DTDC) is initiated only in 7 wards out of the total 70 wards servicing just 8% of the total population.; while secondary collection vide community bins serves only 18% of the total population, the deficient transportation system only handles 40% of waste generated and does not ensure daily lifting of the waste. Open drains and nallas choked with solid waste is a common sight. The stagnation of waste in the drains, open areas transforms them into breeding places of mosquitoes and other vectors of diseases. Ultimately, this condition impacts the public health in an adverse way.

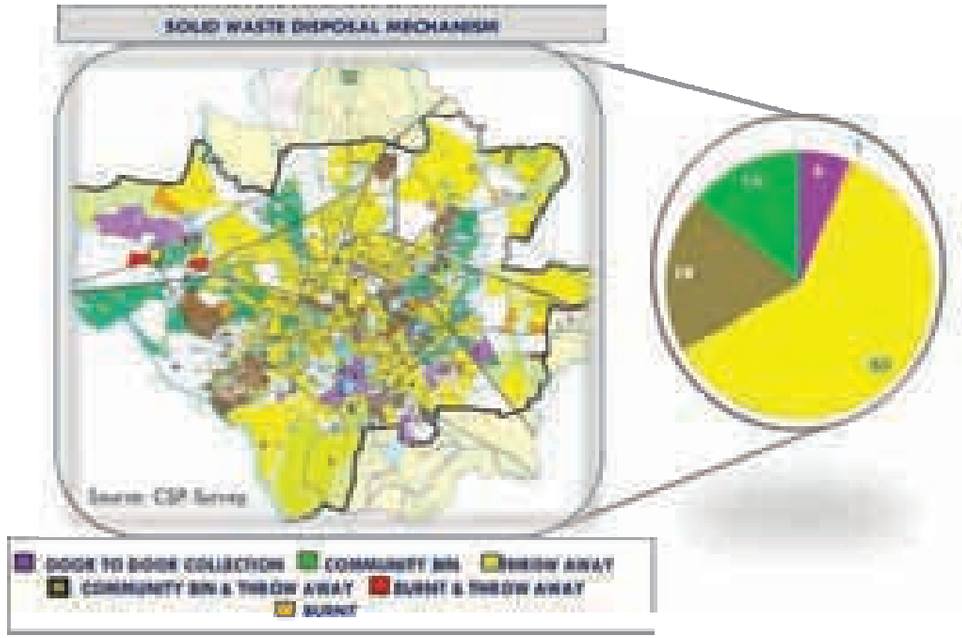
Key Issue 5–
'Indiscriminate dumping of solid waste in open areas and storm water drains due to deficient collection and transportation system

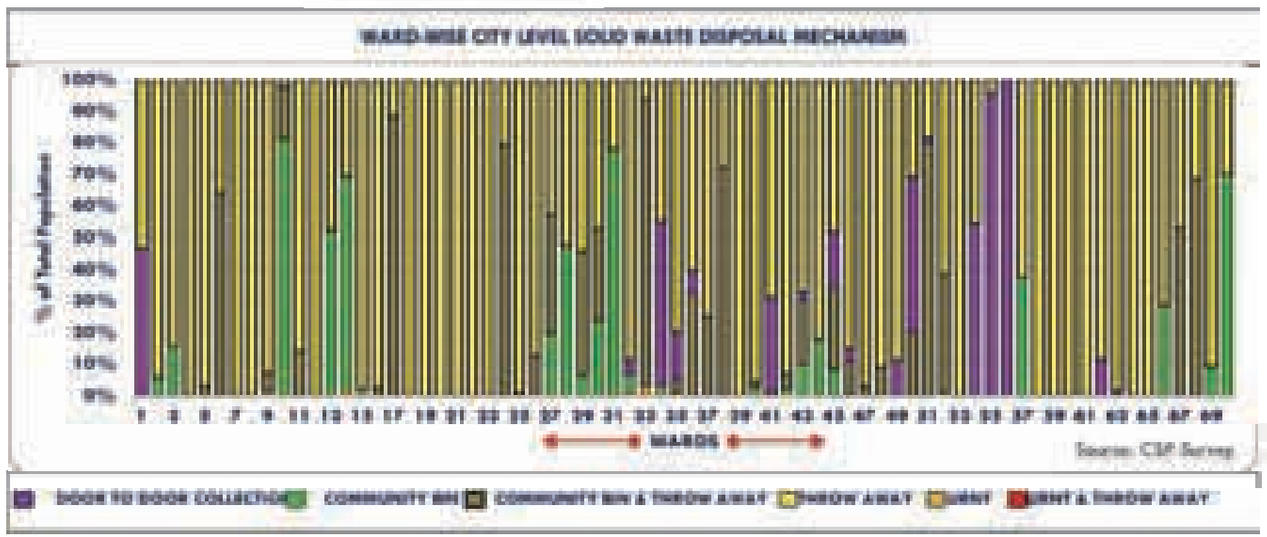


The waste from the entire city that reaches the designated dump site is not handled through engineered scientific sanitary landfill. Periodic burning of the waste is practised, which adds to adverse impacts on public health. The waste is disposed without any treatment and hence the imminent threat of ground water contamination through the leachate produced from the untreated solid waste. There are no measures to initiate recycle and reuse of the waste; previous attempts to produce compost from waste have failed owing to operational & maintenance issues.

Key Issue 6

'Unscientific management of the dump sites receiving the waste from the entire city and lack of treatment and ultimate scientific disposal'





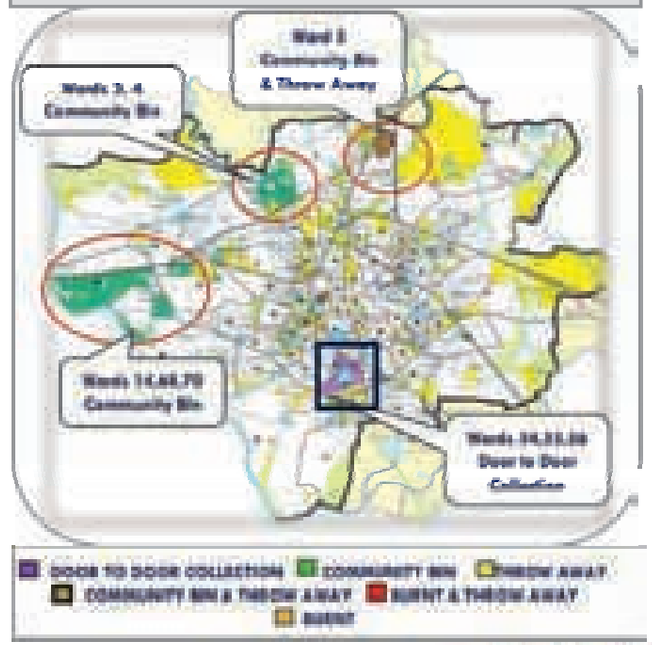
Ongoing Interventions:

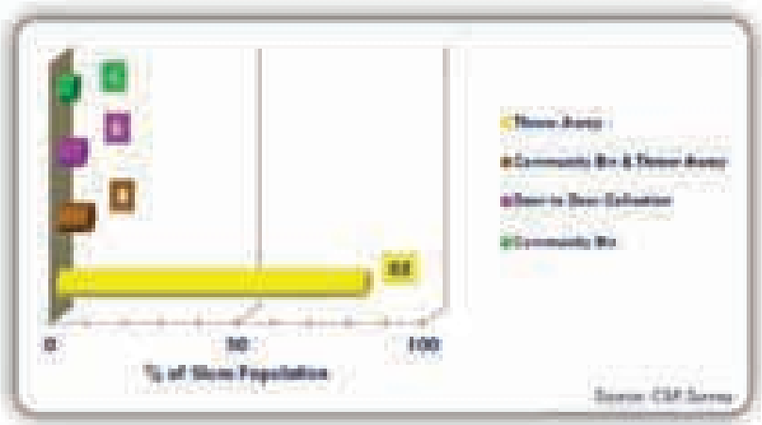
- **The solid waste management detailed project report (DPR) has been approved by RMC;**
- **The State Urban Development Agency (SUDA) released a notice inviting request for proposals for Design, Build, Finance, Operate and Transfer of integrated municipal solid waste management project in the city of Raipur;**
- **SUDA is in the process of finalizing the agreement with M/s Kivar Environ in consultation with RMC and the Mayor in Council.**

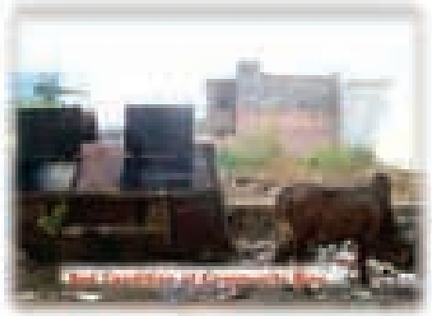
3A. URBAN POOR – SOLID WASTE MANAGEMENT

Solid Waste is handled in the most unhygienic mode in the urban poor areas. It is very evident from the fact that 82% of the urban poor population engages in dumping of solid waste in open areas and storm water drains. The total population that enjoys the door to door collection of solid waste is a mere 6% of the urban poor population; however, irregular collection schedules force the residents to dispose the waste in open areas. It may be largely concluded that in the urban areas, most of the open plots and water bodies and all the drains are filled with solid waste. Clogging of drains leads to flooding during raining seasons and it is a major concern at the city level as it adversely impacts public health.

SOLID WASTE DISPOSAL MECHANISM IN URBAN POOR AREAS







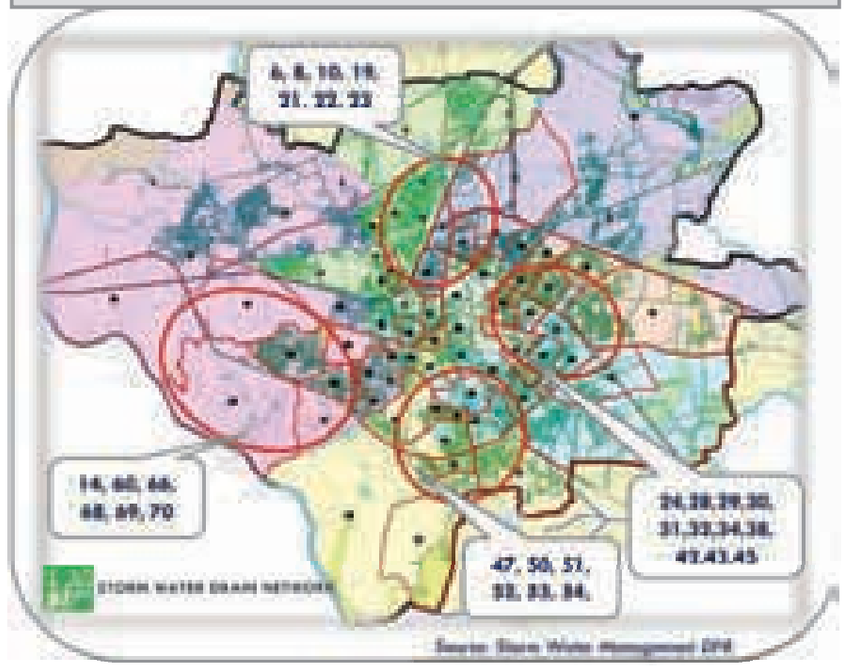
4. STORM WATER MANAGEMENT

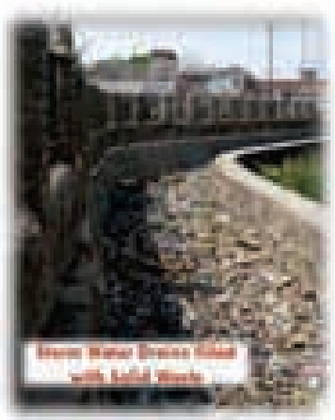
The drainage system in Raipur City comprises of a hierarchy of natural and man-made drains and water bodies that ultimately discharge surface run-off into River Kharun. The current storm water collection network is unplanned as well as inadequate, with coverage of mere 6.48% of total area with total length of drainage network being 63.58 km, resulting in the overflow due to varying flow in the drains; absence of source control initiatives and ground water recharge initiatives further adds to the undesirable conditions. In the current system, ultimately the storm water is discharged into the natural drains / lakes / natural water bodies; outfall structures are lacking. The condition of the storm water drains in few areas is below par and the sub-standard maintenance and cleaning system also deteriorates the condition of the drains further. The poor conditions & low capacity of the storm water drains in few areas added to lack of integrated drainage network, paucity of awareness amongst residents / non-residents towards maintenance of the drains, inadequate covering of the drains facilitating indiscriminate dumping of solid wastes and septage has resulted in the inundation of majority of areas in the city , especially the low-lying areas for almost a period of 3-4 months, with 33 flood prone areas identified in city limits.

Key Issue 7–

'Poor maintenance and non-integration of the available storm water drainage network renders it underutilized leading to a considerable number of water logging areas and hence unhealthy conditions'

WARDS WITH WATER LOGGING ISSUES



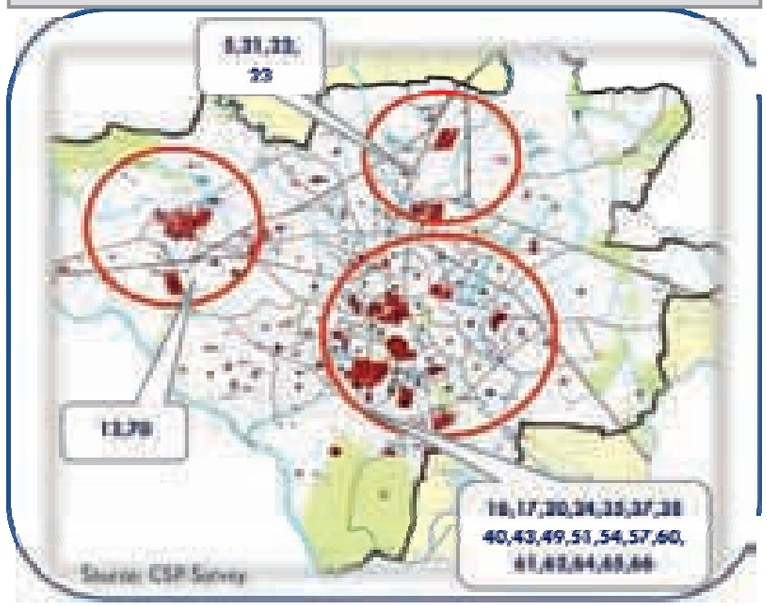


Ongoing Interventions:

M/s Meinhardt India has prepared a storm water management DPR that addresses the issues in the storm water management sector. The newly developed DPRs on Strom Water Drainage and Lake Protection did not completely integrate lakes into the drainage system as suggested in the CDP. Furthermore, Meinhardt has been re-instructed to study the feasibility of integrating the lakes into the storm water drainage network as well as rain water harvesting structures. The DPR is being modified on the aforementioned lines.

5. WATER QUALITY

WARDS WITH WATER QUALITY ISSUES



The water quality samples in the distribution system shows abnormal levels of E-Coli contamination as high as 2400 (MPN) due to the ingress of septage overflow into the water distribution system. It is reported that there were 627 cases of water borne diseases in the city as a result of poor sanitation and unhygienic conditions in the city. The water supply pipes/mains are laid in the open drains (sewer/storm water) causing contamination of the water; The required horizontal and vertical clearances between sewer pipes and the water supply pipes are not maintained and breakages in pipes causes contamination; The stand-posts and hand pumps are located very close to the sewer drains / open storm water drains and In some cases the stand-posts are laid in the open drains (sewer/storm water) causing contamination of the water;

Key Issue 8 –
'Water quality problems for water supplied or accessed in several areas in the city'

Factfile:

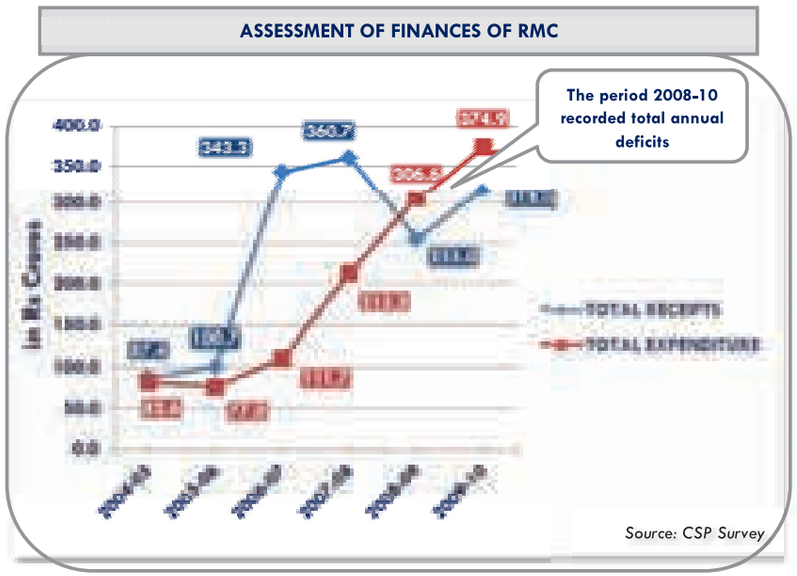
- *627 cases of water borne diseases in the city as a result of poor sanitation and unhygienic conditions in the city*
- *water quality samples in the distribution system shows abnormal levels of E-Coli contamination as high as 2400 (MPN)*

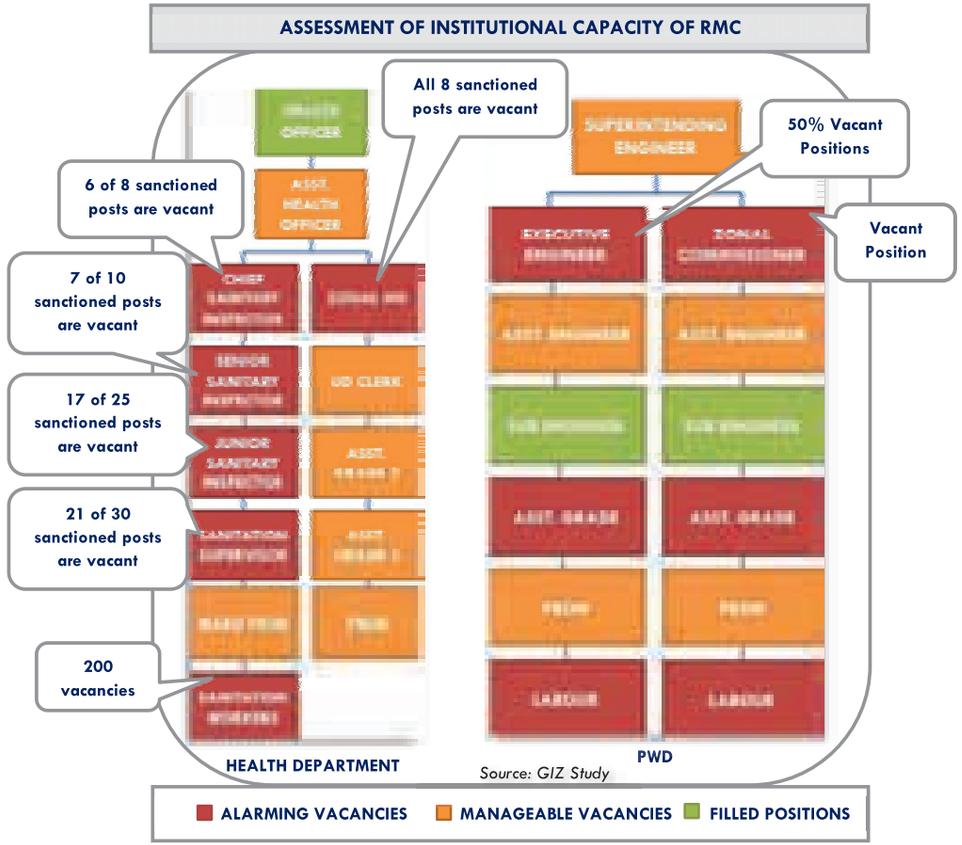
6. INSTITUTIONAL AND FINANCIAL SYSTEMS

The organizational structure is not conforming to the service requirements and service responsibility; furthermore, a considerable number of sanctioned positions are vacant; the short tenure of Municipal Commissioner, notwithstanding the long term nature of urban development projects and high frequency of transfers in the city managements positions adversely affects the continuity and local accountability; The Public Health and Engineering Department and Public Works Department lacks adequate support staff to operate and manage the existing system of sanitation services and moreover are overloaded with several varying nature of tasks cutting across different sectors of sanitation; There is no designated environmental manager in addition to the non-availability of the State Environmental Policy and the Status of Environment Report with ULB; Please refer to chapter 8 for detailed assessment of institutional capacity.

Key Issue 9–

'The existing Institutional and Governance Framework of RMC is not equipped adequately to administer the sanitation development and management services'



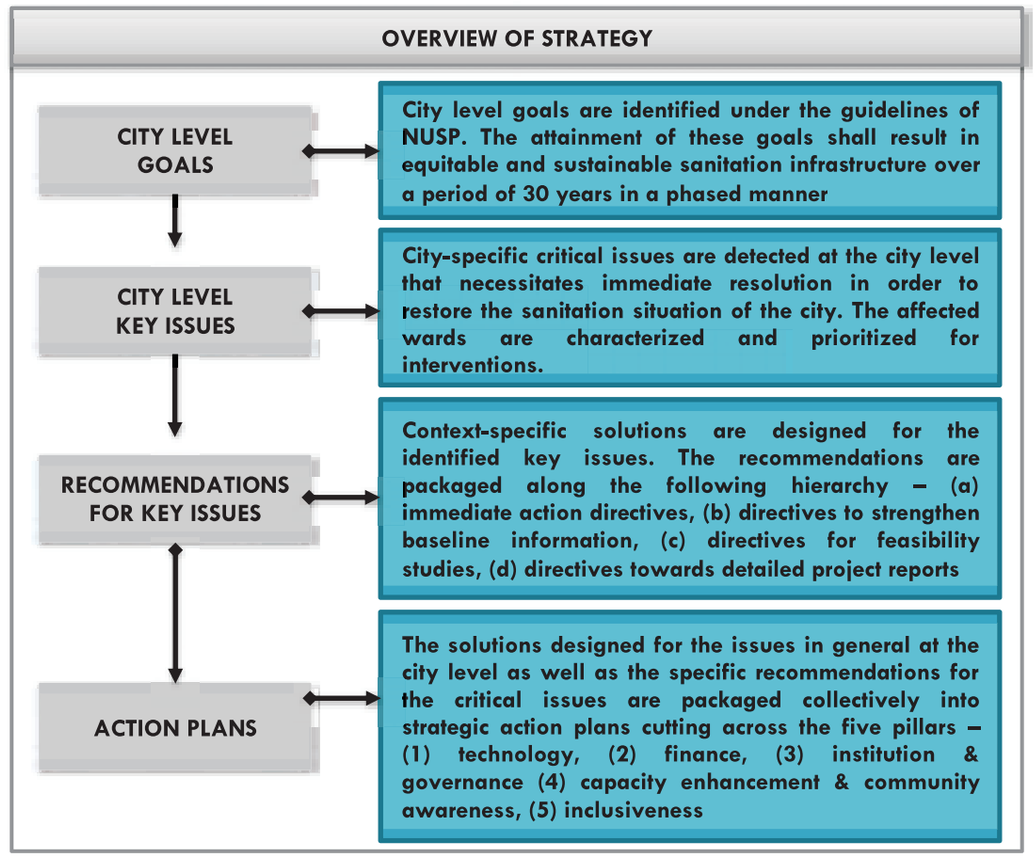


The Fiscal powers and authorities are still not devolved from the state government to local bodies; There is low capacity and lack of skilled professionals in RMC to assume the financial responsibility; the total own source revenues aggregates to a mere twenty-two (22) percent of the total receipts. The financial analysis of RMC for the period 2004 – 2010 reveals that the RMC's total annual surplus/deficit over the last six years has been widely fluctuating, lack of administrative procedures that ensure financial data flow and reporting and absence of internal and external controls and cost-effective and revenue generating mechanisms is evident. User charge/tariff structuring and property tax is still vested with the state

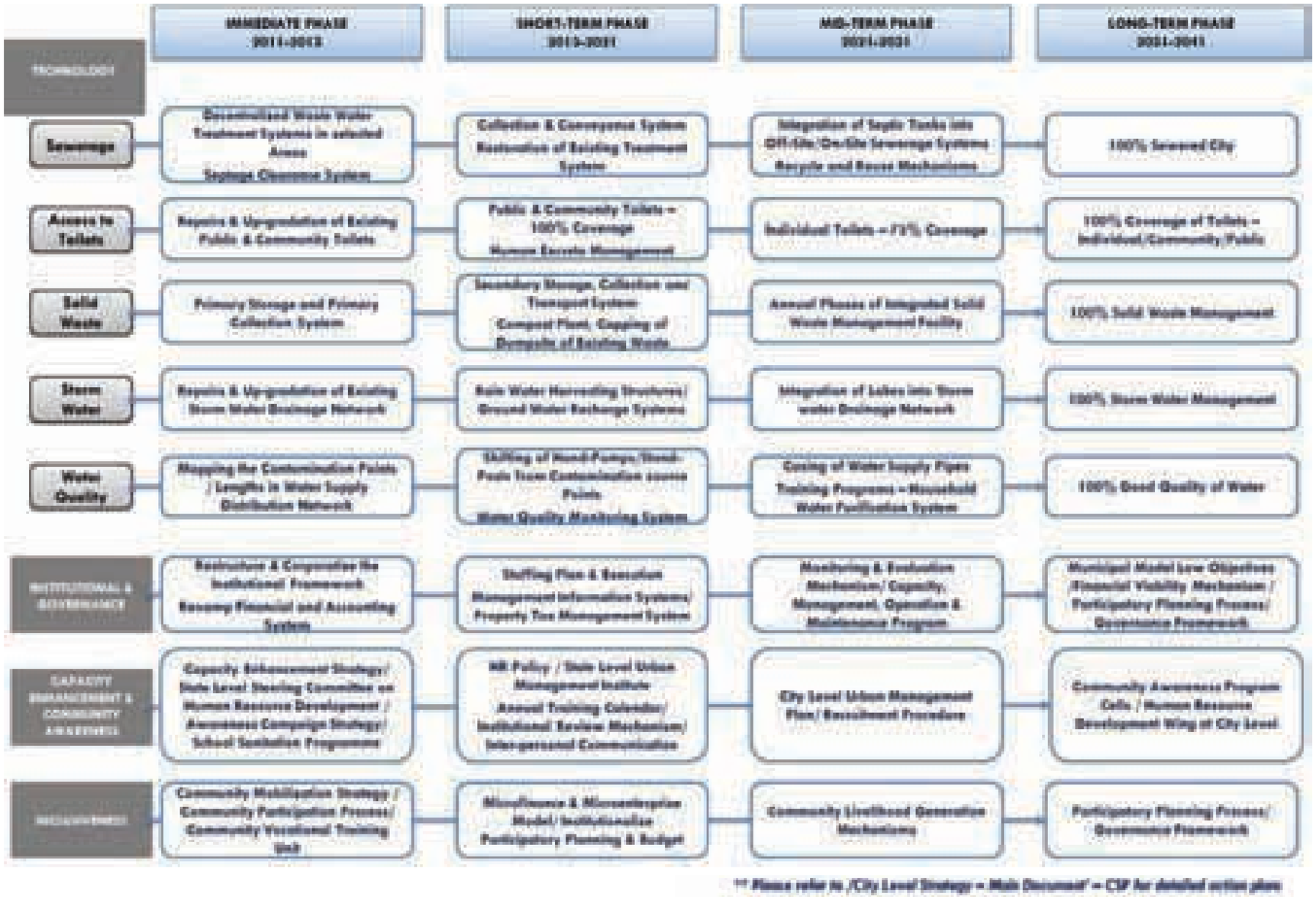
Key Issue 10–

'Existing financial management system doesn't meet the demands of the current and future sanitation requirements'

4 Strategies



BROAD OVERVIEW OF THE KEY MILESTONES IN ACTION PLANS

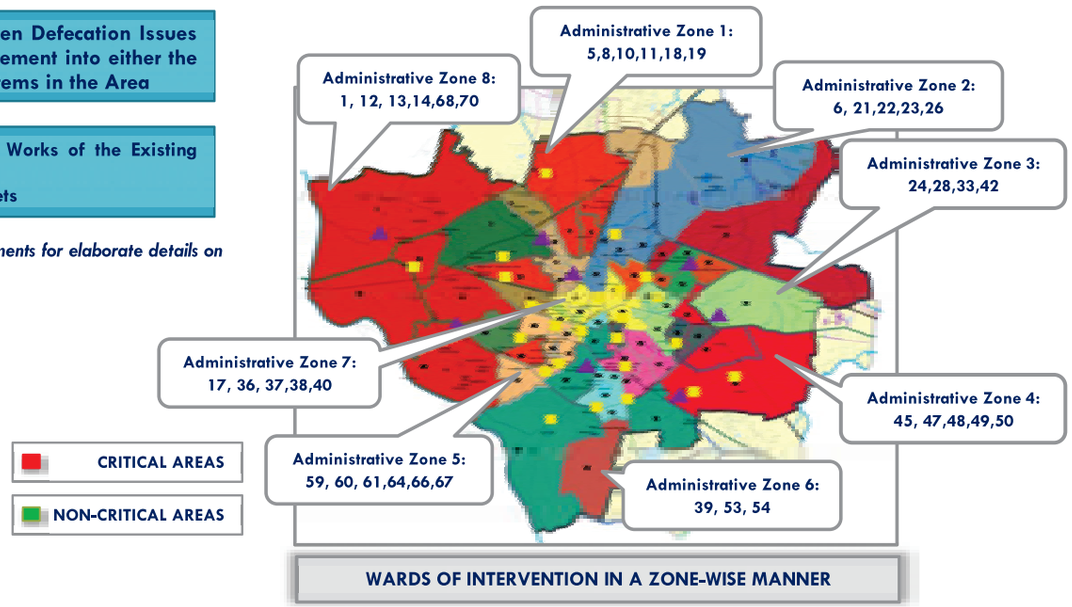


** Please refer to /City Level Strategy – Main Document' – CIP for detailed action plans

BROAD OVERVIEW OF THE RECOMMENDATIONS

IMMEDIATE ACTION DIRECTIVES	Tender for Design, Rehabilitate, & Upgrade of the Exiting Community & Public Toilet Facilities on Rehabilitate, Operate & Transfer Basis in People Public Private Participation Mode
PILOT PROJECT	Promote the Use of Mobile Toilets & Shared Toilets. Develop Operator Model/Financial Model & Septage Management Plan for the Planned Toilets in the Pilot Intervention Area
STRENGTHEN BASELINE DATA	Ascertain the Exact Numbers /Location/Condition of Public Toilets, Community Toilets & Toilets In Municipal Schools
FEASIBILITY STUDY	Zone Wise Strategies to Address the Open Defecation Issues and Integration of Faecal Sludge Management into either the Decentralized/Centralized Sewerage Systems in the Area
DPR	➢ DPR for Rehabilitative & Up-gradation Works of the Existing Toilets ➢ DPR for Construction Works of New Toilets

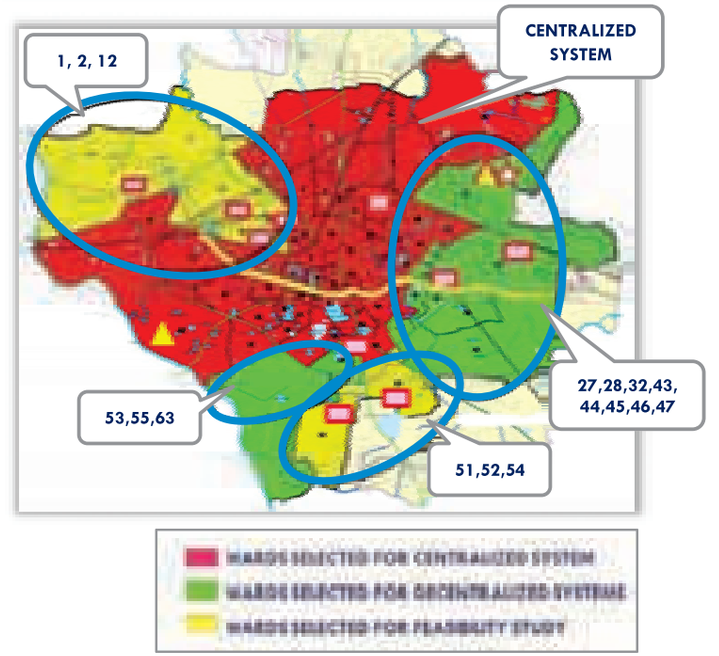
*** Please refer to 'Executive Summary'– CSP and 'Sectoral Strategies' – CSP documents for elaborate details on recommendations*



WARDS OF INTERVENTION IN A ZONE-WISE MANNER

IMMEDIATE ACTION DIRECTIVES	➢ Execution of Recommended Amendments to DPR with an aim to Evolve Sustainable Solutions ➢ Award of contract of operation & Maintenance of Existing Pumping Stations and Sewage Treatment Plants on Rehabilitate, Operate & Transfer Basis ➢ Enforcement of Municipal Bye-Laws & Building Codes with respect to Septic Tanks ➢ Institutionalization of the Training for Plumber Certification
PILOT PROJECT	➢ Establish Decentralized Treatment Systems in the proposed Sewerage Zones – I & III.
STRENGTHEN BASELINE DATA	➢ Ascertain the Exact Numbers /Location/Condition of Septic Tanks; Assess the Magnitude of Pollution due to Septage Overflow ➢ Ascertain the Exact Length/Location/Condition of Sewer Lines; ➢ Assess the organic / hydraulic load inflow to the existing sewage treatment systems
FEASIBILITY STUDY	➢ Integration of Septic Tanks into Existing/Future Off-site Sewage Treatment Systems ➢ Assess the Demand in order to Design Sustainable Septage Management Systems ➢ Coverage of Core Area with Centralized System and Demarcation of Areas for Decentralized Systems ➢ Interception and Treatment of Sewage Outflow from Drains prior to Disposal into Water Bodies
DPR	➢ DPR for Rehabilitative & Up-gradation Works of the Septic Tanks and Septage Management System ➢ DPR for Decentralized Sewage Treatment Systems

WARDS OF INTERVENTION IN A PHASED MANNER



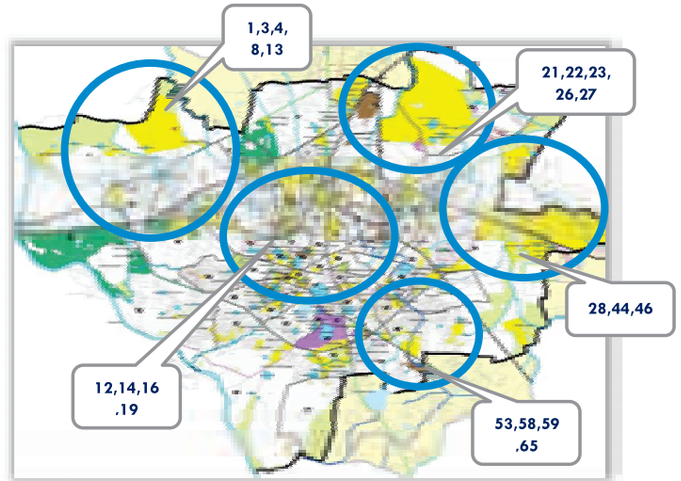
*** Please refer to 'Executive Summary'– CSP and 'Sectoral Strategies' – CSP documents for elaborate details on recommendations*

IMMEDIATE ACTION DIRECTIVES

- Finalize the Tender Process and Initiate the Integrated Solid Waste Management Services
- Coordinate with Storm Water Management Department and Ensure the Covering of all Drains with Grates to Discourage the Dumping of Solid Waste
- Exercise Sanitation Worker's Training Program
- Enforce Municipal Bye-Laws
- Implement Awareness Campaigns

ONGOING INITIATIVES

- Finalize the Compost marketing Strategy and initiate the process



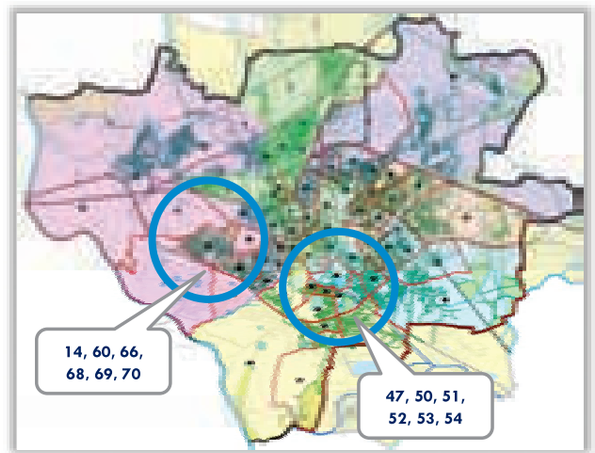
WARDS OF INTERVENTION – AWARENESS CAMPAIGNS FOR A BETTER SOLID WASTE MANAGEMENT SYSTEM

IMMEDIATE ACTION DIRECTIVES

- Execution of Recommended Amendments to DPR with an aim to Evolve Sustainable Solutions
- 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
- Implement Source Control Initiatives

FEASIBILITY STUDY

- Integration of Lakes into Storm water Drainage Network
- Create Recreational facilities in Low-Lying Areas

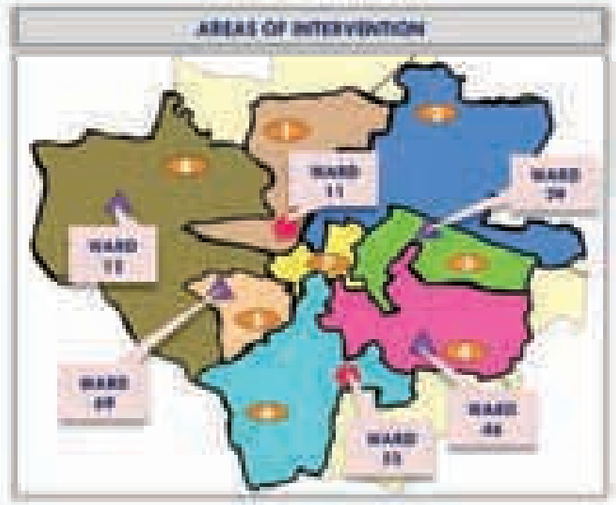


WARDS OF INTERVENTION – FEASIBILITY STUDY FOR RECREATIONAL FACILITIES IN LOW LYING AREAS

*** Please refer to 'Executive Summary'– CSP and 'Sectoral Strategies' – CSP documents for elaborate details on recommendations*

BROAD OVERVIEW OF THE PILOT PROJECTS

- Design and Implement '*Shared Toilets*' in Wards 53 and 11
- Design and Implement '*Mobile Toilets*' in Wards 12, 29, 46, and 69
- The Design shall include the Septage Management Plan.
- Sustainable Operator Model / Financial Model shall be Established
- Awareness Campaign and Community Involvement Program for Operation & Maintenance shall be Implemented



"Mobile Toilet" could serve as temporary solution wherever in-situ development of slums or relocation of the community is planned or areas where land tenure issues are flagged.

They could address the seasonal need of the floating population.

The could also serve as a solution for wards where place constraints do not allow any permanent solution.

The wards selected for pilot projects represent wide range of issues in the access to toilets sector. The wards are affected by the issue of open defecation and the factors responsible for the critical situation are wide ranged – absence of infrastructure, lack of awareness for hygiene, administrative issues, land availability, and socio-economic issues.

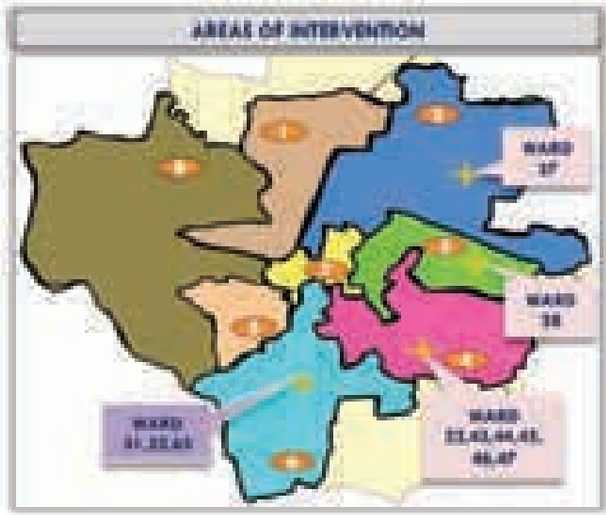
The pilot projects shall evolve sustainable solutions considering all the factors responsible for the critical situation.

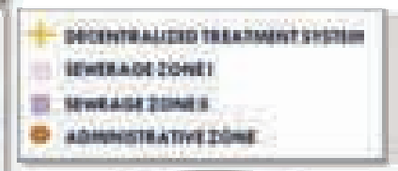
These wards are also representative of wide range of target groups. This shall enable a comprehensive pilot awareness campaign and the feedback from the groups may be utilized to scale up the initiatives to city level.

"Shared Toilets" should be promoted as a solution for wards where area constraints and financial constraints are prevalent. A group of houses could own a set of toilets and bear the capital and operation & maintenance costs together – 'a joint ownership of the asset'.

*** Please refer to Section 2.6.4.2.1, Pg 91–95 in Sector Specific Strategies' – CSP document for elaborate details*

- Design and Implement 'Decentralized Systems' in Sewerage Zone I – Wards 27, 28, 32, 43, 44, 45, 46 & 47; and Sewerage Zone II – Wards 46, 51, 52 & 63
- Sustainable Operator Model / Financial Model shall be Established
- Awareness Campaign and Community Involvement Program for Operation & Maintenance shall be Implemented





"Decentralized Waste Water Treatment Systems" could serve as a long-term climate solution with minimal maintenance requirements and low – energy inputs.
They offer flexibility and the technologies are tolerant towards inflow fluctuations. They enable better watershed maintenance.

The wards selected for pilot projects represent wide range of issues in the sewerage management. The reasons range from lack of infrastructure to behavioural issues. The wards demonstrate the suitability for adoption of decentralized system –

- Availability of Land
- Reuse/recycle Opportunities
- Potential for Inclusive Approach Demonstration

These wards are also representative of wide range of land-use and target groups. This shall enable a comprehensive pilot awareness campaign and the feedback from the groups may be utilized to scale up the initiatives to city level.

"Decentralized Waste Water Treatment Systems" should be promoted as a solution for wards where topography complexities are prevalent. They could be tailored in different combinations to suit the topography and financial budget.

*** Please refer to Section 1.6.3, Pg 27-28 in Sector Specific Strategies' – CSP document for elaborate details*

CREDITS

We are grateful to the following listed City Sanitation Task Force members for their valuable contributions towards the efforts of preparation of the City Sanitation Plan –

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Sri Lakhwant Singh Gill
Sri Govind Mishra
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Sri Malwe
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Sri O P Mishra
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Sri Bhaskar Dhwivedi
Sri Shafique Ahmed
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Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH (German Technical Cooperation) changed its name to The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on 1 January 2011. It also merged with among others, InWEnt – Capacity Building International, Germany.

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