



Work programme

# Increasing Financial Flows for Urban Sanitation

Case study  
Jodhpur, India

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## Increasing Financial Flows for Sanitation – Case Study of Jodhpur City

### Part A: Country and WSS Sector Background

**About India:** With about 1.2 billion people, India is the second most populated country in the world, after China. Out of this, 835 million people (69%) live in rural areas and 377 million (31%) live in urban areas. The decadal growth, between 2001 and 2011, was 17.64% for the entire population, while the same was 12.18% for rural population and 31.80% for urban population. There is significant variance in the decadal growth across the different states in India, ranging from 11% in Andhra Pradesh to 25% in Bihar. About 65.5 million people live in slums, which is nearly 18% of total urban population.

India is a federal government containing about 29 states and 7 Union Territories (directly under the control of the central government). The roles and responsibilities of the central government or Government of India (GoI) and the state governments is laid down in the Constitution of India. The 73<sup>rd</sup> and 74<sup>th</sup> amendments to the Constitution laid down roles and responsibilities of the local governments also. The three-tier Panchayati Raj Institutions (PRIs) at District, Block and Gram Panchayat/ village forms the basic rural local governance structure, while the Urban Local Bodies (ULBs) take care of urban local governance issues. Based on the population, the ULBs are divided into three types; Municipal Corporations (metros and town above 0.5 million people), Municipality (50,000 to 0.5 million) and Nagar Panchayat (5000-50,000). As the respective state governments are vested with powers to confer ULB status to a settlement, the population size for a given ULB type varies across states.

The number of districts, ULBs and villages in India are as follow;

- 707 districts in India<sup>1</sup> (2016), up from 640 in 2011.
- 7,935 ULBs in 2011. Out of these there are about 53 million plus cities and about 465 cities with population more than 100,000<sup>2</sup>. About 2613 towns reported to have some portion of residents living in 'slums' (2011 census).
- 239,000 Gram Panchayats, further divided into about 640,930 villages<sup>3</sup>.

**Water Supply Status in India:** While the stated coverage with water supply is almost universal in India, there are a lot of issues with 'service delivery' aspects. A large majority of urban and rural settlements have drinking water supply that is; intermittent, unreliable, doubtful quality and are not connected to households. Data from Joint Monitoring Program (JMP), 2015 assessments, is presented below, in table-1, to indicate coverage.

Table-1: JMP Data for Drinking Water, 2015:

	Drinking water coverage estimates					
	Urban (%)		Rural (%)		Total (%)	
	1990	2015	1990	2015	1990	2015
Piped onto premises	47	54	6	16	16	28
Other improved source	42	43	58	77	55	66
Other unimproved	10	3	32	6	26	5
Surface water	1	0	4	1	3	1

As can be seen from the data, only about 6% Indian population do not have access to improved sources. However, there are a lot of issues with 'service delivery and sustainability' aspects. The following table-2 depicts the overall 'average' service levels in urban India<sup>4</sup>.

<sup>1</sup> [https://en.wikipedia.org/wiki/List\\_of\\_districts\\_in\\_India](https://en.wikipedia.org/wiki/List_of_districts_in_India)

<sup>2</sup> Website of Ministry of Urban Development, Government of India, [www.moud.gov.in](http://www.moud.gov.in)

<sup>3</sup> Website of Ministry of Panchayati Raj, Government of India- [www.panchayat.gov.in](http://www.panchayat.gov.in)

<sup>4</sup> Urban Water supply and sanitation in India, Indian Institute for Human Settlements, 2014

Table-2: Service level benchmarks for Urban Water Supply in India:

Sr. No	Indicator	Unit	Benchmark	Median	Average
1	Household connections	%	100	53	50.2
2	Per capita supply	LPCD	135	69	69.2
3	Metering of connections	%	100	0	13.3
4	Non revenue water	%	20	29	32.95
5	Continuity of supply	Hrs	24	2	3.1
6	Quality & treatment	%	100	94	81.7

- House connections is still a 'luxury' in many systems – only about 28% population experience house connection. The situation is relatively better in urban areas with about 54% population having house connections, but is still a far cry compared to international standards. The situation is worse in urban slums.
- A large majority of urban and rural settlements have drinking water supply that is; intermittent, unreliable, doubtful quality. 'None of the Indian towns have 24x7 water supply'<sup>5</sup>.
- The Non-Revenue Water (due to leakages, unauthorized connections, billing and collection inefficiencies, etc.) is huge, estimated between 40-70% of the water distributed<sup>6</sup>
- As most systems are subsidized directly (grants from governments, budgets for staff costs, electricity subsidies etc) and indirectly (high tariffs for commercial and industrial users, apportioning of funds from other municipal taxes etc), there is no focus on aspects like costs recovery nor even recovery of operational costs. 'Operations and maintenance cost recovery through user charges is hardly 30-40%'<sup>7</sup>.
- With per capita annual water reserves dwindling fast, India is predicted to become a 'water stressed country' in near future. While per capita renewable water resource availability in 1951 was 5,177 cubic meters (cu.m) per capita per year, this became 1,588 cu.m by 2010, placing the country well within the water-stressed category<sup>8</sup> (CWC, 2010). This problem would further be compounded by the possible impacts of climate change.

There is no such data available for rural water supply. Most of the rural water supplies are dependent on groundwater and hence, face seasonal variations, due to changes in groundwater availability. Most villages suffer from low to high levels of water scarcity in summer, as the groundwater depths fall and yield reduces.

Sanitation Status in India: This study defines sanitation as management, treatment and re-use of human excreta and waste water and hence, the analysis is also undertaken on the following basis: (i) access to improved toilets (human excreta) (ii) treatment of human excreta (iii) treatment of water, and (iv) re-use.

The practice of open defecation, being continued from centuries, is still a big behavior problem in India, despite several attempts by national and state governments. This seen as one of the impediments to development in terms of health, safety, economic loss and dignity of women. A World Bank study (World Bank, 2006) estimated that economic impact of inadequate sanitation is about 6.4% of the country's GDP in 2006.

Access to Improved Toilets: In 2010 (census 2011) about 53% of the total 1.2 billion people were estimated to be practicing open defecation- about 70% in rural areas and about 18% in urban areas. This made India the largest contributor to the number of people practicing open defecation globally. The new government at the center (led by Mr. Narendra Modi) made this a top government priority and efforts have been increased many fold since 2014. The aim of the GoI is eliminate the practice of open defecation by October 2019. The situation has improved since 2011 and is reflected in the three sets of data presented below.

- (i) The first set is the JMP data, 2015, given below in table-3.

Table-3: JMP data for Sanitation coverage in India, 2015:

	Sanitation coverage estimates		
	Urban (%)	Rural (%)	Total (%)

<sup>5</sup> World Bank article, July 2011, - <http://www.worldbank.org/en/news/feature/2011/09/22/urban-water-supply-india>

<sup>6</sup> Same as above.

<sup>7</sup> Same as above

<sup>8</sup> Central Water Commission, GoI, 2010

	1990	2015	1990	2015	1990	2015
Improved facilities	49	63	6	28	17	40
Shared facilities	16	21	1	5	5	10
Other unimproved	6	6	2	6	3	6
Open defecation	29	10	91	61	75	44

- (ii) The Ministry of Health and Family Welfare (MoH), GoI undertakes periodic National Family Health (NFH) surveys. The 4<sup>th</sup> NFH survey done in 2015-16 also captured access to improved water supply and sanitation facilities. The results are given below in table-3.

Table-4: 4<sup>th</sup> NFH Survey Results for WATSAN:

	Urban	Rural	Total
HHs with improved water supply	91.1	89.3	89.9
HHs with improved sanitation facilities	70.3	36.7	48.3

- (iii) The Ministry of Urban Development (MoUD), GoI tracks the progress on achieving 'open defecation status' in the urban areas. According to latest data (April 2017) about 531 cities (out of the total 7,935 cities/ towns) achieved this status. In the same way, the Ministry of Drinking Water and Sanitation (MDWS) tracks achievements in rural areas at state level, district level and Gram Panchayat level. According to the MDWS, the current situation of units that achieved ODF status is: 3 states (Kerala, Himachal Pradesh and Sikkim), 36 districts (5 in Rajasthan) and about 194,555 villages (30% of total villages in the country).

Treatment of Human Excreta: Not much regular information is available under this section, beyond some studies and estimates. The assumptions for addressing this issue are: (i) households are connected to sewer systems, which convey both human excreta and waste water to a decentralized/ centralized Sewer Treatment Plants (STPs), that treat sewage to either primary, secondary or tertiary levels- of the total urban households, only about 32% are connected to sewer systems (census 2011), and (ii) in the absence of such systems, the toilets are at least connected to 'septic tanks', and the towns deploy vacuum suction cleaners to empty septic tanks and treat the excreta to some extent- about 38% of the urban households are connected to septic tanks (census 2011)

There are only 601 STPs in the entire country (it is not clear as to how many towns have these facilities) and out of this only 522 are working, with an installed capacity of about 18,833 MLD<sup>9</sup>. The total expected sewage generated is about 62,000 MLD<sup>10</sup>. Even assuming that all the plants are operating at full scale, the maximum sewage treatment is, at best, only about 30%. Thus, more than 70% of sewage generated in urban India is not treated. It should be noted that none of the Indian cities have 100% sewage connections, collection and treatment.

Re-use of Treated Water: There is no information available on this topic.

Policy Framework and Financing for Sanitation in India: Water supply and sanitation is a state/ local government subject in India and hence, theoretically, states are responsible for making necessary policies. However, the national government has taken a lead in developing these sectors and guided the development through various policies, guidelines and Centrally Sponsored Schemes. These schemes are implemented on cost-sharing between central and state governments, with varying ratios for different schemes. The following are the current key policies/ programs for the sector in India.

<sup>9</sup> Inventory of STPs in India, Central Pollution Control Board, 2015

<sup>10</sup> <http://www.indiaspend.com/cover-story/70-of-urban-indias-sewage-is-untreated-54844>

Swacch Bharata Mission -SBM (Clean India Mission): This is one of the national flagship programs, under the CSS, that aims to make India ODF by 2019. This is a program and is also treated as policy across India. There are two streams – SBM- Gramin (rural) and SBM-Urban.

SBM- Gramin: This is aimed at making all rural areas ODF by October 2019. The main components of SBM-G are:

Component	Cost INR/(USD <sup>11</sup> )	Central Share	State Share	LG/ Beneficiary share
IEC, start up and capacity building	Upto 8% of program cost	75%	25%	Nil
Revolving fund (for giving loans to build toilets)	Upto 5% of program cost	80%	20%	Nil
Individual household toilets	12,000 (185)	75%	25%	Nil
Community sanitation complexes	Actual amount required, to make village ODF	60%	30%	10%
Administrative charges	Upto 2% of program cost	75%	25%	Nil
Solid and liquid waste management	As required for a village	75%	25%	Nil. The LG is responsible for total maintenance, once built

World Bank Loan – SBM -G: Gol signed an agreement with the World Bank to support it's SBM-G through a loan of about USD 1.5 billion. This program is financed by the World Bank through its new Program for Results (P4R) instrument, under which disbursements are made to Gol after achieving agreed results that are verified by an independent verification agency. This loan is aimed at incentivizing achievement of ODF status at GP, district and state levels. 'Incentives' are provided to these governments based on % of achievement vis-a-vis baseline status. The key components of this support are;

Disbursement Linked Indicators	Description	Financial allocation (USD-millions)
DLI-1	Reduction in the prevalence of open defecation	730.12
DLI-2	Sustaining ODF status in villages	464.63
DLI-3	Increase in rural population with access to Solid and Liquid Waste Management	132.74
DLI-4	Operationalization of performance incentive grants	147.50
Program Management		025.00
Total		1500.00

Swacch Bharat Mission- Urban (SBM-Urban): This program was also launched by Gol, simultaneously along with the SBM-G. The main aims of this program are to eliminate open defecation practice and also eradicate 'manual scavenging<sup>12</sup>' from urban India. The main components and funding sources are given below.

The total outlay for this program is about INR 620,000 million (USD 9530 million). Out of this the Gol contribution is expected to be about INR 146,230 million (USD 2250 million) and states are expected to contribute about 25% of this (USD 526 million). The remaining amount is planned to be raised through other means like: LG funds, user fees, beneficiary share, private sector participation, land leveraging, corporate social responsibility and external assistance.

<sup>11</sup> For the purpose of this note, one USD is equal to INR 65.

<sup>12</sup> Manual scavenging refers to the age old inhuman practice where people (usually from lower caste) clean the pits of bucket latrines, manually. While this practice has been eradicated to a large extent, there are still pockets where this is continuing.

The main components of this program are:

- Covering 80% households practicing open defecation with household toilets
- Covering remaining 20% households practicing open defecation with 'community toilet blocks'
- Building 'public toilets' in all key places of the city for 'floating population', as required
- Design and execution of solid waste management facilities, as required
- Undertake IEC and awareness campaigns for behavior change
- Capacity building of LGs

Smart Cities Mission<sup>13</sup>: With a view to improve the overall standard of living in Urban India, GoI launched a new 'Smart Cities Mission', across the country, targeting large cities. The main objective of this mission is to promote cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'Smart' Solutions. Provision of improved and sustained water supply and sanitation (including sewage systems) is a core element of this mission. About 100 cities have been identified by GoI and they are expected to develop innovative proposals for funding, as required. The cities are also expected to form a Special Purpose Vehicle (SPV) for managing these activities and attract adequate PPP. These proposals are vetted by an expert team and only winning proposals get funding support. Thus far, since 2015, about 60 proposals have been found suitable and funds to the tune of INR 1,317,620 million (USD 20,271 million) have been sanctioned.

Atal Mission for Rejuvenation and Urban Transformation (AMRUT): AMRUT mission has been launched by GoI, in 2015, to provide basic amenities for all households living in urban areas, including household tap connection and sewerage/ septage network connection. The ATAL mission will focus on 500 cities with population more than 100,000 for a five-year period from 2015 to 2020.

Here, the onus is vested with state governments to identify needs, prioritize and develop state annual action plans for funding support from GoI. The GoI will provide 50% funds, while state and ULBs are expected to bear the remaining 50% funds. The funding ratio between GoI, state government and ULBs in the ratio of 50:30:20. The ratio between state and ULB may vary, as per state government decision.

Operations & Maintenance (O&M): While all these missions/ programs provide capital expenditure, the O&M is the responsibility of local governments. There are no clear O&M policies and ULBs (and PRIs also) are encouraged to levy 'user fees/ tariff' for the services that is sufficient for O&M. However, in reality most urban LGs charge very less (due to political compulsions) and do not recover much, that too for water supply only. World Bank estimates that indicate that the ULBs, on an average, do not collect more than 30-40% of O&M costs.

There is hardly any user fee/ tariff for sewer connections. This is usually collected indirectly as a part of water bill and/or property tax. There are no credible estimates of this collection as a percent of O&M costs. In addition, ULBs (and also rural LGs) use other 'devolution grants' they get from central governments and state governments.

'Jodhpur' the city under this study prepared proposals for sewerage/ septage development projects to the tune of INR 10,800 million (USD 166 million).

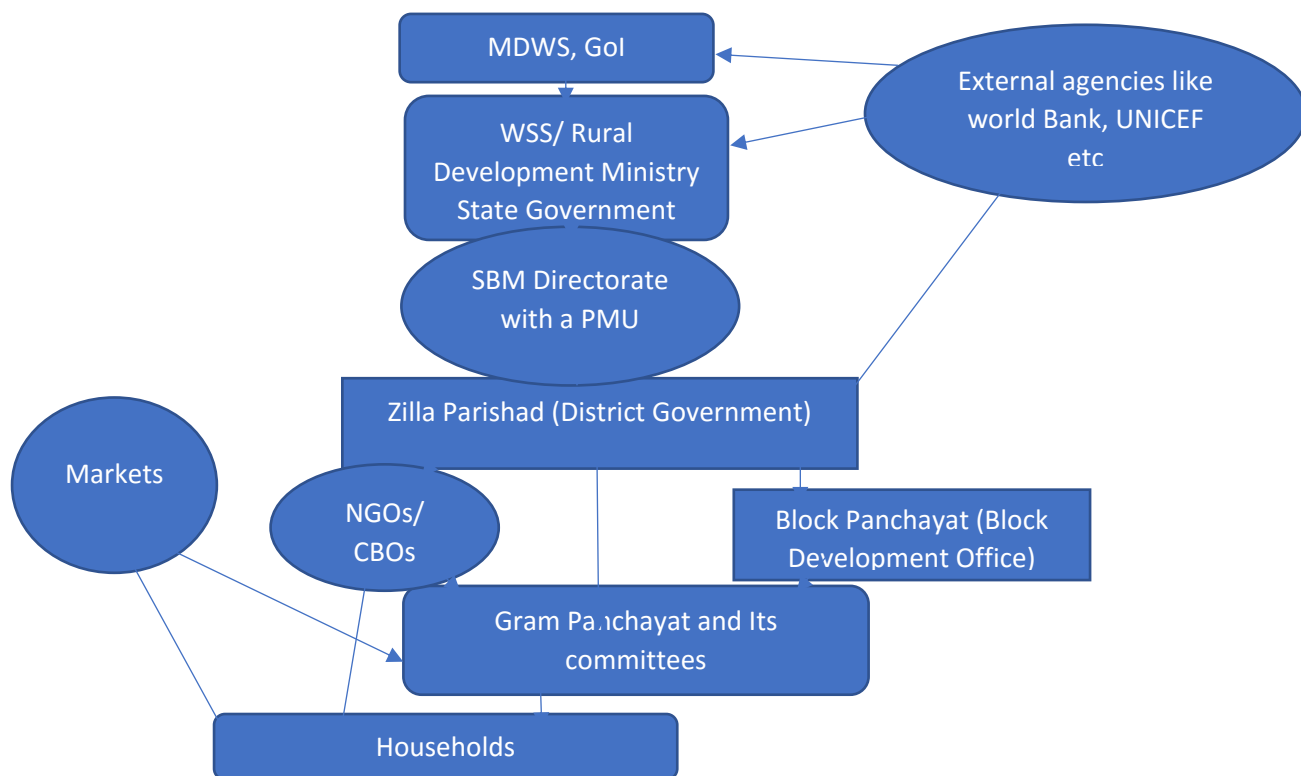
Institutional Framework for Sanitation in India: While the elected national government is a powerful central government, each state is governed by an 'elected state government' and is responsible for social and economic development, including water supply and sanitation service delivery.

As explained earlier the local governments, PRIs for rural areas and ULBs for urban areas are responsible for water supply and sanitation provision and service delivery. However, several states also have central engineering agencies – Public Health Engineering Departments (PHEDs)- with expertise in design, execution and O&M of water supply and sewerage schemes. These PHEDs were established in early 70s, when engineering capacity was not available at local levels. Due to this, the actual institutional arrangements vary across states. The following is a broad framework for both rural and urban sanitation service delivery.

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<sup>13</sup> Website of MoUD, GoI

Institutional Framework for Rural Sanitation



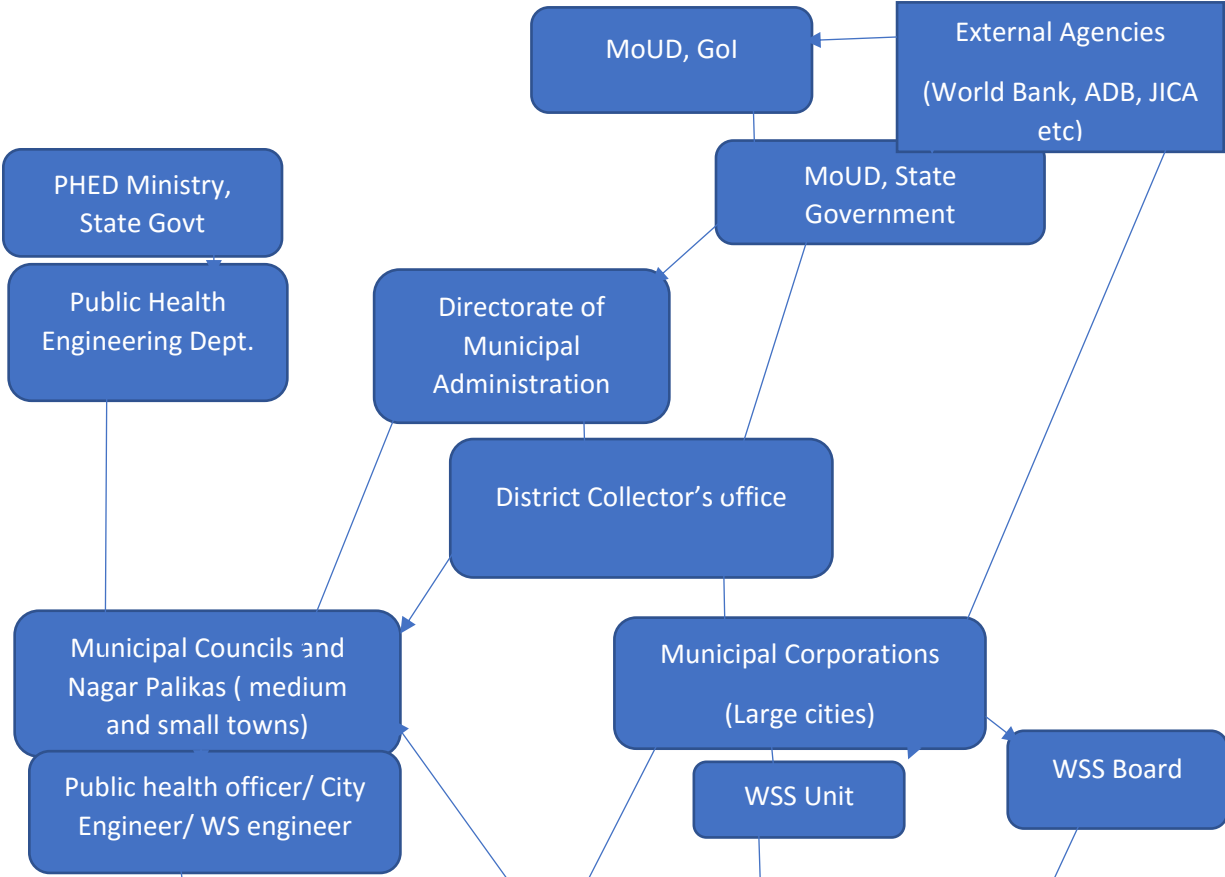
Roles and responsibility for implementing rural sanitation:

Institution	Role	Reporting to
MDWS, GoI	National goal setting, program design, funding, guidelines, monitoring, coordination with other ministries and externally aided projects	Report to parliament
State government (respective ministry/ ministries)	State/ regional goal setting, program design, co-funding, state specific guidelines, monitoring, coordination with other ministries, externally aided projects and corporates, hire services of NGOs, academic institutions for required support.	State assembly, MDWS
District Governments+ Block governments	Baseline surveys, annual action plans, capacity building, IEC activities, hire NGOs for local support, monitoring construction activities, transmission of subsidy/ incentives to households and accounting	Districts report to state Blocks report to districts
Gram Panchayats+ committees <sup>14</sup>	Motivate households, assist them in getting access to finances and materials, devise and implement	Report to Block governments

<sup>14</sup> While GPs are elected local governments for villages and have the responsibility of overseeing the implementation of sanitation activities, to make their village ODF, they also form subject committees for various subjects. In this case it is called 'Village Water and Sanitation Committee (VWSC).

	local regulations (for ex- fines for open defecation etc), coordinate with local government officers, local dispute resolution.	
NGOs/ CBOs	Usually hired for social mobilization activities, capacity building and technology advise, for specific periods, as required. They are also involved as third party verification of ODF status.  Some Self-Help Groups (SHGs) led money for building toilets to their own members.	Report to district/ blocks as required.
Local Markets	Though a bit unrecognized in Indian context, the local markets play a big role in supplying materials (cement, bricks, sanitary pans, doors etc), masons and skilled/unskilled labor for construction of toilets.	To customers
Households	Build toilets, use and maintain them. While some households are eligible for government subsidy/ incentives, they may have to add some mote finances. Non-eligible household shave to fully finance their toilets.	
External Agencies	Provide technical assistance/ funding/ loans to Gol/ state governments. In some cases they also work with district governments to pilot and demonstrate innovations.	Department of External Affairs, Gol

Institutional Framework for Urban Sanitation:





Private Sector: Technical consultants/ financial agencies/ service providers/ NGOs

Households

Roles and responsibility for implementing urban sanitation:

Institution	Role	Reporting to
MoUD, Gol	National goal setting, program design, funding, guidelines, monitoring, coordination with other ministries and externally aided projects	Report to parliament
State government (MoUD ministry) + Directorate of Municipal Administration (DMA)	<p>The MoUD in the state is responsible for all urban development activities. Most states have a full fledged DMA under the MoUD. The DMA usually looks after the activities of small and medium towns, as their capacity is weaker than Municipal Corporations.</p> <p>The key roles are: State/ regional goal setting, program design, co-funding, state specific guidelines, monitoring, coordination with other ministries, externally aided projects and other financial institutions/ funds</p>	State assembly, MDWS
Ministry of PHED	Several states have strong PHEDs, established in 1970s with good engineering expertise. After devolution of functions (and funds), they function more as 'project managers' to ULBs- usually through state orders and sometimes by ULB invitation. Once planned infrastructure is built, the same is handed over to ULBs for regular service delivery and O&M.	Ministries
District Governments (District Collector's office)	The District collector's office is an overseeing agency for urban WSS issues. The city plans and budgets are vetted by this office and passed onto the higher tiers at state levels. Similar, they monitor progress and report to higher tiers. They do not play any direct role, like the ZPs in rural sanitation.	Districts report to state
Municipal Councils/ Nagar Palikas (Medium and small towns)	<p>Baseline surveys, sewerage scheme planning with support from PHED/ consultants, prepare ODF plan, build and maintain community/ public toilets, levy and collect taxes/ user fees, spend funds received and maintain accounts.</p> <p>A typical Municipal Council/ Nagar Palika has some technical staff – city engineer, water supply engineer and a few assistants. In some cases, there might be a small WSS unit and take care of water supply aspects. These cities usually do not have sewerage systems.</p>	Report to District collector/ DMA at state level.

	Sanitation (seen as – public toilets maintenance, street cleaning, drain cleaning, solid waste management etc) are under a Public Health Officer.	
Municipal Corporations (big/ large cities)	<p>A municipal corporation is generally a town with more than 500,000 residents. In most cases, MCs have a full-fledged WSS unit taking care of water supply and sewerage aspects. The SWM is taken care by a separate unit – either SWM unit or public health unit.</p> <p>For some large metro cities, independent Water and Sewerage Boards<sup>15</sup> have been constituted to take care of WSS services, including infrastructure building.</p> <p>These units/ boards also perform all related functions: planning, design, execution, service delivery, tariff setting, billing and collection, citizen grievance redressal, regulations etc.</p>	MoUD at state level.
Private Sector: Technical consultants, service providers, materials and labor, financial services, NGOs etc.	<p>There are a variety of private sector players in the urban sanitation sector and play vital last mile connectivity roles. Some of the key ones are:</p> <ul style="list-style-type: none"> <li>-Consultants: design and project management services for households/ housing societies</li> <li>-Contractors: build public/ private infrastructure and sometimes, manage its O&amp;M</li> <li>-Financial services: provide loans to households and builders. Some financial institutions provide loans to ULBs also, but usually under a state guarantee and routed through state</li> <li>-NGOs/ CBOs: community mobilization, service provision, advocacy etc- usually for slum residents and on critical citywide issues</li> <li>- Septic tank emptying: about 38% of urban India is connected to septic tanks and depend on local service providers for emptying their septic tanks. A few ULBs have their own services (through their departments) but in general, they also shortlist private service providers and fix a fee for the services.</li> </ul>	To customers/ ULBs/ contract managers
Households	Unlike rural sanitation, which is highly funded (subsidy/ incentives) by government, most investments within houses are met by households. Government subsidy is usually limited to below-poverty families and slum residents. In slums, cities usually provide community toilets and do not support 'household toilets' due to legal aspects pertaining to land tenure.	
External Agencies	Provide technical assistance/ funding/ loans to Gol/ state governments.	Department of External Affairs, Gol

<sup>15</sup> Some examples of city based WSS boards are: Delhi Jal Board for Delhi city, Hyderabad Metropolitan Water Supply and Sewerage Board for Hyderabad city, Bangalore Water Supply and Sewage Board for Bangalore city.

	In some cases they also work with district governments to pilot and demonstrate innovations.	
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Circular Economy: This concept is still new in India and is not practiced in any of the government programs. The main focus is still on infrastructure building.

#### Part B- Short background on Jodhpur

Jodhpur is the second largest city in the state of Rajasthan and is located in the lower middle of the Thar desert of Western Rajasthan. It is also known as gateway to Thar. Jodhpur with a population of about one million (2011 census), which is estimated to be about 1.1 million in 2016. The city is at a height of about 250-300 meters above mean sea level and is spread over 78.6 square kilometers.

Historically, founded in 1459 A.D by Rathore rulers, the city was known as Marwar. The city is famous for its forts and temples and is one of the international tourist destinations. The old city is around the fort of Mehrangarh. Jodhpur is also called as 'Blue City' as almost all the houses based around the fort of Mehrangarh are painted in blue color. Polo has been the royal sport of Jodhpur since medieval times. Polo enthusiasts visit the city to participate in the various equestrian events that are held here. Jodhpur is also well known for its furniture industry, handicrafts, glass bangles, cutlery, carpets and marble goods. Jodhpur also boasts of a unique cuisine. The local eateries accord the tourists a delectable platter of local culinary delights.

Jodhpur is also a big education hub with several educational institutions like Indian Institute of Technology (IIT), All India Institute for Medical Sciences (AIIMS), National law College, National Institute for Fashion Technology etc having their presence in the city. Jodhpur with a population of about one million (2011 census), which is estimated to be about 1.1 million in 2016. There are about 53 cities that have a population of one million or more (census 2011) and Jodhpur stands at 45<sup>th</sup> position.

The city is governed by the Jodhpur Municipal Corporation (JMC) and functions as per mandate detailed under the Rajasthan Municipalities Act, 1959 (with subsequent amendments). The city is divided into 65 wards, each ward being represented by an elected 'councilor'. The Jodhpur Development Authority (JoDA) has been established in 2009, to develop and implement projects for the regional development. Some of the projects are; water supply augmentation, sewer systems, bridges, sports complex etc.

The MoUD, Gol, has been undertaking rating of cities in the country for sanitation (cleanliness ratings). In 2017, Jodhpur stood at a middle rank of 209 out of 434 cities rated. The city scored about 970 marks out of 2000 marks for this rating, almost half of the score of the best city in the country (Indore, 1808 marks out of 2000). It stood at a low rank of 337 out of the 476 cities rated in 2016. These surveys rate the cities on issues related to: municipal solid waste management, individual toilets, community/ public toilets, open defecation free status, capacity building, awareness campaigns etc.

Water supply: Water supply for the city comes from a long distance from Harike barrage at the confluence of Sutlej and Beas rivers, in Punjab and travels through the Indira Gandhi canal, which is about 650 kms long and feeds water to several cities, villages and fields in Rajasthan<sup>16</sup>. Currently, 219 MLD of filter water and 20 MLD raw water is supplied daily to the city population through 155728 water connections and 2410 PSPs. Gross per capita supply is 241 lpcd. Water supply in all sub zones is intermittent as water is supplied for 2-4 hours daily. Annual O & M expenditure for the year 2010 INR 937 million (USD 14.4 Million) Crores (excluding depreciation and debt services) and operating revenue was INR 275 million (USD 4.2 million), just about 30% of the operations cost<sup>17</sup>.

Sewerage: The city has an old sewerage system, which has been upgraded from time to time. Currently a 1500 kms network of underground piped sewerage network covers about 70% of the city areas. While the total sewerage collection capacity is about 170 MLD, the current collection is about 132 MLD (78%). However, the treatment capacity is only about

<sup>16</sup> [https://en.wikipedia.org/wiki/Indira\\_Gandhi\\_Canal](https://en.wikipedia.org/wiki/Indira_Gandhi_Canal)

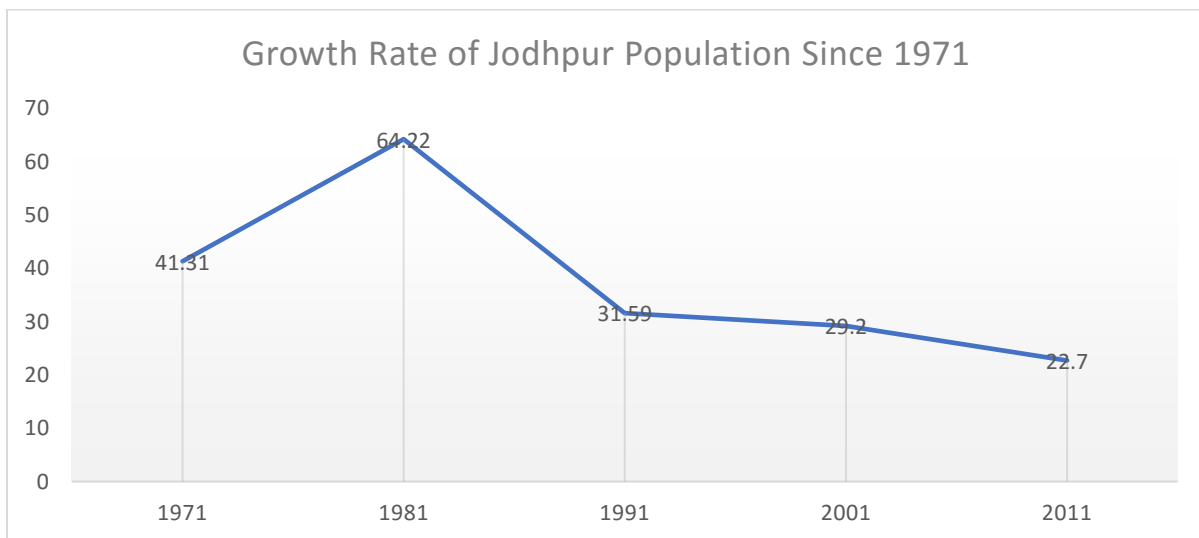
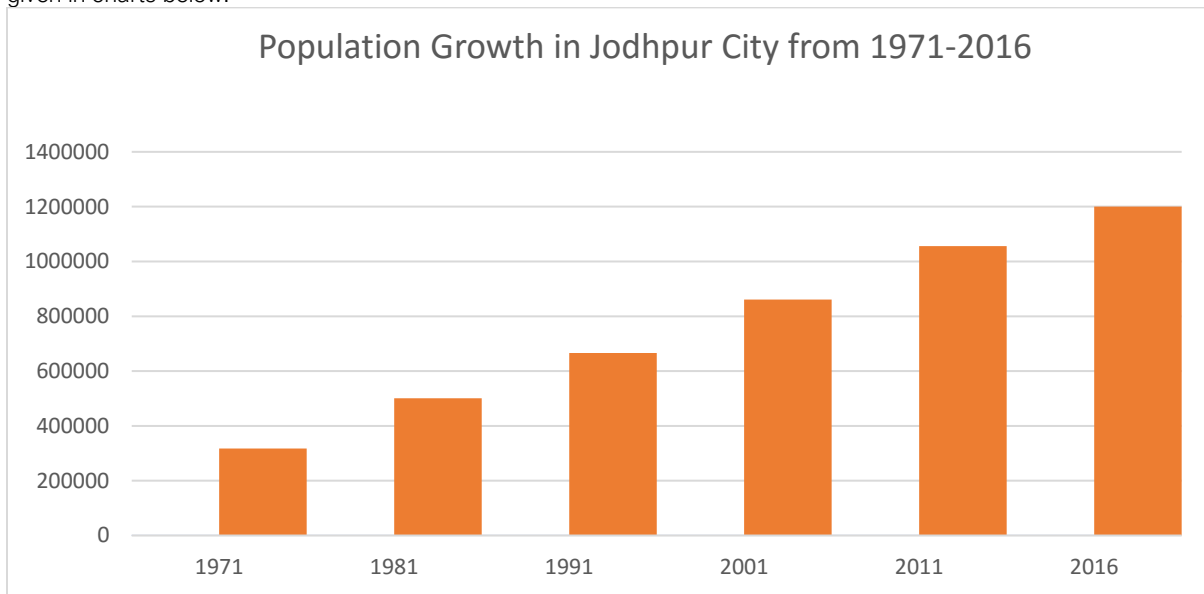
<sup>17</sup> As per details in the EOI floated for design and building of additional sewerage system by Municipal Corporation Jodhpur, 2011.

70 MLD (two plants of 50 and 20 MLD each), which is about 53% of the collection<sup>18</sup>. Currently, the city is not collecting any separate user fees for sewerage and about 30% of the water charges are apportioned to sewerage account (exact numbers to be verified).

The Government of Rajasthan (GoR) developed a Rajasthan State Sewerage and Waste Water Policy, in August 2016, to guide cities in managing sewerage and waste water. This policy encourages cities to recover 100% operational expenses and reuse treated waste water, to the extent possible. Details of this policy are given in Annex-1.

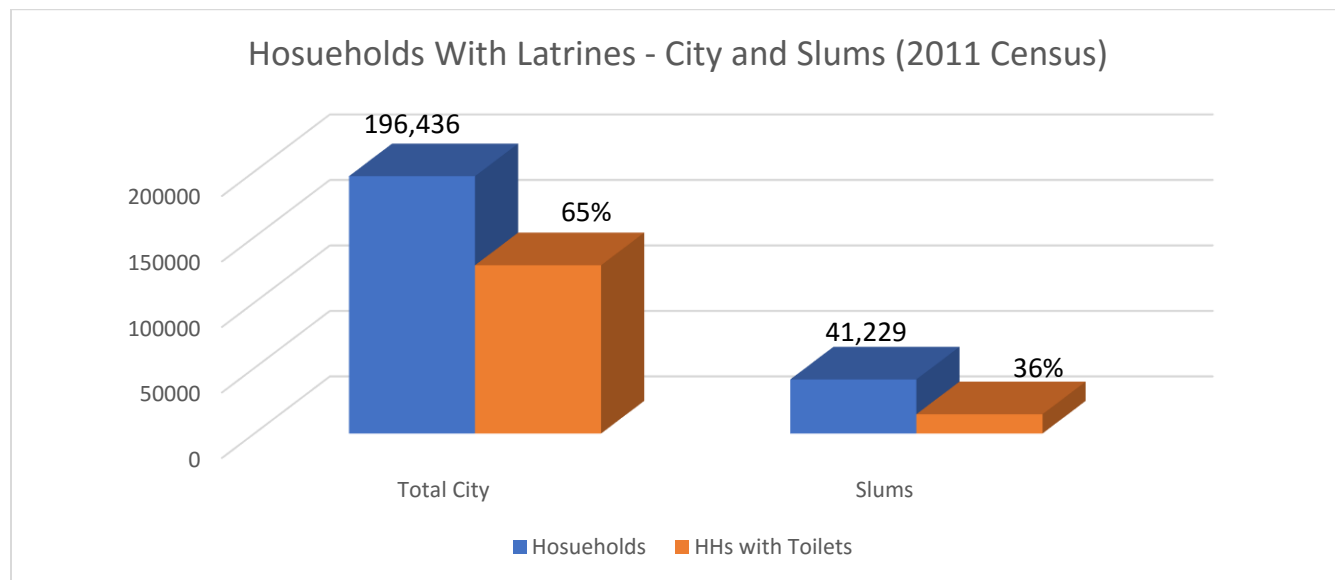
Part C- Detailed information about Jodhpur city

Population and Growth: Jodhpur city has about one million in 2011 and is now expected to be about 1.1 million (2016). The population grew more than three times since 1971, over a span of the last 40 years. The growth rate was high in 1971 (41.31%) and 1981 (64.22%) and stabilized to about 22% in 2011. There are about 243 slum pockets within the city and accounts for about 270,211 people i.e roughly 27% of the city's population. Details of population growth are given in charts below.



<sup>18</sup> Details from the same report as above.

Sanitation Arrangements: As per Census, 2011 data out of the total 196,436 households, about 128,432 households (65%) have access to improved latrine and about 48,021 (24%) have unimproved latrines. About 21% of total households (41,299) live in slums and only 36% of them have household latrines. The families without access to household latrines either depend on 'community sanitation complexes' or resort open defecation. Almost all the latrines have septic tanks. Details of household toilets in city and slums are represented in the chart below.



After the launch of SBM-Urban in 2014, the city has facilitated building (or in the process of building) household toilets for about 5825 households under the SBM-Urban program. The total cost of the 'twin-pit' toilet is estimated to be about INR 12,000/- (USD 185/-) and the GoI, GoR and Jodhpur Municipal Corporation (JMC) contribute 33% each, for the same. The individual household could add more money to this amount to build a better super structure.

According to the city officers, there are about 23 community sanitation complexes, each having 12 to 15 seats and a few bathrooms also. These are for the use of the households without access to individual toilets and most of them reside slums. In addition, JMC is building another 8 such community sanitation complexes. The JMC hired services of a local operator for the maintenance of these toilets and pay the contractor about INR 7500/- (USD 115/-) per month per unit. The total annual contract value is about INR 2.07 million (USD 31,850 mn).

As per Census, 2011 records there are about 187,421 properties<sup>19</sup> (152,709 domestic, 33,878 commercial and 925 others) in the city. In addition, there are about 5,288 industrial properties. JMC has a well-developed sewerage system and provides connections to about 120,000 (65%) of domestic, commercial and other properties. JMC has a sewerage network of about 1500 kms length, covering about 75% of city area. The expected sewerage generated in JMC area is about 100 MLD and the available functioning treatment capacity is about 70 MLD (2 STPs of about 50 MLD and 20 MLD capacity). In addition, a new STP of 50 MLD capacity is nearing completion and proposals for a new plant of 40 LPCD have been approved. Work is yet to start on this plant.

The JMC does not provide sewerage connections to industries and they have a separate network and also a separate Effluent Treatment Plant (ETP) of about 20 MLD capacity.

Institutions: The JMC is responsible for building and maintaining all the sewerage network, community sanitation complexes and also public sanitation facilities. The poor households get government assistance to build latrines in their homes, but they are responsible for their upkeep and maintenance. The general households, commercial and institutional establishments are responsible for providing latrines and other sanitation facilities within their properties and also maintain them.

<sup>19</sup> This number is estimated based on the electricity connections.

The PHED is responsible for providing and maintaining water supply system.

A small unit within the JMC, under the engineering department, is responsible for planning and maintenance of sewerage system. The unit has limited staff (4 engineers and 3 support staff). They outsource about 130 labor (2 each for the 65 wards) for regular sewage maintenance works. The O&M of the two functional STPs are also outsourced to 'operators' through competitive bidding, for a period of five years. The maintenance of community sanitation complexes and public sanitation complexes is also outsourced to local operators. While the JMC pays a monthly fee for maintenance of the community sanitation complexes (located within slum areas), the contractor is expected to make money (pay and use) for the maintenance of public sanitation complexes (located in busy areas like markets, bus stands etc).

Financing Sanitation: This is divided into two parts viz financing infrastructure, and financing O&M.

Financing Infrastructure: JMC largely depends on grants made Gol and GoR for financing its sewerage infrastructure. Only in some cases the JMC has to make a matching contribution, which is funded through its regular income. The table below provides information on financing costs and sources for sewerage system in Jodhpur, from 2003.

Table- : Costs and Fund Sources for Sewerage System in Jodhpur

Scheme name/ year	Infrastructure built in Jodhpur			Total cost (INR/ USD Million)	City Share (INR/ USD Million)
	New STP (MLD)	Pipe lines (Kms)	Renovation of pipes / STP		
RUIDP (ADB funded) - 2003	20	400	-	INR 3100 (USD 48) -3000 mn for pipe lines and 100 mn for STP	Nil
UIDSSMT (Gol funded) - 2012	50	125	-	INR 640 (USD 10) 340 mn for pipe lines and 300 mn for STP	10% (INR 64 mn/ USD 1 mn)
Chief Minister Budget program- ongoing	50 (90% of construction complete and could deployed by end 2017)	Nil	Nil	INR 300 mn (USD 4.6 mn)	Nil
New Proposal for state government. Yet to start	40	Nil	Nil	INR 500 mn (USD 7.8 mn)	Nil
AMRUT (Gol program)	Nil	Nil	Yes	INR 770 mn (USD 12 mn)	33% (INR 254 mn/ USD 0.4 mn)
Total	160			INR 5310mn (USD 82 mn)	INR 318 mn (USD 4.9 mn)

Financing household Latrines: As explained above, the JMC is facilitating construction of household latrines for poor families. Since, 2014 they have received about 8,524 applications out of which 5825 have been found to be eligible.

Detail	Cost/ unit (INR)	Total Units	Total cost (INR Mn)	Share of Different Govts (INR 000)		
				Gol	GoR	JMC
HH Latrine	12,000	5825	70	23.3	23.3	23.3

The total cost for this activity is about INR 70 million (USD 1.07 mn) and JMC's share for this is about INR 23.3 million (USD 0.36 mn).

The total share of sanitation in building of sanitation infrastructure of JMC, since 2003, is about INR 341 million (USD 5.25 million)

Financing O&M: The O&M costs are related to sewerage system maintenance and maintenance of community sanitation units. As explained above, JMC owns a sewerage system that has about 1500 kms of pipe lines and two functioning STP plants and 23 community sanitation complexes. The O&M costs for the same are given below in Table-xi

Table x- Actual Expenditure on of O&M Sanitation Services

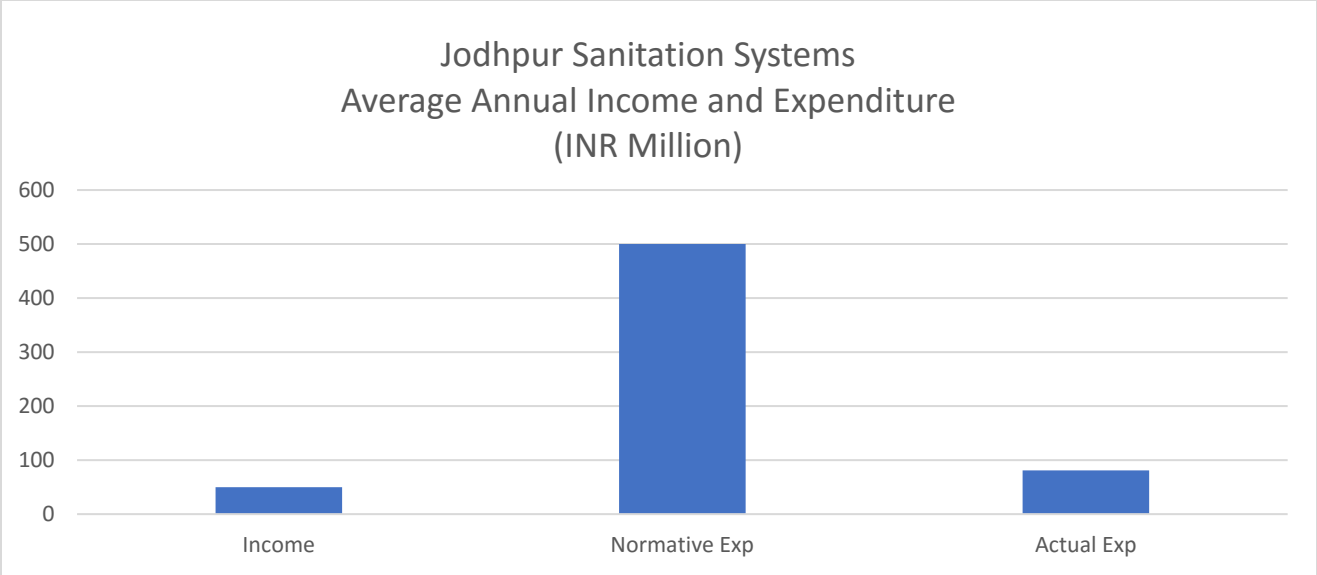
Sr.No	Detail	Annual cost (INR/ USD – million)
1	50 MLD-STP INR 1 million/month	12.00 (0.2)
2	20 MLD -STP INR 0.1 million/ month	1.2 (0.02)
3	Electricity for both STPs INR 1.0 million/month	12.00 (0.2)
4	Labor for pipes cleaning etc 130 nos (65 wardsx2) INR 1000/ ward/day	23.72 (0.37)
5	Machines for sewerage cleaning etc INR 2.5 mn/ month	30.00 (0.5)
	Sub-Total	78.92 say 79.00 (1.21)
5	O&M of community sanitation complexes INR 7,500/month/ unit	2.0 (0.03)
	Grand Total	81 (1.24)

Normative O&M costs: The city engineers estimate that the total asset value of the entire sewerage system is about INR 10,000 million (USD 154 mn). As per normative estimates the O&M costs for a sewerage system is about 5% of investment/ asset value. Considering this, the full-fledged O&M of the city sewerage system would need about INR 500 million (USD 7.7 mn) per annum. However, due to the severe financial constraints, the JMC team is doing with minimal O&M expenditure as shown above.

Income from Sanitation: The main income for managing sanitation comes from indirect sewerage user charges. There are no direct municipal taxes for sewerage. 33% of water user charges are to be apportioned to the sewerage head. In addition, the unit earns some money from new connections and sludge cleaning from septic tanks. The JMC sells the treated waste water to a vendor (selected through tendering), who in turn sells it to farmers nearby. The annual sale income is meagre at about INR 45 million (USD 0.7 mn). The average annual income over the last few years is shown below.

Sr. No	Source/ Details	Income INR million (USD mn)
1	Portion of water charges As per GoR rules, 33% of income from water charges are supposed to be transferred to sewerage account. However, the PHED which collects water charges, deducts some amount (like meter charges etc) and passes on 33% of the remaining amount	45 (USD 0.7 mn)
2	Income from sale of waste water	0.45 mn (USD 0.007 mn)
3	Others (connection charges, septic tank cleaning etc)	0.1 mn (USD 0.002 mn)
	Total	50 mn (USD 0.8 mn)

The total income, normative expenditure and actual expenditure is reflected in the graph below.



Circular Economy at City Level: Jodhpur city tried to recycle waste and earn income from the same, with partial success. The details are captured below;

- Gas from Waste: The JMC established gasification chambers at the biggest STP (50 MLD) in order to either bottle the gas and sell it as cooking gas and/or generate power from the gas for lighting purposes. No contractor came forward in the auction process to participate in either of these activities, as they found that these proposals were not cost effective. Hence, this activity did not move forward and the gas generated from the process is currently burnt.
- Recycling Waste Water: The JMC has been partially successful in recycling the treated waste water and sell the same to farmers. However, due to administrative and political economy reasons, the JMC is compelled to sell the waste water to the highest bidder in bulk, rather than selling it directly to farmers, the end customers. The highest bidding vendor offered a purchase value of INR 0.45 mn (USD 0.007 mn), while he sells the same to the end user at a very high price (almost 4 times more than the bid price). If the JMC were to directly sell the water to the end customers, they fear that the farmers would not pay any money, as it is seen as 'government property'.
- Composting Solid Waste: The JMC established a composting plant to recycle the organic solid waste into compost and sell to farmers/ retail users. However, this experiment also is not financially viable as the cost of production of compost is about INR 1.50 per KG and the selling price is lower than it. There are no takers for this compost and hence, the JMC is forced to sell at discounted prices.



#### Part D: Analysis

Current Sector Status: India's urban population grew at a rate of x% in the last two decades and now stands at 377 million people (79 million households). The urban sanitation sector has been a neglected sector for a long time, with no major policy and/or financial support to cities. Due to improvements in education levels, incomes and aspiration for a better lifestyle, the sanitation coverage increased, mainly owing self-financing of toilet construction. As of 2011, about 65% (Census 2011) to 70% (NHFS, 215) households in the country have access to toilets and another 21% use shared facilities and the remaining resort to open defecation. However, about 14 million households (18% of total households and about 65 million people) reside in slums spread across 2613 towns, and the access to household toilets in slums is much lower at 35%. The residents in slums mostly depend on shared facilities made available by local governments, in the form of 'community/ public' sanitation complexes. However, there was no major focus on transportation, treatment and safe disposal/ reuse of sludge and this was first recognized in the National Urban Sanitation Policy, designed by Gol in 2007. As per information available and best estimates only about 30% of sewerage generated is being treated and only a portion of that waste water is being reused.

The situation in Jodhpur city is better than the national averages. Out of the 196,436 households 65% have access to improved latrine and about 24% have unimproved latrines. About 21% live in slums and only 36% of them have household latrines. Jodhpur fares very highly on account of sewerage connections, treatment and reuse of waste water, in comparison to national average. The 1500 km long sewerage network covers about 65% of properties (residential, institutional and commercial) and treats about 70% of sewage generated in the city. They are selling the aster water and earning a small revenue from it. The city also tried other means like converting the treated sludge into gas for selling and also converting the solid waste into manure for selling. But both efforts were not commercially viable and hence, were not successful.

Policy Environment: The policy making is usually led by central governments, as the same are embedded in centrally sponsored schemes (CSS), with cost sharing arrangements between central government, state governments and cities.

The National Urban Sanitation Policy (NUSP), 2007 was the first major policy in the sector and was reflected in the national schemes such as Jawaharlal Nehru Urban Renewal Mission (JNNURM) and Urban Integrated Development Scheme for Small and Medium Towns (UIDSSMT), both initiated in 2006. These schemes have been subsequently reshaped as the Smart Cities Mission and Atal Mission for Rejuvenation and Urban Transformation (AMRUT).

In addition, the GoI launched the Swachh Bharat Mission -Urban (SBM-U), in 2014, to make the cities and towns open defecation free, by 2019. As of date, about 531 cities/ towns out of the total 7935 have been declared ODF. Some sections doubt these numbers and feel the data could have been fudged to show higher achievement.

Several states, including Rajasthan, have adopted these policies and programs and are actively working on the same. In addition, they have developed their own policies and programs also.

Rajasthan reflects a vibrant policy environment. The Rajasthan State Sewerage and Waste Water Policy, 2016 and the Rajasthan Urban Water Policy (draft), November 2015 are examples.

Financing Arrangements: Financing for urban sanitation, in Jodhpur city, is mainly through national and/or state led programs. The main ones in the past were the ADB funded program (2003) and GoI funded UIDSSMT (2012) which helped in creating a large part of the current infrastructure (sewerage network and STPs). The ongoing schemes are funded under the state's Chief Minister program and center's AMRUT program. The city had/has to contribute some share in UIDSSMT (10%) and AMRUT (33%), while they did not have to share any part in the other programs. All the funding under all the above programs was grant money to the city and not a loan. The ongoing SBM-U finances (grant) construction of household toilets for the poorer sections and this is a direct incentive to the individual households.

All the policies and projects mandate that the assets belong to the city (JMC) and that financing the O&M is their responsibility. While they adequate appropriate tariffs for the same, the state policy and practice limit levy of tariffs and recovery. As per the current policy/ practice there is no direct tariff on the sewerage services and is collected indirectly. About 33% of the water tariffs are to be apportioned to sanitation/ sewerage services and this depends on the 'effectiveness' of the drinking water providers, the PHED. Thus, the majority of the annual budgets come from PHED and the same is not sufficient for expected O&M. Thus, the JMC is undertaking sub-optimal maintenance, attending to only emergency maintenance/ repair works.

The JMC has been successful in earning some revenues from sale waste water, though the managers feel that they could have earned more, if not limited by the 'public organization' tag. The JMC also tried to convert the treated sludge into gas, but was not successful in 'selling the gas' for commercial exploitation due to technical and scale issues.

The team managing the entire sanitation comprises of about 5 people and are part of the JMC staff. Their salaries and allowances are taken care by JMC. All other activities like O&M of STP, cleaning of drains, operating septic tank cleaning vehicles etc have been outsourced to local contractors and this is a good arrangement to minimize permanent liability on accounts of the JMC.

The assets built/ owned are not properly registered and there is no scientific asset management and accounting system within JMC. They are seen as expenditure incurred and are accounted in that manner.

Institutional issues: Water supply and sanitation are managed by two different organizations. While the PHED is managing water supply, including infrastructure building, O&M, connections, billing and collections, all sanitation aspects including infrastructure building, connections and O&M are managed by a small unit within JMC.

It is universally accepted that the two functions are complimentary to each other and best undertaken by the same unit/ utility, the case is not so in JMC and almost all cities in Rajasthan, due to the state policy. The PHED is accountable to their head office and the sanitation unit within JMC is accountable to JMC.

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The sanitation unit within the JMC is not a ringfenced unit. The budget does not reflect the income (revenues and grants) and expenditure (staff, contracts, power expenses etc) at one place and are spread over different locations/ line items. In such a situation, it is difficult to understand the real financial situation.

Way Forward: The financial management of the sanitation system is entirely governed by the policies and practices of GoR and there is not much scope unless the system is changed. It is also tied to the overall efficiency and effectiveness of municipal financial management of JMC, which is not in a good condition.

Given, this overarching framework, there are not many options for improving the overall financial health of the sanitation system. The following options, most requiring state policy reforms, are suggested for further deliberations.

- Direct taxes for sanitation: Initiate direct tariffs for sewerage services, with due orientation and awareness building among the users. Currently, it is managed by indirect tariffs
- Ringfencing: Ringfence sanitation accounting in the municipal budgets. Provide estimates of actual required costs in the annual budgets and indicate how much is being actually allocated and spent. This would hopefully open the eyes of policy makers and start allocating more resources to O&M issues.
- More Municipal Subsidies: Efforts should be made to allocate more resources for sanitation management, from other sources such as municipal taxes/ grants received by JMC. In order to achieve this, there is a need for an overall improvement in tax collection in JMC. Currently JMC is unable to collect even 1% of the property tax and collects only INR 0.5 million out of the expected INR 82.6 million<sup>20</sup>. The collection of city development tax is also very low at less than 5% (INR 1.36 million out of expected INR 300 million)<sup>21</sup>.
- Combined WATSAN Utility: Integrate operations of water supply and sewerage into one unit/ utility for operational and scale efficiencies. Currently, the water supply system is managed by the PHED and has a huge task force. Their budgets are not part of the JMC budget system. The state urban water supply policy, still envisages the PHED as the agency for building and managing water supply infrastructure and also run it and transfer to ULBs over a period of time. This could be re-assessed and steps could be taken to transfer all water supply systems to ULBs and integrate them with sanitation systems and rest the management with one single entity.
- Incentives: Encourage and incentivize large properties such as large housing societies, educational institutions, hospitals, hotels etc to establish their own decentralized facilities for treatment and reuse of waste water. Currently, three properties (two star hotels and AIIMS institute) practice this approach successfully. This would (i) reduce the load on municipal systems and enable optimization of operational costs, and (ii) improve the circular economy processes.

#### Annex-1

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<sup>20</sup> As per JMC budget 2013-14 document.

<sup>21</sup> As per JMC budget 2013-14 document.

### Rajasthan State Sewerage and Waste Water Policy. August 2016

The GoR developed its own sewerage and waste water policy in August, 2016. The main aim of the policy is to 'ensure improved health status of urban population, specially the poor and under privileged, through the provision of sustainable sanitation services and protection of environment'. The steps recommended for ensuring this aim are;

All local bodies will make city sanitation plan (CSP) for a period of 30 years considering future development and city development in line with city Master Plan to avoid any conflicts in developing the city in the future.

The cities which do not have a master plan may prepare a short-term plan of 5 years from the base year for immediate implementation and during this process then prepare a full-fledged CSP.

Treatment of wastewater shall be targeted towards producing an effluent fit for reuse in irrigation in accordance with WHO guidelines as a minimum requirement.

Central treatment plants shall be built to serve semi-urban areas, and collection of wastewater can be made initially through trucking until collection systems are justified. Specifications and minimum standards as stipulated by CPHEEO<sup>22</sup>.

The reuse of treated wastewater in irrigation and industrial application shall be given the highest priority and shall be pursued with care.

The base tariff for treated waste water shall be 50% of drinking water supply tariff in case of industrial/commercial reuse and Rs. 3.00 per thousand litres increasing at the rate of 10% per annum, in case of agriculture/horticulture/fishery/landscape reuse.

The user fee and taxes shall be so set to cover atleast the O&M costs of sewerage systems for collecting, transporting, treating, disposal and reuse. At present sewerage charges are built into water bill, about 33% of water bill. This shall remain same. Other sources of revenue generation could include: connection fees/deposit, sale of treated water, sale of bio-gas, sale of fertilizes, sale of electricity etc, if generated.

Several sources for capital financing have been suggested. These include government grants, additional cess, ULB's own funds, loan from financial institutions etc.

PPP option is encouraged. GoI provides about 20% Viability Gap Funding (VGF) for feasible PPP projects. GoR shall match with this with another 20% VGF for sewerage projects in the state. The concession period for PPP projects could be as high as 30 years. GoR also commits other financial incentives for PPP projects viz- (i) land shall be given for STPs as per government rules on lease, (ii) 50% concession on VAT, (iii) exemption on excise and customs duty on certain condition, (iv) 50% exemption on electricity duty for seven years.

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<sup>22</sup> Central Public health and Environmental Engineering Organization, Ministry of Urban Development, GoI.