

Urban Sanitation Practices: Post Covid-19

Rajasthan



Research Study

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Mumbai

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Preface

Covid-19 pandemic has severely impacted the functioning of Urban Local Bodies (ULBs). Even though ULBs are undertaking all measures to tackle the impact of the pandemic, COVID-19 has affected the delivery of even basic urban services. Delivery of urban services related to public health, like sanitation and waste management services is crucial in maintaining the health and hygiene of the communities.

Unhindered delivery of sanitation and solid waste and liquid waste management services have always been challenging for urban local bodies. ULBs face challenges in terms of poor collection efficiency, inadequate tariff collections to support delivery of services, operational challenges in terms of required set-up, monitoring of human resources etc. Due to COVID-19 nature of service delivery has changed radically and has added to the challenges faced by the ULBs. Composition of waste collected has changed drastically as the quantity of hazardous and plastic waste has gone up drastically.

In order to assess the impact of COVID-19 in delivery of sanitation and solid waste management services it is essential to evaluate the existing practices. As on March 09, 2021, in overall state comparison of total confirmed Covid-19 cases in India, Rajasthan stands at 10th position. A city from Rajasthan State is selected for a pilot study. Selection of the city for research is based on parameters like size of project town, connectivity means/modes of transportation, existing set-up of FSTP and/or SWM treatment facility, willingness of local government officials /elected representative etc.

This study on, 'Urban Sanitation Practices: Post COVID-19-Rajasthan' aims to study the existing system of sanitation and solid waste management systems to identify gaps and issues and challenges faced by ULBs for efficient service delivery for the selected ULB from Rajasthan state. Considering the role played by various stakeholders involved in sanitation and solid waste management sectors, like stakeholder groups from ULB (administrative and elected representatives), local entrepreneurs, NGOs, sanitation workers, vegetable and fruit market vendors, local farmers etc. Interest and influence matrix will be developed to map these stakeholder groups and consultation plans will be developed accordingly. Based on the assessment conducted, the study explores innovative and implementable solutions having scope of replications.

Acknowledgement

I take this opportunity to put on record our deep appreciation for the Ministry of Housing and Urban Affairs for providing us an opportunity for working on this study. I would like to convey our gratitude to the Advisory Committee, RCUES Mumbai for providing us an opportunity to contribute to the task of rethinking public spaces and infrastructure.

I also take this opportunity to express my gratitude towards Shri Ranjit Chavan, President, All India Institute of Local Self Government, for showing confidence in us and valuable support to complete the Report. My sincere thanks are to Shri Rajiv Agarwal, IAS (retd.), Director-General, All India Institute of Local Self Government, Mumbai, who was instrumental in initiating the report and providing encouragement and valuable direction to the report.

This study has been undertaken by Mr. Suraj Kumar, Independent sanitation expert and his team with RCUES Mumbai. Their contribution and tireless efforts towards this study are highly appreciated. Their relentless work to make this study useful and worthwhile, despite the challenging circumstances of COVID is highly valued and appreciated. I would also take this opportunity to thank all the other stakeholders who have contributed to this study through interviews, discussions, data and knowledge sharing etc.

I would also like to thank team RCUES who worked towards the completion of the report.

I hope this work will be encouraging and helpful for the cities and state governments to take necessary steps in resolving challenges in efficient delivery of sanitation and solid waste management services.

**Director,
RCUES of AILSG**

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I. Scope

I.1 Scope of Project

- I. Developing an overall framework for the research study, with inputs from various relevant stakeholders and in consultation with RCUES of AILSG, Mumbai
- II. Ensuring that the study output is relevant to the geographical area subjected for the study. T
- III. Ensuring that study considers inputs from various relevant experts and Gov. and non-Govt. stakeholders
- IV. Conducting a study as per the proposed submitted (section V) and the comments shared by RCUES on the same, keeping the outline of the study flexible to incorporate timely changes in the COVID times and adhering to the timely directive/guidelines by respective Govt. authorities
- V. Technical scope as per proposal submitted:
 - To identify key areas of consideration as to recommend the mitigation measure of service delivery and efficient operations in both sanitation and municipal solid waste management
 - Explore options of sustainable financing in form of impact bond investment for improvement in sanitation operations of ULB
 - Develop the performance benchmark for impact bond investment and evaluation framework
 - To recommend measure on empowerment of sanitation workers including improvement on health and safety aspects of operations
 - Explore an innovative and implementable solutions having large scope of replications

I.2 Scope of deliverable

Current deliverable attempt to understand the broad sanitation outline at Rajasthan state and further narrow down the details at identified pilot towns. The scope is limited with sanitation sector and related financial substitutability (especially operation) of system. Approach and methodology of project and an overall description of pilot town has also been included in the report. The following key outcome is envisaged at end of this deliverable:

- Challenges towards operational sustainability of sanitation services
- Opportunity towards integrated sanitation services management
- Understanding of key enablers and concept outline
- Review of best practices and take-away

I.3 Timeline

Sl. No.	Deliverables	Timeline	Remarks
I.	Inception and Kick-Off	1 month	Completed
II.	Baseline Report	2 month	Completed
III.	Draft Recommendation	3 month	On-going
IV.	Final Recommendation	4 month	Post submission of draft

I.4 Limitation

Study recommendation will be largely drawn from secondary data and consultation. No primary surveys will be undertaken at any given part of the research study. The financial model numbers are drawn from existing data base of municipality and related market rate from various reliable sources.

2. Introduction

2.1 Impact of COVID-19 in ULB functioning in Rajasthan

As on March 09'21, Rajasthan total confirmed covid cases stands as 10th positions in overall state comparison. The current status as on date is given in table below: -

Table 1 Rajasthan State Covid-19 cases as on 09.03.21

State	Total Cases	Total Active	Active %	Total Recovered	Recovered %	Total Deaths	Death %
Uttar Pradesh	593,680	10,864	1.83%	574,312	96.74%	8,504	1.43%
West Bengal	561,321	7,538	1.34%	543,826	96.88%	9,957	1.77%
Odisha	332,106	1,890	0.57%	328,271	98.85%	1,945	0.59%
Rajasthan	313,425	6,585	2.10%	304,104	97.03%	2,736	0.87%
Chhattisgarh	290,084	8,550	2.95%	278,029	95.84%	3,505	1.21%
Telangana	290,008	4,518	1.56%	283,924	97.90%	1,566	0.54%

Source: Gol COVID-19 online tracker

This entire covid-19 pandemic has severely impacted the functioning of ULB, especially in terms of smooth running of urban basis services including waste management. The contractors although had been given the mandate of waste collection (both liquid and solid waste), but overall collection volume has gone significantly down, at least till the month of December'20 and eventually started picking up again, yet below the average collection volume of pre-covid situations. Apart from management, the collection efficiency of services has also gone lower this year as common trends through-out the municipalities of state. The poor performance of couple of services sections has impacted the entire work-cycle and one of badly affected area of municipality is poor revenue collections and thus needs considerable increase in support/grants from Rajasthan state government. While doing some consultation in ULBs of Jaipur and Dausa districts, it was also observed that waste management trucks were also largely used by ULB during the related work of COVID-19, mainly in separate handling of COVID-19 waste and disinfection, cleaning of affected locality and other relief measure.

2.2 Status of Wastewater management

Out of total 193 cities in Rajasthan, 38 currently have operational STPs, whereas 20 more cities are expected to develop STPs to meet the demands of wastewater treatment of its urban population. These STPs will have an overall wastewater treatment capacity of 1,355 MLD, to cater to approximately 61% treatment demand of the Rajasthan state's urban population. GOR has already showcased its immense commitment to the cause of safe treatment coverage, through efficient ground implementation as a part of various reform missions of Government of India like AMRUT, Smart City, JnNURM, NLCP etc, and has been successfully improving the service levels for a substantial population. GoR through RUIDP has also built 34 STPs (operational/under construction) with massive sewerage network coverage, to cater to around 27 cities under three different phases of their program implementation.

Table 2 Wastewater treatment coverage and gaps in ULBs of Rajasthan

Wastewater Treatment	Size of ULBs	Class I - ULBs (pop > 100k)	Class II - ULBs (pop 50K - 100K)	Class III, IV, V- ULBs (pop < 50K)
Number of ULBs 1		30	25	138
% population access to WWT		62%	36%	8%
Untreated WW volume (MLD)2		345	118	395

Source: Rajasthan State Sewerage and Wastewater Policy, 2016

Additionally, through the grant support of 2 million USD from the Bill and Melinda Gates Foundation in 2016, RUIDP has successfully demonstrated innovative non-sewer sanitation solutions in three pilot project

1 Government of India. 2011. Census 2011, latest urban local bodies of DLB.

2 GOR. 2016. Sewerage and Wastewater Policy. Jaipur.

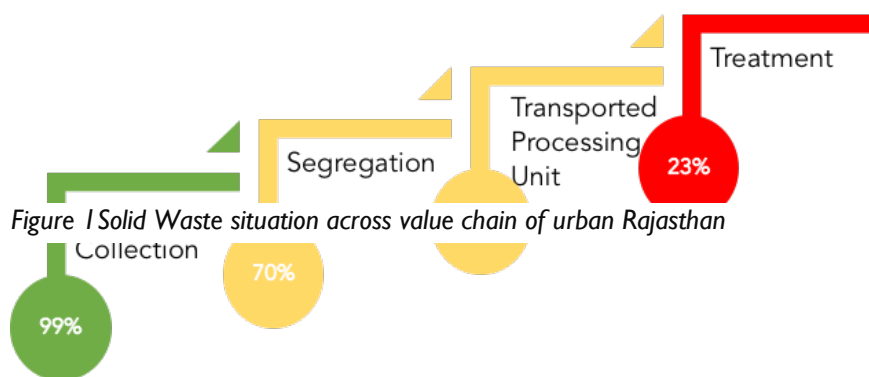
towns (Lalsot, Phulera and Khandela). A first of its kind demonstration of faecal sludge treatment solution with consolidated reforms of improved infrastructure, robust regulations and strong institutional framework, these pilot projects are getting considerable attention at both national and international platforms.

Recently GoR has also completed a state of art project of river rejuvenation and has developed five STPs (of a total 170 MLD capacity) along Dravyavati river in Jaipur, to ensure continuous in-flow of clean water throughout the year. This project included setting up of the state’s largest STP of 100 MLD capacity. Some of the opportunity areas like co-treatment, decentralized waste treatment solutions to the community, cluster-based treatment approach, etc. are now also being explored along with proposed STP and FSTP, to accomplish the state vision³ of “safe sanitation access and treatment solutions for its entire urban population.”

2.2 Status of Solid waste management⁴

The total solid waste generated by the State in urban areas in 2019 is 6500 TPD², of which 99% (6435 TPD) is collected from door to door, 70% (3779 TPD) is segregated at municipal wards and 99% of this solid waste is transported to the respective processing units.

In order to manage and process the generated solid waste, there are 40 Operational Plants, of which 4 are Centralized and 36 Decentralized Plants with a total capacity of 613 TPD (9% of the total waste generated) and 256 TPD (4% waste) respectively. Besides, there are 7 processing plants under construction and 7 under environmental clearance with a total capacity of 746 TPD (11% of the total waste generated) and 567 TPD (10% waste) respectively. Along with these, there are 2 waste processing plants with a capacity of 567 TPD (10% of the total waste generated) and 10 Material Recovery Facilities (MRF3) with a capacity of 325 TPD (5% waste).



The decentralized processing (wet waste to compost) is carried out by Bulk Waste Generators at their premises with a total capacity of 650 TPD (10%) processed waste. For remaining 1352 TPD (21%) waste generated, the State Government has approved Annual Rate Contract for Processing/ Compost Machine (50-1000 kg) for

processing of waste in decentralized manner. 13 % (869 TPD) of the total waste is treated by 40 Processing Plants, 10% (650 TPD) by 549 Bulk Waste Generators and the remaining 4547 TPD has been dumped at dumping site.

2.3 Key Challenges

Stain on financial sustainability of system

Both solid and liquid waste management are largely depending on user tariff collections and generally in all medium and small towns, poor collection efficiency in solid waste and non-schedule desludging in liquid waste management, impact the financial sustainability of both the operations. Largely these services operations are dependent on financial aid and support from state government to manage on interrupted operations. There is presence of private operators in both the services provided having assured fixed annual payment terms contract with municipality, working in constant supervision and monitoring of local body.

Operational challenges in terms of required set-up, human-resource and monitoring

3 GOR. 2019. Draft FSSM Policy. Jaipur; GOR. 2018. FSSM Guidelines. Jaipur.

4 Rajasthan state solid waste management policy and strategy, 2019

Solid waste system in state has adequate collection and transportation but only 1/4th of waste getting managed at designated treatment plant. Similarly, in case of class II town, only 36% whereas class III and lower only 8% sewage are getting into treatment plant. This clearly shows that both in case of solid and liquid waste, the state has alarming issue in case of treatment facility. Further monitoring is mainly tracked by GPS based installed device in case of some of solid waste management facility, there are no such measure in case of desludging trucks of FSTP (either in recently set-up plant of three FSTP or any of existing private desludging operators). However, having GPS is just one dimension of monitoring, details of collection and treatment efficiency, collection defaulters and addressal of complaints etc. are generally not present in any of municipality of small and medium towns. Both at municipality and operator's level, there is also challenges of adequate human resource (both in terms of number of staff and skilled resource) to manage the entire operation value chain efficiently.

Non-attractive module/ potential business opportunity for local entrepreneur

Sanitation services has become a business opportunity for entrepreneur, especially in class I cities and there are visible results on ground along with high level momentum of SBM 1.0. However, a common observation is that scale of operations is directly proportional to revenue making opportunity. In case of Rajasthan, success is limited to only few examples like sewage treatment plant of Dhelawas (Jaipur), Recycling of wastewater and reuse for industry in Udaipur city (Hindustan Zinc Ltd). There are around 100 local entrepreneurs working in recycling and scrap-dealers market and located in all across Rajasthan. Although Rajasthan ground water depletion is in alarming stage, water dependent Industry are yet to use treated sewage wastewater as intake of their processing plants. Similarly, around 80 entrepreneurs of organic compost in different parts of Rajasthan. 80% of these organic waste producers are not directly linked/dependent on municipal solid waste collection mechanism and running their operations independently.

Ground impact/effectiveness of behavioral changes initiatives

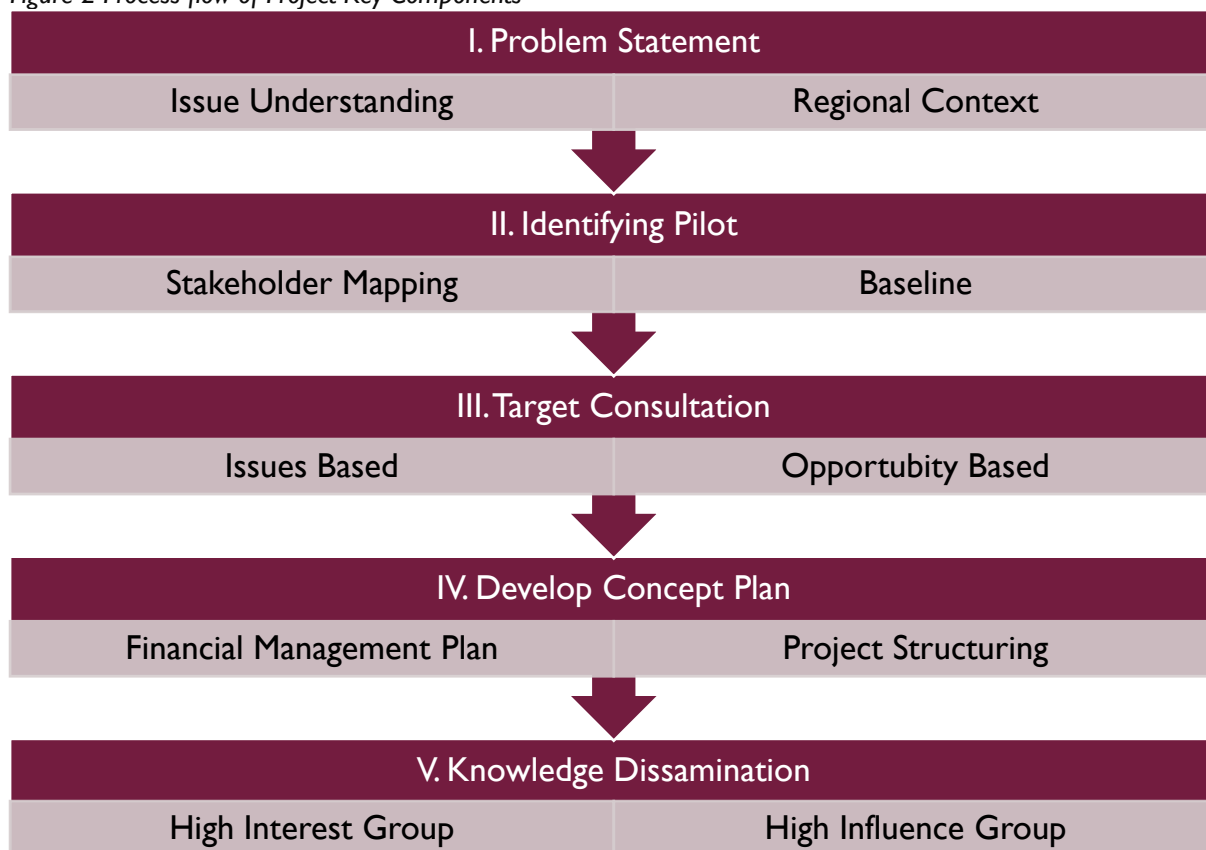
Source segregation is the key in financial success of solid waste management system as this substantially reduce the operation time and cost in processing and further yield the better market value based on segregation quality and types. Although there is good spending under SBM 1.0 on behavior change and communication program, the effective in source segregation in Rajasthan have not been much effective. 70% of segregations are post collections and hence led to in-adequate quality product for market players. Recently Jaipur municipal corporations has initiated a scheme of buying segregated waste from identified rag-pickers and paying them on spot at MRF facility. 200 such ragpickers have already been



provided the ID card and more are in pipeline to be included as part of this program. Alliance of Indian Waste Pickers estimates around 1.4-1.5 million rag pickers in India and Gol commitment for streamlining of rag pickers as part of existing waste management reforms reflects the high-level commitment in this regard.

2.4 Study approach and methodology

Figure 2 Process flow of Project Key Components



Sanitation as domain (including both solid waste and liquid waste management) has always been challenging for urban local body in terms of smooth system operations. However, the problem ranges in multiple domains including capacity building, financial sustainability, system efficiency across value chain etc. This research project is mainly focusing on improving financial sustainability of municipal sanitation services and thus the very 1st step here would be understanding the problems/relevant challenges more in regional context of Rajasthan.

Research proposal will also deep dive into identifying suitable pilot to understand the real ground impact of proposed solutions. The baseline analysis will have details fact-showcasing as part of baseline analysis report and key informants and influence matrix will be developed to map the stakeholder segment of pilot towns. Some of these stakeholder groups would be from ULB (both administrative and political representative), local entrepreneurs, NGOs, sanitation workers, vegetable and fruit market vendors, local farmers etc. Interest and influence matrix will be developed to map these stakeholder groups and consultation plans will be developed accordingly.

Target consultation will have two broad areas of consideration i.e., issues and opportunity-based consultation. Issues based consultation will have main objective on ground validation of perceived issues and challenges in sanitation across value chain system. Similarly, opportunity consultation will have role in understanding the feedback, comments and priority of target groups on potential interventions.

Concept plan will be developed based on gathered understanding (both from case study and stakeholder consultations) and will be supported by detail financials of proposed solutions. This will be worked out through financial model highlighting all revenue and expenditure stream for next 10-15 years cycle and arriving the IRR of proposed solutions. Scenario building and comparison with present baseline will also be undertaken.

The key learning from this research project will be summaries and disseminated through various means and platform including blogs, research paper, articles, presentation at different forums etc.

3. Opportunity Area

3.1 Integrated Operations – connecting the dots

There are several means of integrations in sanitation system from integrated solid and liquid waste management system to involving local scrap dealers, rag-pickers, recyclers and organic composters in relevant heads of system value chain. These integration opportunity lies in terms of improving the system efficiency in parts and as a whole of system. Potential benefits and related opportunity areas are highlighted in table below: -

Table 3 Integrated Operations - Options, Mechanism & Advantages

Sl. No.	Options	Mechanism	Advantages
I.	Integrated Solid and Liquid Waste Management	<ul style="list-style-type: none"> Common treatment plant site and connected operations and re-use Shared human-resource Shared tractor (removable trolley) Common contractor and tariff collectors Revenue stream – Organic compost, treated wastewater, recyclable waste, service tariff collections 	<p>Shared cost on resources including machinery, human-resources (reduced OPEX, CAPEX)</p> <p>Limited area footprint needs for setting of treatment plant</p> <p>Ease of contracting, monitoring and supervision</p>
II.	Collaboration with Rag-pickers	For both depositing of the collected waste and getting the money from treatment plant and also helps in waste segregations at treatment units Shared manpower for waste segregations and adding sum to recyclable waste volume	More efficient solid waste segregation system at treatment plant Streamlining the informal operations of Ragpickers with their formal identity
III.	Collaboration with organic compost producers	<ul style="list-style-type: none"> Pressure of maintain the compost quality to match the industry standards May sub-let the composting units to local players on fixed concessionaire agreement for better operations and market outreach of product 	<p>Quality compost Locally available organic compost on subsidized rate</p> <p>Encourage the operators to aware and collect the segregated waste from HH collections</p>
IV.	Collaboration with farmers, industry as buyers	Assured buyers in vicinity for organic compost, treated wastewater, recycled waste products etc. Potential industry includes power plant, range of industries, railways, farmers, recycling and manufacturing industry etc.	Closed business loops for by-products and connected market players
V.	CSR Collaborations	Mapping of CSR players – both regional and state level with potential scope in funding in CAPEX, capacity building and branding of produced market products. Including within given scope of sanitation impact bond.	Opportunity to get associated and branded as one of efficient integrated solid and liquid waste operations
VI.	Funds pooling benefits from SBM 2.0 and other programs	Convergence with project components including SBM, Pradhan Mantri Kaushal Vikas Yojana, National Safai Karamcharis Finance & Development Corporation (NSKFDC)	Funds availability from existing schemes and programs of Government

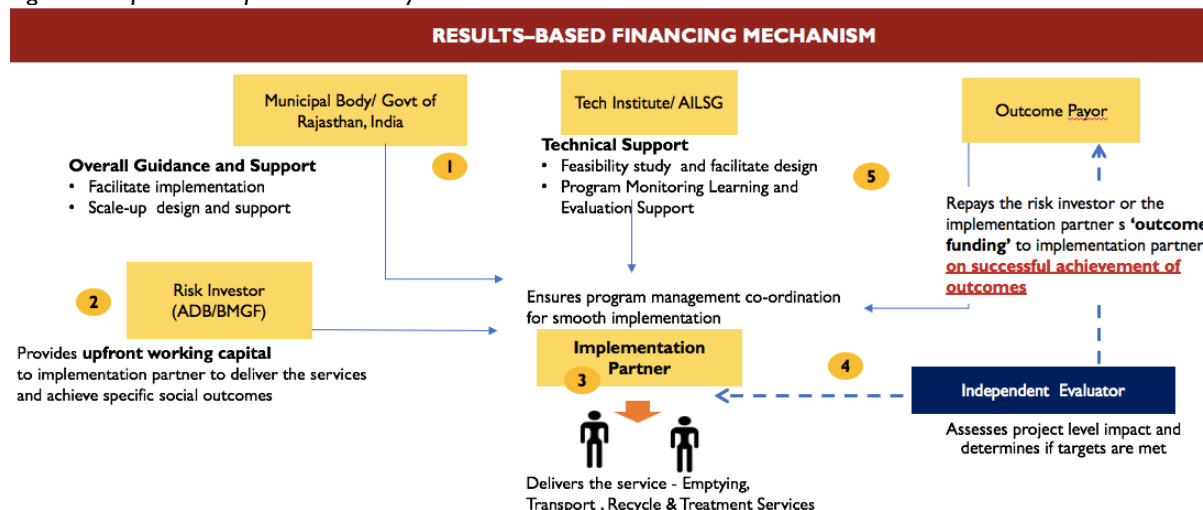
3.2 Need of contextual (and local) entrepreneurship

Sanitation industry is generally interest to the large number of small and medium industry players and not much appealing to larger industry player. Thus, mapping and customizing the whole strategy at regional level would be able to more sustainable in operations and business prospects. This applies to both demand supply user, vis-à-vis to buyer and seller of this business domain. Demand/supply groups may include but not limited to scrap dealers, organic composting unit, nearby districts, power plant units, stone cutting industry, railway stations etc. Gov. will have larger role in facilitating the policy decision, mainly instructing the regional industry players (relevant) to buy the treated wastewater, similarly connecting with manufacturing unit to take recycled product on adequate prices and encouraging farmers to purchase the produced compost. There can be a good capacity building and entrepreneurship opportunity in case of absence of such regional players and sanitation workers, desludging workers, rag-pickers etc. can be encouraged to form SHG groups and run the entire operations.

3.3 Exploring option of Impact bond (pay for performance instrument) for promoting local entrepreneurs in Sanitation business

Development impact bond is the recent trends in education and health sector in India and elsewhere in world successfully used in various other sectors as well. In-fact in year 2017, Rajasthan is 1st state in world to have 1st healthcare development bond (and 1st development impact bond in India) aims to reduce mother and baby death in state. Result based payment drive greater operational and financial sustainability in the process. The overall collaboration for impact bond in case of Rajasthan sanitation project, will be push towards successful financially sustainable integrated operations of solid and liquid waste management. GoR will provide overall guidance and support and may also function as outcome payor. Tech institute like AILSG or any regional university may provide all technical and capacity building support in the mandate where as ADB/BMGF/CSR may play the role of risk-investors for the proposed module. Local NGO, SHGs or existing solid water/FSTP plant operators may play the role of implementation partner for at least 3-4 years of operations.

Figure 3 Impact-Bond process with key stakeholders



Payment can be made post achieving the performance indicator by implementation partner. It is advised to explore this option to encourage local entrepreneurs to build their capacity and participate in sanitation operations and management. Some of potential area may include co-composting, re-use and resale of treated wastewater and measure of reduction in operations cost of sanitation system, schedule desludging, recycling, sanitation tariff collection efficiency and grievance redressal of user complain. Local entrepreneur (SHG, CBO, NGO, Cooperatives etc.) can work in conjunction with larger contractors and FSM cell will extend the support for overall smooth coordination. Pay for Performance (P4P) mechanism links financial and other incentives to pre-agreed and measurable outcomes to catalyze improvements in achievement of those targets.

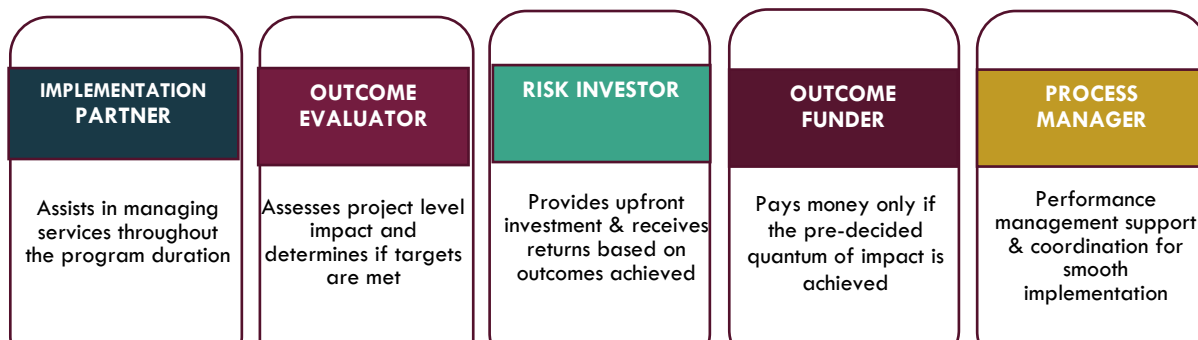


Figure 4 key Stakeholder of Impact Bond and Functions

An illustrative of performance indicator of some of potential impact bonds are summarized in table below: -

Table 4 Impact Bond - Key performance indicator of implementor

Sl. No.	Performance Indicator	Baseline	Target	Business Prospects
1.	Percentage of co-compost produced from produced sludge	5 %	100%	Nearby farmers can use this manure supplements (or better alternative of existing fertilizer)
	Sale of produced compost at agreed price	0%	60%	
	Sale of recycled products as compare to waste volume	0%	5%	Involve scrap dealers and nearby manufacturing industry
2.	Re-use of treated wastewater	30%	90%	Farming, Industry and Other uses
	Sale of treated wastewater	0%	60%	
3.	Schedule desludging	5%	80%	Users service payment, Desludging operation
	Regular collections of solid waste	50%	80%	
	Sanitation tariff collection efficiency	40%	80%	
4.	Grievance redressal of user complain	NA	80%	Based on MIS/improved data management record system

The set target is subjective to collective discussion with implementation players, risk investor, outcome players and other key stakeholders. The key objective to encourage the implementation players to efficiently perform their task responsibility and reach to the respective target in get paid for performed services. Implementation player will be encouraged to form such partnership at local level. Pay for performance instrument will be applicable for all four-opportunity area and financial benefits/payment would go directly to these entrepreneurs, basis to achievement of the ground results against set-targets.

3.4 Leveraging finance from existing scheme and programs

SBM Urban 2.0 has been recently launched by Gol with faecal sludge management and grey water management are key focus area of interventions. State Government will have large financial kitty to implement the mission and this it-self is a huge opportunity area of fund convergence for implementation of an integrated sanitation plan. Similarly, **15th FC commission** has also made provision of tied fund for non-million plus towns in water and sanitation with allocation of around 20,000 crores in 1st phase of implementation. This is additional funds to ULB over and above funds allocated (both union and state share) under the centrally sponsored schemes like Swachh Bharat and Jal Jeevan Missions, AMRUT and other similar schemes being implemented by the States.

Gol has also revised **VGF (viability gap funding) schemes for PPP in infrastructure sector** of Gol/MoF and include the clause of 'Project related to wastewater treatment/sanitation will qualify for such grant subject to maximum 30% of project cost. In case Gol/ state government propose to provide further assistance, another 30% can be added under VGF.' VGF up-to 200 Cr can be sanctioned from

Empowering committee. State level proposal of PPP driven complete safe sanitation coverage for small and medium town may leverage substantial financing from VGF schemes.

Sanitation Workers Rehabilitation Scheme (SWRS), provided terms through State Channelizing Agencies (SCAs), Regional Rural Banks (RRBs) and Nationalized Banks to the target group. Loan under this scheme is provided to the target group who are presently doing sewerage/drainage work in unhygienic working conditions to do the cleaning work mechanically instead of manually for the project with a maximum project cost up to Rs.15.00 lac per unit (with 6% interest rate to beneficiaries up to 10 years after implementation period) for purchase of various sanitation based equipment like Vacuum Loader, Garbage Disposal Vehicles, Suction Machine and Pay & Use Toilet for doing sewerage/cleaning work mechanically & other sanitation related income generating activities etc. Loan component from SKFDC can be provided up to maximum of 90% of the unit cost and the remaining 10% is to be provided by the State Channelizing Agencies in the form of loan, subsidy or from any other available sources of funds.

3.5 Review of case study

3.5.1 Case Study: SHG Women leading the entire operations of FSTP, Odisha

In a path-breaking decision towards women empowerment and inclusive sanitation, the Odisha government in year 2020, handed over Operation and Maintenance (O&M) of four Septage Treatment Plants (SeTPs) to self-Help Groups (SHGs) run by women and transgender. The treatment facilities were handed over to women SHGs in Berhampur, Baripada and Sambalpur and to a transgender SHG in Cuttack through a contract agreement signed between the SHGs and the Urban Local Bodies (ULBs). Women SHGs have been managing the operation and maintenance of community toilets very well across several cities in the state and now took over the handling of the O&M of FSTP.



3.5.2 Case Study: Counting every drop of treated

wastewater, Surat, Gujarat

The Surat municipal corporation is successfully operating a 40 MLD (Net Output) Sewage Treatment Plant based on Ultra Filtration (UF) & Reverse Osmosis (RO) technology at Bamroli, generating Industrial grade Water and supplying it to Pandesara GIDC since year 2014. No complaint ever received



regarding the quality of treated wastewater and user industries are satisfied with the quality & quantity of water. At present, SMC is earning annual income of Rs30 crore by supplying treated water to industries in Pandesara at the rate of Rs28.80 per kilo litre. Two new tertiary treatment plants- one of 35 MLD capacity and another of 40 MLD at Bamroli and Dindoli, respectively- will be commissioned by the year-end and will further add substantial revenue by selling of treated water to industries. There are

other cities like Chennai, Mumbai, Nagpur etc. also been supplying treated wastewater to industry and substantially reduce the overall operational expenditure of WTP.

3.5.3 Case Study: Business model of FSTP through selling of compost to farmers, Nilgiri, Tamil Nadu

Integrated solid and liquid waste management with complementing system functions. System revenue stream able to recover the complete operational expenditure of system. Natural/biological process of treatment with low cost and limited skills requirement in operations. Currently all produced compost are getting sold with more increasing demands by local farmers. A 15% increase in crop yield and 20% increase in annual income supplemented with the application of either co-compost or recycled greywater. A total area of 447 hectare of vegetable cultivation has been brought under the adoption of co-compost and recycled greywater. A total of 135.45 tonnes of co-compost was produced at two Resource Recovery Parks, and distributed to 969 vegetable farmers



Compost is being used as supplement to chemical fertiliser and part of fertiliser required are served through co-compost (cost difference of INR 17 /kg of chemical fertiliser to INR 5 /kg of FSTP produced compost). Project concept of linking water, sanitation and agriculture has recently got

endorsement from NITI Aayog to promote and develop similar model in other parts of country.

3.5.4 Case Study: Clean energy production and substantially saving on power expenditure, Delawas, Jaipur, Rajasthan

STP Delawas, Jaipur based on conventional activated sludge process was commissioned by RUIDP in 2006 with a capacity of 62.5 MLD. The average daily power consumption for operation of STP is 8576 Kwh, which amounted to an electricity bill of more than 1.2 million per month. Power generation based on biogas fuel from produced sludge and other energy saving measure have been able to reduce the power cost about 75-80% and has made the STP almost self-sufficient except for meeting peak hour demand. Methane captured from the plant is also used to generate clean electricity to run the entire facility. The Jaipur Municipality says this will save more than USD 300,000 a year in electricity cost. The treated water is released into channels and farmers use it free of cost to irrigate their farm fields.



3.5.5 Case Study: Ragpickers streamlining in Waste Management at Jaipur, Rajasthan

Jaipur municipal corporation has started its Material Recovery Facility (MRF) at Mathuradaspora landfill site where the waste collected by ragpickers are being recycled. Under the project, uniforms and identity cards are being given to the ragpickers. Around 200 of them have already started working with the centre. At the centres, JMC is purchasing the waste collected by the ragpickers, who won't have to travel to the city for the purpose. Project has been designed keeping in mind the contribution of ragpickers in recycling and plastic waste disposal. Right now, these ragpickers are collecting plastic which can be sold to the dealers at higher rates. They usually collect plastic items which are big in size or heavy. They do not collect glass bottles, shoe soles or tyres. At the MRF centres, all kinds of dry waste will be accepted and ragpickers will be paid on



the spot. This will also save time spent in travelling to the city and rule out middlemen, The MRF centre is running by by NGO Sarthak. The MRF centers have bailing machines, fatka machines and shredding machines that will minimize the size of the waste. The bailing machines compress the waste material in a sheet. Fatka machines pack the waste in one packet and shredding machines shred the plastic into small pieces. The plastic shreds can be utilized in cement sector. Moreover, medical camps are also organized for ragpickers to protect them from any diseases caused due to working with garbage.

3.5.6 Case Study: World's 1st health impact bond at Rajasthan for maternal care

The world's first development impact bond (DIB) in healthcare is focused on improving the quality of care among private maternity care providers in Rajasthan. The expected benefits include 10,000 maternal and newborn deaths could be averted over a five-year period. Partners include USAID, UBS Optimus Foundation, Palladium, PSI, HLPPT and MSD for Mothers. Rajasthan has one of the highest maternal and newborn mortality rates in the country, with 244 maternal deaths per 100,000 births and 47 infant deaths per 1000 live births. The Maternal and Newborn Health DIB – known as the 'Utkrisht bond', taken from the Hindi for 'Excellence' – will support government efforts to reduce maternal and newborn deaths by improving access to, and the quality of care in, up to 440 private healthcare facilities in Rajasthan.

For this impact bond, the upfront funder, UBS Optimus Foundation has provided up to USD 3.5 million initial working capital so service providers can begin their work with private facilities in Rajasthan. Interventions is getting delivered by NGOs Population Services International (PSI) and HLPPT and reaching up to 600,000 pregnant women with improved care during delivery and could lead to up to 10,000 maternal and newborn lives being saved over a five-year period. The impact bond was designed by Palladium, who will manage implementation throughout the three-year term.

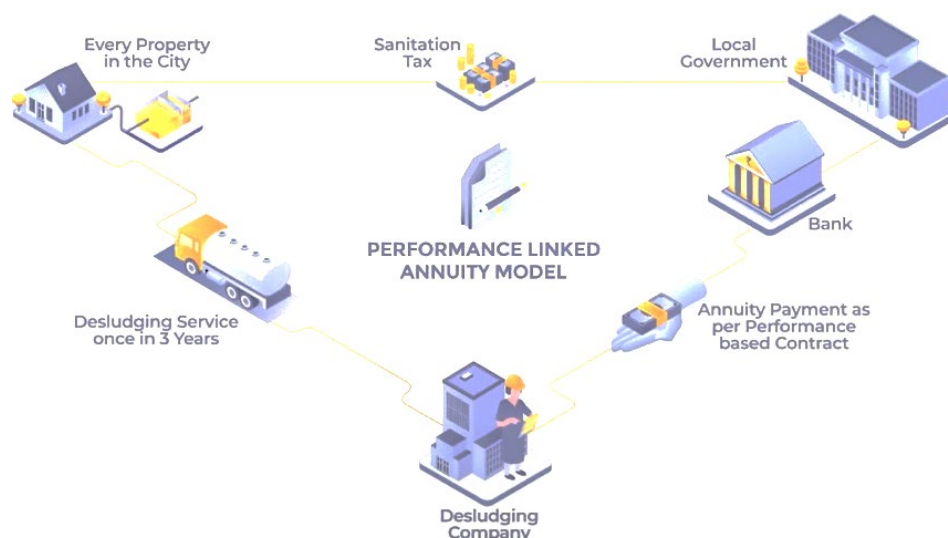


The Utkrisht impact bond is the world's largest development impact bond

PSI has adapted its Engage, Launch and Support quality improvement framework and will be implementing this in 14 districts of Rajasthan. HLPPT will be working in 19 districts to support and engage private medical facilities through capacity building, mentoring and ongoing support. In a further innovation, all implementation partners are also co-investors, contributing more than 20% of the capital required. USAID and MSD for Mothers have committed a total of up to USD 8 million in outcome funding, provided a set of independently evaluated targets.

3.5.7 Case Study: Performance based service contract to desludging operators in Wai, Sinnar, Maharashtra

A performance-based service contract was awarded to desludging operators in Wai and Sinnar. To incentivize the private operators, an escrow account was set-up for payment towards scheduled desludging. To make the financial system more transparent and smooth payment, a system of escrow account was introduced in both the cities. An escrow account is a tripartite agreement between the local government, local banks and the selected private operators. The Escrow account has three months of additional funding always available as a reserve fund and this reduce the delays in payment



to operators against the delivered services, that may happen from local governments. And while payment was guaranteed through an escrow account, the private contractor was also held for performance. An outcome-based contract was signed wherein the private sector based on the performance would be getting paid. Any underachievement against set-targets will lead to

proportionate payment to operators. The contract also mentions specific measure to ensure that service is provided in an appropriate manner. Performance linked annuity model of Wai and Sinnar has been a success story for scheduled emptying in FSM domain.

4. Selection of Pilot Town

4.1 Objective

Some of key strategy in pilot selection lies from scope of replication of success story, scale of interventions, adequate size of project town, having good connectivity means/modes of transportation, existing set-up of FSTP (and/or SWM treatment facility) and most importantly willingness/cooperation/felt necessity of local government officials /elected representative are some of key considerations in selections of pilot towns for this research project. Three towns i.e., Phulera, Lalsot and Khandela are 1st set of towns having successfully demonstrated non-sewered sanitation solutions. These towns are in close proximity of Jaipur and because of good amount of consultation, capacity building and awareness program already undertaken as part of the existing NSS reforms, there is already a positive atmosphere across key stakeholder groups. However, Lalsot town with the tagline of 1st FSTP of Rajasthan state is more appropriate for final selection because of serving as regional mandi for Dausa district with presence of adequate number of industrial set-up around project towns.

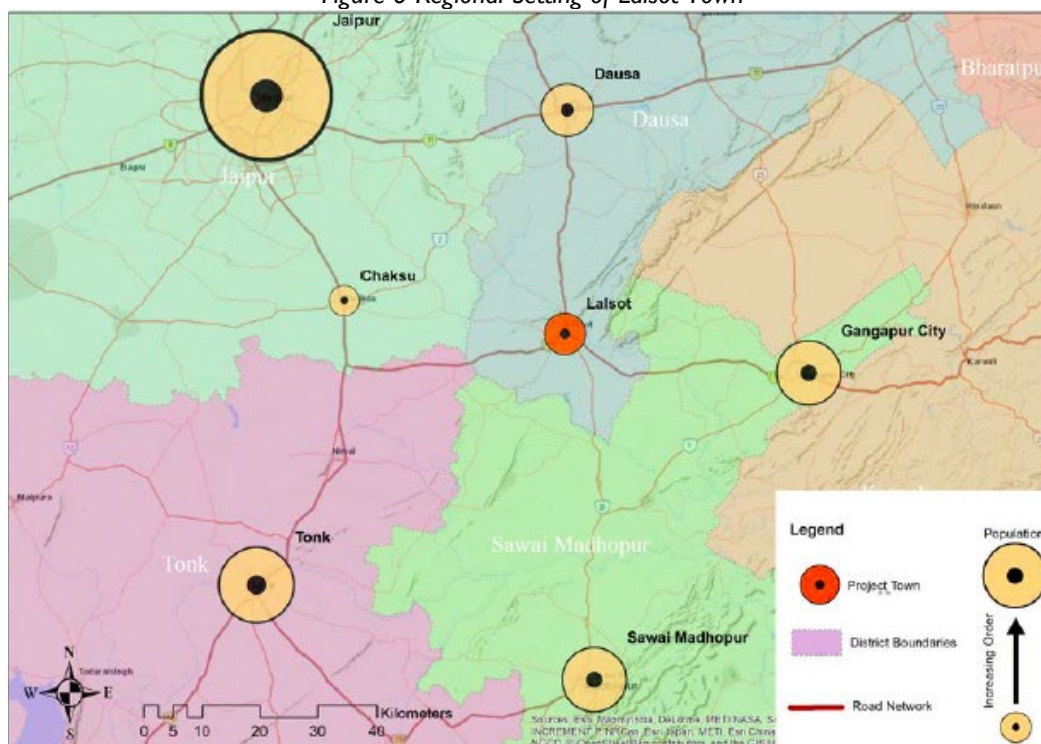
Figure 5 Strategy of Pilot town selection



4.2 Lalsot – Town Introduction

A municipality located in Dausa district of Rajasthan, Lalsot town is divided into 25 wards and 19 revenue villages. The town is famous for its saw cutting industry and Grain Mandi. Wood for industries is procured from nearby villages namely, Mandawari, Bagdi and Sishingpura. A RIICO industrial area is situated 4km from the city.

Figure 6 Regional Setting of Lalsot Town



Lalsot is situated at a distance of ~100km from Jaipur at north, ~45km from Gangapur City at east, ~65km from Sawai Madhopur at south and ~88km from Tonk at south west. NH 148, NH 23 and SH 24 crosses the town and provides connectivity to different major towns and cities of the district and state.



Overview of Lalsot

Particulars	Values
No. of Wards ⁴	25 nos.
No. of revenue villages ⁴	19 nos.
Geographical Area ³	290 ha
Total Population ³	45,319
Population (Lalsot M) (2011) ³	34,363 persons
Population (Revenue Village) (2011) ³	10,956 persons
Total Households ³	7,710 nos.
Households (Lalsot M) (2011) ³	5,756 nos.
Households (Revenue Village) (2011) ³	1,954 nos.
Sex Ratio ³	924
Literacy Rate ³	63%
Working Population ³	33%
Households with Water Connection ⁵	4,726 nos.
Existing duration of Water Supply ⁵	1 hour per day

³Source : Census of India , 2011 (www.censusofindia.gov.in)

⁴Source : Master Plan Report Lalsot, 2010-2031

⁵Source : PHED, Water Bill , July , 2017

4.3. Sanitation Services - NSS

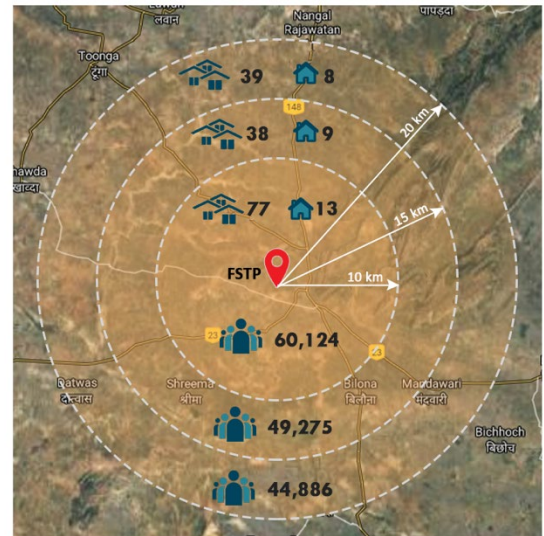
Population (2019)	• 45,319
Cluster Population	• 154,285 (154 villages)
Infrastructure Development	• FSTP-20 KLD, 2 Nos. Desludging Equipment
CAPEX, (INR)	• 3.6 Cr, 4 lakhs/yr
OPEX	• SC & GT – SR – SDBs
Technology	• Liquid: ISAF- PGF
	• Solid: Dispose / Reuse/Co-composting
Salient Features	• Combining O & M of treatment plant and desludging operations.

SC: Screen Chamber, GT: Grit Chamber, SR: Stabilization Reactor, SDBs: Sludge Drying Beds, ISAF: Integrated settler and Anaerobic Baffle Reactor, PGF: Planted Gravel Filter, PDBs: Planted Drying Beds, PP: Polishing Pond



LALSOT FSTP

- DISTANCE FROM JAIPUR: 83 km
- CAPACITY: 20KLD/Day
- TOWN POPULATION SERVED: 45,319
- EXTENDED CATCHMENT POPULATION: 1,54,285
- GRAM PANCHAYAT BENEFITED: 30



No. of Villages
 No. of Gram Panchayats
 Population



4.3. Sanitation Services – Solid Waste

Number of Trucks	<ul style="list-style-type: none"> • 5 (5000Kg Capacity)
Sanitation Worker	<ul style="list-style-type: none"> • 55
Infrastructure	<ul style="list-style-type: none"> • Collection, Transfer, No Treatment
Amount paid to contractors	<ul style="list-style-type: none"> • 65 lakhs in 2019-20, 75 lakhs in 2018-18
Collection Fees from user tariff	<ul style="list-style-type: none"> • 1.94 lakhs in 2019-20, • 1.8 lakhs in 2018-19
Other information	<ul style="list-style-type: none"> • Tariff Collection efficiency : 20% • Treatment plant : DPR under preparations



4.4 Municipal Finance of Lalsot Nagar Palika

Table 5 Lalsot Municipal Budget - Income & Expenditure

Sl. No.	Description	2018-19 (in lakhs)	2019-20 (in lakhs)
1.	Total Expenditure	1899	1802
2.	Total Income	1726	1529
3.	Grant under SBM Program	100	94

Source: ULB

It is evident from reviewing the financials summary table of both year 2018 and 2019, the financial health of Lalsot municipality is not adequate. The fund receive from SBM are largely used in cleaning and construction of new community and public toilet. Although sanitation (both liquid and solid waste) management is core service of ULB, it involves a continues CAPEX and recurring OPEX cost to maintain the system vis-à-vis. for smooth services. This also indicates towards need of more financially sustainable system as to off-load (full/partially) to Lalsot municipality. The current financial year of 2020-21 has been even difficult for ULB as significant cost head has gone into COVID-19 preventions and management measure and this has put even bigger stain on financial health of municipal system.

4.5 Assessment of Sanitation Systems through CWIS Framework

City Wide Inclusive Sanitation (CWIS) focuses on promoting approaches to ensuring everyone in an urban area is served by safe, equitable and financially viable sanitation service systems. This means systems are designed to

reach the poor and to ensure human waste is safely managed along the whole sanitation service chain (safe containment to safe disposal/reuse). Equity, safety and sustainability are core CWIS outcomes whereas responsibility, accountability, resource planning, and management are core CWIS functions. The CWIS service framework identifies core outcomes and functions for public service delivery systems and includes both sewered and non-sewered part of town. Table below represent the existing sanitation situations of Lalsot municipality in alignment to the CWIS Framework.

Table 6 CWIS compliance of existing sanitation situations

CWIS Parameter Observations

Safety

- All HHs have access to Onsite Sanitation Systems
- The supernatant flow from septic tanks and greywater (kitchen and bath) from HHs are discharged into the open drains and ends up polluting the waterbodies increasing public health risks.
- Inadequate safety protocols mainly in solid waste management expose sanitation workers to various health risks during desludging operations
- Unscientific disposal of solid waste may impact overall area hygiene and microenvironment
- Desludging services are being taken care by recently set-up FSTP plants and trucks and safely being collected, disposed and treated at treatment unit

Equity

- In the town, all HHs have toilet containment/access
- HHs located in areas where road width is >3m are easily accessible to Desludging vehicles whereas HHs located along narrow streets (<3m) are not adequately served with desludging operations.
- Current service fee for desludging is same for all settlements in the town irrespective of the income and social status.
- Emphasis on equity among sanitation workers is not covered – aspects such as gender pay gap, involvement of women in decision-making for sanitation interventions.
- Similarly, service fees of solid waste system is same for all users (without factoring economic conditions of HHs)

Sustainability

- The current desludging operations are demand based
- Current desludging demand is approximately 20-25 Nos truck load per month with per round trip tariff of INR 1500/- for 3500 capacity truck and INR 1100/- for 1000-liter capacity trucks.
- There is no treatment by-product of solid waste and currently open disposal of mixed waste is in practice (site around 100 meter close by FSTP site)

Responsibility

- Municipality is responsible for sanitation, solid waste, and property tax collection system. There is no-sewerage system in town currently.
- Currently there is no service subsidy for marginalized and urban poor populations.
- For septage management, ULB appointed operators is performing desludging services by its truck and human-resource basis to request received at municipality.
- Similarly, for solid waste management, ULB appointed operator is performing the collection, transportation and disposal facility.

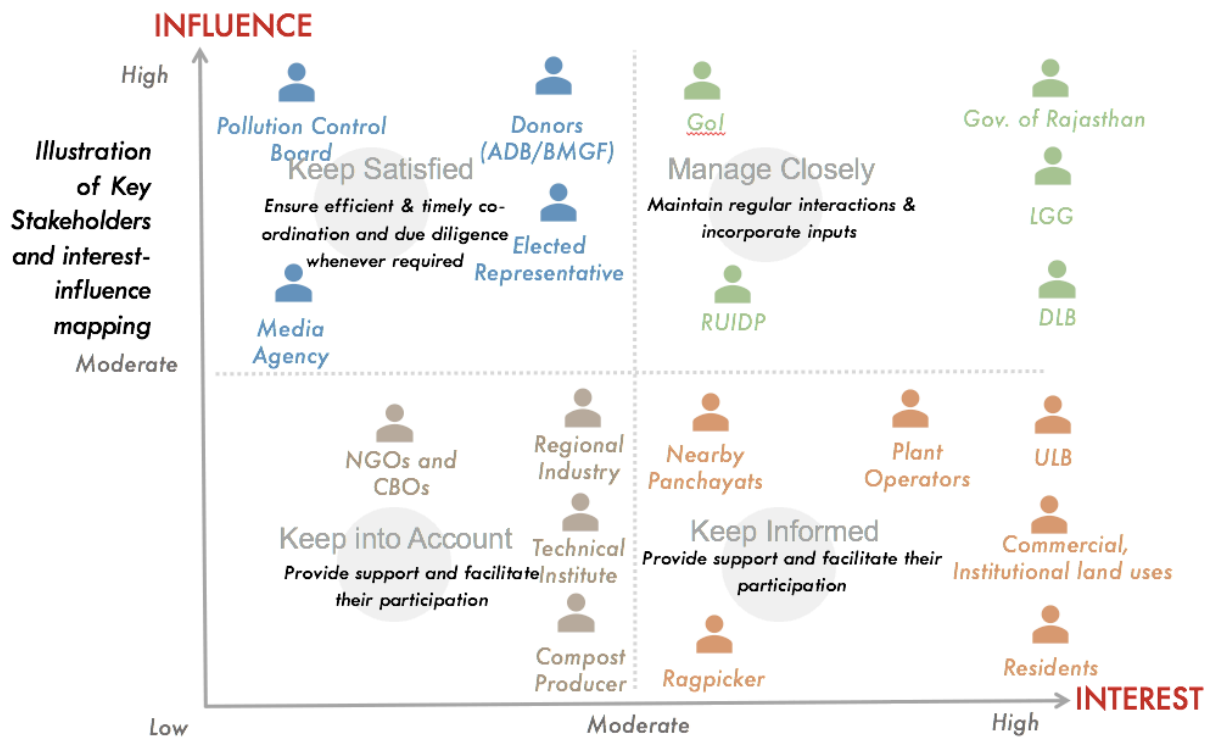
Accountability

- FS Operators keep the record of all desludging performed in logbook and also keep the duplicate copy of payment receipt. This amount gets deposited at ULB on monthly basis, basis to record of payment receipt.
- In case of solid waste management, the payment is collected by municipality and operators are directly paid by ULB basis to their fixed fees contractual arrangement.
- There is no existing KPI and incentive mechanism placed in any of municipal services.
- Accountability process is inclusive of customer and non-customer engagement, including marginalized voices. Customer grievance mechanisms are in place.

Resource Planning

- There are two sources of revenue for ULB. One is grant from state government and other is tax collection from own sources.
- Fund allocations are subject to approval of line department at state i.e., Department of Local Self Government and based on necessity and feasibility of project.
- Fund allocations are also linked with past performance of fund utilization.

4.6 Stakeholder – Interest and Influence Matrix



The mapping has been developed basis to understanding of role of each relevant stakeholders in research project domain and accordingly positioning of their interest and impact has been placed.

Executive Officer (Seema Chaudhary)

Solid waste trucks can dump organic waste of mandi at plant and initiate manure productions. However, will need help in plan preparations and initial technical support in operations.

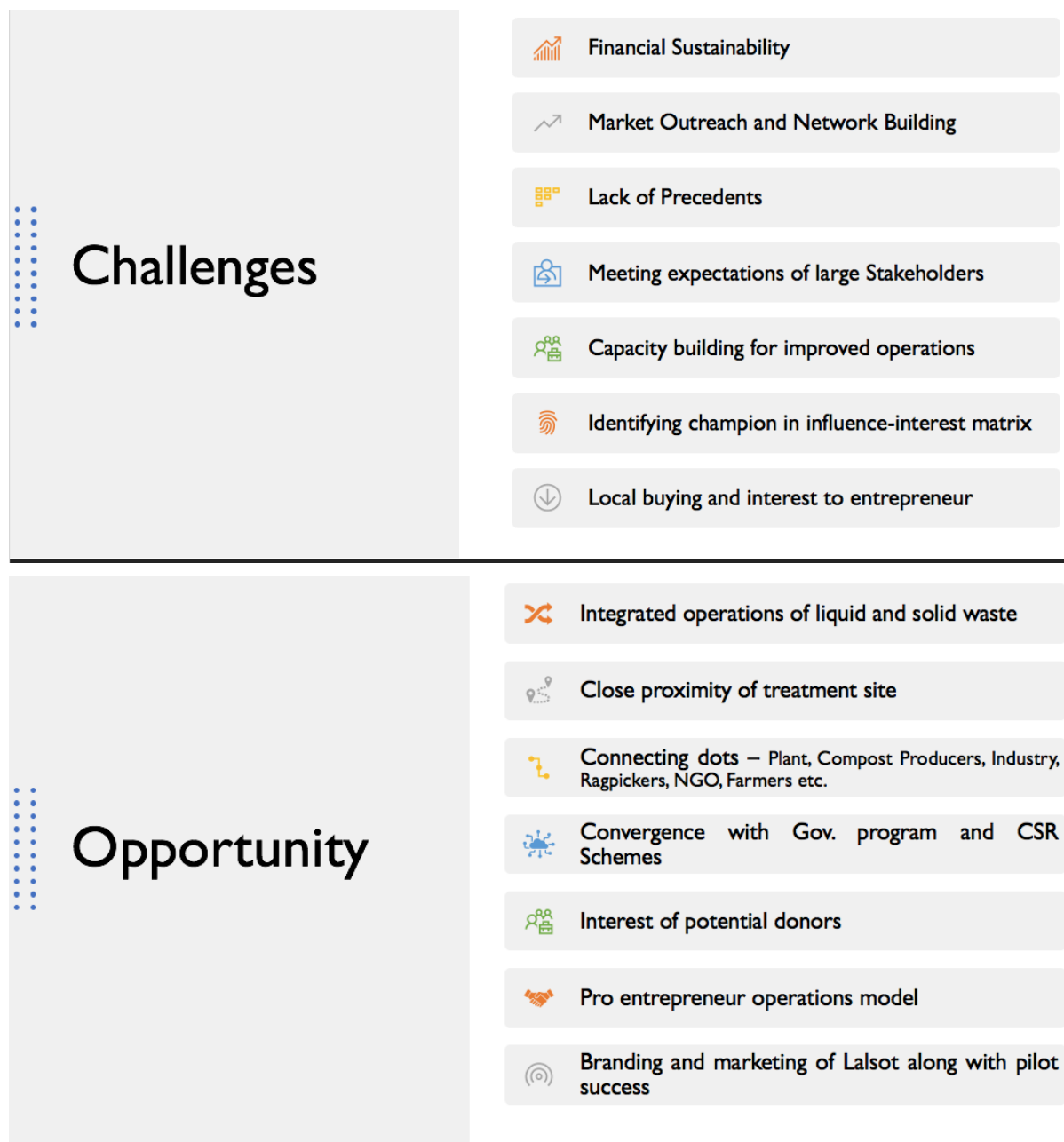
Sanitary Inspector (Banwarilal Bairwa)

Both FSM and Solid waste management have operational challenges and connected mainly to household. Dumping yard proximity to FSTP may help towards integrations.

Chairman (Raksha Mishra)

We have become the 1st municipality in Rajasthan with operational FSTP. GoR is committed to provide all required support to further improve the sanitation situation in Lalsot and become the model town.

4.7 Challenges and Opportunity



5. Concept Outline of Sanitation Reforms

The proposed intervention in identified pilot will have five key stages as part of this research project and next stage of report will capture all five stages in detailed manner. The concept has been detailed out here for broad understanding.

Stage 1: Market Sizing

The overall sanitation industry of Lalsot (both town specific and in regional context) needs to be worked out to understand the overall business potential.

Stage 2: Identifying and Ranking of Key Market Contributor /Segmentation

All existing market players (mainly the entrepreneur) will be identified and based on their proportionate share in existing market their ranking, vis-à-vis. sectoral ranking will be undertaken to understand the existing market engagement and gaps for opportunity area.

Stage 3: Baseline and Potential Trajectory

Existing baseline of market groups including compost, scrap/recycling industry, treated wastewater both in terms of market demand, current and estimated supply (post interventions) will be worked out to understand the market attractiveness to customize the business propositions accordingly.

Stage 4: Mapping of funds Contributors

The existing program and schemes including SBM 2.0, 15TH FC and other related will be mapped components wise to have 1st level of Gov. contributions known in beginning. Further ranking of CSR players will be also undertaken to further gauge the understanding of potential interest. MP, MLA, LAD funds can be also explored to see possible scope of contributions. Furthermore, donors like ADB, BMGF, US-Aid, World Bank will be some of donor's groups and detail list of such players with contract channel will be developed.

Stage 5: Financial modelling of proposed interventions

All CAPEX and OPEX elements including details of revenue stream with adequate assumptions will be detailed out for next 15 years project cycle in financial model. IRR, NPV and yearly RoI will be identified to understand the business potential of proposed interventions.

Stage 6: Project Implementation Packaging/Structuring

Project structure clearly highlighting players for running the proposed operations and their contractual terms and condition. Payment terms and other key obligation such as incentive, penalty, any revenue share with ULB etc. will be also detailed out.

Stage 7: Market Pitch and feedback from potential contributors and entrepreneurs

The detailed findings with concept proposal may be also shared with potential contributors. Feedback from entrepreneurs will be taken to gauge their interest and further to incorporate any improvement/suggestions.

Stage 8: Launch action plan and share with potential investors, key stakeholders

Action plan for implementation with detail of each steps, action area and responsibility matrix will be developed to work as 'primer' for any other cities/town to adopt/replicate this model. Key stakeholder feedback/consultation will be reflected in testimony section.

5.2 Market Sizing

Table 7 Lalsot sanitation market size 2019

Particulars	Details
Population (2020)	45319
Per capita waste generations	0.4 Kg
Total Volume	18127.6
Bio-degradable Waste Share	51%
Total Bio-degradable Waste Volume	9245
Addition of bio-solid, agriculture residue and animal waste	40%
Waste volume reductions in composting	40%
Total market sell produces annually	2958424
Total market size of municipal compost waste/year (INR 7 /Kg)	20708970
Recyclable Volume (with manual segregations)	20%
Total market sells of recycling produced annually (INR 10/Kg)	1160166.4
Total market size of recycling waste of town	11601664

Total market size of municipal solid waste and FSTP process output (INR)	32310634 (i.e., 3.23 Cr Annual)
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This is only from Government operations and there are plenty of private composting company operating in and around District (largely based on source as farming and animal waste). Considering presence of agriculture field and soil fertility being core issues in large parts of land footprints of Rajasthan, the market opportunity of organic compost is huge and currently growing with exponential trends. This market size in case utilize even 60-70% of current potential of Lalsot nagar Palika, this would be able to recover on operational cost of both solid and liquid waste management of city.

5.3 Identifying of Key Market Contributor /Segmentation

Table 8 List of operating compost vendors nearby Lalsot town

Sl. No.	Name of Vendor	Contact Details	Location	Address
1	Jaipur Bio Fertilizers	0141 402 0690	Jaipur	J-71, Ashok Chowk, Adarsh Nagar, Jaipur, Rajasthan 302004
2	Vermicompost Organic fertilizer manufacturer	076100 09787	Jaipur	80 Feet Rd, Ram Nagar, Dada Gurudev Nagar, Sanganer, Jaipur, Rajasthan 302029
3	Shri Organic Farming	0141 403 3970	Jaipur	S.A. 306, Jai Givind Complex, Kahazana Walon, Ka Rasta, near Indira Bazar, Jaipur, Rajasthan 302001
4	Disha Organic Science Tech Industries	089551 19999	Jaipur	Manglam Vihar-D Rd, Shankar Vihar Extension, Jamna Puri, Jaipur, Rajasthan 302013
5	AVT Organic Agro Park Hi-Tech Agriculture Products	080 4535 3724	Jaipur	14 K, Shri Ramnagar Vistar, 100 Feet Road, Jan Path, Jhotwara, Jaipur, Rajasthan 302012
6	Sagra Organic products	090131 47722	Jaipur	Dhundhla Krishi Farm, Vill & Po - Sujat Nagar, Tehsil - Kotputli, Distt, Jaipur, Rajasthan 303107
7	V. R. Brothers	094140 44831	Jaipur	Surajpole Anaj Mandi, Shop No.B15, Near, Transport Nagar, Jaipur, Rajasthan 302003
8	Gardenia Nursery	093146 44693	Alwar	Opposite Jai Paltan Officers Quarters, Chetan Enclave, Alwar - Jaipur Rd, near Old Bhura Sidh Hanuman Temple, Mandir, Alwar, Rajasthan 301001
9	Vinayak Nursery	089520 21604	Jaipur	01, Officers Campus Extension, Hanuman Nagar Extension, Anand Nagar, Jaipur, Rajasthan 302012
10	Mahadev green nursery	098283 59940	Jaipur	village: bagwara, teh, Amer, Jaipur, Rajasthan 303805
11	Sovam crop Science Pvt. Ltd	080 4857 3658	Jaipur	C143A, RIICO Housing Colony, Rd Number - 1D, Vishwakarma Industrial Area, nagar, Jaipur, Rajasthan 302023
12	Terra Agro Biotech Pvt Ltd	0141 235 7442	Jaipur	620, Vaibhav Tower Amrapali Circle, Vaishali Nagar, Jaipur, Rajasthan 302021
13	International Institute Of Advanced Agriculture Skill Development (IIAASD)	083291 99541	Jaipur	Goshala, IIAASD, Pinjara Pole, Tonk Rd, Sanganer, Jaipur, Rajasthan 302030
14	Hahnemann Charitable Mission Society	098875 55005	Jaipur	J-890, Tonk Rd, Sitapura Industrial Area, Sitapura, Jaipur, Rajasthan 302022

Sl. No.	Name of Vendor	Contact Details	Location	Address
1	R3Greens	093149 35972	Jaipur	49, Vidyut Abhiyanta Colony, Malviya Nagar, Jaipur, Rajasthan 302017
2	ZeroWaste Recycling Private Limited	0141 659 5090	Jaipur	147, Ajmer Rd, Heera Nagar, Tagore Nagar, Jaipur, Rajasthan 302024
3	clethin kiosk		Jaipur	Tagore Lane, Mansarovar Sector 7, Shipra Path, Barh Devariya, Mansarovar, Jaipur, Rajasthan 302020
4	RECYCLEX ENVIROTECH	072310 11555	Jaipur	G-1/45, Sitapura Industrial Area, Sitapura, Jaipur, Rajasthan 302018
5	PWL RECYCLING		Jaipur	F-142, Sirsi Rd, RIICO Industrial Area, Bindayaka, Jaipur, Rajasthan 302012
6	Prithvi Group- Pyrolysis Plant Manufacturer		Jaipur	S-2,189 Shiv Nagar A,Kalwar Road, Jhotwara,Jaipur, Jaipur, Rajasthan 302012
7	Reathon Consulting	1800 102 0664	Jaipur	201, Amrapali Marg, Block E, Vaishali Nagar, Jaipur, Rajasthan 302021
8	HG Overseas	0141 510 8854	Jaipur	B-48, Tulip Enclave, A-14, near Time Square, Central Spine, Vidyadhar Nagar, Jaipur, Rajasthan 302039
9	Shri Krishna Additives Pvt Ltd	096949 39279	Jaipur	Plot no. F, 105, Matsya Industrial Area, Alwar, Rajasthan 301030
10	Gravita India Limited	0141 405 7700	Jaipur	A-27B, Gravita Tower, Shanti Path, Tilak Nagar, Jaipur, Rajasthan 302004
11	Yjunk	095212 11177	Jaipur	62, Rajat Path, Narayan Pura, Mansarovar Sector 6, Mansarovar, Jaipur, Rajasthan 302020
12	Aar Pee Paper Industry	080 4275 3277	Jaipur	411, Sarna Dungar Indusrrial Area, Extension, Jhotwara, Jaipur, Rajasthan 302012
13	Malawalas	096805 74304	Jaipur	104, First floor, Evershine Tower, Vaishali Nagar, Jaipur, Rajasthan 302021
14	Parc Profile Technology Pvt Ltd	0141 265 3823	Jaipur	4 Ka 14, Sector 4, Jawahar Nagar, Jaipur, Rajasthan 302004

Sl. No.	Name of Vendor	Contact Details	Location	Address
15	Etco E-Waste Recycler Pvt Ltd	080055 87883	Jaipur	
16	Bijson Innovations Pvt. Ltd. Jaipur	082333 33000	Jaipur	3rd Floor, Tilak Bhawan Opposite Udyog Bhawan, 5A Tilak Marg, C-Scheme, Jaipur(Rajasthan) Pin- 302001, Jaipur, Rajasthan 302001
17	Harish Scrap Dealer	095714 00817	Jaipur	92, Amer Rd, Amer, Devisinghpura, Amer Rd, Devisinghpura, Amer, Jaipur, Rajasthan 302028

5.4 Baseline and Potential Trajectory

Table 9 System baseline and potential trajectory

Sl. No	Indicator	Baseline	Potential
1.	Segregations of municipal waste	0%	90%
2.	Co-compost produced from produced sludge	5%	100%
3.	Recyclable uses for business	0%	100%
4.	Re-use of treated wastewater	30%	100%

By involving private operators in more kind of incentive model of initial years with limited liability (both financial and service operations) to ULB and letting them pursue on business interest of their own while adhering to all relevant rules and regulations. The benefits to government here would-be part of their service hassle like recycling, segregations and re-use of waste (both solid and liquid) are being taken care by private players and port performance observations of initials years, municipality may come up with revenue share model after initial years of successful operations.

5.5. Mapping of funds Contributors

The existing program and schemes including SBM 2.0, 15TH FC and other related will be mapped components wise to have 1st level of Gov. contributions known in beginning. Further listing of CSR players actively engaged in Rajasthan state will be also undertaken to further gauge the understanding of potential interest. MP, MLA, LAD funds can be also explored to see possible scope of contributions. Furthermore, donors like ADB, BMGF, US-Aid, World Bank will be potential groups and detail list of such players has been included in table 10 below.

Table 10 Mapping of fund contributors (other than government sources) from potential sources in Rajasthan

S No.	Organisation	Role
1	USAID	Outcome Funder
2	Tata Trusts	Outcome Funder
3	BMGF	Outcome Funder
4	WaterAid	Implimentation / TA
5	WASHfunders	Outcome Funder
6	The Stone Family Foundation	Outcome Funder
7	Ondiyar Network	Risk Investor
8	Aga Khan Foundation	Outcome Funder
9	FCDO (formerly UK Aid/ DFID)	Outcome Funder
10	SBI Foundation	Outcome Funder
11	Global Partnership for Results-Based Approaches	Outcome Funder
12	NTPC	CSR
13	L&T	CSR

S No.	Organisation	Role
14	Bajaj Auto	CSR
15	ITC	CSR
16	ICICI Foundation	CSR
17	Wipro Ltd	CSR
18	REC Limited	CSR
19	Infosys Limited	CSR
20	Power Grid Corporation of India Ltd	CSR
21	Hero Motocorp Ltd	CSR
22	Tata Steel Ltd	CSR
23	Axis Bank Foundation	CSR
24	Reliance Industries Ltd.	CSR
25	NLC India Limited.	CSR
26	UNDP	Outcome Funder
27	JICA	Outcome Funder
28	Ford Foundation	Outcome Funder
29	The Rockefeller Foundation	Outcome Funder
30	IFC	Investor
31	Acumen Fund	Investor
32	Aavishkar	Investor
33	LGT Venture Philanthropy	Investor

5.6 Financial modelling of proposed interventions

This section has been developed with an objective of understanding a business potentials and attractiveness of municipal integrated waste management system. This would also help to generate key inferences as strategy for municipality to adopt to improve upon PPP based partnership in waste management services. The OPEX has been factored as part of financial viability and CAPEX has not been considered. This is largely because factoring CAPEX of entire set-up will not be able to make the system financially sustainable. The larger issues in municipal solid waste management services are recurring OPEX with limited financial support from state. At Gol level and further several states have already adopted the model of operational cost recovering of municipal services from local level resources and there are trends of discouragement in providing financial support from state on requirement of operational expenditure of municipal services. Following considerations have been factored while developing financial model:

1. Population projection of approved FSTP DPR has been considered for calculation.
2. Existing tariff of both liquid and solid waste with current desludging frequency and tariff collection efficiency has been considered.
3. There are two scenario generation – one when private operator has to handle the complete solid and liquid waste management whereas second option where private operators are only involved in activity with high scope of financial return and on rest of service, they are being paid by municipality vis-à-vis. provided services.
4. Scenario terms and year of offering has been back calculated from model and accordingly tariff has been arrived.

Output/key findings from financial model:

1. Under Scenario 1, private operators taking care of entire solid waste management and liquid waste management from 1st day of operations. This includes investing in required CAPEX and human resource for setting of composting and recycling facility. From financial model, it is prevalent that around 7% negative IRR coming in 15 years of project cycle.
2. Under scenario 2, private operators taking care of entire operators but only paying for composting and recycling in initial three years and then subsequently taking cost share of city solid liquid waste management services, starting from 40% to 100% at the end of year 2035. This from financial model becomes very attractive proposition for entrepreneurs and giving huge IRR in this operation. In this case private operators taking care of all the cost involved in his core business operations.

3. Estimations has been done on taking conservative scenario both in terms of tariff collection efficiency starting from 20% with 2 % annual increase and potential capture in compost and recycling and reaching up-to 40% at end of project durations.
4. An CAPEX investment of INR 2 Cr has been considered/calculated on behalf of operators with 100% loan financing (@11% interest rate) and payable periods of 13 years in total. This is primarily for setting of composting and recycling unit by private operators.
5. In both financial model scenario, existing trends of poor collection efficiency has been factored. However monthly collection efficiency increases of 2% in both solid and liquid waste management has also been included. Monthly collection of solid and liquid waste management is the long term and sustainable solutions to improve upon the service delivery of sanitation system and thus a more preferable option.
6. Sanitation is one of core responsibility of ULB under 74th municipality amendment rule and considered as public service infrastructure. Although PPP based model is essential to efficiently manage and improve on system response time, but Gov. should not hesitate in contributing sanitation system improvement and should largely work towards betterment and smooth running of entire sanitation operations.
7. This model has not gone into integrity of integrations of solid and liquid waste management other than composting services. However, a next version of study can be conducted for detail mapping of all system integration components and factor the financial implications in financial model accordingly.

Detailed calculation of numbers and break-ups are enclosed separately in annexure 1

5.7 Project Implementation Packaging/Structuring

Project packaging of both scenarios are details in table below:

Table 11 Options analysis of project intervention scenarios

Project Packaging	Options 1	Option 2	Remarks
Service Accountability	Operators taking care of entire services of sanitation value chain for both liquid and solid waste management. Additionally, also involved in both composting and recycling industry business with his own equipment and human resource set-up.	Operators taking care of entire services of sanitation value chain for both liquid and solid waste management. Additionally, also involved in both composting and recycling industry business with his own equipment and human resource set-up.	There is no difference in service accountability of both the options.
Financial Accountability	Operators taking care of entire operations expenditure including regular and routine maintenance of system for 15 years of project operations.	Operators taking care of only recycling and composting units of business and rest operations with financial support from ULB. Operators financial contributions starts from 4 th years of services with 40% overall OPEX contributions with 5% annual increase.	Option 2 will help to eventually reduce and completely remove any financial burden of sanitation services. However, option1 target this from day 1 of operations.
Pros	Remove financial burden from day 1.	Gradually reduce the financial burden on ULB and within 8 years, remove this completely.	Sanitation should not be considered for ULB for profit making opportunity and rather should attempt for no profit and no loss in long run. System should encourage private
Cons	Not very attractive to private players as financial risk is higher.	ULB still would need to invest money in sanitation services for initial years	
Opportunity	Initial set-up is transferred from ULB to operators.	Initial set-up is transferred from ULB to operators.	

Project Packaging	Options 1	Option 2	Remarks
	Tariff collections system are likely to get improved being shared interest of private players	Town system can be clubbed for larger tender at regional levels.	sectors to untap the immense opportunity area and explore all means of revenue generations (within regulations)
	More wider options for existing system improvement	CSR can come as gap fillers of initial years fund requirement on behalf of ULB.	

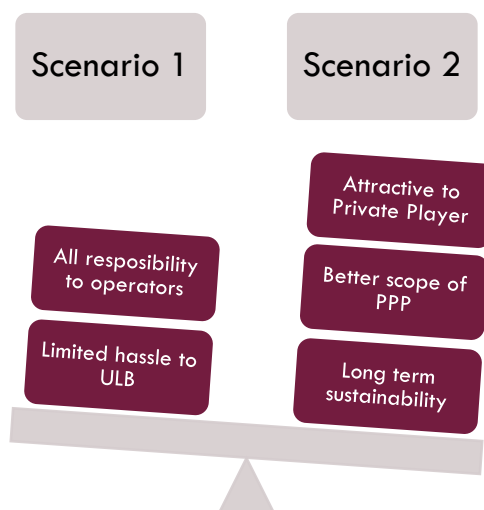


Figure 7 Scenario Comparison of Integrated Waste Management potential contributors and focus on entrepreneurs

Structured consultation with at least 10-15 players of both composting and recycling industry of in and around project towns needs to be undertaken, followed by combined meeting with ULB financial. This help to understand and accept the potential intervention domain to ULB and encourage to roll out such involving sanitation business opportunity for local entrepreneurs. Basis to feedback and suggestion received at town level meeting, this can further be discussed at state level with larger group for an attempt to embedding such interesting inputs as part of state level relevant policy document. This attempt should try to at-least roll out one such tender opportunity on basis of interested private entrepreneurs' availability. State level discussion will also encourage more such opportunity area to shape reality in various other town of Rajasthan. It is suggested to appoint a technical consultant to engage constantly in market outreach and develop a detailed financial and operations plan, including bidding document basis to concept outline highlighted as part of this research document. Further to entrepreneurs, CSR players can also be contacted to make them understand the concept potential and invite them as VGF for options 2 of model. CSR may also have additional role of capacity building and exposure visits to both private operators and ULB officials to understand and learn the other best practices and suitably incorporate in the project town.

5.9 Launch action plan and share with potential investors, key stakeholders

As part of launch plan, the consultants with local entrepreneurs will participate in town level workshop and do a brainstorming on proposed concepts and project options. Once the consultation is completed at town level, ULB will endorse a state level meeting DLB (Directorate of local body, Rajasthan) for both technical and bid process management support. State officials based on their understanding of potential and replications, may call state closed group meeting with range of participants from entrepreneurs, CSR players, ULB and donors. Further to understanding developed, for facilitating such development in all FSTP town (and or other towns), a consultant can be engaged for bid process management and facilitate handholding on successful launch of pre-entrepreneur set-up in all identified pilot towns.



Figure 8 Pilot launch steps and understanding

6. Conclusion and learning application

Sanitation (both liquid and solid waste) being one of core service responsibility area of ULB, has significant role in smooth functioning of urban services and maintain the local environment and overall hygiene of towns. Although there are adequate funding and schemes provision under SBM, the impact in small and medium towns of Rajasthan has largely been limited in collection, transportation and disposal of both liquid and solid waste management.

Operations sustainability of system (mainly financial) has key role to play in setting of such services. On



other hand, there are good number of local entrepreneurs working in domain of sanitation, in particularly composting and recycling industry. The opportunity here to bridge this linkage and perceive solid waste and FSM as integrated options of ILSWM in true sense. Further the operations to be driven by local entrepreneurs without adding much of revenue sharing load in initial years of operations with Government. This research project is an attempt to highlight all these gaps and explore a way to connect the confirming dots of FSM and Solid waste through market expertise of local entrepreneurs. The key findings of research study and

possible scope of replications are summaries as follows:

- I. **Integrated system operations of solid and liquid waste in small and medium towns**
Infrastructure, equipment, human-resource and system out product all have options of integrations and further improving upon overall efficiency and limiting both CAPEX and OPEX of operations. Integrated solid and liquid waste management needs to take as reality across sanitation value chain.
- II. **Local entrepreneurs driven operations of waste management**
In order to attain system efficiency, financial sustainability and optimum resource utilization, system needs to be developed to encourage local entrepreneurs especially compost producer, scrap dealers and recyclable industry players to come on board and manage both city sanitation operations and untap the existing resource potential utilizations

- III. Sanitation is public service with core responsibility of ULB and should not hesitate in investing for system improvement and need to shift the focus from business mind-set**
Sanitation being core services of municipality and also remain prime responsibility of ULB as per 74th amendment to provide standard basic services to entire populations. This makes it more as service approach rather a business opportunity (at least for ULB perspective). However, waste to wealth without any saying a huge business opportunity especially for local entrepreneurs. The larger purpose of this research paper highlights the need of onboarding private local entrepreneurs especially those already into this relevant business domain and gradually reduce the operations cost to zero in the long run. Smooth system operations of integrated solid and liquid waste management without any financial load to ULB, would be a substantial achievement to attain and showcase this as huge success story.
- IV. Project sustainability in sanitation defines operations sustainability of system**
SBM 2.0 benefit like SBM 1.0 benefits needs to be fully availed by urban local body and thus all expected schemes benefit including funds for setting of infrastructures, capacity building and awareness sanctioned needs to utilize by towns. However, the larger issues would be operations sustainability of built systems and project efforts in smooth and long-term interrupted operations should the top priority in decision making.
- V. Capacity building and IEC should also include local potential entrepreneurs to get part of the municipal waste management system**
Existing capacity building and IEC program should also extend the catchment to local entrepreneurs. The need to make them understand the opportunity of being part of municipal waste management system and full supports by ULB on all related project dimension including financial support in case required viability gap funding.
- VI. CSR and other funding opportunity need to repackage as opportunity to push PPP (and other innovative financing) and more efficient operations to handle the city waste management system**
CSR players both at regional and state level needs to reach-out to showcase the impact funding opportunity with key focus on sustainable engagement to local entrepreneurs in integrated sanitation operations. These outreach program needs to be undertaken through high-level channels from state to catch hold the number of players and make them understand on the seriousness/commitment of planned sanitation interventions.

Annexure

Annexure I Financial Model Break-up

Table 12 Baseline information of Lalsot project town

Baseline Information					
Year	Projected Population ⁵	Residential ⁶	Urban poor households ⁷	Commercial	Large Institutions
2020	59896	11979	1797	958	8
2021	62090	12418	1863	993	8
2022	64443	12889	1933	1031	9
2023	66972	13394	2009	1072	9

⁵ Source: FSTP Lalsot, DPR

⁶ Estimated household size =5

⁷ Assumed urban poor 10%, commercial 8%, Institutions (source from FSTP Lalsot DPR)

2024	69697	13939	2091	1115	9
2025	72640	14528	2179	1162	10
2026	75828	15166	2275	1213	10
2027	79290	15858	2379	1269	11
2028	83061	16612	2492	1329	11
2029	87182	17436	2615	1395	12
2030	91700	18340	2751	1467	12
2031	96671	19334	2900	1547	13
2032	102161	20432	3065	1635	14
2033	108250	21650	3248	1732	14
2034	115032	23006	3451	1841	15
2035	122621	24524	3679	1962	16

Table 13 Project estimated cash outflow from overall operations

Cash Outflow					
Year	FSM ⁸	Solid Waste ⁹	Human-resource Cost for Sanitation Business ₁₀	Operators Investment (Paid Loan yearly) ¹¹	Total OPEX
2020	2500000	6500000	1350000	3850000	12850000
2021	2650000	6890000	1431000	4081000	13621000
2022	2809000	7303400	1516860	4325860	14438260
2023	2977540	7741604	1607872	4585412	15304556
2024	3156192	8206100	1704344	4860536	16222829
2025	3345564	8698466	1806605	5152168	17196199
2026	3546298	9220374	1915001	5461299	18227971
2027	3759076	9773597	2029901	5788976	19321649
2028	3984620	10360012	2151695	6136315	20480948
2029	4223697	10981613	2280797	6504494	21709805
2030	4477119	11640510	2417644	6894764	23012393
2031	4745746	12338941	2562703	7308449	24393136
2032	5030491	13079277	2716465	7746956	25856725
2033	5332321	13864034	2879453	0	19196354
2034	5652260	14695876	3052220	0	20348136
2035	5991395	15577628	3235354	0	21569024

Table 14 Project estimated cash inflow from solid waste tariff collection/year

⁸ Exiting FSTP and desludging operations including regular and periodic A&M

⁹ Source: ULB Lalsot, existing amount paid to solid waste management contractor

¹⁰ Estimated cost of human resource only assigned for composting and recycling work and paid by operators

¹¹ Estimated loan borrowing from bank for purchasing of equipment for operators to run composting and recycling. Loan pay-back period 13 years with annual interests' rate of 11% (100% borrowing)

Cash Inflow : Solid Waste Tariff Collection Per Year						
Year	From Residential users ¹²	From Urban Poor	From Commercial	From Institutions	Revenue from Tariff Collection	Revenue - varying collection Efficiency
2020	50	25	100	150	8891025	889102 ¹³
2021	54	27	14	165	635057	76207
2022	58	29	15	182	711878	99663
2023	63	31	16	200	799033	127845
2024	68	34	17	220	898105	161659
2025	73	37	18	242	1010959	202192
2026	79	40	20	266	1139798	250756
2027	86	43	21	292	1287241	308938
2028	93	46	23	322	1456405	378665
2029	100	50	25	354	1651026	462287
2030	108	54	27	389	1875599	562680
2031	117	58	29	428	2135560	683379
2032	126	63	31	471	2437519	828756
2033	136	68	34	518	2789559	1004241
2034	147	73	37	570	3201628	1216619
2035	159	79	40	627	3686045	1474418

Table 15 Project estimated cash inflow from FSM tariff collection/year

Cash Inflow : FSM Tariff Collection Per Year						
Year	Tariff from Residential users ¹⁴	Tariff from Urban Poor	Tariff from Commercial	Tariff from Institutions	Revenue from Tariff Collection	Revenue - varying collection Efficiency
2020	50	25	100	150	740919	74,092
2021	54	27	14	165	735642	88,277
2022	58	29	15	182	824627	1,15,448
2023	63	31	16	200	925581	1,48,093
2024	68	34	17	220	1040338	1,87,261
2025	73	37	18	242	1171057	2,34,211
2026	79	40	20	266	1320292	2,90,464
2027	86	43	21	292	1491074	3,57,858

¹² Proposed tariff is line with existing system. However differential tariff for urban poor with 50% rebate has been proposed to ensure inclusion.

¹³ Existing tariff collection efficiency has been factored for base year i.e., 2020 with annual improvement of 2%. This is a conservative scenario and with improved performance and continues awareness program, the tariff collection efficiency is expected to grow significantly in project life cycle.

¹⁴ Proposed FSM Tariff is based on consultation with both plant/truck operators and ULB officials. The differential tariff system has been proposed in town with subsidy offered for urban poor populations. With estimation that collection efficiency will start from 30% with tendency of schedule desludging in town with 6% increase annually.

2028	93	46	23	322	1687015	4,38,624
2029	100	50	25	354	1912441	5,35,484
2030	108	54	27	389	2172558	6,51,768
2031	117	58	29	428	2473662	7,91,572
2032	126	63	31	471	2823408	9,59,959
2033	136	68	34	518	3231160	11,63,217
2034	147	73	37	570	3708436	14,09,206
2035	159	79	40	627	4269505	17,07,802

Table 16 Cash Inflow : Revenue Mapping from Composting and Recycling Setup

Cash Inflow : Revenue Mapping from Composting and Recycling Setup				
Year	Compost Selling Annually ¹⁵	Recyclable Waste Selling Annually	Total Revenue from Waste Business	Total Revenue from Waste Business - Conservative
2020	2,73,70,269	1,53,33,484	4,27,03,753	1,70,81,501
2021	2,83,72,646	1,58,95,040	4,42,67,685	1,77,07,074
2022	2,94,47,745	1,64,97,336	4,59,45,081	1,83,78,032
2023	3,06,03,413	1,71,44,769	4,77,48,182	1,90,99,273
2024	3,18,48,612	1,78,42,360	4,96,90,972	1,98,76,389
2025	3,31,93,626	1,85,95,869	5,17,89,495	2,07,15,798
2026	3,46,50,293	1,94,11,929	5,40,62,222	2,16,24,889
2027	3,62,32,302	2,02,98,208	5,65,30,510	2,26,12,204
2028	3,79,55,546	2,12,63,611	5,92,19,157	2,36,87,663
2029	3,98,38,565	2,23,18,524	6,21,57,089	2,48,62,836
2030	4,19,03,087	2,34,75,119	6,53,78,206	2,61,51,282
2031	4,41,74,699	2,47,47,731	6,89,22,429	2,75,68,972
2032	4,66,83,693	2,61,53,330	7,28,37,023	2,91,34,809
2033	4,94,66,125	2,77,12,115	7,71,78,240	3,08,71,296
2034	5,25,65,155	2,94,48,266	8,20,13,421	3,28,05,368
2035	5,60,32,754	3,13,90,899	8,74,23,653	3,49,69,461

Table 17 Project estimated cash outflow and cash in-flow summary statements

¹⁵ With assumption of 50% municipal waste volume as bio-degradable waste and 20% as recyclable waste (sourced from working research paper of solid waste management in India, ICRIER)

Cash Outflow and Cash In-flow Summary				
Year	Cash-Outflow	Cash In-flow		
		Revenue Factored from Tariff	Revenue factored from Waste Re-use	Total Revenue ¹⁶
2020	2,73,70,269	1,53,33,484	4,27,03,753	1,70,81,501
2021	2,83,72,646	1,58,95,040	4,42,67,685	1,77,07,074
2022	2,94,47,745	1,64,97,336	4,59,45,081	1,83,78,032
2023	3,06,03,413	1,71,44,769	4,77,48,182	1,90,99,273
2024	3,18,48,612	1,78,42,360	4,96,90,972	1,98,76,389
2025	3,31,93,626	1,85,95,869	5,17,89,495	2,07,15,798
2026	3,46,50,293	1,94,11,929	5,40,62,222	2,16,24,889
2027	3,62,32,302	2,02,98,208	5,65,30,510	2,26,12,204
2028	3,79,55,546	2,12,63,611	5,92,19,157	2,36,87,663
2029	3,98,38,565	2,23,18,524	6,21,57,089	2,48,62,836
2030	4,19,03,087	2,34,75,119	6,53,78,206	2,61,51,282
2031	4,41,74,699	2,47,47,731	6,89,22,429	2,75,68,972
2032	4,66,83,693	2,61,53,330	7,28,37,023	2,91,34,809
2033	4,94,66,125	2,77,12,115	7,71,78,240	3,08,71,296
2034	5,25,65,155	2,94,48,266	8,20,13,421	3,28,05,368
2035	5,60,32,754	3,13,90,899	8,74,23,653	3,49,69,461

Table 18 Project aggregate cash flow and scenarios of packaging

Aggregate Cash Flow – Two Scenario (IRR)		
Year	Scenario 1 ¹⁷	Scenario 2 ¹⁸
2020	2,73,70,269	1,53,33,484
2021	2,83,72,646	1,58,95,040
2022	2,94,47,745	1,64,97,336
2023	3,06,03,413	1,71,44,769
2024	3,18,48,612	1,78,42,360
2025	3,31,93,626	1,85,95,869
2026	3,46,50,293	1,94,11,929
2027	3,62,32,302	2,02,98,208
2028	3,79,55,546	2,12,63,611
2029	3,98,38,565	2,23,18,524

¹⁶ Only 40% of overall compost volume and recycle waste of total potential are being tapped (conservative scenario throughout the project cycle)

¹⁷ Scenario 1 indicates difference of net cash inflow to net cash out flow, factoring all heads of revenue and expenditure. In both the scenario expected income from other revenue stream (compost and recyclable) have been considered as 10% (of estimated potential) to start this in initial year and with increase of 2 % annually. This gives an result of overall negative IRR of 7%.

¹⁸ Scenario 2 only consider the net-income from recycling and compost business whereas expenditure of related heads i.e., human resource for this particular work and loan interest rate for borrowed capital. Other heads are all though managed by operators but actual operating expenses are paid by ULB for three years and then fourth year onwards 40% cost share of other heads with annual growth rate of 5% .

2030	4,19,03,087	2,34,75,119
2031	4,41,74,699	2,47,47,731
2032	4,66,83,693	2,61,53,330
2033	4,94,66,125	2,77,12,115
2034	5,25,65,155	2,94,48,266
2035	5,60,32,754	3,13,90,899
IRR	-7%	87%

Table 19 List of Vendors Producing Compost Waste in Rajasthan

Sl. No.	Name of Vendor	Contact Details	Location	Address
1	Priyanshi organic varmi compost khad		Jaipur	DHANI -BERALA VILLAGE-KAIRLY TEH. -VIRAT NAGAR, near OLD RAV HOTEL, Jaipur, Rajasthan 303119
2	Rajasthan organic farming	096949 45908	Udsar Lodera	Udsar Lodera, Rajasthan 331403
3	D. G. Organic Suppliers	090797 98213	Bikaner	Near R. T. O. Office, Gas Plant Road Bichhwal, N. H. d15, Sri Ganganagar Rd, Bichhwal, Bikaner, Rajasthan 334006
4	Jaipur Bio Fertilizers	0141 402 0690	Jaipur	J-71, Ashok Chowk, Adarsh Nagar, Jaipur, Rajasthan 302004
5	Vermicompost Organic fertilizer manufacturer	076100 09787	Jaipur	80 Feet Rd, Ram Nagar, Dada Gurudev Nagar, Sanganer, Jaipur, Rajasthan 302029
6	Shri Organic Farming	0141 403 3970	Jaipur	S.A. 306, Jai Givind Complex, Kahazana Walon, Ka Rasta, near Indira Bazar, Jaipur, Rajasthan 302001
7	Earth queen Vermi compost plus		Dharyawad	Hanuman Colony, Dharyawad, Rajasthan 313605
8	Organic Compost By Srishti Foundation		Rahori	Rahori, Rajasthan 302027
9	Disha Organic Science Tech Industries	089551 19999	Jaipur	Manglam Vihar-D Rd, Shankar Vihar Extension, Jamna Puri, Jaipur, Rajasthan 302013
10	Rhizo Organics		Hanumang arh	Industrial Area II, Hanumangarh, Rajasthan 335512
11	Vermeco Organics		Udaipur	7, Ashok Vihar, Sector 3, Near Jain Temple, Hiran Magri, Udaipur, Rajasthan 313002
12	Vandana Minerals		Kaklana	Kaklana, Rajasthan 305205
13	Mount Natural Fertilizer Ltd.	094600 90425	Beawar	Street No.- 6, Pratap Nagar, Beawar, Rajasthan 305901
14	Shree Aai Mata Khad Beej Bhandar	095716 37337	Pali	Keshav Nagar, Pali, Rajasthan 306401
15	Kalpataru Microns Industries	098280 51429	Amet	village gadrola, kelwa road, Amet, Amet, Rajasthan 313332
16	AVT Organic Agro Park Hi-Tech Agriculture Products	080 4535 3724	Jaipur	14 K, Shri Ramnagar Vistar, 100 Feet Road, Jan Path, Jhotwara, Jaipur, Rajasthan 302012
17	Khandelwal Agro	094141 80008	Kota	Plot No. B 253-A, Road Number 6, Indraprastha Industrial Area, near Bhamashah Mandi, Kota, Rajasthan 324005
18	Sagra Organic products	090131 47722	Jaipur	Dhundhla Krishi Farm , Vill &Po - Sujat Nagar, Tehsil - Kotputli, Distt, Jaipur, Rajasthan 303107
19	V. R. Brothers	094140 44831	Jaipur	Surajpole Anaj Mandi, Shop No.B15, Near, Transport Nagar, Jaipur, Rajasthan 302003

Sl. No.	Name of Vendor	Contact Details	Location	Address
20	Gardenia Nursery	093146 44693	Alwar	Opposite Jai Paltan Officers Quarters, Chetan Enclave, Alwar - Jaipur Rd, near Old Bhura Sidh Hanuman Temple, Mandir, Alwar, Rajasthan 301001
21	Shree Pathmeda Gau Amrit Bhandar	094133 57589	Bhopal Ganj	Textile House, Aazad Mohalla, Bhopal Ganj, near Srinath Stadium, Rajasthan 311001
22	Kedar Organic Farming Udaipur	098870 90610	Udaipur	Hiran Magri Main Rd, Mahaveer Colony, Sector 4, Gayariawas, Central Area, Udaipur, Rajasthan 313001
23	Vinayak Nursery	089520 21604	Jaipur	01, Officers Campus Extension, Hanuman Nagar Extension, Anand Nagar, Jaipur, Rajasthan 302012
24	BALAJI GOSHALA	094145 52370	Baran	Balaji Dungri Road, Chhipa Baroda, Baran, Rajasthan 325221
25	Mahadev green nursery	098283 59940	Jaipur	village: bagwara, teh, Amer, Jaipur, Rajasthan 303805
26	SRM Organic Fertilizers	077376 50998	Bikaner	83/985, Near Riico Industrial Area, Bikaner - Nagaur Rd, Nagaur, Rajasthan 341001
27	Ankush Khad Beej Bhandar Rampuriya	099506 65094	Chechi	Chechi, Rajasthan 312023
28	Sovam crop Science Pvt. Ltd	080 4857 3658	Jaipur	C143A,RIICO Housing Colony, Rd Number - 1D, Vishwakarma Industrial Area, nagar, Jaipur, Rajasthan 302023
29	Krishi Vigyan Kendra, Pali	02932 256 771	Pali	National Highway 65, Cazri Colony, Pali, Rajasthan 306401
30	Terra Agro Biotech Pvt Ltd	0141 235 7442	Jaipur	620, Vaibhav Tower Amrapali Circle, Vaishali Nagar, Jaipur, Rajasthan 302021
31	Gau Dairy	095495 43254	Kota	Gau Dairy Farm, Near Royal Sun City, Thekra, Borkhera, Kota, Rajasthan 324001
32	Maple Tree Nursery Balotra	094604 61308	Balotra	Pachpadra, Pawiya Road, near Gaman Shah Gargah Jarkheswar Mahadev Temple, Balotra, Rajasthan 344022
33	Tirupati Traders	094604 36931	Pratapgarh	NH 113, high secondary school road, Pratapgarh, Rajasthan 312605
34	Govindam Gir Cow Farm	095882 78173	Bassi	Near Dhani Kishna Patel Agra Road, Jatwara Rd, Bassi, Rajasthan 303305
35	International Institute Of Advanced Agriculture Skill Development (IIAASD)	083291 99541	Jaipur	Goshala, IIAASD, Pinjara Pole, Tonk Rd, Sanganer, Jaipur, Rajasthan 302030
36	Hahnemann Charitable Mission Society	098875 55005	Jaipur	J-890, Tonk Rd, Sitapura Industrial Area, Sitapura, Jaipur, Rajasthan 302022

Table 20 List of Vendors of Scrap Dealer/Recycling Industry in Rajasthan

Sl. No.	Name of Vendor	Contact Details	Location	Address
1	R3Greens	093149 35972	Jaipur	49, Vidyut Abhiyanta Colony, Malviya Nagar, Jaipur, Rajasthan 302017
2	ZeroWaste Recycling Private Limited	0141 659 5090	Jaipur	147, Ajmer Rd, Heera Nagar, Tagore Nagar, Jaipur, Rajasthan 302024

Sl. No.	Name of Vendor	Contact Details	Location	Address
3	Green Recycling Waste Management	099908 97350	Bhiwadi	J-983 RIICO Industrial Area Chopanki Gandhola, Bhiwadi, Rajasthan 301019
4	Greentech recycler		Bhiwadi	Plot no.F-18C, Phase-1, RIICO Industrial Area, Bhiwadi, Rajasthan 301019
5	clethin kiosk		Jaipur	Tagore Lane, Mansarovar Sector 7, Shipra Path, Barh Devariya, Mansarovar, Jaipur, Rajasthan 302020
6	Lalit Recycle Center		Buhana	Buhana, Rajasthan 333502
7	Useless paper disposal		Gokulpura	Bikaner Bypass Rd, Gokulpura, Rajasthan 332021
8	Anand Recycle Company		Roopangarh	Vinayak Colony, Roopangarh, Rajasthan 305814
9	Ultimate Plastic Works	081749 79531	Ramchandpura	Sitapura Industrial Area, Sitapura, Ramchandpura, Rajasthan 302022
10	Universal E-Waste Recycling Pvt. Ltd	0124 437 5804	Bhiwadi	G1-117(B), RIICO INDUSTRIAL AREA KHUSHKHERA, Bhiwadi, Rajasthan 301019
11	RECYCLEX ENVIROTECH	072310 11555	Jaipur	G-1/45, Sitapura Industrial Area, Sitapura, Jaipur, Rajasthan 302018
12	GreenTekh	095401 71448	Bhiwadi	G-1-201 Phase-Kahrani, RIICO Industrial Area, Bhiwadi, Rajasthan 382001
13	PWL RECYCLING		Jaipur	F-142, Sirsi Rd, RIICO Industrial Area, Bindayaka, Jaipur, Rajasthan 302012
14	Prithvi Group- Pyrolysis Plant Manufacturer		Jaipur	S-2,189 Shiv Nagar A,Kalwar Road, Jhotwara,Jaipur, Jaipur, Rajasthan 302012
15	Garbage area		Jaipur	
16	GRWM Pvt. Ltd	082878 29246	Bhiwadi	Plot No- J-983 RIICO Industrial Area, Bhiwadi - Chopanki Rd, Rajasthan 301019
17	Kay Bee Batteries Pvt. Ltd.		Bhiwadi	G1/573, Distt, Phase-1, RIICO Industrial Area, Bhiwadi, Rajasthan 301019
18	Mahak Disposal	0141 256 9178	Bhiwadi	3rd Crossing, Near Swetamber School, Ghee Walon Ka Rasta, 3rd Crossing, Near Swetamber School, Ghee Walon Ka Rasta, Badi Choper, Johari Bazar, Jaipur, Rajasthan 302003
19	Abaad Developers Pvt.Ltd.		Bhiwadi	G1, 747, Bhiwadi - Chopanki Rd, RIICO Industrial Area, Bhiwadi, Rajasthan 301018
20	Adatte E-Waste Management Private Limited (Factory)	097899 78420	Bhiwadi	F-120, Karoli Industrial Area Tapukara, extension, Bhiwadi, Rajasthan 301707
21	Hm Waste Management Pvt Ltd.	099998 29601	Shahjahanpur Distt, Neemrana	H1-137H RIICO INDLAREA SHAHJAHANPUR DISTT, Neemrana, Rajasthan 301706
22	City Dumping Yard		Jorbeer Rural	named Road, Jorbeer Rural, Rajasthan 334001
23	V.P Plastics	085277 19493	Khushkhera	Plot No. G-1 167 B/1, Haryana, Khushkhera, 301707
24	Reathon Consulting	1800 102 0664	Jaipur	201, Amrapali Marg, Block E, Vaishali Nagar, Jaipur, Rajasthan 302021
25	Hari plastics	092511 69433	Khushkhera	Khushkhera, Rajasthan 301707

Sl. No.	Name of Vendor	Contact Details	Location	Address
26	HG Overseas	0141 510 8854	Jaipur	B-48, Tulip Enclave, A-14, near Time Square, Central Spine, Vidyadhar Nagar, Jaipur, Rajasthan 302039
27	Dumping yard kishangarh	01463 250 327	Kishangarh	Paryavaran 2nd Rd, RICCO Industrial Area, Kishangarh, Rajasthan 305801
28	Shri Krishna Additives Pvt Ltd	096949 39279	Jaipur	Plot no. F, 105, Matsya Industrial Area, Alwar, Rajasthan 301030
29	MIDSSE	085609 60860	Gangapur	near railway malgodam,nursing colony,gangapur city, Gangapur, Rajasthan 322201
30	Gravita India Limited	0141 405 7700	Jaipur	A-27B, Gravita Tower, Shanti Path, Tilak Nagar, Jaipur, Rajasthan 302004
31	Yjunk	095212 11177	Jaipur	62, Rajat Path, Narayan Pura, Mansarovar Sector 6, Mansarovar, Jaipur, Rajasthan 302020
32	Aar Pee Paper Industry	080 4275 3277	Jaipur	411, Sarna Dungar Industrial Area, Extension, Jhotwara, Jaipur, Rajasthan 302012
33	Malawalas	096805 74304	Jaipur	104, First floor, Evershine Tower, Vaishali Nagar, Jaipur, Rajasthan 302021
34	Parc Profile Technology Pvt Ltd	0141 265 3823	Jaipur	4 Ka 14, Sector 4, Jawahar Nagar, Jaipur, Rajasthan 302004
35	Bkg Metal Recycling	063763 37500	VK Industrial Area	No-735C, Road No. 9FC VK Industrial Area, Rajasthan 302013
36	Etco E-Waste Recycler Pvt Ltd	080055 87883	Jaipur	
37	Scrap Udaipur (K.K. Scrap Service)	099281 55486	Udaipur	BAPPA RAWAL NAGAR HIRAN MANGRI SECTOR 6, Udaipur, Rajasthan 313001
38	Bijson Innovations Pvt. Ltd. Jaipur	082333 33000	Jaipur	3rd Floor, Tilak Bhawan Opposite Udyog Bhawan, 5A Tilak Marg, C-Scheme, Jaipur(Rajasthan) Pin- 302001, Jaipur, Rajasthan 302001
39	Jai Maa Bhawani Scrap Center	097993 55856	Jodhur	Baba Ramdev Rd, Opposite New Banjara Tent House, Masuria Colony, Masuria, Baldev Nagar, Jodhpur, Rajasthan 342003
40	SCRAP UDAIPUR (K.K. SCRAP SERVICE)	099281 55486	Udaipur	BAPPA RAWAL NAGAR HIRAN MANGRI SECTOR 6, Udaipur, Rajasthan 313001
41	Harish Scrap Dealer	095714 00817	Jaipur	92, Amer Rd, Amer, Devisinghpura, Amer Rd, Devisinghpura, Amer, Jaipur, Rajasthan 302028

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