Climate resilient waste management services for small and medium towns in India

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CWAS leading Gujarat cities towards citywide, climate-resilient waste management service

Becharaji Municipal Council

Mansa Municipal Council

Viramgam Municipal Council

Category	Shortlisted towns
Medium town (50,000- 1,00,000)	Viramgam
Small town (20,000- 50,000)	Mansa
Small town (20,000- 50,000)	Becharaji (former census town)

Framework and Approach of Assessment

Climate risk ,hazardous ,vulnerability assessment

Water supply and resource management

Waste management services (solid and liquid)

Community Engagement &Behavioral change

Policy Institutional Finance, Governance and regulatory

Accessibility I Quantity I Quality I Reliability I Affordability I Effectiveness I Efficiency

Climate Resilient waste management action plan (Mitigation and adaptation)

Preparation of assessment plan :
Context of city- climate resilience, vulnerability and risk
Water, Sanitation and Solid waste management services
Lake Management
Institutional Structure , Finance and Governance

Preparation of **Climate resilient waste management action plan**

Implementation of activities

Current scenario of Solid Waste Management services in the three small and medium towns of India

Source Segregation

- Waste segregation at source a challenge
- Low stakeholder awareness leading to mix waste generation.

Collection

- Good coverage ~90% of door to door collection, but Irregular and inconsistent services.
- Weak accountability and monitoring affect D2D contract performance.
- GVP formations observed due to irregulated D2D and shortalls
- GVPs around water bodies of city and waste burning releases greenhouse gases (GHGs) and air& water pollutants.

Waste Processing & Treatment

- Processing facilities exist in Viramgam, however non-functional as MRFs is not designed as per local waste characterizations.
- Utilization of all facilities lead to higher energy consumption.
- Capacity gaps are observed among private waste operators.

Recycle/ Reuse

- Informal recycling is active, indicating scope for formal recycling systems.
- Processed products with low quality leading to less recycling
- Functional C&D waste facilities are limited, and reuse demand is low.

Current scenario of sanitation services in the three small and medium towns of India

User interface

- Good coverage of individual toilets in all three cities along with vulnerable area.
- Lack of maintenance of Public Toilets

Conveyance & Collection

- 70-80% city is covered with sewage network ,20-30%- Dependency on septic tanks/ pits Poor stormwater drain design causes waterlogging during monsoon.
- Lack for monitoring on the Direct discharge of wastewater into lakes and nearby water bodies in vulnerable area
- Monitoring of desludging services are absent.

Treatment

- Functional STP SCADA which in build by in all three city's managed by GWSSB.
- Funding for operations can be a challenge due to high energy bills
- Underperforming SCADA limits data-based decision-making

Reuse

- AT Mansa Approx 3 MLD STP treated water given to farmers without any charges.
- Limited industrial linkages restrict wastewater reuse opportunities.

Institutional Coordination and Governance Gaps

Coordination and communication gaps between **State authorities and ULBs** during **infrastructure** planning and execution

Need for **improved inter-departmental** coordination ,**Institutional transitions** affecting continuity of service delivery.

Poor monitoring, data systems, and enforcement mechanisms due to **Limited technical knowledge** among officials
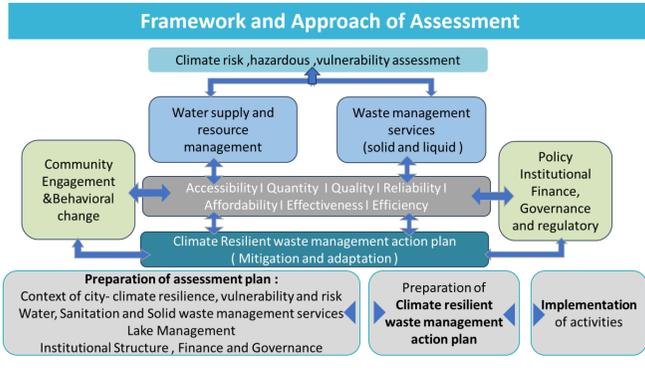
Initiatives in Solid Waste Management and Sanitation Service Chain Across the Three City

Solid Waste Management Service Chain

Source Segregation /Collection/ Transportation

Strategies Improving source segregation, through awareness in cities- Identifying model society.

Exploring Drone as a service" for monitoring Garbage Vulnerable Points, trucks & lakes

Exploring sensor-based bin tracking systems and digital grievance redressal

GVP Design & Mitigation Strategies , documenting visible cleanliness ,fund utilization.

GPS based Route Monitoring for waste collection including
1. Route Deviation Alerts
2. Geo fencing of each POI (entry-exit)

GIS-based route optimization for waste collection including all vulnerable areas saving energy costs and distance

Developing sweeping Plan focusing on distribution of workload between sweepers with designated routes

Designing optimized route for ward 5 SWM D2D collection using GIS and Python code

Waste Processing & Treatment

Understanding waste composition through on-ground waste characterization activities for Assisting ULBs in using **data-driven approaches for decision-making**.

Supporting ULBs in preparing **RFPs for efficient MRF operations**.
Identifying recyclable waste products quality for reuse and market linkage.

Implementing solar plant at SWM plant to reduce energy costs and move towards **green energy** at Viramgam and Mansa

Recycle/ Reuse

Exploring options for improving waste management services in the temple premises and Becharaji

Management strategy for Becharaji Temple Town

Forward Linkages based on Waste Characterization in all three Towns
Promoting circular economy

Sanitation And Sewerage Service Chain

User interface and Containment

- Strategy for safe faecal sludge management in the city.
- Licensing of private desludgers for efficiency in monitoring

Conveyance & Collection

Preventive & Tech Interventions
Exploring Drone and sensor based mapping of drain blockages & illegal connections for **early warning & preventive maintenance**

Treatment

Technical support for implementing a **performance-based maintenance contract** with private agency for STP operations after handover from GWSSB adhering strict monitoring

Implementing **renewable energy** sources at STP in Becharaji

Reuse

Linkage with non-potable demand industries to create **Revenue models** for treated wastewater from STP

IEC and Capacity Building

Series of Community participation & awareness activities Promoting source segregation, ban on single use plastic and more to effectively implement the SWM services

Engaging with diverse Audience including, teachers, students, medical officials

- IEC- Workforce Safety
- Training of sanitation workers, PPE usage & safety protocols

Water Hyacinth Management -key step toward lake rejuvenation

8 lakes identified across three cities

Across the three cities, the lakes are experiencing severe eutrophication due to waste dumping and untreated wastewater inflows, therefore, water hyacinth removal is being considered as a key step toward lake rejuvenation.

There are major four methods for the removal of hyacinth :

Physical Removal | Chemical Removal | Biological Recovery

Key reason of hyacinth
- Nutrient-rich water via sewage and runoff
- Stagnant water
- Slow flow
- Eutrophication

Water Hyacinth to Resource: The Circular Process

Resource Recovery

Scaling up learnings

Working with **District Development Office**, Mehsana for improving the solid and liquid waste services in its villages. Supporting through strategy, trainings and exposure visits

CWAS as -Swachhta Knowledge Partner under SBM