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Government of India
Ministry of Drinking Water and Sanitation
(NBA Division)

12th Floor, Paryavaran Bhawan,
CGO Complex, Lodhi Road,
New Delhi – 110003

Dated the 9th December, 2013

Subject: Management of Solid and Liquid Waster in States – Comments on the Draft Policy Guidelines – reg.

Ref.: Study IND cluster 0003 – Advanced Project Preparedness for poverty reduction – ADB study on SLWM – Draft guidelines -

Sir / Madam,

The Ministry of Drinking Water and Sanitation along with the Asian Development Bank have jointly carried out a study in the country to formulate a draft National Guideline for the formulation of State Level policies on Solid and Liquid Waste Management in the country. The guidelines will be useful for the States to formulate their own policies and enact them in their States.

I am enclosing herewith a copy of the draft Guidelines. I request you to please make it convenient to go through the same and forward your comments to ddws_nrcecon@nic.in within a week.

Secretary, Ministry of Drinking Water and Sanitation desires to hold a video conference to have further discussions about the draft guidelines to hear the views of the States. The video conference will be held on 17th and 18th December, 2013 between 2.30 pm and 5.30 pm.

I request you to kindly make it convenient to attend the video conference in the NIC studio as detailed below:-

S. No.	Date	Time	States
1	17-12-2013 (Tuesday)	2.30 pm	1. Karnataka, 2. Mizoram, 3. Manipur, 4. Madhya Pradesh, 5.Orissa, 6. Punjab, 7. Tripura, 8. Haryana.
2	17-12-2013 (Tuesday)	4.00 pm	1. Andhra Pradesh, 2. Arunachal Pradesh, 3. Assam, 4. Gujarat, 5.Sikkim, 6. Tamil Nadu, 7. Uttarakhand.
3	18-12-2013 (Wednesday)	2.30 pm	1. Chhattisgarh, 2. Himachal Pradesh, 3. Jharkhand, 4. Jammu & Kashmir, 5. Meghalaya, 6. Nagaland, 7. Rajasthan, 8. West Bengal.
4	18-12-2013 (Wednesday)	4.00 pm	1. Bihar, 2. Goa, 3. Kerala, 4. Maharashtra, 5. Uttar Pradesh, 6.Dadra Nagar Haveli, 7. Puducherry.

.....2/-

- 2 -

The Director of CCDU in your State and State NBA coordinator may also be directed to participate in the video conference.

The draft policy guidelines will be hosted in the Ministry's website. I am looking forward to your valuable comments on the draft guidelines.

Yours faithfully,



(Saraswati Prasad)
Joint Secretary (Sanitation)

To

The Principal Secretary /Secretary (In-charge of Rural Sanitation)
All States / UTs

भारत गणराज्य

REPUBLIC OF INDIA



Ministry of Drinking Water and Sanitation



Asian Development Bank

IND (Cluster-TA0003)
Advanced Project Preparedness for Poverty Reduction
Technical Assistance for Supporting Clean Villages for
Millennium Development Goals

Guidelines for developing State Policies
on Solid and Liquid Waste Management (SLWM)
in Rural Areas

8 December 2013



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List of Abbreviations and Acronyms

ACA	Additional central Assistance
ADB	Asian Development Bank
BSUP	Basic Services to Urban Poor
CBO	Community Based Organization
CCDU	Capacity and Communication Development Unit (as state level)
CRSP	Gol's Central Rural Sanitation Programme
EA	Executing Agency
Gol	Government of India
GP	Gram Panchayat
GR	Government Resolution
HH	Household
ILCS	Integrated Low Cost Sanitation Scheme
MDG	Millennium Development Goal
MDWS	Ministry of Drinking Water and Sanitation
M&E	Monitoring and evaluation
NBA	Nirmal Bharat Abhiyan
NGO	Non-governmental organisation
NGP	Nirmal Gram Puraskar
NTSM	National Total Sanitation Mission
O&M	Operation and Maintenance
PRI	Panchayati Raj Institutions
PURA	Provision of Urban Amenities in Rural Areas
SC/ST	Scheduled Castes/ Scheduled Tribes
SLWM	Solid and liquid waste management
SSA	Strategic Sanitation Approach
TA	Technical Assistance
ToC	Table of Contents
ToR	Term of Reference
TSC	Total Sanitation Campaign
WSSO	Water & Sanitation Support Organisation (at state level)
VWSC	Village Water and Sanitation Committees

0. EXECUTIVE SUMMARY

Objective

In 1999, only around one in five rural households used a toilet. Therefore, the focus was on prompting behaviour change to eliminate open defecation and encouraging the use of toilets was seen as the highest priority. Subsequently, as sanitation coverage has increased and the number of open defecation free (ODF) villages has grown, the focus of the NBA has widened to include issues such as waste management in rural areas.

In order to address this situation ADB was requested by MWDS to focus on the third of the goals, *solid and liquid waste management (SLWM)*, with a specific aim of providing support for the development of policy by States and guidance on implementation of SLWM by Gram Panchayats (GP).

This policy framework is intended as a guide to assist states in developing their own policies for solid and liquid waste management in rural areas. As such, it does not prescribe what should be in the state's policy. It raises the issues and challenges that may need to be addressed for the state to formulate its own policy and provides suggestions on how to do this.

This framework means that the efforts undertaken by States at the local level are part of an overarching national goal given in the NBA. Although the States will be responsible for setting their own Policies, they should contribute to the national objective.

Definitions

In a national policy aimed at the rural environment the best definitions are those which include both descriptions and approaches so that they can facilitate action. A new definition of SLWM in rural areas of India is being introduced in this Policy Framework, with the aim of supporting action than producing one very broad "catch-all" definition for national use in all contexts.

Roles and responsibilities

Subsidiarity is the driving force of SLWM in rural areas: when applied to rural SLWM, subsidiarity means that maximum efforts should be focused on the management of waste at the point of generation e.g. a household, institution or market place.

The policy should clearly assign the roles and responsibilities to the appropriate organisations involved in the sector in accordance with current legislation, such as the Panchayati Raj Act. Altogether there are 4 different types of actors:

- Government (from national to GP level).
- Households (APL and BPL).
- Communities (either formally or informally associated).
- Providers (products and services). This category would also include financial services.

Key Principles and technologies

- The identification of motivations and conditions for *ownership, sustainability* and *scaling up* of SLW services should reflect the demand expressed by the population as closely as possible, rather than perceived demand or speculative demand. require to stick as close to the demand of the populations as possible. Demand can be voluntary or it can be created because specific actions are required or enforced. *Generic demand*, includes all direct benefits perceived by the community as motivations to change without external influence. Generic demand includes all measures that will contribute to increasing the quality of the local environment for everyone.
- *Enforcement*, including all motivations from external resources, such as local regulations. Enforcement creates a demand that would not exist if the community is left to adopt behaviours independently.

Within households, *men and women* have different interests in sanitation, different reasons for installing a disposal system and different roles in the installation process. In managing sanitation programmes it is important that women and men from the different social and economic groups are equitably represented and involved.

The best way to avoid having to dispose of solid waste is to avoid generating it in the first place. The most common approaches to achieve this are *reduction, re-use, recycling* and recovery.

The Policy Framework identifies an initial list of technologies that are expected to be suitable for rural areas in India for dealing with organic solid waste, bio gas from organic solid waste, facilities for grey water treatment and septage management.

Financing

The costs associated with implementing national sanitation policies include: (a) the capital costs required for initial investment in sanitation infrastructure and facilities which can be met through loans or grants; (b) the recurrent costs required to operate and maintain the facilities and; (c) the programme costs for activities such as training, institutional development, community organisation and hygiene improvement.

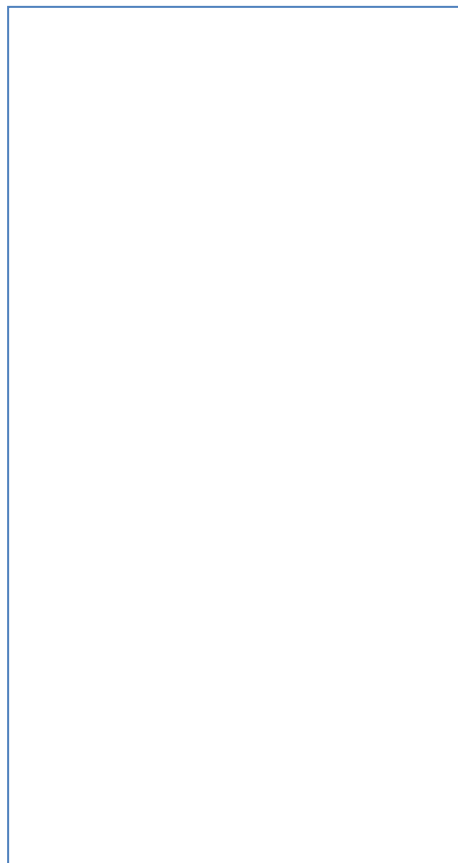
Given that the benefits of properly managing SLW are shared between those generating the waste (i.e., households, commercial and industrial establishments) and the community as a whole, the costs of collecting, transferring and disposing of waste should be shared with contributions from both the public and private bodies.

The public sector can recover the costs of providing solid waste management services through, instituting or enhancing refuse taxes, collecting tipping fees, adding a surcharge to electricity or water supply bills, or relying on other general revenues (including property tax and business licenses).

- a. Capital finance
- b. The NBA Guidelines make provision for capital costs based on the population of the GP. Capital finance for the development of services is required for software components such as planning, community participation processes, and IEC for promoting the purpose of SLWM and how to use the services, as well as for the hardware, infrastructure components.
- c. Operational finance

There are three main sources of funds for operational finance which can be used independently or in combination, these are: payments by users of the service; subsidies from GPs and/or government funds; and revenue from the value of selling waste materials as resources.

Guidance for Developing a State Policy



1. INTRODUCTION

1.1 Background

1.1.1 Waste management in rural areas: a real challenge

In rural areas, waste is a severe threat to public health and cleanliness. Despite the waste generated being pre-dominantly organic, incorrect disposal can lead to serious problems including the growth of water borne diseases such as diarrhoea, malaria, dengue, cholera and typhoid. It is estimated that people in rural India are generating 0.3 to 0.4 million metric tons of organic/recyclable solid waste per day and that 88% of the total disease burden is due to a lack of clean water, sanitation and improper solid waste management (Gol, 2008).

In October 1997, the Empowered Committee (Ministry of Rural Areas and Employment), recommended that 20% of central sector funds be earmarked to fund participatory community based projects including IEC. In 1999, revised guidelines for the implementation of rural water supply and sanitation were issued (including, recommendations for 10% capital cost sharing, community management, capacity building, hygiene education, community monitoring, operation and maintenance etc.). Based on this, several districts were selected in different States to implement pilot projects.

In 1999, the Government of India's Central Rural Sanitation Programme (CRSP) (which was started in 1986) was expanded to cover all aspects of environmental sanitation and adopted a "demand driven" approach. It was renamed the Total Sanitation Campaign (TSC).

In 2003, the Gol adopted a reward scheme, Nirmal Gram Puraskar (NGP), for achieving total sanitation coverage in a Gram Panchayat. Based on the success of NGP, the TSC was renamed as "Nirmal Bharat Abhiyan" (NBA), with the objective "to accelerate the sanitation coverage in the rural areas so as to comprehensively cover the rural community through renewed strategies and saturation approach" (MDWS, 2012). In July 2011, "Towards Nirmal Bharat: Rural Sanitation and Hygiene Strategy 2012 – 2022" was published with three goals (DDWS, 2011):

- Creation of Totally Sanitized Environments – By 2017: The end of open defecation and achievement of a clean environment where human faecal waste is safely contained and disposed.
- Adoption of Improved Hygiene Practices – By 2020: All people in the rural areas, especially children and caregivers, adopt safe hygiene practices during all times.
- Solid and Liquid Waste Management – By 2022: Effective management of solid and liquid waste such that the village environment is kept clean at all times

This was followed in July 2012 by the publication of the Nirmal Bharat Abhiyan Guidelines.

There are three key problems associated with improving waste management, these are;

- Institutional capacity is a challenge because the by laws and regulations in place to ensure proper waste management are difficult to enforce without sufficient human and financial capacities being in place. There are also staff shortages throughout the waste management departments at the GP level.
- Financial capacity is probably the biggest constraint on expanding service levels. Lack of financial resources impacts on so many areas including, hiring staff, purchasing and maintaining large scale equipment, managing dumpsites more effectively, increasing levels of household collection, enforcing by laws and regulations, developing new, more modern landfill sites and engaging in targeted public awareness campaigns.
- Public attitude was cited throughout the study visits as being a critical issue to tackle. Many areas suffer from indiscriminate dumping of solid and liquid wastes in open spaces, especially along roads, in rivers and in market places.

1.1.2 A new focus on solid and liquid waste management

In 1999, only around one in five rural households used a toilet. Therefore, the focus was on prompting behaviour change to eliminate open defecation and encouraging the use of toilets was seen as the highest priority. Subsequently, as sanitation coverage has increased and the

number of open defecation free (ODF) villages has grown, the focus of the NBA has widened to include issues such as waste management in rural areas.

In order to address this situation ADB was requested by MWDS to focus on the third of the goals, solid and liquid waste management (SLWM), with a specific aim of providing support for the development of policy by States and guidance on implementation of SLWM by Gram Panchayats (GP).

1.1.3 Development of the policy framework

There were a number of different steps in the development of this Policy Framework:

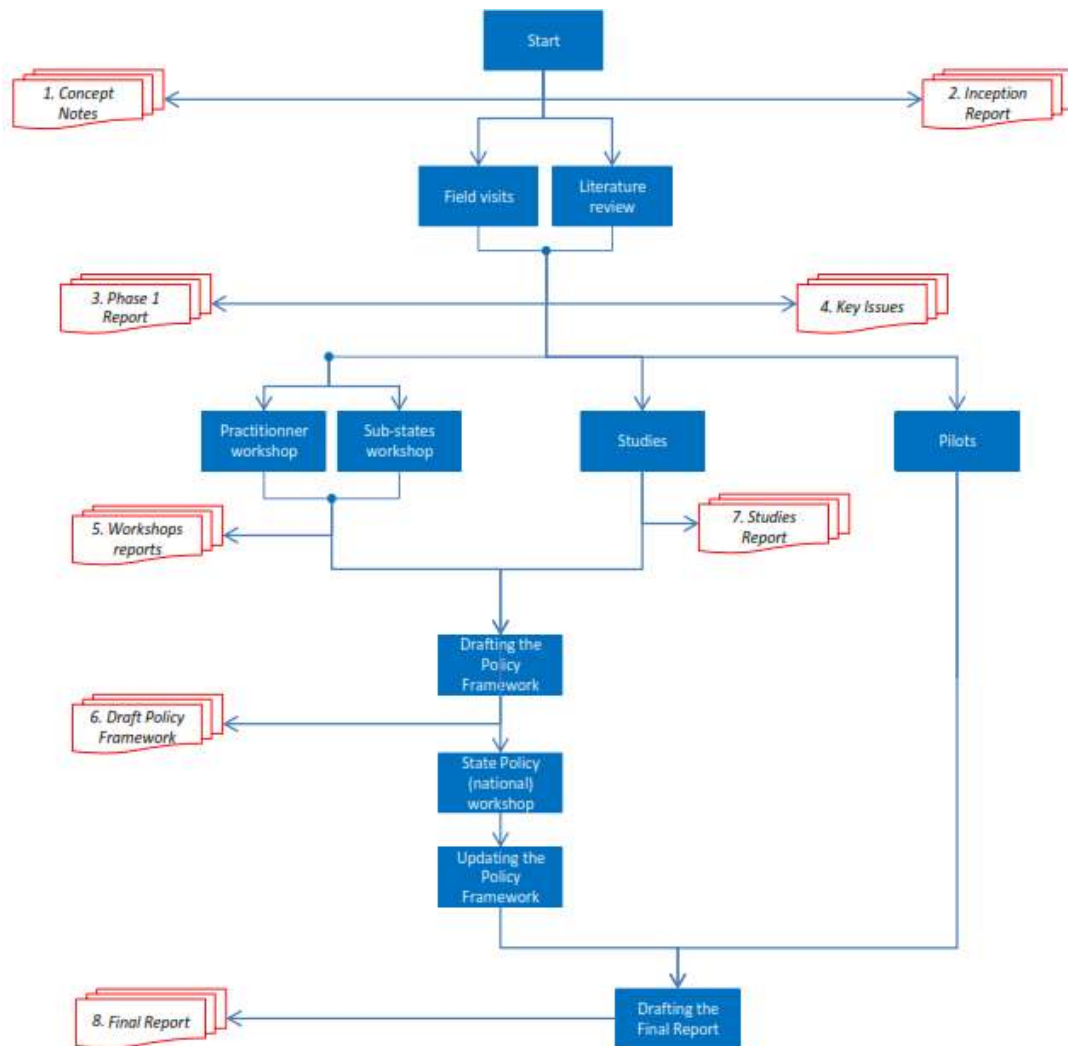


Figure 1: Steps in the development of the Policy Framework

- A review of Indian and international experiences and literature on SLWM
- Field visits to five states to understand the challenges, needs and capacity at village, gram panchayat (GP), block, district and state levels. The five states selected for assessment were Orissa, Haryana, Bihar, Maharashtra and Karnataka.
- Assessment of examples of good practice, by visits to places where SLWM services have been developed, and identification of case studies and reports of such operations (including examples in Andhra Pradesh, Karnataka, Tamil Nadu and Gujarat)
- Interviews with organisations and individuals at national and state level
- Based on these assessments and consultations, preparation of a discussion paper on key issues of SLWM. Consultations with key stakeholders on the principles and contents of the SLWM policy framework to create a sense of ownership, including;

- Sub-state consultation workshops (in Haryana, Bihar, Maharashtra and Orissa), involving representatives of GPs, blocks and district and State governments.
- A national practitioner workshop with representatives from research and academic institutions, NGOs, government, and development support agencies
- Further interviews at state and national level
- A national State Policy Workshop to review the draft policy framework (forthcoming).

[Minutes of the workshops are presented in Appendix 5.

- Studies and trials into particular aspects of SLWM in a range of rural villages (in Tamil Nadu, Maharashtra and Bihar) including
 - Solid waste assessment and characterisation study
 - Liquid waste assessment and characterisation study
 - Septage management scoping study
 - A study of the business orientation and financial viability of SLWM services in rural areas
 - A review of legislation and regulation, including local governance institutions relevant to environmental sanitation.

1.2 Objectives of the Guidelines

This policy framework is intended as a guide to assist states in developing their own policies for solid and liquid waste management in rural areas. As such, it does not prescribe what should be in the State's policy. It raises the issues and challenges that may need to be addressed for the State to formulate its own policy and provides suggestions on how to do this.

Each state has a set of unique legal, institutional, economic, social, demographic, physical, and environmental conditions that are likely to influence its solid waste and wastewater policies. Whilst national experience is useful for generating policy options, solutions to each state's problems must be tailored to circumstances in each state. The formulation of state policies for solid and liquid waste management can be complex and is dependent on many factors including, the size and topography of the state, its hydrological and environmental conditions and the diversity of stakeholders. A State specific assessment is an essential step in developing policy.

Table 1 below introduces the Framework for Policy, Strategy and Planning.












<p>Policy and Legislation Sets the development goal (vision) for the sector. Outlines the roles, rules and approaches that will need to be adhered to in order to achieve the goal</p>		<p>Vision statement A declaration of where the sector is headed – the future state. To formulate a picture of what the future will be and where the sector is headed Principles</p>	<p>National Govt. State Govt.</p>
			
<p>Legislation Acts National and state laws Local by-laws and ordinances Regulations</p>		<p>Measures that allow or limit policy Measures for enforcement of policy principles</p>	<p>National Govt. State Govt. GP</p>
			
<p>Strategy the means by which policy is effected – the bridge between policy or high-order goals and detailed actions It comprises a set of medium- to long-term objectives and associated components to support the achievement of development goals and to implement policy</p>		<p>Strategic objectives The medium and long-term aims for strategic areas which combine to achieve the vision</p>	<p>State</p>
			
		<p>Implementation guidelines and procedures Technical guidelines Standards – technical and process</p>	<p>State National</p>
<p>Long-Term (5-Year) Plan</p>		<p>Multi-year planning</p>	<p>District State National</p>
			
<p>Annual operational plan A set of tasks assigned to an individual, team or organisation that lists targets for each task as well as due dates, responsible persons, and measures for success. Action plans illustrate for individuals or teams how they will affect the completion of organization-wide objectives</p>		<p>Annual planning Activities Outputs Indicators Inputs Staffing Budget Other resources</p>	<p>GP Block District State National</p>

Table 1: Framework for Policy, Strategy and Planning

2. GUIDELINES FOR SLWM IN RURAL AREAS

2.1 Objective

Due to the current lack of a National level policy or operational guidelines, most of the States have reported that there is no clarity on “*how to go about addressing the SLWM issues*” While the States have indicated that the SLWM initiatives will be taken up as per the NBA guidelines, they have expressed concern over weakness and inadequacies on guidance and implementation aspects.

States have discussed that they lack the capacities to decide on the policy aspects and framing of State level guidelines. The NBA does not provide clarification on these aspects.

There are examples of SLWM initiatives and activities which have been implemented by States under programmes aimed at improving rural living conditions. For example, roads constructed under schemes including MNREGA, MPLAD and MLALAD have included the construction of drainage channels. The World Bank has supported this type of project in Jalswarajya, Maharashtra and in Jal-Nirmal, Karnataka. Awareness raising programmes are also helping communities to understand the problems created by poorly managed solid and liquid waste.

Individual States have launched their own State based reward schemes similar to the Nirmal Gram Puraskar. In 1999, the State of Maharashtra initiated a competition based campaign “Sant Gadge Baba Gram Swachata Abhiyan” (Saint Gadge Baba Clean Village Campaign). In 2003, the Government of Tamil Nadu launched the Clean Village Campaign to increase awareness of and motivation to tackle sanitation problems. In initiatives where GPs were given some flexibility in the use of their award money, activities financed include the maintenance and repair of sanitation infrastructure, providing dustbins for refuse collection and cleaning up previously neglected sites.

There are also reward schemes for schools and Anganwadi centres. These types of initiative help to support a growing awareness of sanitation issues and can be individually tailored to meet the needs of each State. State supported initiatives also show a high level of willingness from States to prioritise sanitation issues with the overall aim of supporting the national vision, a Nirmal Bharat.

“A Nirmal Bharat is the dream of a clean and healthy nation that thrives and contributes to the wellbeing of people”.

The vision of a Nirmal Bharat is enshrined in the Rural Sanitation and Hygiene Strategy 2012- 2022. Three goals are set in the Strategy:

- Creation of Totally Sanitized Environments – By 2017: The end of open defecation and achievement of a clean environment where human fecal waste is safely contained and disposed.
- Adoption of Improved Hygiene Practices – By 2020: All people in the rural areas, especially children and caregivers, adopt safe hygiene practices during all times.
- Solid and Liquid Waste Management – By 2022: Effective management of solid and liquid waste such that the village environment is kept clean at all times.

To achieve the vision and goal in rural areas a number of commitments are set:

- Completely eliminating the traditional habit of open defecation and making this a relic of the past
- Operationalizing systems for the safe management of solid and liquid waste at scale
- Promoting the adoption of improved hygiene behaviours
- Addressing inequalities in access with special attention to vulnerable groups such as women, children, aged and disabled
- Ensuring that providers have the capacity and resources to deliver services at scale
- Stimulating and enabling cooperation across public sector agencies concerned with rural development, health, environment and vulnerable sections

- Working with business, academic and voluntary partners to achieve the goals of the strategy

The main objectives of the NBA are:

- Bring about an improvement in the general quality of life in the rural areas.
- Accelerate sanitation coverage in rural areas to achieve the vision of Nirmal Bharat by 2022 with all Gram Panchayats in the country attaining Nirmal status.
- Motivate communities and Panchayati Raj Institutions promoting sustainable sanitation facilities through awareness creation and health education.
- To cover the remaining schools not covered under Sarva Shiksha Abhiyan (SSA) and Anganwadi Centres in the rural areas with proper sanitation facilities and undertake proactive promotion of hygiene education and sanitary habits among students.
- Encourage cost effective and appropriate technologies for ecologically safe and sustainable sanitation.
- Develop community managed environmental sanitation systems focusing on solid and liquid waste management for overall cleanliness in the rural areas.

This framework means that the efforts undertaken by States at the local level are part of an overarching national goal given by the vision of the NBA. Although the States will be responsible for setting their own policies, they should contribute to achieving the national objectives.

2.2 Definitions

2.2.1 Solid and Liquid Waste

The NBA Guidelines define solid and liquid waste by referring to specific management options including 'compost pits, vermi-composting, common and individual biogas plants, low cost drainage, soakage channels/ pits, reuse of waste water and systems for collection, segregation and disposal of household garbage etc..... Projects should be approved by State Scheme Sanctioning Committee (SSSC)'. This definition focuses more on what can be done with solid or liquid waste rather than what it actually is.

In the manual on scaling up SLWM in rural areas the World Bank Water and Sanitation Programme (2012) define waste as "*any material or liquid that is left over after productive use or which is beyond any use in its current form and is generally discarded as unwanted; it can also be defined as any material linked to human activity in comparison to nature which has its own system of recycling waste such that it eventually becomes a resource: for example, organic matter such as leaves, branches, and so on, decompose to form manure*". This is a much more general definition of what constitutes solid and liquid waste.

Although most of the challenge is generated by domestic activity, rural SLWM is not limited to households, villages and communities. Industries located in rural areas may severely impact the local environment. Institutions (such as schools and health centers) are also facing SLWM challenges. The State policy should be exhaustive and cover all situations found in rural areas. Therefore, the definition of solid and liquid waste should cover domestic and non-domestic wastes.

In a national policy aimed at the rural environment the best definitions are those which include both descriptions and approaches so that they can facilitate action. Producing a definition which is specific to the types of rural waste and management options applicable to rural areas is more useful in supporting action than producing one very broad "catch-all" definition for national use in all contexts (e.g. urban and rural areas, domestic and industrial waste, hazardous or toxic waste etc.). Identifying specific actors or stakeholders can also be beneficial as it helps to define roles and responsibilities for implementation.

Based on this objective a definition of wastes is introduced in Figure 2.

2.2.2 Rural

Rural areas are also known as the "countryside" or a "village" in India. The main characteristic is a very low population density. In rural areas, agriculture is the primary source of livelihoods in conjunction with fishing and cottage industries (e.g. pottery).

In the Census of India, 2011, rural areas are defined by stating that they are not urban areas as shown in the definition of urban and rural areas;

Urban: Statutory town, census town and out growth

- Statutory town: All places with a municipality, corporation, cantonment board or notified town area committee etc.
- Census town: Places that satisfy the following criteria; a minimum population of 5000, at least 75% of the male main working population engaged in non-agricultural pursuits. A density of at least 400 peoples per km².
- Out growth: Out growth should be a viable unit such as a village or part of a village contiguous to a statutory town and possesses the urban features in terms of infrastructure and amenities such as pucca roads, electricity, taps, drainage system, education institutions, post offices, medical facilities, banks etc. Examples of OGs are railway colonies, university campuses, port areas that may come up near a city or statutory town outside its statutory limits but within the revenue limit of a village or villages contiguous to the town or city.

Urban Agglomeration: is a continuous urban spread constituting a town and its adjoining urban out growth or two or more physically contiguous towns together and any adjoining urban out-growths of such towns.

All other areas other than urban are rural. The basic unit for rural areas is the revenue village¹.

Given that SLWM is service based, a definition that takes into account population density would be the most useful. The fieldwork highlighted that different areas have different needs regarding waste management and densely populated areas will require different service structures to those with a low population density. Sanitation services are usually designed to serve the needs of specific population groups.

In the specific case of a rural State SLWM Policy it will be necessary to clearly define the range of application of the Policy. The definition of "rural" can lead to several interpretations, ranging from political (administrative boundaries), institutional (under GP responsibility), technical (densities), economical and social. When included in an overarching national constitution the definition of "rural" is not expected to be different from one state to another. However, the way it is described and clarified in the Policy may be different, and should therefore be given sufficient attention.

¹ Ministry of Home Affairs, 2011

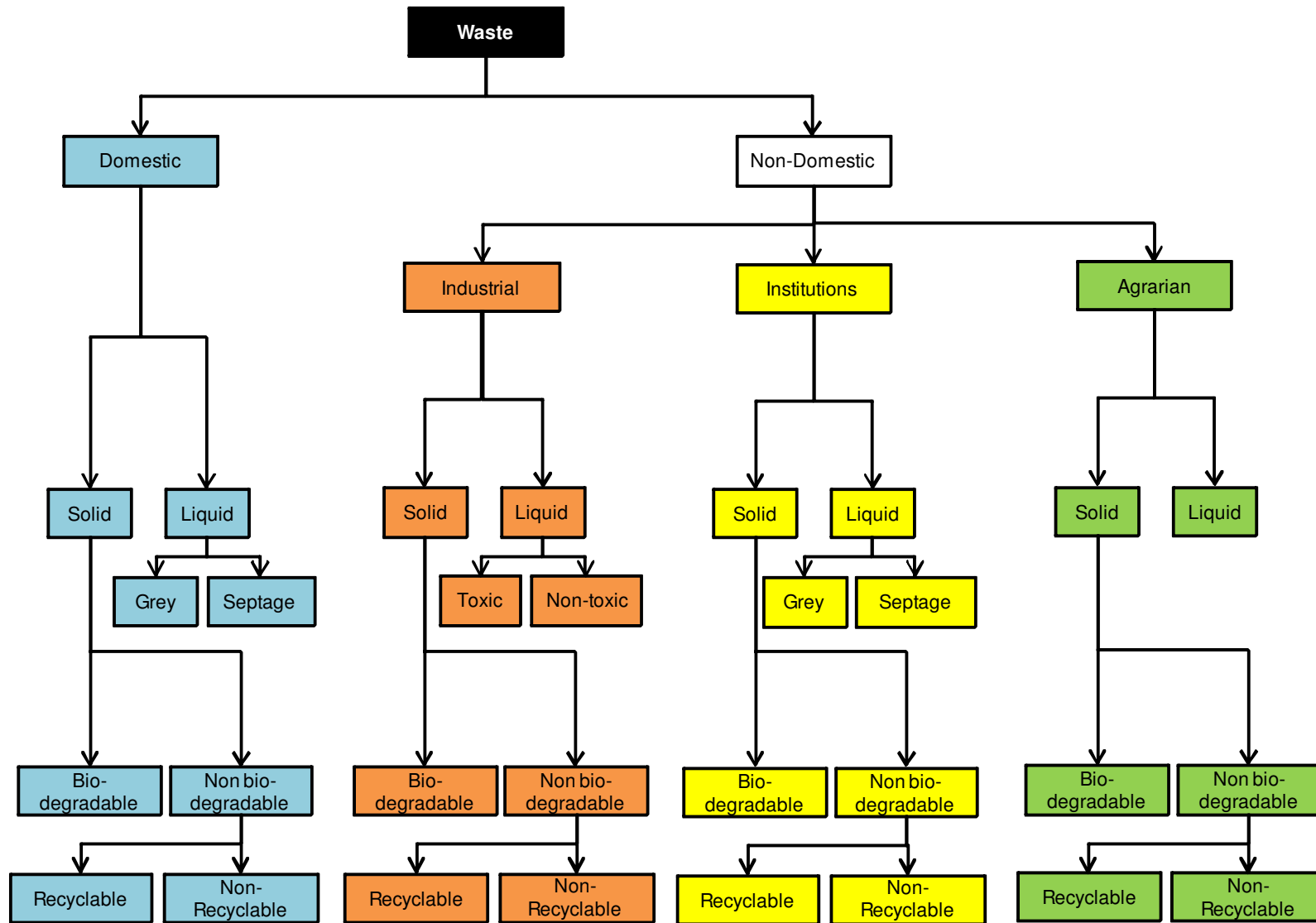


Figure 2: Definition of Solid and Liquid waste in rural area

2.3 Key principles

2.3.1 Demand driven approach

The identification of motivations and (internal and external) conditions for *ownership*, *sustainability* and *scaling up* of SLW services requires specific expertise and the use of well implemented research methods,

In order to reach this ownership objective, the Policy should ensure it stays as true as possible to the real demand.

"Demand" is a key principle for the implementation of SLW services. Demand can be generic or enforced;

- *Generic demand*, includes all direct benefits perceived by the community as motivations to change without external influence. Generic demand includes all measures that will contribute to increasing the quality of the local environment for everyone.

Based on a thorough analysis of generic demand, the Policy should focus on the best ways to enhance it, considering a large range of *direct and indirect benefits for the communities*, for example, (i) positive impacts of improved cleanliness (ii) better economic conditions (iii) additional gains resulting from "green" marketing and better environmental image, (iv) savings made e.g. through reductions in water and energy use, grey water separation and reuse options. Figure 3 outlines some of the benefits that can be achieved by improving environmental sanitation.

- *Enforcement*, including all motivations from external resources, such as local regulations. Enforcement creates a demand that would not exist if the community is left to adopt behaviours independently. Enforcement is particularly necessary in cases of environmental protection including the protection of natural resources and human safety.

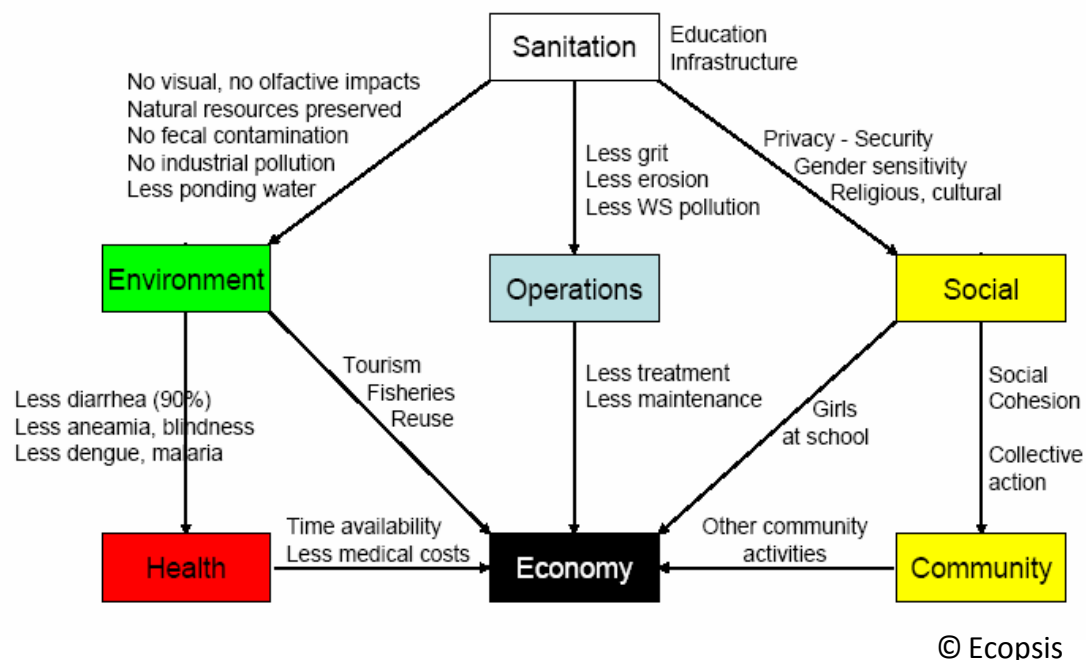


Figure 3: Benefits of sanitation

Demand for waste management services is growing, as are the emerging markets for recycled goods, the possibility for economical energy recovery and the costs for waste treatment. Return on Investment for SLW services remains low, consequently, beyond a certain service level, demand for SLW services is primarily due to the enforcement of environmental laws rather than economic benefits.

For example, recovering energy from waste is an attractive option in terms of treating waste (environmental benefits) and increasing access to energy (social benefits) but the systems currently have low returns on investment and are therefore financially unattractive. Figure 4 shows the relative attractiveness of 4 types of environmental projects. Waste water and solid waste management are both less attractive than water supply or energy projects.

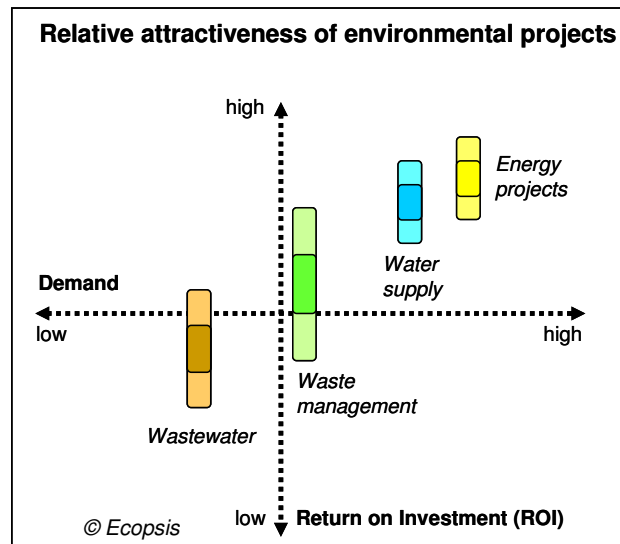


Figure 4: Relative attractiveness of environmental projects

Designated standards and the approaches used to meet those standards need to be adapted to the developmental profile and financial capacity of the villages. Even if a given village commits to implementing SLWM measures, it must be ensured that operation and maintenance costs will be affordable, properly collected and properly spent.

Therefore, the Policy should consider a differentiated approach according to village size and profile and, if relevant, the SLW requirements and related technical solutions can be brought in gradually, in phases. The (cheaper) soft and (expensive) equipment investment components must be carefully balanced.

2.3.2 Subsidiarity

Subsidiarity is an organizing principle which is based on the understanding that matters should be handled by the smallest, lowest or least centralized stakeholder. This principle should be the driving force of SLWM in rural areas: it implies that whatever can be done at the household level should be done at household level. If not possible at household level, then the possible association of multiple households (neighbours) could play a role and so on up to State level.

When applied to rural SLWM, subsidiarity means that maximum efforts should be focused on the management of waste at the point of generation e.g. a household, institution or market place. By managing the waste as close to the source of generation as possible, it is possible to save time, money and labour. Only waste that cannot be managed at the household level should be part of the community waste management process and system.

This principle is already recognised by national level actors and in sector documents (e.g. the Rural Sanitation and Hygiene Strategy 2012-2022).

Table 2 shows the typical organisations involved in the sector at each level as a guide. The actual organisations are likely to vary in different States, consequently, The State should identify its own list of organisations involved at each level.

Level	Organisation
National	Ministry of Drinking Water & Sanitation
	Ministry of Health
	Ministry of Rural Development
	Ministry of Women and Child Development
	Ministry of Human Resource Development
	Ministry of Environment and Forest
	Ministry of Urban Development
	Central Pollution Control Board
State	Public Health Engineering Department
	Water Supply and sanitation Office
	Communication and Capacity Development Unit
	Panchayati Raj and Rural Development Department
	State Pollution Control Board
District	Zilla Panchayat
	NBA Cell
	NGOs
	Private sector
Block	Block Development Officer
	Panchayat Raj Public Works
	Block Resource Centre
	NGOs
	Private Sector
GP	Gram Sevak/Sachiv
	Panchayat Development Office
	Community based organisations
	Self-help groups
	Private sector/entrepreneurs
	Households

Table 2: Actors in rural SLWM

The selection of the best responsible entity for SLWM will depend on a long list of factors, ranging from capacity to economies of scale. However, as a general approach, experience has shown that the subsidiarity principle should be considered as a starting point for selecting the best share of responsibilities between actors.

The identification of solutions should start at household level, and then go upward like the rungs on a ladder.

2.3.3 Economies of scale

Economies of scale for SLWM applies to determining the most appropriate type of disposal technology (e.g. landfill, septage treatment plants), the optimal facility sizes in the best location for the lowest cost.

In one geographic area, there can be a large number of potential waste disposal sites for household waste from rural communities.

Each potential disposal site may be able to accommodate different annual quantities of waste, and, because of economies of scale, the larger the size of a landfill, the lower the average disposal cost per ton.

In a world without transportation costs and community resistance, the most obvious least cost solution with the best economies of scale would be one huge site handling the solid waste from all GPs in the area.

However, the existence of high waste haulage costs complicates the issue. Beyond a certain haulage distance, the increase in transport cost from some waste generation points to a single large disposal facility may more than offset the fall in disposal cost per ton associated with accommodating the extra waste. This makes it more economical to build additional disposal facilities to reduce haulage costs. When there are many generation points and a number of alternative site locations, the site selection and transport routing problem rapidly becomes quite complicated. However, the sites can become too small to be economically effective.

For example, placing a disposal site in each GP, independent of the amount of waste each generates, would not be an optimal solution because economies of scale could not be exploited, and system wide costs would not be minimized [57].

At the opposite extreme, the trivial solution of placing a disposal site in each GP, independent of the amount of waste each generates, would not be optimal since economies of scale could not be exploited, and system wide costs would not be minimized.

In the case of septage, given the difficulty of collecting septage and hauling it across rural areas to designated disposal and treatment sites, medium-scale satellite treatment plants in easily accessible locations may significantly reduce collection and haulage costs. Capital, operating and maintenance costs decrease with increasing plant size. However, since larger treatment plants require longer haulage distances between pits and disposal sites, costs escalate for collection companies, which in turn increases the risk of indiscriminate and illegal dumping. The optimum plant size has to be determined on a case-by-case basis as it depends on the local context (e.g. labour cost, land price, treatment plant scale, haulage distance, and site conditions).

Fixed costs per unit associated with land acquisition, permits and licenses, buildings, erosion control and construction management fall with increasing landfill size. In addition, larger landfills have lower per unit operating costs for labour, equipment maintenance, operation of the leachate collection system, and well monitoring.

As a consequence, the following criteria should be regarded by GP or association of GPs when analyzing the opportunity of shared facilities:

a. Economic least cost analysis

At first an *economic least cost analysis* should be run, taking into consideration all costs (investment and O&M). This analysis would be based on a Net Present Value calculation in order to compare different options: one facility in each GP, one facility for all GPs, or several facilities shared between selected GPs, and so on.

The *least cost* solution will depend on several factors, such as size of service area, population density, distance between GPs and the facility, unit costs in this specific area, and so on.

b. Political decision

By their very nature, landfill and septage treatment plants proposals may attract opposition. While many potential problems can be reduced by proper design and management, landfills or septage treatment plants nevertheless may impose hidden costs on surrounding communities, which can become significant in the absence of professional waste management practices, such as groundwater pollution.

Ultimately, because of these potentially negative externalities, the choice of a waste disposal facility location and technology must ultimately be made in the political arena after public consultation and the results of an economic least cost analysis would best be used to inform the decision making process, not determine it.

2.3.4 Legal and institutional framework

The chosen solution may be different from the “optimal” configuration prescribed by an economic model because of the need to take into account the concerns and considerations raised during the consultation process. What an economic analysis can do for the decision maker is pinpoint locations that are likely to be accepted or unpopular, and show the added cost implications of deviations from the efficient solution that are made to accommodate external concerns.

The current legal and regulatory frameworks are relevant only in urban areas, with the exception of the National Green Tribunal Act and E-Waste management rules.

The original guidelines on TSC (DDWS, 2010) state that the Panchayati Raj Institutions (PRIs) are required to establish mechanisms for refuse collection and disposal and to prevent water logging. The Rural Sanitation and Hygiene Strategy 2012-2022 (GoI, 2011) clearly indicates that the Gram Panchayat are responsible for solid and liquid waste management at the village level. The strategy states that “a GP will view SLWM service delivery as an obligation” (GoI, 2011). In their role as service providers GPs are also expected to be custodians of any assets

developed. The role of institutions at other service levels is to provide support and facilitation with communication, financial, technical and human resources.

The role of Block Panchayats in rural drinking water and sanitation is envisioned as one of support, awareness generation, motivation, mobilisation, training and assistance for village communities, GPs and VWSCs. The BRC is intended to serve as an extended delivery arm of the District Water & Sanitation Mission in terms of software support and to act as a link between it and the GPs, VWSCs and village communities. However, it is acknowledged that the BPs need to be strengthened before they can take on this role (DDWS, 2010).

The problem of local organisation is reflected in the Rural Sanitation and Hygiene Strategy (GoI, 2011). It is recognised that in some states, greater priority has been given to NBA (and therefore SLWM) than in others and that the department handling the implementation of the NBA programme at State level has a significant influence on the success of implementation. Implementation can be carried out by the Department of Public Health Engineering, Department of Rural Development, and the Department of Panchayati Raj, depending on the convenience of the State. There have been greater levels of success in states where either the Department of Panchayati Raj or the Department of Rural Development are responsible.

2.3.5 Environmental protection, climate change and Health

Increasingly SLWM is being seen as a major issue in environmental protection. Improper disposal of wastes can pollute surface and groundwater bodies and the land surface, causing great risks to health and impacting the local economy. Poor waste disposal practices also adversely affect general aesthetics and the overall quality of life for those living in the vicinity. A growing problem in many countries is the economic impact of environmental degradation on tourism, fisheries and other industries sensitive to pollution. The most serious problems occur when large quantities of waste are concentrated in small areas.

The health impacts of SLW and the associated economic implications for national and household economies are a primary reason for developing SLWM policies.

The policy should guide the implementation of SLWM programmes with a view to achieving specific health outcomes. In order to accomplish this, Policies should address specific health concerns related to SLW including; diarrhoeal rates, infant mortality, helminth infections and cholera epidemics. It is essential that the general public is made aware of the problems that arise from poor SLWM and understands the role that proper SLW services can play in addressing these problems.

Challenged by a limited budget, the States (and eventually the GPs as the implementing local body) have to reach several objectives at the same time, including environmental protection and health objectives. They also have to comply with the new challenge of climate change.

As they will be preparing their Panchayat Plan with a list of activities to be carried out, the GP will have to set priorities in order to optimize the limited financial resources available. For most of the activities the objectives will be related: for example, by improving the environment, the GP will also contribute to improving the health of the population.

However, there will also be cases where the environmental and health priorities may not be so easy to define. For example, it might be cheaper for households to bury their waste rather than treating it. Whilst this approach may remove the waste from the visible environment and protect their health in the short term, the long term consequences of ground water pollution are severe in terms of both environmental and health impacts. The Panchayat Plan should therefore establish priorities and plan for investment accordingly.

Although decisions may be made on the basis of service levels, convenience, costs or regulatory factors, the *health consequences* of SLWM provision should be the key rationale for the formulation of State Policies.

2.4 Roles and responsibilities

2.4.1 Levels of intervention

The Policy requires a thorough listing of the *different roles of SLWM*. Some roles may be shared by the same actor, e.g. septage treatment and solid waste collection. In most of the cases, the activities will be specific to local conditions.

The roles of SLWM include for instance:

- The household services, owned, operated and maintained by private households.
- The promotion of specific approaches towards hygiene at different levels.
- The monitoring of applied local rules or by laws for appropriate SLWM.

Figure 5 lists the different roles within SLWM and compares them with objectives and specific sub-sectors:

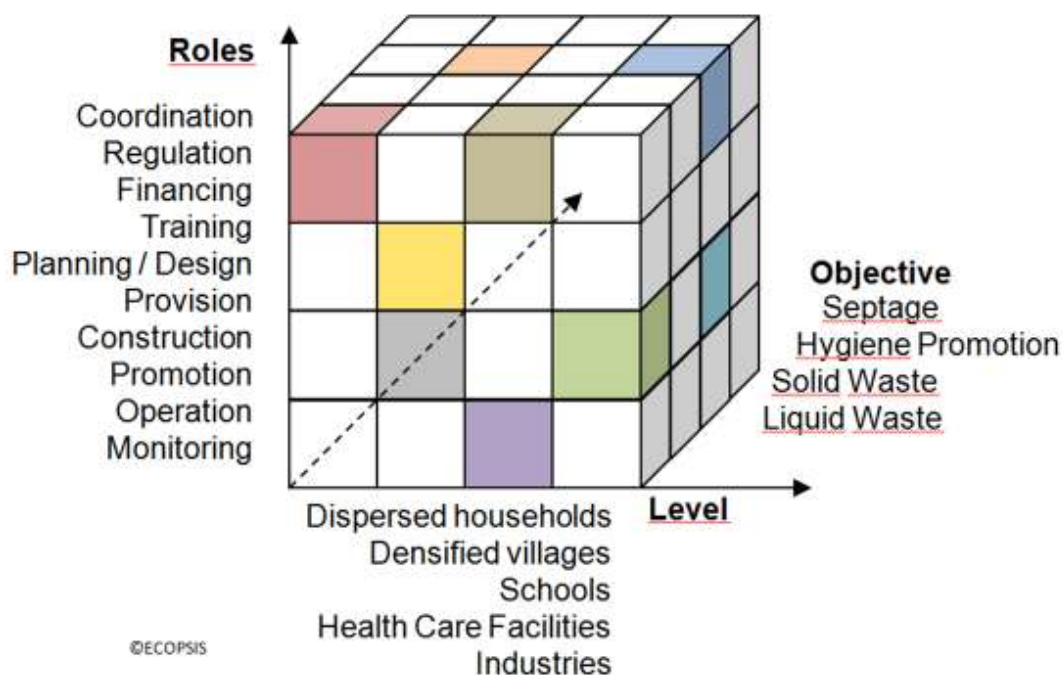


Figure 5: The "SLWM Cube": level of intervention, objectives and roles

It is not possible for all of the issues given in figure 5 to have the same level of importance, there must be some that are of greater priority than the others. Not all of the issues will be relevant for all States and some are only likely to be relevant in very specific circumstances e.g. septage management for industries (industrial waste) is unlikely to be of widespread concern in the majority of rural areas. State policies should list relevant issues according to priority, paying particular attention, when needed, to specific important issues including financing of SLWM, operation, promotion of hygiene in rural areas, and so on.

An exhaustive list of roles and responsibilities is presented in Appendix 4.

2.4.2 Sector Coordination

Solid and liquid waste management involves a number of national, state and local government agencies and programs, NGOs and the private sector. Effective coordination between stakeholders, is necessary to make services work, both at the development stage and in the long term. The policy should define the coordination mechanisms necessary at each level for service delivery, regulation and performance management, and monitoring. Coordination of funding arrangements and convergence with other funding programs will also be necessary to ensure efficient and effective disbursement of funds for the development and ongoing sustainability of services.

a. Ministries and departments

There are multiple agencies with at least some responsibility for SLWM activities in rural areas. However, legislation for SLWM is fragmented, consequently, the roles and responsibilities assigned to each actor are also fragmented which leads to the duplication of some responsibilities and the neglect of others. Co-ordination between so many agencies is a significant challenge. Developing more effective legislation will support a stronger, more coordinated sector but legislation is only effective if there is the capacity to

enforce it. Roles and responsibilities assigned to each actor must therefore take into consideration their real ability to successfully carry out the activities assigned to them.

Table 3 outlines the different agencies involved in SLWM activities in the three States visited during the elaboration of these guidelines.

Maharashtra	Tamil Nadu	Bihar
Water and Sanitation Support Organization	Panchayati Raj and Rural Development Department NREGS	Water and Sanitation Support Organization
Rural Development and Panchayat Raj Department- NREGS	TWAD Board	Rural Development- NREGS
Environment Department	Clean Village Campaign	
Pollution Control Boards	Pollution Control Boards	Pollution Control Boards
Khadi and village industries Commission	Water Management & Watershed	Non-Conventional Energy
Health Department, NRHM	Health, NRHM	Health, NRHM
Department of Women and Child Development	Department of Women and Development	Department of Women and Child Development
Maharashtra Energy Development Agency (MEDA)	Minor irrigation department	Khadi and village industries Commission
SC/ST department Ministry of Social Justice and Empowerment	Khadi and village industries Commission	Agricultural department
Indira Awas Yojana	Roads, Culverts & bridges	Public Health and Engineering Department
Education department/SSA	Non-Conventional energy- National Biogas programme	SC/ST department
Agricultural department	PURA	India Awas Yojana
PWD	SC/ST department	PWD
Eco Village Project - Rural Development Department	Indira Awas Yojana	
Home Department	Education department/SSA	
Tribal Development Department	Tsunami rehabilitation programme	
MP, MLA funds	MP, MLA funds	MP, MLA funds
ESA – World Bank, UNICEF etc.	ESA – World Bank, UNICEF, ADB etc.	ESA – World Bank, UNDP, UNICEF, WaterAid etc.

Table 3: Agencies with a role in SLWM activities in Maharashtra, Tamil Nadu and Bihar

b. Coordination

Coordination of a complex sector like SLWM is always a challenge. Bringing together the different inputs (construction, community development, training, business management, finance and accounting), each of which may be provided by different organisations at different levels, in order to develop a service, and then to manage, regulate and monitor

the service over the long term requires continuous communication and co-ordination between stakeholders.

c. Private sector

The role of the private sector is not clearly defined in the existing literature from India. The private sector in its various forms, from individual artisans, entrepreneurs and consultants to engineering contractors, has an important contribution to make. The challenge is to positively engage the private sector.

There are private sector service providers working in SLWM. However, there is very little interaction between these service providers and the public sector. Private sector service providers should be viewed as collaborators rather than competitors. The role that private sector service providers can play in improving sanitation in India has not been fully explored.

The physical capacity of service providers is available, people are willing to work in SLWM sector and they can see the potential to make SLWM into a business. Examples of successful SLWM based businesses are already operating (especially for septic tank emptying, collection of paper, glass bottles, etc.). For medium sized operators, their financial capacity is boosted through bank loans and for small scale operators there are a number of NGOs and development programmes working to develop the idea of SLWM as a business. Technical capacity is available through machines, trucks and low-cost technologies are being developed by international organisations for services like pit-emptying, decentralized treatment plants, prefabricated plants, etc.

The most important aspect that needs to be developed is an understanding of government priorities, by laws, regulations and codes of practice. Service providers can include local public service providers, nationalized public service operators, private concessionaires, private contractors, or a combination of organizations. Independent service providers tend to fill gaps created by inadequate public services, and operate without public monitoring or regulation.

d. Sector Regulation

As public services are developed at GP and village level, the number of individual operators and services will increase enormously. It will be essential to ensure that each of these public services continues to function in accordance with the relevant standards and to deliver the level of performance that users are paying for. Policy makers should define the scope of the regulatory system and assign responsibility for it. Such regulation should be independent of the organisations responsible for delivering the services, including the GPs. The regulator should act as a neutral arbitrator between the service commissioner (the GP), the service operator, and the users of the service (domestic households and commercial businesses).

e. Village Water and Sanitation Committee (VWSC)

Village Water and Sanitation Committee comprises members representing the various sections of the village community, traditional leaders, members of the Gram Panchayat living in the village and village institutions like youth clubs and women's groups. VWSC members can be selected through the Gram Sabha. The VWSC needs to assume direct responsibility for the planning and implementation of project activities in the village in collaboration with and support of the Gram Panchayat institution.

To perform these functions equably, VWSC need to be representative of the community social structure with members selected democratically after considering their competency, dedication and motivation. A partnership approach involving the village community (both women and men), appropriate community sub-groups and project organizations will be developed with each partner agreeing to and understanding their roles and responsibilities. The VWSC needs to be established in each village and thereafter provide the focus for continuity of community based activities. They also need to be given legal status as a sub-committee of Gram Panchayat.

The membership of the committee may consists of 7 to 15 members comprising elected Panchayat members and at least 50 percent women with due representation to Scheduled Castes and Tribes. With the help of trained VWSCs, it is possible to promote effective dialogue and to articulate the interest of communities in SLWM projects.

During planning and implementation, VWSCs need to be involved in all stages of the project cycle including the tendering process. A well-functioning VWSC can play the following roles in the context of SLWM:

- Formally represent the community in all aspects of SLWM and Hygiene promotion activities.
- Coordinate all community involvement in village/sub village and be responsible for the preparation of a Community Action Plan.
- Collaborate on all investigations, planning, design and promotional activities concerning environmental sanitation, hygiene education and other community related components.
- Direct the planning, organization and implementation of community environmental sanitation activities.
- Be responsible for the storage, use and distribution of materials for community built project works.
- Monitor the progress of all work on sanitation and hygiene related activities, especially those involving community members.
- Support the acquisition of land for SLWM and other facilities.
- Be responsible for the effective use, operation and maintenance of community environmental sanitation facilities.
- Organise (and manage) the collection of tariffs and funds for the operation and maintenance of water supply and as necessary, environmental sanitation facilities.
- Promote basic rights, responsibilities and desirable behaviour concerning the use of sanitation facilities and the maintenance of a hygienic village environment.

In order to take on these responsibilities, the Village Committee needs to be well organised and take a structured approach to the implementation of meetings and overall management of WASH activities. A detailed step by step implementation plan needs to be developed based on local requirements and conditions.

There are a number of roles and responsibilities for developing, operating and regulating services for rural solid and liquid waste management at different levels of the state administrative structure (as shown in Table 2, section 2.4.2).

The policy should clearly assign these to the appropriate organisations involved in the sector, in accordance with current legislation such as the Panchayati Raj Act. In some cases it may be necessary to establish a new organisation to take on a particular responsibility. (Table 2 can be completed by the State policy development team).

Altogether there are 4 different types of actors:

- Government (from national to GP level).
- Households (APL and BPL).
- Communities (either formally or informally associated).
- Providers (products and services). This category would also include financial services.

Below is a pre-selection of roles and responsibilities. These are only suggestions, the States should adopt the best solution for local conditions. However this pre-selection of roles and responsibilities is a mirror of what is being developed at the international level in the field of SLWM. This information has been collected through field visits, workshops and a review of sector literature. It is aimed at inspiring the States in their search for appropriate, sustainable and economic solutions.

2.4.3 Solid waste management

GPs struggle to provide waste collection services to the majority of residents, especially those in high density villages and difficult to reach areas, it is also not a priority in many cases. Small scale sanitation service providers are better placed to provide more localised services which keep their costs lower and enable them to target more hard to reach areas.

However, they require training to understand how the GP would like activities to be carried out. For example, a man may decide to become a door to door waste collector in a high density

village, he charges the households a fee for the service he provides but due to a lack of formal waste collection facilities he then dumps the collected waste in a nearby river. The man is providing a service that the GP is unable to provide but he is increasing the problem of environmental pollution faced by the GP.

If the small and medium scale service providers and GP staff are trained to work in collaboration with each other then there will be the potential for a strong partnership to develop and for service levels to increase. Each party can focus on a different aspect. In the case of solid waste collection, the private collectors can go door to door and the GP could collect the waste from designated points throughout the village. The GPs would no longer be expected to provide every step in the service chain from collection to transportation and processing of the waste. Figure 6 outlines the relationships between different actors.

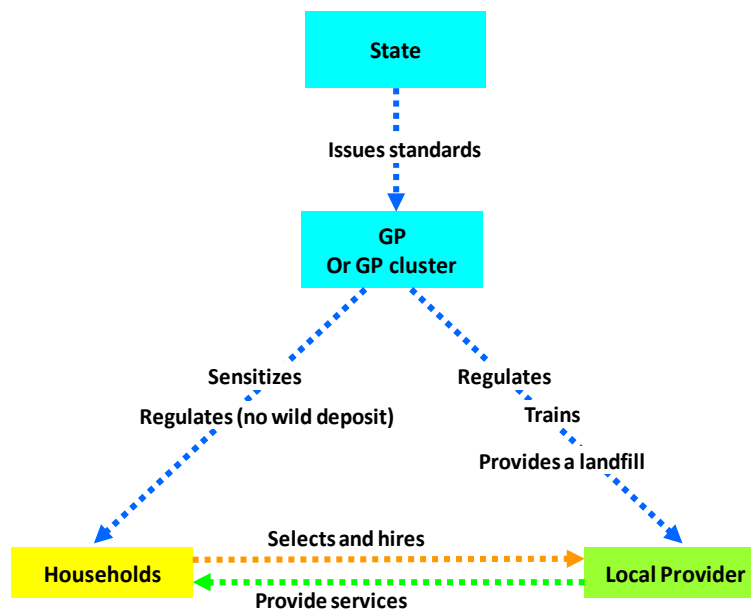


Figure 6: Roles distribution for Solid Waste Management

The scale of operations for different types of waste management should be decided based on the following factors:

1. Type of waste (e.g. dry, wet, electronic, etc.)
2. Quantity of each type of waste
3. Technology
4. Economies of scale
5. Distance from city
6. Access and availability of market, processing facilities in the vicinity
7. Finance
8. Population / level of administration

Based on these factors, decisions should be taken to decide what scale of operation is suitable for the particular area. All administrative levels should be consulted on this decision. Using administrative boundaries to define the area of service provision is a practical way to operationalize solid waste services. However, the population in an area does affect the type and quantity of waste produced, therefore, the design of any processing, treatment or disposal facility must take population size into account.

As a general guide, figure 7 provides an overview of how solid waste operations can be scaled up at each administrative level. Technology selection at each level of operation should be decided based on need, affordability, quantity and type of waste generated. Available technologies are discussed in §2.5.2.

Figure 7: Scalability of solid waste management

Scalability and its relevance for different elements of solid waste is described further in the following sections:

a. Generation, segregation & recovery

At household level, the best way to handle solid waste is to segregate it at source and recover what is possible. E.g. dry waste such as paper, plastic, glass, metal and wet organic waste.

The solid waste management system can be designed so that recovered dry waste is stored at the household level and then at the GP level for a fixed number of days; after which it is collected by a designated collector for transporting to a market place in the vicinity (at block level, district level or any existing city where a market exists) . From here traders either process the waste or transport it further to a recycling facility.

It will make more economic and operational sense to develop such as system at district and / or region level, or link it with operations in a nearby city.

b. Storage, collection and transportation

In the in case of wet / compostable waste, primary storage has to be done at the household level and open dumping should be strictly prohibited. The waste can be composted or converted into biogas.

For a door to door wet waste collection system rickshaws, motorised vehicles or any local means of transport can be used to service a designated number of households. For every 500 households one motorised vehicle or three to four manual rickshaws or carts may be required depending on the quantity of waste to be collected.

Where door to door collection is not possible, easy to transfer wheeled community bins can be installed in such a way that all households have easy access to the bins. Community bins may be located in close proximity to a processing unit (e.g. a composting plant) for easy transfer and transportation of the waste for processing.

For transporting refuse (left over garbage after recovery and processing) a different strategy for a group of villages/ GPs (depending on population and the quantity of left over refuse) will have to be developed depending on the availability of landfill facilities in the area. In some cases the closet facility may be a municipal facility. If such a facility does not exist, efforts may be made to coordinate with the biggest municipality nearby and development of a regional landfill site can be advocated for at higher levels of government.

c. Processing

For wet compostable waste, local processing (at household level, community level, village level or GP level) is the best option.

If GPs are located in proximity to an existing facility or if there is a possibility to establish a large composting facility collectively (may be in partnership with a private operator), it could be given preference during the planning phase providing that local community concerns are considered. Community, village or GP level biogas plants are also a possibility where there is a willingness to adopt more advanced methods of waste disposal. The viability of any project can only be determined after conducting an extensive feasibility study.

Processing of dry waste is not advisable at village or GP level due to its economic viability. Instead, district and regional authorities should devise a strategy to promote such facilities either at district level or use the existing (if any) facilities within nearby cities and towns. It will be crucial to link the processing of dry waste (and link GPs) with urban areas nearby, to achieve economies of scale.

d. Disposal

Final disposal of refuse which should not exceed 20%, however, with effective segregation, recovery and processing; it can be brought down to less than 10%, of the total garbage generated. Final disposal should be done at an engineered sanitary landfill site if available. If such a facility does not exist, efforts may be made to coordinate with the biggest municipality nearby and development of a regional engineered landfill site can be advocated for at higher levels of government.

2.4.4 Septage management

Ideally a comprehensive septage management program includes the following elements [55]:

- Individual facilities design and construction - Regulatory oversight for the design, installation, and use of septic tanks;
- Individual facilities inspection and desludging - Requirements for periodic inspection and desludging of septic tanks;
- Procedures for Individual facilities desludging and septage transportation - Rules for transporting septage once it is removed from the tank;
- Record keeping and reporting – Tracking mechanisms, such as use of manifests and self-monitoring reports; and
- Septage treatment and disposal - Rules that prescribe the septage treatment and disposal requirements.

In order to protect health and the environment, roles should be distributed among all actors at local levels including, households, service providers, community based committees and GPs, all of which are responsible in some way for performing sludge or septage management activities. One actor working independently cannot reach the objective.

The distribution of role and responsibilities for septage management in rural areas is different from urban areas. Although there is extensive information available on urban septage management, activities in rural areas remain undocumented.

The following recommendations for assigning roles and responsibilities has been developed based on existing efforts to develop rural septage management programmes in India and around the world [8][55][56]. Figure 8 presents an overview of recommended roles in a septage management.

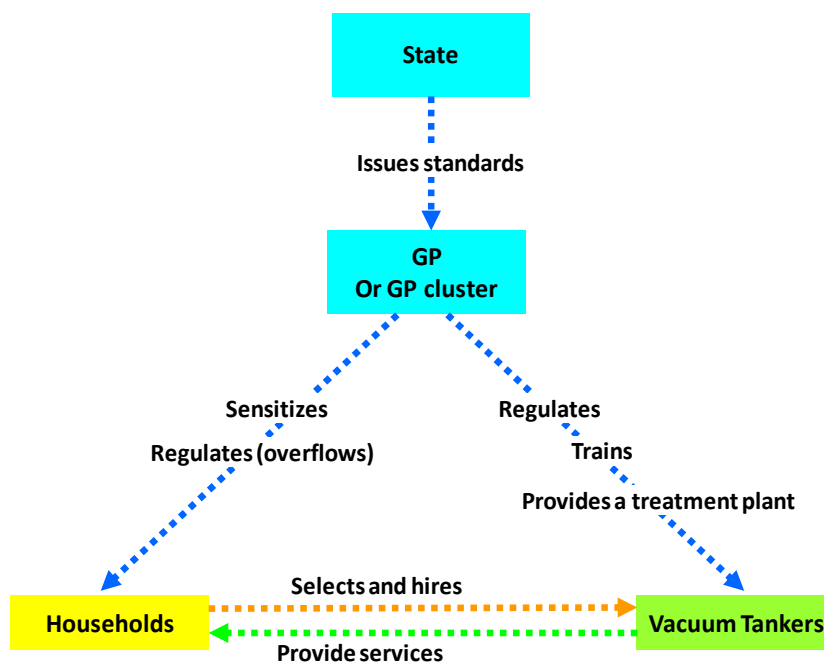


Figure 8: Roles distribution for Septage Management

a. Households

Households should take all possible measures to reduce the volume and load of septage on their own plot. This will benefit their financial situation, as it will reduce the future cost of desludging. Measures can include:

- Ensuring that new or previously constructed individual facilities comply with the provisions made in National Standards.
- Separating effluents to be discharged into the septic facility (either a latrine or a septic tank) from effluents that can be discharged directly into the ground or any collection system. This applies particularly for dispersed areas, where water consumption remains low. Wastewater from bathing or laundry should be discharged into infiltration facilities instead of being discharged into the septic facility.
- Ensuring the septic tank is desludged before the solids exceed 50% of the tank volume, or is desludged every three to five years, whichever comes first.

b. Gram Panchayat

The GP should develop a septage management plan with supporting ordinances to promote regular desludging within the covered area, thereby ensuring the protection of the environment and citizens' health.

It will then be the GPs responsibility to [55]:

- Provide a location for sludge disposal and treatment. GPs can associate into a GP "cluster" to reduce costs, for instance by sharing a treatment facility. This association by cluster should be made carefully, taking into consideration both costs and equity. See §2.3.3 above.
- Train providers on best practice service delivery.
- Enforce regulation for service providers so that no other disposal location is being used. Issue sanitary permits to service providers who comply with environmental sanitation requirements, including the presentation of a copy of their contract with a treatment facility and disposal site, especially for mobile service providers.
- Require septic permits for all buildings with new septic tank constructions, changes of use, substantial remodelling or repair of existing services.
- Inform the households about where to get appropriate septage management services from e.g. provide a list of approved service providers.

- Enforce regulation in the GP so households do not dispose of their septage in a non-suitable way. GPs may wish to consider adopting a fee structure to support septic system permit and inspection programs. Fees should be set to cover the costs associated with administering and implementing the program. Graduated fines and sanctions for non-compliance should also be considered.

A new bill was drafted in 2012 with a view to make the law regulating manual scavengers more effective. It was passed by both Houses of Parliament on September 7, 2013 as The Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013. Its main objectives are:

- o Prohibition of employment as manual scavengers
- o Rehabilitation of manual scavengers

The Act recognizes the link between manual scavengers and weaker sections of the society. It therefore, views manual scavenging as being a violation of their right to dignity.

The main features of the Act are:

- o The Act prohibits the employment of manual scavengers, the manual cleaning of sewers and septic tanks without protective equipment, and the construction of insanitary latrines.
- o The definition of 'manual scavenger' has been widened to include a person engaged or employed, inter alia, for manual cleaning of human excreta in an insanitary latrine or in an open drain or pit, railway tracks etc.
- o Express provisions for identification of manual scavengers and insanitary latrines.
- o Prohibition of hazardous manual cleaning of septic tanks and sewers, so as to ensure that health and safety of such workers is not compromised.
- o More stringent penal provisions for contravention of the new Act.
- o Vigilance and monitoring Committees to be set up at the Sub-division, District, State and Central levels.

c. District

GPs are responsible for septage management, both legally and according to the subsidiarity criteria. As such they should also be supported and regulated. This task could be handled by the district authority who would:

- Enforce regulation of the GP (or association of GPs in case of shared facilities) making sure GPs are complying with their roles and responsibilities. This regulation could be made by reporting and regular visits.
- Support the GP efforts in running awareness and information campaigns aimed at promoting appropriate behaviour such as separation of effluents, building individual facilities according to state standards and so on.

d. State

At present, private operators are major providers of septage management services. By creating new incentive schemes and regulatory programs, State governments can better leverage the private sector to scale up.

As part of local standards, a State level "manual of practice" can guide service providers on how to properly contact customers, inspect and clean tanks, take safety precautions, transport the waste, and maintain the equipment.

State authorities should also plan to update and enforce septic tank design codes.

States authorities could also contribute to the appropriate development of SLWM by creating training courses for service providers and GP authorities.

e. Service Providers

The provision of septage services in India is currently conducted only by private operators. Operators may be individuals desludging by hand, or small companies with tanker trucks.

The service providers should comply with the following rules:

- Apply for a sanitary permit for the operation of the business. The service provider first submits the application form to the GP. The GP will determine if the application is complete and meets all local requirements.
- Comply with national and local government regulatory and permitting requirements relevant to the operation of the business;
- Submit quarterly environmental reports to each GP within their approved area of operation for monitoring purposes.
- Service providers should coordinate with GP for the scheduling of desludging activities.

In case of liquid waste management, approaches for scaling up operations should be decided based on the following factors:

1. Type of liquid waste (e.g. Grey, black)
2. Quantity of liquid waste
3. Technology available
4. Finance
5. Geography and geology

Under normal circumstances, designing and implementing the interventions should be done at village or cluster of village / GP level. The situation however, will differ for large and peri urban villages with more urban characteristics. Considering that the distances between villages and/GPs is large, treating multi-village liquid waste may not be economically feasible.

For onsite treatment technologies, particularly for septage treatment and management, a scale up of block level operations may be suitable.

In the case of liquid waste management, the scale of operation may be decided based on; suitability of technology in a given area e.g. a sullage stabilization pond or duckweed treatment ponds take a lot of land but can serve multiple villages in the vicinity. Ideally, household level and a village or cluster of village level systems should be the primary consideration for the most effective management of liquid waste.

2.4.5 Industrial solid and liquid management

State Pollution Control Boards (SPCBs) are responsible for the implementation of legislation relating to the prevention and control of environmental pollution. As such the SPCBs will bear direct responsibility for enforcing regulation on industries located in rural areas.

This enforcement is a serious concern and should be addressed properly by the States. Experience has shown that industries should comply with regulation if proper SLWM is expected from the GP. This condition needs to be fulfilled so that investments and efforts made by the GP and the community (both in solid and liquid waste management) are not jeopardized by (often strong) pollution impacts from industries located in the GP. Figure 9 presents an overview of the roles of the different actors with responsibilities for improving industrial SLWM activities.

The State, District and the GP are expected to;

- Inform the industries about relevant regulations and legislation.
- Support industries when needed to meet the requirements.
- Enforce the implementation of the regulations and legislation.

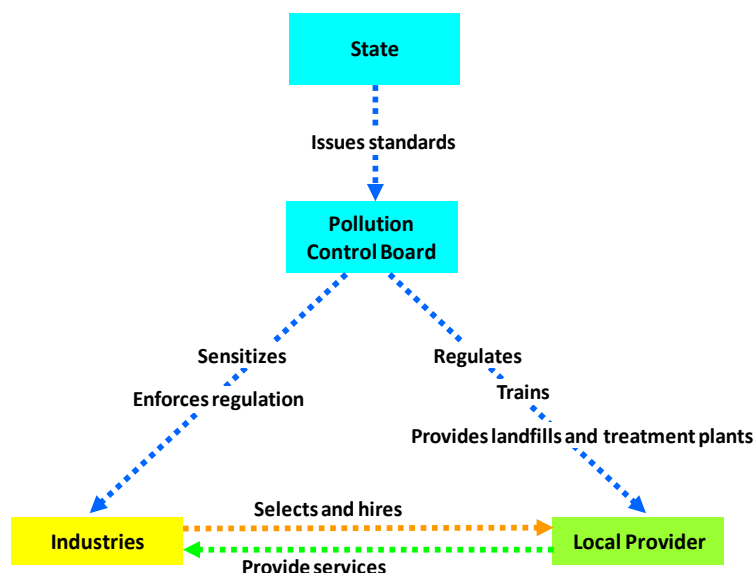


Figure 9: Roles distribution for industrial SLWM

2.5 Technologies

2.5.1 Reduce, Reuse, Recycle, Recovery

The best way to avoid having to dispose of solid waste is to avoid generating it in the first place. The most common approaches to achieve this are reduction, re-use and recycling.

Reduction in waste generation is the most cost effective and beneficial approach and is the preferred option. By reducing the amount of resources used initially, fewer resources are lost as waste.

Once waste is produced, re-use (or re-pair) is the next best option as it gives the resource a "second life" with minimal inputs of additional resources.

Recycling is the third best option because whilst reducing the amount of waste that goes into landfill there are economic and environmental costs associated with recycling materials and re-manufacturing them into new products. Recycling often requires the use of new materials in addition to the recycled ones, in order for materials to achieve the same standards and have the same properties as completely new ones. To do this effectively, reliable market linkages have to be established.

The fourth, less common option, is recovery, or gaining energy from waste. Whilst there are efforts to improve waste-to-energy processes in many countries, the technologies are more applicable on a large scale. The most accessible waste to energy option for rural areas is the production of bio-gas. Whilst producing energy from waste is useful for reducing the amount of waste that goes into landfill, the infrastructure and high energy requirements for running waste to energy processes makes the process less preferable than the first three Rs (reduce, reuse and recycle).

The following chapters present an initial list of technologies that are expected to be suitable for rural areas in India. These technologies are described in the document "Technical Options for Solid and Liquid Waste Management in Rural Areas" (MDWS, March 2013, draft version).

These technologies are only listed here for information purposes. States are expected to identify and develop technologies adapted to their local environment and conditions.

The by-products of septage treatment include biosolids, methane gas, biomass, and liquid fertilizer, which have commercial applications or at least can reduce operational costs. GPs can design facilities in ways that allow for the recapture of these by-products, such as separating septage from sewage sludge to minimize pollutant loading and promote reusability, or installing methane gas recapture pipes for anaerobic septage digestion tanks.

Districts can also establish incentive programs to encourage more private sector involvement. For example, utilities in Vietnam and Thailand sell treated septage for fertilizer. Indah Water Konsortium in Malaysia has also built a methane gas recapture facility at one of its treatment plants [58].

There are many international examples of the establishment of community based solid waste management organisations. However, the role of these CBOs is limited to collection and sorting of the waste into those that can be recycled or re-sold.

In some cases community composting is promoted but the issue of what to do with the remaining solid waste remains unsolved in countries around the world. Recycling centres and waste to energy processes require large quantities of waste which involve transporting the waste large distances from rural areas to these centres. In most cases the waste is still put into local landfills, which although this is not ideal, it is a step forward from indiscriminate dumping.

International examples are presented in order to illustrate the opportunities for solid and liquid waste management in rural areas:

- Philippines: Ecosavers programme

The scheme was introduced by the Department of Environment and Natural Resources but is managed by a local women co-operative. People generate savings by recycling their waste. People bring their segregated waste to the Material Recovery Facility (MRF) on a Friday where they deposit their recyclables with a caretaker who weighs them and assigns points to the deposits which are recorded in a personal savings book (a pass book). The Co-op gets a 10% share of the worth of each item (e.g. 1kg of plastic). Contracted buyers take the recyclables immediately so there is no need to store them at the MRF. The Coop has set periods for the depositors to withdraw their deposits in cash values, that is in May, before their town Fiesta, June before the opening of classes, October before All Saints' Day, and December, either before Christmas or New Year. The women in the co-op gain a livelihood and manage solid waste at the same time. The scheme focuses specifically on women vendors and microenterprise operators. Although it currently operates in towns and schools there is potential to operate a similar scheme in rural areas.

- Brazil: Santo Antônio community proposed biomass energy production from waste

The Santo Antônio community has no road access, it can only be accessed by boat, current power is supplied by diesel generators. There are two factories in the area, a sawmill and a broom factory. A case study has been conducted to assess the viability of building a biomass fed power plant in order to provide an alternative source of power to the community using current waste products. It is estimated that a small plant would need 300kg/hour of biomass to meet a 50kW demand which would be provided to households. The factories produce at least 750kg/hr of wet biomass which would guarantee a supply of biomass for the plant. Households would be supplied with electricity through a mini-grid approximately 600m long with a low voltage (220v) which requires little maintenance. It is unlikely that the plant could meet all of the existing power needs of the whole community and the factories therefore the households are prioritised. In the case of any excess power being available it could be used in the factories.

- Jordan: USAB-hybrid reactor

In Jordan, a study into wastewater treatment in rural areas identified that a Upflow anaerobic sludge blanket (USAB)-hybrid reactor was the most suitable technology to use at the household level. A USAB is a type of anaerobic digester. A USAB-hybrid combines a standard UASB with an anaerobic filter to reduce the production of solids. Wastewater flows upwards through a blanket of granular sludge containing microorganisms which treat the wastewater. The blanketing of the sludge allows solids requiring a long time for digestion to be retained whilst simpler compounds are processed and released within a day. Biogas with high concentrations of methane is produced as a by-product which can be captured and used as an alternative source of energy if required.

In Jordan, the total surface area needed for the system was calculated at 0.138 m², which is very small, compared to other systems which rely on discharge into the ground. Local materials are available to construct a majority of the system but polyurethane foam is not available locally and needs to be imported. Sludge should be discharged every 3-4 months but can be done locally.

- Sweden: Södertälje municipality

Development of a decentralised system for wastewater treatment. Wastewater is separated at source. Grey water is treated locally through settling and infiltration whereas black water is stored in a septic tank before being removed by tanker to a local treatment

facility which uses a combination of wet composting and urea treatment to sanitise the waste ready for agricultural application. The wet composting is a form of thermophilic composting which uses high temperatures and constant air flow to rapidly produce compost. Although the system is used in a rural area of Sweden the population of the municipality is still 85,000. The use of the same system in a more rural setting with a smaller population has not been tested.

- Malaysia: Sludge management in rural areas

Sludge is buried in trenches sited in dedicated areas or plantations with non-food crops. When full, the trenches and sites are closed and left for several years whilst the sludge naturally decomposes and is re-absorbed into the ground. As land prices increase there is an increasing shortage of land for disposal.

2.5.2 Specific technologies for solid waste management

- Organic solid waste

Composting, either naturally, through vermi-composting or through thermophilic composting is the most effective way to manage organic solid waste. There are many different ways to compost, some require initial infrastructure, others just require space. The table below outlines the options for composting in rural India. The most appropriate method for a given area is primarily dependent on the type of waste being composted (e.g. does it include human waste or not) and the level of operation and maintenance that people are willing to carry out.

Technology or Approach	Description	Advantages	Disadvantages	Conditions for use
Pile Composting	Composting is done in systematic piles above ground. Organic materials are added in layers and covered in soil to protect it. After 8 weeks the compost is ready for use.	Easy to establish at the household level and low cost. Good in areas with high rainfall as pile needs frequent addition of water.	Requires frequent maintenance (adding water and turning the pile after 2-3 weeks). Turning should not be done in the rain to prevent water-logging Space is needed for piles so method is unsuitable in densely populated areas	Composting works better in higher temperatures. In colder climates piles should be made bigger. During the winter (especially during snowfall) piles should be left without turning until temperature rises. Strong winds and sun have little effect on larger piles but may need more frequent addition of water and a wind breaker can be used if desired.
NADEP method	Composting takes place in a rectangular brick tank with aeration holes. Organic material is added in layers Compost is ready in 3 months	Composting can be done on a larger scale than using piles All nutrients are retained in the tank so resulting compost is more nutrient rich.	Tanks work in 3 month rotations so at least 2 are needed which increases the cost. Large quantities of soil and water are needed which can be difficult to transport in some areas. The entire tank should be filled within a maximum 48 hour period (24hrs is better).	Tanks can be built in all conditions. The thatch roof protects the tank from moisture. Tank should be monitored to check for cracking of seal which would allow moisture to escape. Tanks require space and a lot of initial material so a community approach is better, using a communal space for the tank and agreeing the date for bringing material/ filling the tank.
Bangalore method	Waste is composted anaerobically in a pit.	Can accept municipal waste and night soil.	Cannot be used in wet areas as the pit may become waterlogged.	Useful in areas where the use of piles is limited by severe weather conditions e.g. strong winds and sun.

	Compost is ready in 6-8 months	Good for dry areas No O+M is needed	Gases produced can smell and the pit requires quite a large space. Composting process is slow	Can be done at the household level where space permits as no O+M is required. Very cheap compared to tank methods as no infrastructure is required.
Indore method	Waste is cut into small pieces and spread 10 -15cm thick above ground or in a pit. Compost is ready in 4 months	No infrastructure is needed and process is relatively quick	Nutrients are lost to the soil. Regular turning is needed (every 5 days). Cannot be used in wet areas or areas with heavy rainfall due to waterlogging	Pit/heap is unprotected so may need some protection from animals/children etc. A windbreaker can be used to reduce effects of drying out. Very cheap compared to tank methods as no infrastructure is required.
Coimbatore method	Waste is composted anaerobically in a pit with the addition of rock phosphate to minimize nitrogen loss. Compost is ready in 4 months	Resulting compost is nitrogen rich. Some O+M required after initial 4 weeks (turning and addition of water)	Odour can develop The pit requires space so not useful in densely populated areas	No infrastructure is required but the cost of rock phosphate should be considered. Not suitable in areas with heavy rainfall due to water logging. Pit is protected during first month but afterwards is left open so may need some protection from animals/children etc.
Vermi-composting	Composting using a specific species of worms to break down waste Compost is ready in 3-4 months but compost must be removed in stages as the worms process it	More efficient than normal composting and produces richer compost.	Needs a vermi-tank or vermin-bed and worms need to be bought or grown which increases cost Needs more O+M than normal composting to keep the worms alive.	Worms optimal temperature range is 15- 35 degrees Celsius. Lower temperatures hamper reproduction and higher temperatures kill the worms or make them leave. Worms are very sensitive to drought so use in very dry areas is not recommended unless a reliable water source is available.
Chinese high temperature composting	Materials are heaped in alternating layers with bamboo poles inserted to make aeration holes. After 5 days the poles are removed and the holes are plastered. Compost is ready in 2 months	Can accept night soil, urine, sewage, animal dung and chopped plant residues. Turning is done once after 2 weeks	Handling of human waste and sewage requires special protective equipment. Additional waste such as ash cannot be added.	Can be used in most locations as heap is protected from weather conditions using mud plaster but water logging should be avoided.
Thermophilic composting	Composting is carried out in a specially designed thermophilic plant Compost is ready in 2 weeks	Composting is very quick compared to all other methods	Daily O+M required (adding compressed air to ensure aerobic conditions) Initial cost of thermophilic plant is high	Can be used in areas with low temperatures or hilly terrain unsuitable for digging

Table 4: Technologies for solid waste management

- Bio gas from organic solid waste

Bio gas is created by the decomposition of organic waste in anaerobic conditions. The resulting gas can be let off into the atmosphere (as it is in the anaerobic methods of composting in the table above) or it can be tapped for burning as a fuel. As well as the biogas, the process also produces a slurry which can be used as a nutrient rich fertilizer.

The biogas plant can be linked to the family or community toilet or it can be a standalone system to which wastes are added. There are many different designs available. The choice of design will be influenced primarily by the desired capacity, the space available to install the plant, the type of feed material (cattle dung has higher gas producing capacities than human waste) and the finances available for construction. Waste should be added daily to ensure continuous gas production. Gas accumulation rates are slower than rates of use but for areas reliant on wood as a fuel for cooking biogas provides an excellent alternative. Stoves, cookers or lamps must be converted to accept biogas but the gas itself burns without odour.

2.5.3 Specific technologies for liquid waste management

The 3 main types of wastewater are grey, black and septage. Each type contains different pathogens and requires different types and levels of treatment to make it safe to return to the environment. The types of technology required to collect and transport the wastewater depends on the type of wastewater in the system. For example, for grey water only, open drains can be used but if grey water is mixed with black water all the water has to be considered as black water and a closed system should be used. The table below outlines the different options for collecting and treating waste water at the household level.

a. Grey water

Technology	Description	Advantages	Disadvantages	Conditions for use
Soak pit	Dug out pit filled with stones, preferably placed over burnt bricks. Porous walls to allow water to slowly soak into the ground and prevent stagnation.	Lowest cost option for treating grey water Uses very little space	Water is lost to environment Not suitable for rocky terrain or areas difficult to dig (e.g. clay soils) Excess water will overflow to surroundings and can result in standing water	Pits should be at least 1.5m above ground water table so approach is not suitable for areas with a high water table. Suitable for use in most temperatures but in areas where the ground freezes water can pool in the surrounding area.
Leach pit	Brick lined circular pit using honeycomb masonry. Diameter approx. 1m. Water percolates into the ground. Pit should have a proper insect proof cover with water let in using a water seal trap to avoid mosquito breeding.	Can handle larger volumes of water than a soak pit Prevents water stagnation Prevents vector breeding	Some O+M required Not suitable for rocky terrain or areas difficult to dig (e.g. clay soils) Water is lost to environment rather than being reused Excess water will overflow into surroundings and can result in standing water	Pits should be at least 1.5m above ground water table so approach is not suitable for areas with a high water table. Suitable for use in most temperatures but in areas where the ground freezes water can pool in the surrounding area.
Kitchen garden	Grey water is passed through a silt and grease trap to remove debris and into a simple surface irrigation system or into a piped root zone water system. The root system has the added feature of a filter bed	Simple and cost effective technology Prevents water stagnation Prevents vector breeding Supports growth of produce for consumption or	Requires some O+M More expensive than a pit solution Use of strong detergents/cleaning agents in the home could lead to killing plants in garden	A kitchen garden can be scaled up according to the space available. Produce to grow should be chosen according to the success of different crops in the given

	around the PVC pipes which further filters the water before it reaches the plants.	sale		location.
Three tank filtration	Grey water passes through a 3 part structure – 1 st is a filtration grease trap, 2 nd is a treatment chamber filled with gravel, 3 rd is a treatment chamber filled with sand. The remaining water can be safely stored for future use.	Most effective form of waste water treatment. Water can be safely stored for periods of drought.	Higher cost compared to other options Regular O+M required including de-sludging and washing of sand and gravel.	Tank system can be used in any climatic conditions but building the tank and storage tank requires a large area to be available. Difficult digging conditions (e.g. rocky ground) could make the cost of construction prohibitively expensive.
Open/surface grey water drainage	System of drains connected to each house and collecting waste water for transportation to a treatment site or release into the environment	Relatively simple and easy to operate offsite system. O+M costs are low once the system has been constructed All households can be connected	Requires a master plan and technical knowledge to construct Requires regular O+M	Needs a lot of public support to keep drains free from waste If pollutants enter the water or the drainage system they will be released into the environment
Closed drains (small bore system)	Households are connected via PVC pipes to a series of intercepting tanks which lead onto a main line which transport the waste water to the treatment site	Lower in cost than conventional sewerage Can accept black water Useful in high density areas Comparable in cost to open surface drain Free from other waste/litter	Requires a master plan and technical knowledge to construct High investment cost compared to household level solutions	Unaffected by differing climatic conditions. User education is vitally important to control what is flushed and prevent blockages.

Table 5: Technologies for grey water management

The table below outlines the options for decentralized treatment of wastewater.

Technology	Description	Advantages	Disadvantages	Conditions for use
Community level systems for water treatment				
Sullage stabilisation pond	Grey water from the drainage system is passed through large shallow basins or ponds placed in series	Natural process Capital cost is very low O&M cost is low Can be managed by unskilled manpower	Needs some technical inputs	Needs large area of land to be available Flooding can occur during rainy season – needs special management afterwards. In hot climates scum accumulation rates can be higher which needs more O+M to remove it
Duckweed treatment in connection to aquaculture (fisheries)	Duckweed grows naturally in India and has high bio-accumulation rates for dissolved nutrients, particles and even heavy metals (to some extent). When the	Duckweed can be used in fishponds Treated water is well below required limits for re-use in agri/aquaculture No additional materials or	Requires daily maintenance to keep duckweed under control otherwise blooms could lead to eutrophication of the water	Climatic conditions will affect the viability of plant and fish growth in outdoor ponds, some species are more tolerant of higher or lower temperatures than others. A viable market for the fish

	duckweed is harvested it removes the undesirable elements.	equipment is required		should also be available.
Root zone treatment system or Constructed wetland	The process uses the natural biological process of the reeds and soil to clean the water	Technically simple Ecologically sustainable Water can be re-used in plantations Can handle a large variety of pollutants	Requires some O+M Requires a large space Can become overloaded with organic matter without careful pre-screening.	Can be used in any climatic conditions but in areas prone to freezing process will be less efficient
Aerobic treatment (can be decentralized – DEWATS)	Grey and black water is passed through a 2 tank sedimentation and filtration system with a continuous air flow (15-16 hours per day)	Quality of effluent is higher than the anaerobic version Process is quicker than the anaerobic version	Maintaining air flow requires continuous electricity (not available in all areas). Expensive compared to stabilization ponds	Can be used in any climatic conditions but maintaining an air flow requires a reliable electricity supply
Anaerobic treatment (can be decentralized – DEWATS)	Grey and black water is passed through a multi-tank (3 or more) sedimentation and filtration system	Water can be safely stored and used when needed	Expensive compared to stabilisation ponds Frequent O+M can be required – removal and cleaning of filtration medium which increases O+M costs	Pumping can be required in some areas so a reliable electricity supply is needed
Rotating biological contactors/filters	Fixed bed reactors, partially submerged and rotated as wastewater flows through them.	Compact system so can be used in more densely populated areas Can be used to treat black and grey water or industrial wastewater	Requires skilled staff for construction and O+M Requires a constant electricity supply. Collected sludge requires further treatment and is not high in nutrients so is not useful for agriculture High initial cost of infrastructure and ongoing maintenance costs	Must be protected against sunlight, wind and rain and cannot be allowed to freeze in cold climates.

Table 6: options for decentralized treatment of wastewater

b. Septage

The table below outlines the options for treatment of septage management

Technology	Description	Advantages for septage management	Disadvantages for septage management
Individual facilities			
Single pit latrine	The Single VIP is a Ventilated, Improved Pit. It is an improvement over the Single Pit because continuous airflow through the ventilation pipe vents odours and acts as a trap for flies as they escape towards the light.	<p>Does not require a constant source of water and thus reduces the volume of septage.</p> <p>Can be built and repaired with locally available materials</p> <p>Can be used immediately after construction.</p> <p>Low (but variable) capital costs depending on materials.</p> <p>Small land area required.</p>	<p>Sludge (septage) requires secondary treatment and appropriate discharge.</p> <p>Emptying full single pit latrines can cause a serious health hazard, as the freshly deposited sludge at the top of the pit will contain many faecal organisms that may be pathogenic</p> <p>Costs to empty may be significant compared to capital costs.</p> <p>If little or no water is used then the septage may be solid and difficult (or impossible) to pump and has to be emptied by hand.</p> <p>Low reduction in BOD and pathogens.</p>
Double pit latrine	This toilet consists of two pits, each covered with a slab with a drop hole and a vent pipe covered with a fly screen, and one superstructure	<p>Twin pit latrines are designed to be emptied without the need to handle fresh excreta.</p> <p>Removal of dried sludge from a pit that has been left undisturbed for two years should be relatively straightforward as the material will have decomposed sufficiently and be relatively safe to handle</p>	<p>Higher cost than simple pit latrine.</p> <p>Needs more space to install.</p>
Septic tank	A septic tank is a watertight, on-site treatment system for domestic sewage, consisting of two or more compartments, in which the sanitary flow is detained to permit concurrent sedimentation and sludge digestion.	<p>Higher reduction in BOD and pathogens.</p> <p>Long-lasting facility.</p> <p>High level of comfort for the user (similar to sewerage)</p>	<p>If the septic tank collects all domestic wastewater then the total volume is much higher than for pit latrines.</p> <p>Sludge (septage) requires secondary treatment and appropriate discharge.</p> <p>Higher cost than any pit latrine.</p>

Collection and transportation			
Vacuum tankers	A vacuum truck or tanker is a motorised vehicle equipped with a pump and a storage tank. The pump is connected to a hose which is lowered down into a constructed tank or pit.	Fast, and generally efficient. Minimizes risk of contact with unhygienic material. Vacuum truck enterprises can benefit a community and be a source of sustainable income.	Expensive operating and maintenance costs that are passed onto the customer; not all customers can afford the service. Cannot pump thick, dried sludge (this must be manually removed). Very high capital costs. Strong need of regulation to make sure all trucks discharge to a suitable facility. Pumps can usually only suck down to a depth of 2-3m and the pump must be located within 30m of the pit.
Small pumping units	A small pumping unit is a (motorised or not) vehicle equipped with a pump and a storage tank. The pump is connected to a hose which is lowered down into a constructed tank or pit.	Can benefit a community and be a source of sustainable income for local staff. Cheaper than vacuum tankers. Easy access to densely populated villages.	Needs proper training of the operator. Limited to close-by treatment facilities. Higher risk of contact with unhygienic material.
Manual	Some pits can only be emptied manually, for example, material left to decompose and dry out in a twin pit system. Requires manual emptying (with a shovel) because the material is solid and cannot be removed with a vacuum pump	Useful for serving sections of the population which would otherwise go unserved. Potential for local job creation and income generation.	Time consuming Hard, unpleasant work. Requires a close-by disposal point Sludge must be carried/pushed offsite which is difficult and time consuming. Spillage and bad odours are likely.
Treatment of septage			
Septage stabilization ponds (WSP)	WSP systems comprise one or more series of different types of ponds. Usually the first pond in the series is an anaerobic pond, and the second is a facultative pond. These may need to be followed by maturation ponds, but this depends on the required final effluent quality.	Natural process Capital cost is very low O&M cost is low Can be managed by unskilled manpower	Needs some technical inputs Needs large available land in GP Flooding can occur during rainy season – needs special management afterwards.
Biogas reactors (anaerobic digestion)	Septage is a great source of biogas, as it is very high in organic matter that releases methane upon anaerobic digestion. By capturing and sequestering these greenhouse gasses before they can reach the atmosphere, such systems minimize impacts on global warming. Indeed, biogas waste-to-energy systems can actually sell carbon credits on	Capturing biogas is also beneficial because anaerobic digestion and the biogases produced from this process can generate odours. Covering and capturing biogas helps control odor making these facilities more appropriate in areas that are in close proximity to residential housing.	Expensive Difficult to operate and maintain. Risk of odour.

	the open market, which may help recover capital or operation costs associated with the facility.		
Composting	Compost is defined as “the stabilization of organic material through the process of aerobic, thermophilic decomposition. The resulting humus-like material is suitable as a soil conditioner and source of nitrogen and phosphorus [56].	Can be used as a soil amendment to reclaim land or used in landscaping or horticulture.	Exposure can occur during the composting process to workers and to people living around the composting site. Agricultural use or use that may include human contact requires detailed laboratory analysis to confirm concentrations of pathogens and heavy metals are within safe limits. Commercial septage (including that from restaurants, fuelling stations, auto repair shops, dentistry offices and jewellery shops, dry cleaning and film processing operations, and other manufacturing or industrial sources), must be segregated
Lime stabilization	Lime stabilization is the process by which hydrated lime (calcium hydroxide) is added to septage to form a product that can be disposed of on land for use as a fertilizer.	Kills pathogens present and stabilizes the waste thus reducing odours. Stabilized septage can be applied to the land at a rate of 300,000 liters per hectare per year. It can also be used as cover for sanitary landfills [56].	Lime is expensive and difficult to handle
Drying beds	Drying beds are either planted or unplanted sealed shallow ponds filled with several drainage layers and designed for the separation of the solid from the liquid fraction of (faecal) sludge. Sludge is dried naturally by a combination of percolation and evaporation.	Dried sludge can be used as fertiliser (either directly in the case of planted beds or after composting in the case of unplanted beds) Easy to operate (no experts, but trained community required) High reduction of sludge volume Can achieve pathogen removal Can be built with locally available materials	Requires large land area Requires treatment of percolate Only applicable during dry seasons or needs a roof and contour bund Manual labour or specialised equipment is required to remove dried sludge from beds Can cause odour problems

Table 7: options for decentralized treatment of wastewater

2.6 Financing

The costs associated with implementing national sanitation policies include: (a) the capital costs required for initial investment in sanitation infrastructure and facilities which can be met through loans or grants; (b) the recurrent costs required to operate and maintain the facilities and; (c) the programme costs for activities such as training, institutional development, community organisation and hygiene improvement.

Recurrent costs are those needed for ongoing management of the facilities and are paid by individual households through user fees. In addition to operation and maintenance, recurrent costs for sewerage systems should include depreciation, debt service, and expansion of facilities. Programme costs include activities such as training, promotion and technical assistance.

These costs are generally ongoing, but are higher in the early stages of a project when the facilities are constructed. These three categories of costs can be allocated to various parties or stakeholders. Sources of funds typically include national government, local government, external donors and users. The national budget process is an important factor in determining how these costs are allocated.

2.6.1 Polluter-pays criteria

Adequate cost recovery is the key to sustainability in solid waste management.

- Given that the benefits of properly managing SLW are shared between those generating the waste (i.e., households, commercial and industrial establishments) and the community as a whole, the costs of collecting, transferring and disposing of waste should be shared with contributions from both the public and private bodies. Public contribution

The most important way for improving solid waste management and finance is to improve the overall management capacity of the GP authorities and the corresponding municipal finance systems. In the latter case, it is especially important to improve service cost accounting and financial planning, in addition to introducing better cost recovery.

Systems for full cost accounting must be established for effective cost recovery by GPs. These accounting systems must have sufficiently detailed information to accurately measure the costs of operation and maintenance, billing, contract management (if appropriate), debt service and depreciation; and to distinguish amongst costs for residential versus commercial and industrial wastes.

Wherever possible solid waste management components should be included within broader GP development projects.

- Private contribution

User charges should be utilized to recover a portion of the costs of solid waste management from those generating the waste. User charges can generate substantial revenues and provide incentives to minimize waste, especially if structured so that those who pollute more, pay more ("polluter pays principle").

Although user charges can be imposed at different stages of solid waste management (including collection and disposal), they do not cover the full costs of solid waste management activities. Whilst community members, institutions and enterprises may be willing to pay for solid waste to be collected, they might be unwilling to pay the full cost of disposing of the waste in a sanitary manner. Experience has shown that charging the full costs of disposal may create incentives for littering and open dumping, especially if the enforcement of regulatory standards (i.e. no dumping) is limited and entities can avoid paying the user charge by disposing of the waste themselves².

With the exception of a few specific experiences, current practices for cost recovery of solid waste in rural areas are limited.

Options to recover the solid waste service costs range from instituting or enhancing garbage taxes, collecting tipping fees, adding a surcharge to electricity or water supply billings, or relying on other general revenues (including the property tax and business licenses). Choosing among these options depends on the relative importance of various criteria: whether revenues are adequate and easily collected, whether the polluter pays for the damage inflicted, whether the option is politically acceptable, and whether payment of the revenue can be enforced.

For the Indian rural environment it is recommended to take advantage of a "merged" approach including upstream financing (small tax collection from the polluters), decentralized collection service providers, limited subsidies to support public collection (through external support or

² This situation is similar to wastewater treatment : users benefit from sewage collection but don't feel committed to treating the waste.

cross-subsidies from other sectors) and decentralized community-based organizations for recycling at the end of the chain

2.6.2 Financial resources

The availability of funds is a major issue within GPs, Budgets are small and often constrained or limited. The implementation of an extensive SLWM programme in rural areas will exceed the individual budgets of GPs. Limited resources can be combined with Additional Central Assistance (ACA) and State Government allocations to provide more resources for capital expenditure. Alternative forms of capital, other than budgetary support, gain importance and need to be explored to meet the needs of SLWM in rural areas. One significant point to note is the availability of skilled and unskilled manpower in a GP as the availability of human resources has a strong bearing on the levels of implementation possible. The technical capacity of GPs is limited and in some cases non-existent which makes them heavily dependent on State resources for support and guidance.

The rural context presents an ideal opportunity for locally active private sector partnerships. These should be explored further to develop a much greater involvement of the private sector in developing and managing facilities for and on behalf of the GPs. Local partnerships to be explored could also include community groups and associations (such as the CBOs, SHGs, etc.). Where feasible and especially in cases where skilled or highly skilled personnel are required to run technical components, the private sector could be given full management responsibilities providing that they have the technical and financial capabilities to provide the required service.

The Ministry of Poverty alleviation suggests alternative forms of capital for providing basic services and access to facilities for the urban poor. There are guidelines for two national schemes, Basic Services to Urban Poor (BSUP) fund and Integrated Low Cost Sanitation Scheme (ILCS).

The BSUP fund provides support and has earmarked 25% of grant funds and budgetary resources for the development of facilities including water supply, sewerage, drainage, solid waste management, education, toilets, healthcare and sanitation. It is structured as a non-lapsable fund.

The ILCS is more focused on providing access to low cost sanitation for households in urban slum areas, its main objective is to convert dry latrines into low cost pour flush latrines and provide new ones where none exist.

These or similar funds could be applied in peri-urban and rural-urban areas which have similar demographic characteristics, population structures, and socio-cultural habits to urban areas. Close proximity to urban centres of some areas considered as 'rural' may make it necessary to provide similar services in both the urban and rural areas with the same access to available grant funds.

a. Capital finance

Capital finance for the development of services is required for software components such as planning, community participation processes, and IEC for promoting the purpose of SLWM and how to use the services, as well as for the hardware, infrastructure components. The NBA Guidelines make provision for capital costs based on the population of the GP up to a maximum limit. For GPs with more than this number of people, consideration should be given to raising the limit to reflect actual needs. Consideration should also be given to revising the system of budget allocations to take into account geographic area and population densities of habitations in a GP. Other sources of finance including a GPs own funds and funds allocated for other programmes such as biogas promotion should be more effectively utilized.

The land required for recycling facilities, treatment plants and the disposal of residual wastes may be classed as a capital cost. The policy should give direction on how this land should be provided or acquired, including available funding options.

b. Operational finance

Sufficient funding for the operational costs of public service provision is essential for the sustainability of the services. There are three main sources of funds for operational finance which can be used independently or in combination, these are: payments by users

of the service; subsidies from GPs and/or government funds; and revenue from the value of selling waste materials as resources.

- Payment by users has generally become the norm, with the trend towards covering the full operational costs, although special provision may have to be made for the poorest groups.
- Subsidies and grants from different government schemes and programmes, which can be variable and uncertain in the long term if there is a change of policy, so it may not be wise to rely on these.
- Revenue from waste as a resource is becoming increasingly important as a way of funding domestic and public services.

There is some argument for funding the initial two to three years from subsidies. However, this just delays the move to funding by users and getting people accustomed to paying while service development is still in project mode with the accompanying software support to develop local management of all aspects of the service.

Maintenance is normally part of the operational costs; major repairs and eventual replacement of hardware is not so clear. The policy makers will need to make a decision on how the latter costs will eventually be funded.

c. Economics

Converting the value of waste converted into an economic resource can contribute to the operational costs of services. There are several possible policy directions for this:

- Wastewater for kitchen gardening within the household plot.
- Treated waste water for irrigation or aquaculture.
- Composting or vermiculture of biodegradable solid waste for use or sale. One precautionary note is that the resource value of compost as a fertiliser within a village is an important consideration.
- Establishing linkages with Forest, Agricultural and Horticultural Departments for marketing or use of compost.
- Recycling of non-biodegradable wastes – for rural areas it may be necessary to develop links to recycling markets in urban centres.
- Mechanisms for Delivery

The main alternatives for provision of services are:

- Households manage their own wastes, or part of them (e.g. segregation of solid waste)
- Direct labour employed by the GP
- The GP contracts the operation of the services to community based organisations or self-help groups for segregation of solid wastes, composting, vermiculture, etc.

The choice of mechanism depends to some extent on the scale and population to be served. The decision itself should be made by the GP which has direct accountability to the users of the service. For policy makers, the main point is that the various options should be allowed and not restricted

d. Private sector

Desludging tariff structures should be designed to cover the operating costs of transport, treatment, and disposal or even to recoup capital costs. National caps on septage tariffs should consider not only collection costs, but also treatment and disposal fees. Charges can be billed in a way that encourages collection companies to deliver their loads to treatment plants. Desludging fees can be broken into instalments for customers, linked to water bills to give service providers an enforcement mechanism, or paid directly to the government rather than to desludging companies to create an incentive for proper disposal.

For many years, private collectors have been providing desludging services when public agencies fail to do so. There are also many examples of private septage collectors who do

not dispose of septage in treatment facilities because they were not adequately consulted or engaged in the facility's seating and design process. By involving private septage collectors, CBOs, and sanitation workers early in the planning process for new septage collection policies and treatment facilities, GPs can help develop new local business opportunities, build future compliance, and ensure that new facilities will be used.

All possible sources of finance including the ones stated above and other sources such as funds under Ministry of Health & Family Welfare, Ministry of Women and Child development, National Rural Livelihood Mission (of Ministry of Rural Development) may be identified for appropriate activities, while preparing plans at different levels.

Perhaps more relevant in the case of SLWM is the approach adopted under PURA which envisages leveraging ACA for private sector finance and participation in the provision of infrastructure in rural areas (Ministry of Rural Development, 2010).

The scheme covers cross-subsidisation of non-viable components including solid waste management, with commercially sustainable viable components such as rural BPO, commercial centres and health centres. The alternative form of capital is raised through private sector agencies using the Central Government Grant sanctioned to leverage these resources.

The PURA framework may be adopted for meeting the requirements or provisioning of SLWM facilities in a GP or a cluster of villages or a cluster of GPs (more particularly to ensure economies of scale). Under the NBA, the Ministry of DWS could in partnership with State Governments evolve a framework for such a program.

All possible sources of finance for all required purposes may be identified through a consultative process, while preparing plans at different level.

3. GUIDANCE FOR DEVELOPING A STATE POLICY

3.1 Process for the development of state-level guidelines

A series of key elements is recognised as defining and outlining the essential elements of good sanitation policies. These elements cover a range of important issues.

3.1.1 Stakeholders

To be effective in guiding changes in SLWM services sanitation policies must be developed and formulated with the involvement and participation of the stakeholders.

Policies have legitimacy to the extent that all stakeholders (including political leaders, government officials, donor representatives, the private sector and men and women in the general public) collaborate in their development and see them as a valid expression of current government actions and future intentions.

There has to be belief in the policies and their purposes and this can only come when stakeholders have been included in formulating the policies and in participating in making informed decisions.

3.1.2 Legal framework

A major aspect of legitimacy for SLWM policies is the legality of the policy statements. A legal basis is important and may take the form of laws, legislative acts, decrees, regulations and official guidelines.

To be comprehensive this basis should encompass the full range of legal instruments, from the essential legal statutes to the practical technical guidance materials used to implement the policies. Without a legal framework to guide overall policy implementation, SLWM programmes and projects run the risk of violating societal norms and failing to address the objectives for which the policies were established.

To be effective, SLWM policies and associated programme development and implementation must be the responsibility of one or more institutions.

In most countries responsibility for SLWM is divided among a number of ministries, based on their involvement in urban affairs, housing and public services, rural development, environmental protection and local government administration. This can lead to a confusing

mix of institutional activities, sometimes resulting in overlapping authorities or a situation where no organisation seems to have clearly defined responsibilities, thereby resulting in gaps in sanitation coverage, or even conflicting directives. To avoid such problems the sanitation needs of all population target groups should be the clear responsibility of specified institutions.

Each of these elements, if well-addressed in policies, will help define an enabling environment for sanitation improvements.

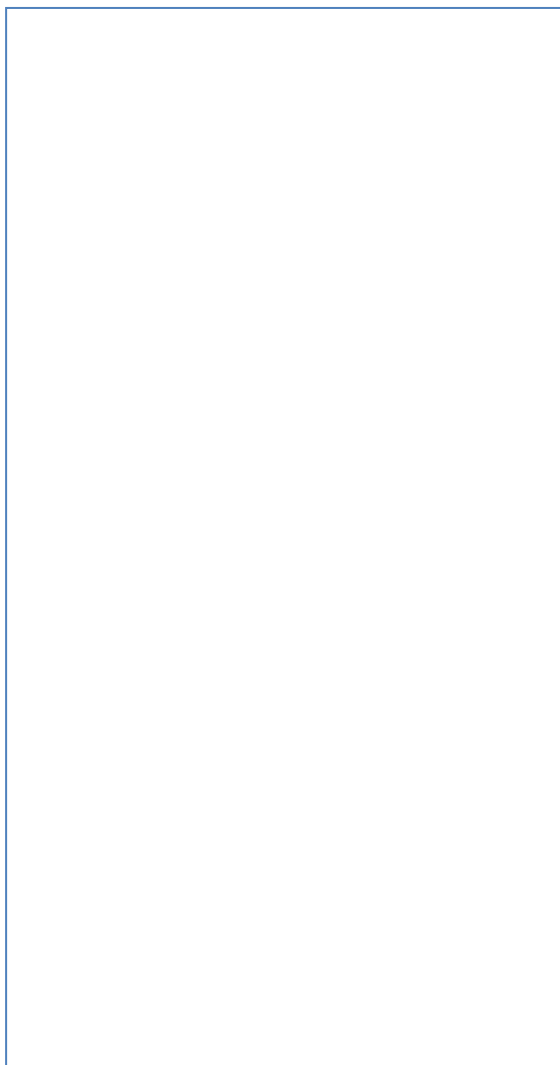


Figure 10: Process for developing a SLWM Policy at State level

3.2 Suggested content for a state policy

3.2.1 Preamble

The State's Policy for Solid and Liquid Waste should be based on the assessment of the State carried out as part of the process of developing the policy. The following contents are suggested as a guide on what should be included in a policy, adapted to the context.

3.2.2 Context

Each State in India is different, in terms of topography and geology, climate and water resources, population and settlement patterns, and social and cultural traditions. Even within states, there are differences in these aspects. Each State has a different context, needs and priorities. Each State's policy for solid and liquid waste management will be different in order to address the different conditions and needs. Therefore the following existing aspects need to be clearly defined as a basis for policy:

a. Geography

This should cover the type of topography and drainage patterns, surface water and hydrogeology, climate and rainfall patterns.

b. Population

This should include the total numbers of people in rural areas, the population growth rate, the number and density of habitations and range of sizes of habitation. This range is particularly important, as the services for a village of less than 5,000 people are likely to be very different to the services for a small town of more than 20,000 people.

The ethnic diversity of people should also be considered to determine whether the policy needs to define different approaches.

Population data should be disaggregated by gender and age ranges, together with some form of poverty profiling or mapping.

c. Health

General health indicators such as life expectancy and infant and child mortality rates are important. The latter rates are closely linked to the levels of sanitation found in households and communities and their impact upon the health of children. Data on the prevalence of diseases associated with poor environmental sanitation should also be presented. In particular, vector borne diseases such as dengue fever, malaria and chikungunya disease should be noted. It is also useful to show geographic variation of disease prevalence within the state.

The common hygiene practices for households disposing of solid waste and liquid waste should be noted.

d. SLWM coverage and costs

Existing coverage of domestic and public services for solid waste and liquid waste should be assessed, including whether the services are available to all the population in a habitation, and the functionality and whether the services are up to required performance standards. An assessment of the capital costs for provision of infrastructure, and the operating costs and revenue generation of these services should also be included.

The needs for services should include the range of different types of need, from small predominately agricultural villages to the semi-urban areas with a more commercial economy. The needs for industrial services should also be assessed.

Current practices (and problems associated with these) for managing wastes in communities without facilities should be assessed.

e. Institutional arrangements and capacity

All the different organisations, government actors (ministries, departments, agencies, statutory authorities, etc.), NGOs and private sector representatives, and their roles and responsibilities in SLWM should be stated. The staffing capacity and gaps in capacity to undertake these roles should also be stated. This should be defined by level: GP, Block, District and State.

f. Legal framework

Existing national and state legal instruments (laws, legislative acts, decrees, rules and regulations, and guidelines) relevant to SLWM should be listed. From a review of these, any gaps in the legal framework should also be noted.

3.2.3 Core Principles

A policy normally sets principles to act as overarching guidance on the approach and practices to be adopted to achieve the overall policy objectives. This section provides a set of principles that are derived from wide consultation at national, state and sub-state levels and a review of the literature during the preparation of this framework. As such, they represent the core values and intentions of stakeholders in the sector. These principles should be considered by the state for adoption into its policy.

Chapter 2 of this document suggests a list of main criteria to be used for the development of SLWM in rural areas. Although aimed at supporting and guiding the State authorities in their

efforts to draft State SLWM Policies they are not to be considered as mandatory standards, and can be adapted to local State context. These main criteria are based on core principles that should be reflected in the State policy.

3.2.4 Policy Goal

The Policy Goal for Solid and Liquid Waste Management is in effect pre-set by the *Rural Sanitation and Hygiene Strategy 2012 – 2022*, as given in Section 4. This could be modified for the State's particular context but the core intent should be maintained to conform to the NBA Programme.

A number of objectives are set under the NBA, only one of which is directly relevant to State Policy. The State should consider this and if necessary elaborate more specific objectives to match its needs and aspirations.

Targets for the policy should be set based on the analysis of needs and a realistic assessment of organisational capacity, including capacity development, to meet the targets.

3.2.5 Key Components of the Policy

Policy makers at State level need to consider how the following components should be addressed by the policy. This section is not intended to be prescriptive. Rather, the purpose is to raise key points and possible options for action, with questions that should be answered from the perspective of the various stakeholders and interest groups.

a. Definitions

The broad intent of policy for managing solid waste should be stated, incorporating the appropriate key principles. Aspects to be defined include: categorisation of wastes and the preferred and allowable range of treatment options; minimisation/reduction; reuse and recycling options; segregation at source; etc.

Similarly, the broad intent of policy for managing liquid wastes should be stated, incorporating the appropriate key principles. Aspects to be defined include: categorisation of wastes (grey water, black water, rainwater drainage and the preferred and allowable range of treatment options; minimisation/reduction; reuse and recycling options; etc.

The policy for addressing the growing problem of septage from septic tanks and toilet pits should be defined. This should give a broad direction on septage generation, collection, transport, treatment and disposal, adapted to rural areas from urban practice³

b. Household and Individual Responsibility

As the primary generators of waste, the responsibility of individual households should be defined. The range of possibilities include: minimisation of waste; on-plot composting and re-use; segregation of waste; payment for collection services; primary treatment of waste water; and limits to and control of discharge of waste water.

Responsibility may vary by type of habitation – larger more urbanised or smaller rural villages; densely or sparsely populated; and for solid waste and liquid waste.

c. Agricultural, commercial and industrial responsibility

In rural areas agriculture, commerce and industry can all be significant generators of different types of waste. Decisions should be made about whether they should be required to treat and dispose of their waste themselves, or if waste disposal services can do it, and if so, at what charge. A decision on applying the "polluter pays" principle or not should also be taken.

At the start of the waste cycle, commercial enterprises could be required to contribute to the minimisation of waste by reducing packaging, and in particular, the amount of plastic that will end up as waste. The possibility of banning plastic bags should be considered⁴.

d. Service delivery

³ See, for example, *Policy Paper on Septage Management in India*, Centre for Science and Environment, 2011

⁴ Some states have already regulated the use of plastic bags.

The Gram Panchayat will be responsible for the overall management of solid and liquid waste. Within this responsibility, it may delegate some responsibilities to households and outsource responsibility of operation and management of public services to other institutions such as CBOs/SHGs/ private operators, etc.⁵

The predominant approach under the NBA has been to develop and implement projects for SLWM, design and construction of a technical fix for the problem. Projects and programmes are essentially time-limited activities, mainly to provide infrastructure. Solid waste management and liquid waste management are essentially services; the construction of a waste recycling facility or the wastewater drainage and treatment plant is only one short input to the system necessary for a sustainable service. Solid waste and liquid waste management should be considered as services without time limit. These services need to be paid for over time, so that they are sustained. This means operating them on business principles, raising revenue to cover the operation, maintenance and asset depreciation costs. Business can be either profit or not-for-profit, the critical thing is that the costs are covered by revenue.

e. Technology

Policy on technology needs to address several points to ensure sustainability of the technologies adopted: appropriateness in terms of cost and affordability; performance and suitability for the job required; and suitable for local operation and maintenance capabilities.

Technologies come with attendant capital and O&M costs, and management systems that may or may not be appropriate to the rural situation at a given time. The danger is planning systems that are difficult to finance, institutions are not ready and geared up to operate and maintain them, and people are not ready or willing to adopt them and pay for service provision. Also, technology is linked to a whole set of environmental, behavioural and cultural parameters that need be taken into account. A holistic approach is required for technology choice.⁶

The stakeholder who makes the decision on the technology is critical: in line with the participatory approaches advocated in national planning and policy, it should be the community for both domestic and public SLWM services. This should be done based on the informed choice approach⁷: Informed choice involves decisions by consumers from among feasible technical, financial and organisational options based on an adequate understanding of alternative consequences. Potential consumers need to be provided with accurate information about the different technological options and service levels available, but also need to be aware of the trade-offs between the different options and service levels.

The various technology options are explained in DDWS (2008), *Solid and Liquid Waste Management in Rural Areas: A Technical Note*, published by the Ministry of Rural Development and UNICEF.

f. Health

Sanitation development is a preventive health intervention. Therefore generating awareness about sanitation and its linkages with public and environmental health amongst communities and institutions is important for reinforcing the need for and sustainability of services for solid and liquid waste. The risks of disease associated with indiscriminate disposal of solid waste and discharge of wastewater should be part of an IEC policy component.

g. Environment

The policy measures on environmental aspects of solid and liquid waste and their management should be based on national and state environmental legislation and rules. The primary legislation is the Environment Protection Act (1986). There are no specific rules for rural solid and liquid waste, but The Municipal Solid Wastes (Management and Handling) Rules, 2000, suitably adapted for rural areas, can serve as a guide for policy direction.

⁵ From Rural Sanitation and Hygiene Strategy 2012 – 2022

⁶ Adapted from the National Urban Sanitation Policy

⁷ The TSC guidelines advocated informed technology choices, although this is not mentioned in the newer NBA Guidelines

Risks to the environment from re-use of waste water must be considered. There is no national regulation on this, but the series of WHO *Guidelines for the safe use of wastewater, excreta and greywater* (World Health Organization, 2006), and in particular, *Volume 1. Policy and regulatory aspects* can serve as guide for policy formulation.⁸

h. IEC (Hygiene Promotion)

The state policy should promote mechanisms to bring about and sustain behavioural changes aimed at adoption of healthy sanitation practices, and link with the national WASH Advocacy and Communication Strategy 2012-2017.

3.2.6 Cross-cutting (gender, poverty, vulnerable groups)

Poor families are generally the last to improve SLWM, not because of differences in hygiene perception but because of reduced access to relevant information and to means of, or preconditions for, installation, such as land, or, for poor female heads of households, labour.

Within households, men and women have different interests in SLWM, different reasons for installing a disposal system and different roles in the installation process. In managing SLWM programmes it is important that women and men from the different social and economic groups are equitably represented and involved.

Recognising and catering for differences in means and interests, and achieving equity for women and men, contributes to the effectiveness and sustainability of programmes. In contrast, excluding individual groups from SLWM policies, or overburdening them with unrealistic expectations may result in negative effects.

In line with the key principle of gender-sensitive policy development the policy will need to ensure that the various interests of marginalised members of society are incorporated. As the Planning Commission states: "*presuming that community action will happen on its own, is only perpetuating a myth that hurts the poor. Local communities, left to themselves will not necessarily allow the poor, Dalits, Adivasis and Women to express their voice. There is need to make a specific provision ... for dedicated human and financial resources for social mobilisation, awareness raising and social audit*"⁹.

3.2.7 Research and Development

A number of technical options for solid and liquid waste treatment, re-use, recycling and disposal are available. There are, however, still challenges in developing and applying appropriate technology, for which further research and development may be needed at state level. It is essential that new approaches and technology are carefully introduced and applied in rural areas through a system of rigorous piloting, testing and validation before being more generally applied.

⁸ The full set comprises Volume 1: Policy and regulatory aspects; Volume 2: Wastewater use in agriculture; Volume 3: Wastewater and excreta use in aquaculture; Volume 4: Excreta and greywater use in agriculture. These are available for download at http://www.who.int/water_sanitation_health/wastewater/gsuww/en/

⁹ Planning Commission (2011), *Faster, Sustainable and More Inclusive Growth: An Approach to the Twelfth Five Year Plan*, Government of India

Appendix

Appendix 1 Terminology

anaerobic digestion: a controlled process involving microbial decomposition of organic matter in the absence of oxygen

authorization: the consent given by the Board or Committee to the "operator of a facility"

biodegradable: a substance that can be degraded by micro-organisms

biodegradable waste: that which can be decomposed by biological processes, for example, vegetable peel, food, farm waste, and so on. Organic waste is biodegradable and can be recycled;

bio-medical waste: any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biological, and including categories mentioned in Schedule I of the Bio-Medical Waste (Management and Handling) Rules, 1998.

biomethanation: a process which entails enzymatic decomposition of the organic matter by microbial action to produce methane rich biogas

black water: wastewater from toilets containing fecal matter

collection: lifting and removal of solid wastes from collection points or any other location

composting: a controlled process involving microbial decomposition of organic matter

demolition and construction waste: wastes from building materials debris and rubble resulting from construction, re-modelling, repair and demolition operation

disposal: final disposal of solid wastes in terms of the specified measures to prevent contamination of ground-water, surface water and ambient air quality

environment: includes water, air and land and the inter-relationship between water, air and land, and human beings, other living creatures, plants, micrororganisms and property

environmental pollutant: any solid, liquid or gaseous substance present in such concentration as may be, or tend to be, injurious to the environment

environmental sanitation: The wider concept of controlling all the factors in the physical environment that may have harmful impacts on human health and well-being. It normally includes drainage, solid waste management and vector control, in addition to the activities covered by sanitation.

generator of wastes: persons or establishments generating solid wastes

grey water or sullage: wastewater from bathrooms or kitchens. Gray water generally contains fewer pathogens than black water.

handling: (in relation to any substance) the manufacture, processing, treatment, package, storage, transport, use, collection, conversion, destruction, offering for sale, transfer or the like of such substance

landfilling: disposal of residual solid wastes on land in a facility designed with protective measures against pollution of ground water, surface water and air fugitive dust, wind-blown litter, bad odour, fire hazard, bird menace, pests or rodents, greenhouse gas emissions, slope instability and erosion

leachate: liquid that seeps through solid wastes or other medium and has extracts of dissolved or suspended material from it

liquid waste: water which has been used once and is no longer fit for human consumption or other uses where clean water is required.

non-biodegradable waste: waste which cannot be broken down by biological processes, for example, paper, glass, metal, and so on. Non-biodegradable waste can be further classified into two types: recyclable and non-recyclable

recyclable waste: waste which has economic value that can be recovered, for example, metal, paper, glass, plastic bottle, and so on

non-recyclable waste: waste which does not have economic value of recovery, for example, tetra packs, thermocol, and so on.

operator of a facility: a person who owns or operates a facility for collection, segregation, storage, transportation, processing and disposal of solid wastes and also includes any other agency appointed

as such by the authority for the management and handling of municipal solid wastes in the respective areas

processing: the process by which solid wastes are transformed into new or recycled products

recycling: the process of transforming segregated solid wastes into raw materials for producing new products, which may or may not be similar to the original products

sanitation: Management and disposal of human urine, excreta and domestic waste water

segregation: to separate the solid wastes into the groups of organic (biodegradable), inorganic, recyclables and hazardous wastes

septage: the combination of scum, sludge and liquid that accumulates in septic tanks

sewage effluent: effluent from any sewerage system or sewage disposal works and including sullage from open drains

solid waste: includes commercial and residential wastes in either solid or semi-solid form excluding industrial hazardous wastes but including treated bio-medical wastes

State Board or the Committee the State Pollution Control Board of a State, or as the case may be, the Pollution Control Committee of a Union territory

storage: the temporary containment of solid wastes in a manner so as to prevent littering, attraction to vectors, stray animals and excessive foul odour

sullage: (same as grey water) wastewater from bathrooms or kitchens – generally contains fewer pathogens than black water.

sustainable services: services that have all the financial and economic resources required for operation, maintenance and replacement and take into account the technical, social, institutional, and environmental aspects, so that they are continuously providing the accepted basic level of service.

transportation: conveyance of municipal solid wastes from place to place hygienically through specially designed transport system so as to prevent foul odour, littering, unsightly conditions and accessibility to vectors

vermicomposting: a process of using earthworms for conversion of bio-degradable wastes into compost

Appendix 2 State SLWM Policy "Table of Content"

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Appendix 4 Exhaustive list of SLWM roles and responsibilities

Level	State	District	Block	GP	HH
Sector policy and strategy					
▪ Policy formulation					
▪ Strategy preparation					
▪ Legislation and rules					
Planning					
▪ Data collection					
▪ Inventory of SLW facilities					
▪ SLW planning and investment					
▪ Selection of GPs					
Capital finance					
▪ Budgeting/estimating					
▪ Financial planning					
▪ Budget allocation					
▪ Disbursement					
▪ Monitoring expenditure					
Organisation development					
▪ Need assessment					
▪ Staff training and capacity					
▪ Systems and procedures					
Co-ordination					
▪ Intersectoral					
▪ Intrasectoral					
Regulation					
▪ Policy					
▪ Finance					
▪ Design standards and types					
▪ Quality of work					
▪ Environmental impact					
▪ Conflict resolution					
Service development					
▪ Technical assistance					
▪ Procurement					
▪ Infrastructure provision					
Service delivery					
▪ Operation					
▪ Maintenance					
▪ Repair					
▪ Operational finance					
▪ Development of GP capacity					
▪ management					
▪ Support systems					
▪ Recycling market links					
Monitoring & evaluation					
▪ Sector monitoring					
▪ Sector evaluation					
▪ Service performance monitoring					
▪ Service performance evaluation					
▪ Environmental surveillance					
Research & development					
▪ Commissioning					
▪ Undertaking					

Appendix 5 Workshops minutes

**Report of Sub-state Level Workshops
Development of Policy Framework for Solid & Liquid
Waste Management in Rural Areas**



Ministry of Drinking Water and Sanitation

Asian Development Bank

**State Departments of Rural water supply and sanitation
(Maharashtra, Bihar and Orissa)**

8 July 2013

Background:

Government of India's efforts to improve sanitation through its decadal flagship program of Total Sanitation Campaign has no doubt, increased the number of toilets but the intended impact of improving sanitation has not yet reached the rural areas. Keeping this in view and to give a paradigm shift to the program, Government of India announced the Nirmal Bharat Abhiyan to cover the sanitation in a holistic way by giving flip to the solid and liquid waste management. For implementing this approach, Government requested the Asian Development Bank to provide technical assistance for developing *National Policy Framework* to improve the solid and liquid waste management by closely looking into the existing practices and experiences. Generally the policy is defined at national level and is passed on to states and onto the districts to implement, which often gets complicated to implement due to field problems. To avoid this problem the Government of India this time adopted a bottom up approach and requested ADB to conduct the consultations with all the concerned stake holders starting from village to national level. The grass root level functionaries and practitioners can contribute to the policy development keeping the field realities and successful practices in view. This process may ensure the success once the policy is rolled out. Phase I Technical Assessment was undertaken by the Bank with close collaboration from the Government of India, Ministry of drinking water and sanitation in five states i.e. Bihar, Maharashtra, Haryana, Karnataka and Orissa keeping their performance and practices of solid and liquid waste management. As part of the Phase II TOR, the same states have been selected for consultations with various levels of stakeholders for feeding into the policy for solid and liquid waste management.

Workshop participants, dates and venue

The workshops were planned and organized by the state departments as per the instructions of GOI ensuring the participation of sector stakeholders. In all the four states the participants included the Gram Panchayat members who are at the cutting edge level of implementation and the district and sub district level facilitators who actually carry forward the program with participation from communities. The third group of participants included the District and State engineers who technically support the implementation of the NBA. Another important group of participants were the state level Chief Engineers, Project Directors and Directors who issue government orders for the state level program implementation. Donors/ funding agencies, training institutions, international and local NGOs also participated and contributed in the policy framework process with valuable suggestions. Participants were nominated by state departments so as to ensure the representation from all operational levels i.e. village, taluk, sub district, district, state and national. The main aim was to understand and include the

practical steps into the policy so that the solid and liquid waste is perceived as “resource management” and not as “waste management”.

The workshops were conducted in the four states except in Karnataka due to the local elections. Details of the workshops with date and venue are given below.

Date	State	Venue
5 th April 2013	Haryana	Hotel Saffron, Kurukshetra
16 th April 2013	Bihar	Hotel, Patna
22 nd April 2013	Maharashtra	Park Hotel, Mumbai
27 th April 2013	Odishha	The HHI, Bhubaneswar

Design and structure of workshops:

Keeping the time available and draw the ownership from the states the workshops are inaugurated by the state officials and the participants were also nominated by the states. The workshop structure is designed in a such way that there is participation of all the stakeholders during the discussions. The findings from the Phase I were shared and best practices observed were explained to the participants. The issues of SLWM were presented to prepare the participants to work on the principles to be included into the policy framework. Next session was designed to discuss on the methods, tools, techniques and processes to implement the SLWM policy and guidelines. In order to capture all the elements and to ensure the representation of issues from all the levels the groups are categorized with representatives from village, sub district, district and state level functionaries and also funding agencies, NGOs and training institutions. The detailed program schedule of the workshop is attached as Annex 1.

Inaugural /Opening remarks by the Principal Secretaries/Engineer In Chiefs

The workshop in Haryana was welcomed by Mr Bhushan Pal, APO, DRDA, Kurukshetra and opening remarks were made by Mr. Yash Garg, Additional Deputy Commissioner , Kurukshetra. Mr. Yash stated that the district Kurukshetra is one of the performing districts in the State. CLTS / triggering approach has been adopted and has made a good impact in increasing the sanitation coverage. He also opined that in the absence of a policy and operational guidelines most of the pilot initiatives are implemented on ad-hoc basis. He stressed on the need for policy framework to address the feasibility of the projects keeping in view the socio-economic status of the villages.

The workshop in Patna, Bihar was inaugurated by Principal secretary, PHED, while giving opening remarks, he said that the TSC program had missed out on some of the components of

sanitation and the NBA is designed to fill all those gaps especially in the Solid Liquid Waste Management(SLWM). He mentions that the participants were invited from different levels to give their views and everyone is expected to contribute to the national policy development. He expressed that this workshop will provide some guidance to derive the policy for SLWM. Further he emphasized on the need to think beyond the coverage of toilets to more operational issues of usage and environmental safety addressing the solid and liquid waste management issues.

The workshop in Maharashtra was inaugurated by Shri B Sawai, Director WSSO, Maharashtra . During his inaugural speech he mentioned that the Maharashtra state has been the forerunner in the sanitation and the state has promoted many success stories in sanitation and secured the most number of Nirmal Gram Puraskar awards among all the states in the country. He urged the participants to share their views and provide suggestions for developing the strong policy framework for solid and liquid waste management.

The workshop in Orissa was inaugurated by the Principal Secretary, water resources and PHED Mr. G. Venu Gopal. He suggested that apart from many issues, it is very important to look at the water security situation especially when we want to promote sanitation. Further he emphasized that the solutions are different for each village and the identifying those triggering factors are very important for implementing the policy. Reiterating the field reality, he mentioned that there is no magic formula to solve all the water and sanitation problems, as the solutions are very dynamic and changes with time. It's important to have the policy framework which can guide towards local solutions. He felt that there are three critical elements i.e. "Availability", "Acceptability" and "Affordability" which are very critical for service delivery.

Sharing the findings from field Assessments of Phase I study of ADB :

Field findings from each of the states were presented by the national consultants of ADB who had visited each of these states during the phase I rapid assessment. Most states are in agreement with the findings while there was some resistance in Orissa where the participants felt that the field reality is not reflected in the findings and the field situation is much better. But all in all the participants agreed that the situation of solid liquid waste management does not get enough priority by the department and also at the Gram Panchayat level. Funds are always a constraint especially for sanitation and there is lack of awareness about the various technologies of SLWM.

Issues of Solid and Liquid Waste Management:

After sharing the findings from the state, the facilitator of the workshop presented the issues that need to be considered while working on the principles of SLWM for policy framework. The

presentation brings out the issues that need to be considered to make the policy more relevant to the field context and to inspire the participants to think differently and consider the SLWM as a “resource management” rather than a waste management”. The consolidated issues are presented in the box below.

1. Change in perception from “waste” to “resource”
2. Should SLWM is promoted as **Projects or services?** If it is Service, then focus should be on (solid waste/resource management; wastewater collection & treatment for reuse; septage management (manure/ gas)
3. **Participatory approaches and technology;** Who makes the choice? Community/department/panchayat?
4. **Standards for technical designs and construction;** Process and procedures for ensuring standards and how to measure the service performance to determine the standards, and ensuring both “Quality” and “Quantity” parameters
5. **Approaches** to be followed to ensure the Top-down or Participatory bottom up approaches and setting realistic time lines for reaching the targets rather than mere numbers
6. **Changing attitudes and practices** both at community level and at official levels. Need to take SWLM as a Business approach to mere service provision. Providing Incentives/ Disincentives for change for Households and villages?
7. **Coordination** an important issue for sequencing and taking forward the construction, awareness generation, community development, training, business management, finance and accounting involving various types of service providers
8. **NGOs Competence and Involvement** ; How to address the numbers and competence and also allocate the area of operation avoiding overlap of activities
9. **Involvement of Private sector;** How to make sure that the Corporate Social Responsibility (CSR) initiatives compliment the SLWM
10. **Capacity development** : How to identify and retain the right people with right sets of skills, experience and competence at all levels of implementation. Issues of realistic workloads , clarity on roles, responsibilities and functions among the various stake holders and how to integrate is a great challenge.
11. **Ensuring Gender and Equity;** How can this gap to be addressed? How to ensure that the excluded are included? How can women’s voice be heard and they can be part of the decision-making and management of services? How do we mainstream the poor and women in the planning and management of services?

12. **Transparency and Accountability** ; how can the accounts and record maintenance be made public using display and social audits; how to ensure that the technical designs, materials, measurement are explained and made sure that the community understands and monitors the quality? Is it necessary to measure the performance of services (equity, reliability, efficiency) and finally how to ensure the Upwards/Downwards communication to communities?
13. **Finance** ; Capital and operational costs ;affordable technologies and timely flow of funds. How can user fees be made affordable? Especially for the poorest groups in the community? How can the economic value of the waste or resource be maximised to contribute to the running costs? Can the Panchayats be able to ring fence funds from TFC for O&M of SLWM
14. **Sustainability** ; Assumptions of community management their Capacities to ensure sustainability and what support is required to enable communities to ensure sustainability and what support is needed / who should provide? who and how it should be paid?

Principles for Solid and Liquid Waste Management Policy framework

After presenting the key issues and challenges in sanitation the participants were divided into groups to work out the principles with detailed instructions to the group work. In all the three state workshops i.e. Orissa, Bihar and Maharashtra the participants are divided into four/ five groups depending on the numbers. The discussions were facilitated in such a way that there is opportunity for all the members to voice their views and opinions keeping their operational area and administrative levels. The category of the groups are as follows.

- (i) The Panchayat level representatives
- (ii) Block or sub district level Implementers such as BDOs, field coordinators or facilitators
- (iii) District level facilitators and engineers(they were two separate groups in Bihar)
- (iv) State level key decision makers and donor agencies.

The groups were given clear instructions to choose a rapporteur and presenter and one hour time was allocated to complete the task. But in almost all the workshops the participants came out with the issues or challenges of SLWM. The issues were then classified into the key principles by the facilitators reflecting the expressions of the participants. For e.g. “lack of transparency about the funds” which is can be coined as a principle “Transparency about the available funds”.

Principles as reflected by the Gram Panchayat Representatives



- **Awareness** raising on sanitation and solid and liquid waste management
- **Transparency** about the available funds and allocations at village/block and district levels
- Use of Local/ **indigenous technical options**
- **Non use of plastics** and non degradable items which makes it difficult for disposal
- **Source sustainability and adequate water** provision to ensure safe sanitation and disposal
- **Specific budget** provision for SLWM by the Panchayats
- **Timely release of funds** and ensuring the fund flow at all levels
- **Integrated planning at GP** level for water, sanitation including Solid and Liquid waste management with proper technical options
- **Convergence or linkage** of all the related programs especially the NREGA with the new NBA guidelines
- **Enforcing the existing laws** be it is avoiding plastics or indiscriminate use of ground water

or illegal water connections etc

- **Single window system of fund flow**
- **Monitoring mechanisms** for service delivery and usage of operation and monitor maintenance funds
- **Improving political commitment and involving local leaders** in planning and implementing especially for tariff collection and community contribution
- **Gramsabhas** with a specific focus on sanitation and SLWM
- **Non Discrimination** in providing wages to sanitation workers(infact they should paid more than other wage workers)
- **Regular support** from the officials to provide technical options and operational and maintenance support
- Identifying and allocating open places for solid waste disposal or land filling by the Departments in consultation with Gram panchayats

Principles as reflected by Block level representatives



- **Sufficient Budget allocations** for implementation of NBA/SLWM
- **Legal provisions or enforcing laws** to prevent the large scale disposal of non

biodegradable items.

- **Proper integration and follow up** of water and sanitation activities
- Repairing of existing drainage lines and water sources with **adequate funds for Operation and Maintenance**
- **Prevention of contamination** by **proper planning and construction** of latrines and soak pits near the water sources
- Revise principle of budget allocations from “**population**” based to “**geographic size**” or “**spread of population**” especially for planning SLWM (number of bins, meters of drainage lines).
- **Earmarking** and increasing the Thirteenth Finance Commission funds
- **Proper charging of Electricity** bills (for drinking water should be on a domestic slab instead of commercial slabs)
- **Sensitization of Media** and other related partners for improving awareness
- Communities should not be given **complete responsibility** and they require capacity building
- **Staff capacity building** and improving skills
- **Defining roles and responsibilities** of all the related departments and community based institutions
- Policy and guidelines should reach the village level
- **Corporate organizations** needs to be involved.
- **Mobilizing households** towards **zero disposal** of waste and promote soak pits and dumping of degradable waste, which ultimately reduces the burden on Panchayats

District Level representatives (Engineers and District Level facilitators)

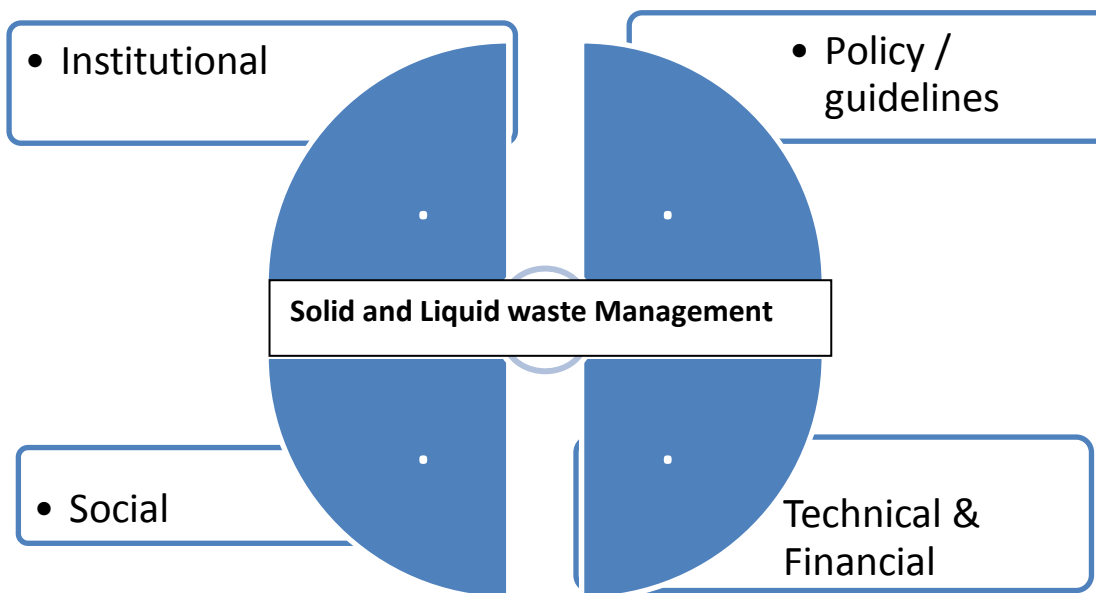


- **Technological solutions** made available to **suit to different agro, hydro, geological conditions** and considering the affordability of the households
- **Ensuring Sustainability** (addressing the day to day issues) of SLWM ensuring support i.e. technical, financial and human resources etc
- **Separate funds for O&M**
- **Separate division for O& M** and training communities/Panchayats on operation and maintenance
- **Need based funds vs. set or ceiled funding** of up to 2,00,000 for SLWM
- **Participatory Monitoring** at all levels (by community and NGOs) keeping out puts and **out comes as basis** rather than mere numbers.
- **Decentralized, Phased & Participatory planning** at Panchayat level
- **Overall Responsibility** of SLWM should be **with panchayat** ensuring additional support
- **Social Auditing and financial monitoring** is essential at all levels
- **Coordination and Convergence** among the related departments and NGOs especially in view of NBA linked with NREGA for toilet construction
- **Engineering staff should be motivated** to work for sanitation

- **Training to engineers** and filling vacancies, recruiting the new staff **and deploying more staff for sanitation**
- **Sustainable technologies** to be identified with **minimum maintenance** to be evolved
- **Incentives to Panchayats** for adopting better SWLM practices

Principles as expressed by the State level representatives

The state level officers i.e. Chief Engineers, Project Directors, State Water and Sanitation Mission members represented this group. In Maharashtra they have developed a schematic diagram on how the SLWM policy Framework and principles can be represented. The same picture is represented adopting certain changes to accommodate other state group's work.



Institutional:

- Working collaboration with combination of community & Govt. machinery with defined roles and responsibilities of various stakeholders
- Representation of Government officials and youth of the village in VWSC. 50% of the membership should be given to youth aged between 20-35 years.
- Role Clarity among all the sector holders belonging to various institutions.
- Handholding or After Sales Support to the VWSCs especially the Operation and maintenance
- Honorarium and Incentives to Village Water Workers/sweepers/ sanitation workers for effective implementation of SLWM

- Strengthening of institutions both Government , community and NGOs involved in SLWM.
- Improving the political participation with proper sensitization, exposure and trainings

Social

- Sensitization, awareness generation and training of stake holders (change in behavior and attitude, water and sanitation committee, knowledge, resource persons)
- Advocacy and IEC material
- 100% O&M cost recovery should be encouraged; Taxes and tariffs based on household socio economic status and Government should issue GOs making the taxes mandatory.
- Mobilization campaigns from time to time for retaining the community engagement.
- Community to be made completely responsible for implementation of SLWM plans.

Policy & Guidelines

- Flexible guidelines needs to in place(local authorizes/officers should have powers to relax guidelines on the basis of village needs
- Third Party Quality Audit
- Regular Monitoring and evaluation keeping out comes as a basis. It's important to measure the service delivery than the physical or financial numbers.
- Preparation of Detailed Project Report in place
- Empanelment and strengthening of KRCs
- Social equity & Gender sensitization
- Exit Plans by the department duly discussing with the community. Pre defined checklists, and social and technical audits to facilitate the exit process empowering the community.

Technical, Financial and others

- Formulation of KRC policy (estimation +execution+ monitoring)
- Comprehensive Sanitation Plan Use MJP's/ other format/ experience covering the entire village at one time
- Use of technology – GIS mapping, contour mapping, household inventory etc. Govt. orders shall be issued
- Fund limit should not be imposed when adopting the saturation approach
- GP selection is very important under saturation approach. (compulsory all GS above 10,000 population).

Analysis of the four group's presentations reveals that, all the groups are emphasizing on the increased allocation of budgets exclusively for SLWM. Also there is a demand for separate/specific funds ring fenced for operation and maintenance. Technological options using advanced technology to suit to various agro, hydro, geological conditions ensuring sustainability

is another critical input. Participatory planning and monitoring focusing on outcomes is essential and social auditing and financial monitoring is a mandate. Convergence and coordination among the related departments was emphasized and deploying more staff with appropriate capacity building programs for all the levels should be part of the principles for ensuring SLWM.

Process, Methods, Tools and Techniques for ensuring the implementation of SLWM policy, guidelines and Principles.

Similar to the group work on the principles, the groups were requested to work on the methods, process, tools and techniques for effective implementation of solid and liquid waste management. Since the groups had already worked on the issues and challenges as part of their first group work, it was explained to them, that they have to provide suggestions, good practices and recommendations to address those challenges or issues while implementing SLWM.

Panchayat representatives

Sensitization, awareness raising activities:

- Advertisements to be given using big boards and posters so that curiosity generates and people show interest to know more about the details
- Skits and Dance ballets as a medium to create awareness
- Demonstrations and Nukkads on safe sanitation and hygiene

Transparency and Accountability:

- Gram sabhas has to be conducted in line with MNREGS and all the financial details should be made public
- Annual action plan to be prepared and shared in the Gramsabhas
- Self project proposals to be made at household level and to be shared in Gramasabha and households should take accountability for up keeping the cleanliness at Household level
- Social auditing is very important and needs to be conducted regularly at all levels

Capacity Building and Skill development Trainings

- Technical trainings to be given from GP to various people.
- The funds for trainings should be given directly to panchayats

Technical Designs , estimates and preparation of DPRs:

- The rates provided by the Government should be competitive to the open market, and the rates to be revised based on the market rates from time to time and not on annual fixed rates

- Department should have a framework while encouraging the local indigenous technologies and communities should also be encouraged for tendering. Participation in E tendering should also be encouraged.
- Estimating and budgeting for SLWM with supervision and guidance from Block level Junior Engineers.
- MJP or any other agency shall act as facilitator for implementing this scheme from start to end
- Individual household waste can be used for bio gas or any other techniques.

O&M by Gram Panchayat by village community

- User fees should be collected for undertaking O&M
- NBA should be handed over to PR department for implementation.
- For individual households subsidy shall be given up to 75 % and 255 by loan for managing SLWM

Support to the Community for overall implementation

- Model villages shall be developed which can become the exposure visit sites for motivation and inspiration.
- Special officer for overseeing the SLWM Plans/ projects of 5-6 villages
- Enforcement of laws and community pressure to avoid encroachment of nallas, tanks and natural drains. Also for banning the non biodegradable waste.
- Funds for Land acquisition for land filling and solid waste disposal.

Group work II by the Block level representatives

Technical and Financial

- Typed estimates for SLWM, Micro Planning keeping the entire village as a unit
- Incentives and encouragement to the GPS,
- GOI should provide basic Guidelines and funds and monitoring and support by the blocks directly
- Policy for giving Technical sanctions and approvals for SLWM at the sub district level.
- Low cost and sustainable technology with low O&M costs and that requires minimum land requirement (e.g.: Bio gas plant)

Support to Community

- KRC & RWS will assist VWSC
- PRA and Social mapping for preparing the micro plans.
- GP should be supported in survey and selection of works to be undertaken, project preparation, submission of project report, getting work done and social audit, and taking care of Operation and Maintenance

Sensitization, Training and capacity development

- Exposure visit /field visits
- Training and capacity building VWSC
- IEC, Training and capacity building of resource persons
- Independent district coordinator

Institutional Development

- Roles and Responsibilities
- State(WSSO) should provide detailed guidelines, funds to districts, monitoring, appointments in RRC
- Formation of state level committees for technical sanctions and approvals
- Deciding the criteria of GP selection
- Deciding the role of DWSM(each member)

Monitoring

- Independent website on daily work progress (recently Govt of Maharashtra started)
- Release of funds to talukas, monitoring, inspection and IEC, economy of solid and liquid waste management (assess the quantities of waste generated and what can be done with it..)
- Monitoring the technical approval ,estimation and measurement processes.

Incentives and Subsidies

- Subsidy provision for individual beneficiary
- Inclusion of income generating activities
- Subsidies to projects lead by cooperative sectors

District representatives

Operation and maintenance

- Separate wing at the district level for O&M to support the communities
- Separate budget and fund flow for taking immediate actions (not always the funds are available with the Panchayats)
- The allocation should be based on assets created and not based on population at the Panchayat level

Planning and Implementation

- GP and Department should take equal responsibility; GP should plan according to the need but not plan according to allocation.
- Prioritization of issues pertaining to SWLM, initially the GP should introduce dustbins and start working on the drainage.
- Preparation of Micro plan keeping the technical options in view.

- Formation of SLWM unit at panchayat level where the employment of workers for SLWM, tri rickshaws procuring, liquid waste cleaning, drainage maintenance responsibilities can be entrusted to the committee.
- Villages shall allocate lands for Water & SLWM in the village development plan

Staff Capacity building and Skill development

- Deploying a Core team at the district level on contract basis and creating a separate sanitation unit
- Capacity building of all the team members
- Typed estimates for SLWM to support the block and village level stakeholders
- Trainings and exposure visits for district level-DWSM, PHED and NGOs
- Awareness generation at panchayat level, budgeting and prioritization of activities
- Orientation at Panchayat level- PRI members, Natural leaders, ASHA or anganwadi workers

Technical and Financial

- Financial constraints to be sorted out: Liquid waste for >5000 +1400 per capita, Less than 5000 population 250/per capita: SW- >5000+ 900/per capita and <5000+500 per capita
- Community participation(for villages having population >25000 it should be limited to design and concept for population for < 2500 SLWM shall be done at IHHL (privatization for WSS and SLWM recovery) .
- Technical identification- engineering committee (EE , RWSS) or dedicated unit to evaluate technologies and approve the micro plans
- Fund flow –district to Panchayat against requisition and against approved micro plan in a phased manner. The adhoc funding/ sanctioning to be avoided.

Incentives and subsidies

- Incentives for changing behavior on SLWM
- Incentives to the officials for raising awareness to all the sector holders
- Incentives for GP which maintain SLW

Monitoring

- CPMEO manual for rural SLWM (Orissa has developed the manual with the support from UNICEF)
- MPCB monitoring at the village level industrial pollutions

State Representatives

Technical and financial

- State level core committee for technical options and suggestions (this is already existing in Maharashtra, this group approves the technical solutions for the state)
- Establishment of R&D section at state level
- Special funds should be provided at district level/state level for R&D
- All the approaches should be demonstrated and best practices should be documented and scaled up.

GP level Planning

- Assessment of the technological options in consensus with the community through gram sabha (participatory micro planning)
- Development of Role Model Villages(SLWM)
- Preparation of village level SLWM plan
- Budgeting- Fund flow from different programs like NBA, MNREGS
- Endorsement and approval of plan (Grama sabha, sanction from Govt)
- Implementation (support from Technical agencies)
- Allocating the place for disposal/treatment is Govt responsibility
- Local skill and capacity should be strengthened .PRI capacity should be enhanced.

Convergence and coordination

- National, State, District and GP level Coordination
- Technical persons need to be appointed at block level

O&M amount should be available /float at GP level

- The community contribution should be ensured for operation and management.
- Handholding for O&M sub-division should deal with SLWM

Incentives and Subsidies

- Performing villages should be given incentives. Provision of rewards for ODF plus villages.
- Honorarium and Incentives to Village Water Worker for SLWM
- Special rewards for GP, Block and district level for institutions and individuals

Monitoring at all levels

- Qualitative monitoring should be included along with quantitative monitoring.
- Assessment studies should be conducted and follow-up activities to be integrated.

Institutional:

- Gram sevak, Junior Engineers etc. shall be members of VWSC
- Role Clarity for various stakeholders

- State level committee/ authority for SLWM
- Young generation shall be encouraged in VWSC –(50% reservation for youth up to 35)

Capacity development and Strengthening of institutions

- Yearly training on SLWM issues to all engineers of ZP, DWSM Team
- Training and exposure visits for elected members.
- Training, exposure, study tours and cross learning for various stakeholders at various levels.
- Operational Manual, Technical Manual etc., pamphlets, films.
- Training for School & College children.

Social/ community mobilization

- Awareness Generation, Mobilization campaigns, training and sensitization of stake holders (change in behavior and attitude, water and sanitation committee, knowledge, resource persons)
- Advocacy sessions for all ZP members, PS members, etc.
- 100% O&M should be encouraged – Tax Govt. shall issue orders on sanitation tax

Policy & Guidelines

- Flexible guidelines
 - Powers to relax guidelines on the basis of village needs
 - Third Party Quality Audit
 - Regular M&E
 - Preparation of DPR
 - Empanelment and strengthening of KRCs
 - Social equity & Gender sensitization
- Exit Plans
 - Pre-defined Exit checklist
 - Social & Technical Sustainability Audit

Technical, Financial and others

- Formulation of KRC policy (estimation +execution+ monitoring)
- Comprehensive Sanitation Plan;100% SLWM plan for projected population
- Use of technology – GIS mapping, contour mapping, household inventory etc.
- Govt. orders shall be issued for implementing the technologies and guidelines
- Comprehensive approach (No emphasis on end process, saturation approach, development of model villages)

Conclusions:

The workshop offered some interesting discussions among the participants and many issues of solid and liquid waste management were identified. Keeping their field experiences as a base participants have offered valuable suggestions in terms of tools, methods and practices to be incorporated into the policy. Further the conclusions of these workshops were presented at the national workshop organized by the Ministry and ADB. The principles to be included for policy framework need to be carefully consolidated validating the suggestions of the participants. The policy framework to address the SLWM is a welcome sign and it is expected that these change will bring safe sanitation practices across the villages in rural India.

Annexure I

Workshop program schedule

Time		Session	Lead	
09:30	09:40	Opening remarks	- State level representatives	Plenary
09:40	10:00	Introduction Objectives Expectations	- Smt. Snehalatha Sreedhar, ADB - Mr. Pramod Dabrased, ADB	Plenary
10:00	10:30	Experience sharing from State: Overview Examples	- Mr. Pramod Dabrased, ADB	Plenary
10:30	10:50	Break	-	
10:50	11:00	Presentation of Key issues for SLWM	- Smt. Snehalatha Sreedhar, ADB	Plenary
11:00	12:00	Identification of Principles for inclusion in policy framework	- All Participants	Group work
12:00	13:00	Feedback from groups Discussion	- Group leaders - Smt. Snehalatha Sreedhar, ADB - Mr. Pramod Dabrased, ADB	Plenary
13:00	13:45	Lunch break	-	
13.45	14:45	Defining guidance needed to make it happen - What tools? - How? – the process	- All Participants	Group work
14:45	15:45	Feedback from groups	- Group leaders - Mr. Pramod Dabrased, ADB & - Smt. Snehalatha Sreedhar ADB	Plenary
15:45	16:30	Discussion, summary and closing	- Smt. Snehalatha Sreedhar, ADB	Plenary

REPORT ON
PRACTITIONERS WORKSHOP FOR
DEVELOPING A NATIONAL POLICY FRAME WORK ON SOLID AND LIQUID WASTE
MANAGEMENT IN RURAL INDIA

20 – 21 May 2013

The Asian Development Bank (ADB) is providing Technical Assistance to Ministry of Drinking Water and Sanitation (MDWS), Government of India (GoI) for developing a National Policy Frame Work on Solid and Liquid Waste Management in rural areas of the country under Nirmal Bharat Abhiyan Programme. In order to discuss the key challenges and issues related to Solid and Liquid Waste Management (SLWM) and to come up with a National Policy that can facilitate the implementation of the SLWM programme in rural areas to make the villages clean and healthy, a National workshop was held on 20th and 21st of May in Park Hotel, New Delhi.

The workshop was attended by more than 20 experts and 15 practitioners including the elected representatives from different parts of the Country. The workshop was inaugurated by the Secretary, Ministry of Drinking Water and Sanitation, Government of India and the participants were welcomed by the Joint Secretary, Ministry of Drinking Water and Sanitation, Government of India.

Inaugural Session

The workshop started on 20th May, 2013 at 10.00AM. The Joint Secretary (Sanitation), Ministry of Drinking Water and Sanitation, Government of India welcomed all the participants. In his welcome address he mentioned that under Total Sanitation Campaign (TSC) of Ministry, 10% of the project cost of each State was for SLWM projects in the State. Now this has changed under Nirmal Bharat Abhiyan (NBA) programme and funds are allocated to States based on population of Gram Panchayats and the funding may range from 7 lakhs to 20 lakhs. He also appreciated the efforts of ADB team in supporting the Ministry to come up with a National Policy frame work for SLWM. After welcoming all, he invited Secretary, GoI to inaugurate the 2 days workshop.

In his inaugural address, Secretary, Government of India focussed on the issues and challenges in the field of sanitation especially the issues of SLWM in India. He initiated the address by saying that SLWM is a challenging subject in India due to its diverse nature like different terrain, varying climatic conditions and different existing culture and customs among the community. Earlier, managing solid and liquid waste is a major issue in urban areas only but now it emerged as an issue in rural areas also. People dump both Kitchen waste and toilet waste in sewerage system, which makes it difficult to properly manage or treat. He also stated that the coverage of sewerage system is only 15-20% even in Cities despite the continuous effort for almost a decade. Managing

waste water itself is a big challenge. He also shared some of the existing issues in managing the SLWM in different parts of the Country. In Lucknow, Uttar Pradesh, a SWM project has been set up which worked initially but later shut down only due to O&M issues. Hence he suggested that we must focus not only on setting up of waste management plants but also on sustainability of the SLWM programmes.

Under NBA programme, Ministry focuses on to make our country Nirmal by 2022 through sustainable sanitation programmes in rural India. Each and every person has a role and responsibility in achieving this, he stressed. He also pointed out that there is no compendium on best practices on SLWM in India. He also emphasized the need of developing some techno-economic models in rural areas. There are only few proven technologies in SLWM and with the help of Research Institutes and other reputed NGOs, we should focus on more research in the field of SLWM. He also focussed his talk on the following points.

- There is a need for more focussed capacity building in SLWM.
- The usual practice of Top to bottom approach has to be changed.
- The PRIs has to be sensitized on SLWM.
- Training and capacity building for O&M at local levels, particularly for the PRIs has to be given. The PRIs are not capacitated to manage even the drinking water supply.
- In rural areas, hardly any focus on SLWM, i.e, a trend of Toilet Vs SLWM is still continuing even though the NBA provides and facilitates SLWM on a large scale particularly in GPs, where NGP was awarded.
- The Engineers usually have civil construction background and they have to be capacitated to look on social engineering aspects also.
- Civil Society Organizations/ NGOs can play an important role in planning and implementing as well as monitoring the SLWM programmes in Gram Panchayats. The support of KRCs can be sought for this also. Ministry will be able to fund NGOs and KRCs who are willing to accomplish R &D in SLWM.
- There are local level practices to manage liquid waste. For eg: The grey water from bathrooms and Kitchen are drained to Coconut palms in Kerala. In Haryana, the aquifers are recharged from rain water.
- Convergence with MGNREGA has to be discussed and made vivid.
- In Karnataka, there are models of subsidised O& M in SLWM programmes. So there should be a discussion on which model we should follow?

He concluded his address by congratulating the ADB team that they has now come up with assessments from field of different states such as solid waste are burnt or dumped in water sources and he hope that the outcome of the workshop will be useful in refining capacity building, sustainability, techno-economic models and scaling up that in rural areas of the Country.

Following the inaugural address of Secretary, GoI, Sri. Jeremy Ockelford, the Team Leader of ADB Team for the TA project in India gave a brief introduction about the programme and the role of ADB in supporting the Ministry.

In his brief introduction, he explained that the Government of India requested technical assistance from ADB to support the transition of the TSC to NBA and during initial discussions in July last year the previous Secretary asked for the TA to focus on rural solid and liquid waste management, with a specific output to develop a policy framework, with practical guidance. This was endorsed by the then Minister of MDWS.

The process for the TA was formulated with four main steps:

1. To carry out an initial assessment of the status of SLWM in 5 states; identify examples of good practice; carry out a literature reviews and identify the key challenges
2. Conduct studies into specific issues and questions related to SLWM
3. Hold consultation process with local government, practitioners and states
4. Formulate and review a draft policy framework and develop practical guidance
So this workshop is an essential part of the consultation process. We will use the out puts for developing the policy framework and practical guidance.

With this brief introduction, the inaugural session ended and the technical session started with the presentation by Dr. Gangadhara Murugan, the National Resource Consultant of Ministry of DWS.

TECHNICAL PRESENTATIONS – 20.05.2013

1. **Dr. Gangadhara Murugan, Consultant (Economics), National Resource Centre, MDWS** on Status of Drinking Water, Latrine, Garbage Disposal facilities and Liquid Waste Disposal arrangements in Rural India.

In his presentation, Dr. Murugan attempted to show the present status of latrines, garbage disposal, waste water and travel distance to fetch water, that have a bearing on the formulation of a National frame work on Solid and Liquid waste.

His presentation was based on the data available in Census 2011 and focussed on the following points.

- Provision of hygienic latrine facilities among rural households
- usage unhygienic latrines and open defecation
- State wise and all India percentage of households with arrangements for garbage disposal
- State wise and all India percentage of households with arrangements for waste water disposal arrangements
- Distance travelled to fetch drinking water by rural households.

With the help of Radar Diagrams, he explained in detail about the above aspects. He also pointed out that more than 80% HH are having facility of garbage disposal

arrangements in Delhi and Chandigarh while Puducherry is the only state falls between 60 – 80% followed by Haryana, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland and Tamilnadu where they have 40 to 60 % HH have facility for garbage disposal. Arunachal, Assam, Chathisgarh, Gujarat, Madhya Pradesh, Punjab, Uttar Pradesh, Dadra Nagar Haveli are states where 20 to 40 % HH having facilities of garbage disposal. Andhra Pradesh, Tripura, Sikkim, Orissa, Jharkhand, Karnataka, Jammu and Kashmir and Himachal Pradesh are having facilities only to 20% HH.

Similarly he presented a detail data on Waste water disposal and other sanitation facilities in Rural India. In order to explore regional patterns and further nature of the coverage a GIS map is used and he also presented on District wise percentages plotted across 640 districts from the Census 2011 data.

This back ground data on status on garbage disposal, waste water and travel distance to fetch water helped the participants to understand the coverage status of sanitation facilities in rural India that have a bearing on the formulation of a National frame work on Solid and Liquid waste Management.

He concluded the presentation by hoping that this background and census data analysis has to be considered while framing a National Policy on SLWM.

2. Prof H S Shankar, Department of Chemical Engineering, Indian Institute of Technology, Bombay on SBT TECHNOLOGY OF IIT BOMBAY

In his technical presentation, he explained about the soil bacterial technology for treating the solid and liquid waste in an eco-friendly way. He focussed on the various applications of this technology, the basics about the technology, the process chemistry and the applications of this novel technology. He pointed that the technology is applicable for Rain water harvesting, Drinking water, Swimming pool, Sewage treatment, Industrial wastewater treatment, Industrial air purification, Municipal solid waste Processing, Commercial production of Soil, Animal House waste processing and Hospital waste treatment.

His presentation gave inputs about the biological treatment technologies possible in rural India for handling the solid and liquid waste in an eco-friendly manner.

During the discussion, some participants raised apprehension on the application of SBT technology in hospital waste treatment, since the hospital waste contains biomedical waste also. The biomedical waste is highly pathogenic and may cause adverse effects if treated on land but everyone appreciated the application of SBT technology in waste water treatment systems which are being implemented in Rajasthan and Bombay.

3. Jeremy Ockelford, Consultant to ADB on Challenges to Achieve Solid and Liquid Waste Management in Rural India.

In his presentation, he focussed on the issues and challenges before the GoI in tackling the SLWM issues in rural India based on the field experience and recent field visits in different parts of the rural India by him. He pointed out that his workshop is part of a process to develop a national policy framework and practical guidance for rural SLWM, which is going to be a difficult task due to the diversity of issues and challenges. In his presentation, he explained that the overall challenge is to enable sustainable management of “waste” in 1,660,000 villages in the next 10 years. He also pointed out that we need to understand and plan how to address the key challenges before we can make progress in preparation of the Policy.

He displayed the following discussion points and issues before the participants to discuss and evolve a strategy. That included

- What will be the achievement in case of solid and liquid waste management?
- Should we address this as Waste or Resource? “Waste” implies a negative; “resource” implies a positive economic value.
- Should it be short-term projects, or development of services for long-term (infinite) time periods?
- How can thinking and approaches be changed?
- What are the incentives and disincentives to change the way things are done?
- Behaviour change of households and communities
- Are there enough people with the right sets of skills, experience and competence at all levels?
- What is the capacity to develop, operate and regulate services to 1.66 million communities within the next 10 years?

All these issues and challenges have to be addressed during the planning and evolution of a National Policy. His presentation evoked thoughtful discussions among the participants.

4. Pramod Dabrase, National Solid Waste Expert, ADB on Issues and Challenges on Solid Waste Management.

In his presentation, he discussed about the missing links in the whole process of SWM starting from Generation, segregation, collection, transport, treatment and disposal. He also mentioned about the existing issues or the present scenario like lack of comprehensive and integrated planning, low awareness and sensitization, lack of policy, regulations and guidelines, waste is not recognized as a resource except selected items, and also about the treatment technology like incineration which is predominant and rampant disposal in drains, water sources are practices of community.

He also discussed about the SWM problems of rural areas like storage of cattle dung, a major challenge and is predominantly used as energy source (cake). Limited and no innovations in the field of SWM technologies, and he also shared the experiences of business approach of SWM which are proven to be feasible but not able to scale up. Another major issue raised is the low developed market links and lack of convergence with other key departments.

The participants were also actively involved in discussions and suggestions during the workshop. Some of the relevant responses and discussions are given below.

5. Jayesh Mandlik, National Liquid Waste Expert, ADB on Liquid Waste/Resource Management or Service- “Issues & Challenges”.

Sri. Jayesh Mandlik discussed in detail about the present status of liquid waste management in the villages, they visited in Maharashtra. His observations are that in Nimbode Village, 25% of the households have individual toilets, 75% of the people use common toilets and most of the overflow of the septage/sewage from common toilets is let off into the fields/farms, which may results in high health risks. Major observations also included that the grey water/sewage from few of the households is let off on the ground itself and in certain cases the bathroom waste water is let off directly to the fields/farms through gutters. 25% of the households have constructed underground Septic Tanks, which are not maintained properly.

He also stressed the need of consideration and study on characteristics of the waste being generated, quantity and frequency of waste generation, availability and affordability of technology options, applicability of the technology option in the area and availability of skilled personnel, energy, O&M needs, land requirements when selecting a technology option in a village/GP/ District/State.

Sri. Jayesh Mandlik also gave inputs on the technology options in LWM like Kitchen Garden with Piped Root System, Leach Pit, Latrine Pits, Soak Pits, Root Zone System, Septic Tanks with Biogas plant, Oxidation Pond, Conventional Trickling Filter with sludge digester, Anaerobic Fixed Film Reactor & Extended Aeration, Anaerobic Lagoon & Aerobic Pond, Packaged Mobile Grey Water Treatment and Packaged Mobile Sewage Treatment with examples and experiences.

He also mentioned about the issues and challenges in septage management, frequency of emptying septic tanks, conversion of septic waste into Biogas, sstandardization of design & drawings of various suitable liquid waste technologies

According to him the overall objective of the final SLWM policy should be to emphasize the principles of 3R's, i.e. Reduce, Recycle, Reuse for SLWM, to have a service approach instead of project approach and also to inculcate sense of subsidiarity, equity, sustainability and priority.

Sri. Chandi Charan Dey, RamaKrishna Mission, West Bengal.

Sri. Chandi Charan Dey, elaborated the present scenario of waste management in West Bengal. He pointed out that no large scale waste management schemes or programmes are attempted in the rural areas of the State. They follow the decentralised system of waste management. Waste management is always planned based on the basic understanding on the culture of the households. Villagers themselves are capable of handling the waste generated in their households. Most of the rural households have cows in their houses, so they feed the vegetable waste to them and keep the non-recyclable wastes separately and sell. Centralised waste management is done in Market places only. The programme of segregation of the waste at household level and managing them at the source is successfully done in 18 Gram Panchayats. Village motivators do most of the IEC activities on waste management and sanitation in the State. He is hopeful that within two years, 90% of the villagers will be motivated to do waste management at the source itself.

He raised few queries also on funding pattern of NBA for SLWM. He suggested that under NBA, incentives are given to GPs for SLWM but clarifications are needed whether it is given directly to the households also. Provisions of funding is from Rs. 7 lakhs to Rs.20 lakhs for GPs having more than 500 households but for GPs having more than 3000 to 4000 households, the funding will be less. This also has to be discussed during the National Policy frame work, he suggested.

Dr. R. Ajayakumar Varma, Former Chief Executive, Sanitation Mission, Kerala

Dr. R. Ajayakumar Varma, made two presentations in which he shared the experiences of building a waste free Kerala and the role of policy and governance. He also mentioned that a high level committee was formed earlier in GoI to develop a National Guideline for SLWM.

He explained the operational Strategy they followed in solid waste management focussed to Plan for households, Plan for institutions, hotels & community halls, Plan for educational institutions, Plan for markets, slaughter houses, industries, Plan for streets, beaches & public places, Plan for water bodies and enforcement on Plastic ban, Modernization of abattoirs.

He also mentioned about the specific initiatives taken for encouraging SLWM in the State, which includes thrust on solid waste management & sewage in mega projects under KSUDP, JNNURM & UIDSSMT, modernization of Slaughter Houses, Resource Recovery Centres- Plastic recycling units, Public Office Sanitation, Malinya Mukta Awards- Schools, Hospitals, Balwadi Offices, Media initiatives- Social Reality show-GREEN KERALA EXPRESS, Integrated Low Cost Sanitation and National workshop on solid & liquid waste management.

He also discussed in detail on the action taken for the development of a National Guidelines for GoI on SLWM, which was initiated in 2010. The draft guideline discusses on Vision document, Technical Support Group, SLWM Project, its safeguards, Handling-Overflow Management, Technical Support, Accredited agencies, Service Providers on SLWM, RSM-PC, Organizational Support, Volunteers, SHGs, SLWM Cell- State, District, Block, Financing, Convergence, Best examples and IEC.

Laxmi Prasad Sharma (Kafley), Up- Adhyaksha, West Sikkim Zilla Panchayat, Sikkim.

Laxmi Prasad Sharma, suggested that Sikkim has a hilly terrain and whenever one makes a Guideline or Policy at National level, the NE States must be given priority due to the difficulties they face. Most of the GoI programmes give more funds to the NE States considering specific issues and terrain features of the State. Hence, he requested that this strategy may be followed while developing the National Policy on SLWM for MDWS.

Dr. Shyamala Mani, Professor, National Institute of Urban Affairs, New Delhi

Dr. Shyamala Mani, shared her experience in Hospital Waste Management. She informed the participants that segregation of wastes in hospitals is difficult task as they tried this in 55 bedded hospital for 7 years. Sharps and plastics are treated along with food waste. In case of rural areas, all the small dispensaries and Block level hospitals must be given awareness on segregation, collection and proper treatment of hospital waste.

M. Kartik, Sr. Scientist, National Environmental Engineering Research Institute, Nagpur

M. Kartik, also shared his experience that in literate population it is very difficult to manage the use of plastics that lot of pouches block the drain and causes severe environmental problems. Most of the STPs in the Country also faces problems due to the mismanagement of plastics. Strict enforcement of laws are needed to control the use of plastics, he concluded.

Kunjumol Chacko, Vice President, Kumily Gram Panchayat, Idukki District, Kerala

Kunjumol Chacko, Vice President, Kumily Gram Panchayat, during the introduction of participants shared the success story of the Clean Kumily, Green Kumily project of her GP. The documents prepared on the basis of the project are then shared with GoI officials.

GROUP WORK - DAY 1

By around 3.45 PM, the participants are grouped into two for Group level Discussions and Presentations. The topics assigned to the two Groups are Solid Waste Management and Liquid Waste Management and each group consisted about 10-11 participants.

Group I – Solid Waste Management

The group consisted of 11 participants. They discussed on various issues, challenges in service delivery, social behaviour change, roles and responsibilities of Institutions, issues that were left out during the presentations and various approaches to be adapted in framing the National Policy Framework. The group consisted of academicians, scientists, practitioners and subject experts representing NGOs, GPs and R&D Institutes.

Group II – Liquid Waste Management

The group consisted of 10 participants of academicians, scientists, practitioners and subject experts representing NGOs, GPs and R&D Institutes.. They discussed and shared experiences on various issues, challenges in service delivery, social behaviour change, roles and responsibilities of Institutions, issues that were left out during the presentations and various approaches to be adapted in framing the National Policy Framework.

PRESENTATIONS OF GROUP

Group 1 emphasised that the term waste may be replaced with Resource. So the presentation was on **Solid Resource Management (SRM)**.

Gist of the points – Group 1

- Lack of segregation of wastes
- Lack of policies at rural level
- Lack of trained and expertise manpower in the field
- Requirement of land-if centralized system is planned
- Towards zero waste is required.
- IEC according to insight of community required
- Requirement of minimum time for IPC.
- Waste management at source to be encouraged.
- Engineering internship at rural areas is required.
- Inclusion in curriculum/syllabus with practical activities.
- Issues that are not addressed included industrial waste, Biomedical waste,E-waste, Construction and demolition waste and Slaughter house waste management.
- GP level sanitation plan is needed.
- Recognition of Communities who do good job.
- Land allocation by Gp should be considered.
- R&D needed for micro to macro level implementation.
- Economic and business model for management and funding needed.

Group 2 discussed about the liquid waste management scenario, issues, challenges and made a presentation based on that.

Gist of the points – Group 2

- Segregation at source as black water and grey water.
- Leach pit should be constructed wherever feasible.

- Site selection is important.
- Motivation at grass root level using women SHGs, religious preachers etc.
- Trainings and capacity building at all levels are needed.
- Separate department needed for SLWM alone.
- Occupational safety, O&M and Environmental sanitation should be given priority.
- Pilot units needed.
- M&E through Social Audits.

The discussions on presentation continued till 7PM.

21.05.2013 Second day of the Workshop

The second day of the workshop started with the recap of the first day. Mr. Jeremy Ockelford initiated the discussions of the second day at 9.30AM.

TECHNICAL PRESENTATIONS - 21.05.2013

1. Dr. Vaijayanti Padiyar, National SME & Finance Expert, ADB on Socio Economic Issues in SLWM

Dr. Vaijayanti Padiyar presentation was divided into 4 parts-Socio-cultural aspects, Economic aspects, Service oriented approach and challenges to be discussed on development of a National Policy. She tried to bring in almost all the challenges and issues in these 4 sub headings of her presentation. She discussed in detail on the 3As of Socio-cultural issues like Attitude, Awareness and Acceptability.

The presentation also included the report of the field visit by the team in Maharashtra State. Villages they covered included Khalapur, Nimbode, Mahad, where the coverage of sanitation is only 22-40 but they have organized swm collection. Humgaon Village was rewarded for best efforts in SLWM with community participation and Vadap village has water supply problem and water quality problem that there are marked red sources available.

She also discussed on some issues of GP level that, Village level Sanitation Committee existing most of the villages but are unaware about the role and responsibilities. Need sensitization for SLWM in GPs. Financial, attitudinal and resource mobilization etc were discussed during her presentation.

2. Dr. Balachandra Kurup, National Governance & Institutional Expert, ADB on Governance and organizational Aspects in SLWM Sector in rural areas.

Dr. Balachandra Kurup, presented and discussed on the major issues in the field of SLWM, the governance and organizational issues. He rightly pointed out the fact that there too many stakeholders of this programme with no clear roles and responsibilities and there exists no coordination among the various stakeholders of the programme. The policy makers and decision makers at higher level, plan SLWM without knowing the ground reality and he also stressed the need of human resources at all levels.

Another point of his presentation was that t the sector is highly influenced by the mafia groups and monopoly of some service providers, he discussed based on the experience. He also stressed the need of role refinement for the VWSCs in accordance to the SLWM. His presentation also bought in the need of convergence and coordination among the various departments at village level. This may help the sustainability of the programme, he added. He presented his concerns over the weak regulatory mechanism, no effective social audit of the programmes and also the lack of effective application of 73rd Constitutional Amendment.

Soon after the presentation, the participants are grouped in two for the discussion of Social & Economic issues of SLWM.

The first group consisted of 10 members. They discussed on the issues and approaches in Socio-Economic Aspects of SLWM

Group1& 2 on Socio-Economic Aspects of SLWM

Under the Social Challenges, the group discussed on the existing caste system in the villages, that only a particular group is engaged for sanitation related activities. They also discussed on lack of literacy, intensive IEC and existing social stigma as the basic social challenges at the grass root level. The approaches that can be adopted may include innovative campaigns and adequate focus on budgeting for participatory planning.

The Economic challenges pointed out by the group members are the lack of economic models in the country and also lack ownership by the community. The approaches mentioned by the group are that the lowest unit of planning may be GP but implementation unit must be villages, O& M support must be ensured and there should be provision for income generation.

Group1& 2 on Governance & Organizational Aspects of SLWM

The key issues pointed out by the Groups are that the incentives are very low, low priority for SLWM, top down decision making etc. In approaches the two group mentioned about the orientation for chief functionaries, clear accountability from GP to State level, the grass root level motivators must paid some incentives, new programmes

must be explained in Gram Sabhas and there should be locale specific operational guidelines.

Both the groups stressed on the need of third party monitoring and evaluation of the project. Beneficiary participation must be ensured and women participation must be considered.

Based on the discussions and deliberations of two days by all the subject experts and practitioners, Mr. Jeremy Ockelford compiled the details and presented. The next steps of ADB were also discussed and following details were given by him. Immediate action will be the development of Draft policy framework, followed by Review of draft framework by Peer review and National Workshop with State representatives. Based on these reviews, the draft policy framework will be revised. ADB also agreed to give practical guidance, trial of adapted SSA as GP planning tool and Draft practical guidance will be developed.

Vote of thanks was extended by Dr. G. Murugan, Consultant, MDWS. The workshop was ended at 4.00 PM.

Major Discussions of Two days Workshop

Scale of task

The task is very huge based on the number of villages, variation in coverage, variation in size, variation in type of village.

Scale of change

The scale of change is also a major challenge as this has to occur at community level and for this intensive IEC needed. Changes should happen in approaches also based on level of participation and service delivery. Changes should be there in case of self-funding operation costs, Change in organisations and also on the capacity to deliver.

Raising the profile of SLW/RM

For making SLWM in priority list, there should be high voltage awareness at community level, in organisations at local and national levels including the awareness at political levels. Focus should also be given to advocacy.

Major decisions of Two days Workshop

The following decisions were taken based on the discussions of two days interactive workshop.

- Draft policy framework will be developed soon.
- Review of draft framework will be done by peer review as first step and National Workshop with State representatives as final step for review of the frame work.
- Based on this, draft policy framework will be revised.
- Practical guidance will be given within the limited scope of this ADB project
- Trial of adapted SSA as GP planning tool will be conducted.
- Draft practical guidance will also be developed.

Appendix 6 Drafting and implementing a SLWM Plan

GPs should carry out the following activities in order to plan and implement SLWM interventions. Schematic representation of all the processes and approach for planning implementing SLWM interventions is given in

Figure 11.

Situational Analysis:

A situational analysis is suggested in order to understand the real situation on the ground, not just in relation to SLWM, but also covering wider aspects of toilet coverage and the situation of SLWM and sanitation in institutional and public settings. It is expected that most GPs will have data related to toilet coverage, the type of toilets in use, disposal mechanisms in use, etc. This data will be useful for designing wastewater and septage management interventions. The situational analysis can include the following;

- Baseline Survey – a baseline survey of the existing solid and liquid waste situation in the GP. This would include physical infrastructure as well as existing service levels, financial conditions, aspects related to user fee collection (if any), existing O & M system, etc.
- Collection of supplementary data – once a baseline survey is completed, additional supplementary data such as data related to toilet coverage, disposal type, availability of landfill site nearby, existing market linkages for solid waste, possibilities for recycling, processing, etc. has to be collected
- Make links with the existing sanitation system- exiting sanitation systems (e.g. treatment plants, toilets and latrines, drainage channels etc).)need to be linked with the new SLWM plan so that a comprehensive and complete sanitation system can be planned. This plan could be called a “GP Environmental Sanitation Plan”.
- Gaps Analysis- once a baseline survey is completed and additional data is collected a gap analysis exercise should be conducted to understand gaps in the existing SLWM system specifically and the sanitation system more generally.

Options analysis, Technical feasibility;

- Identify real demand for services- community consultation may be carried out to understand the real demand for services so that interventions can be framed accordingly.
- Identify suitable solutions- technology, approach, methods, preferences should be selected based on local needs, conditions and acceptance
- Identify manpower, institutions, and partners- in order to plan and implement SLWM interventions appropriate manpower, institutions and partners along with specific roles they are expected to play has to be identified. If there is lack of capacity at any level , suitable measures to bridge the gap must be specified.
- Finalize technology and approach – based on the outcomes of the situational analysis and technology options analysis, appropriate technologies and approaches should be finalized in consultation with all key stakeholders.

Identify resources;

- Identify sources of finance – all possible sources of finance including Government grants, GPs own funds, expected user charges, possible contributions by private parties (if any) have to be clearly specified.
- Identify community willingness to participate and pay for services– it is important to understand how the community responds to proposed interventions and plans. Therefore, their willingness to participate and pay for services should be assessed in order to choose appropriate options, design user fee structures and to adjust finances accordingly.

GP SLWM Action Plan (GP Environmental Sanitation Plan) – as far as possible the plan should be one integrated plan, covering all aspects of sanitation including toilets, waste water, septage, hygiene and solid waste management. Each of the elements of environmental

sanitation has to be appropriately covered. Other aspects such as institutional aspects, technology choice, capacity, IEC, governance, management, etc. should also be appropriately covered.

Implementation;

- Mobilize funds – finances have to be arranged well in advance at the time of implementation. A realistic financial plan with income and expenditure statements should be prepared. In case of user fees, a collection system should be established to ensure timely and effective collection.
- Procurement – all identified goods and services have to be procured appropriately. Depending on the financial limit of a GP, appropriate levels of interventions/ approvals must be sought.
- Strengthen institutions – institutional capacities in terms of appropriate and adequate manpower, infrastructure, etc. have to be strengthened for effective implementation.
- Build Capacities, IEC – staff capacity at all levels must be built for effective programme implementation. At the same time IEC tools must be used to generate awareness.
- Implement – once all essential parameters are in place, implementation may be initiated as per the action plan.

Management & Monitoring;

- Monitor system Progress – for effective programme implementation and service delivery, regular monitoring mechanisms must be in place. Community monitoring mechanisms may also be explored. Tools such as a customers complaints redress system may be established as required.
- Evaluation & Learning – periodic evaluation is necessary to ensure that the programme is meeting expected objectives. Based on the Learning from periodic monitoring and evaluations, adjustments may be made to plan as required.
- Maintain 100% sanitation and SLWM coverage – It is important to achieve 100% sanitation and SLWM coverage to achieve health, economic and environmental benefits and to ensure sustainability of the system.
- Performance, Awards – Achievements and performance may be compared with other better performing GPs. GPs should aim for awards at State and National level to keep themselves updated.

State and district authorities may provide technical support and guidance in preparing the plans. It may also be possible that SLWM Plans for all GPs within a district are prepared at the same time by selecting appropriate technical agencies following established procurement norms. Similarly, stringent monitoring may be practiced at block, district and State level.

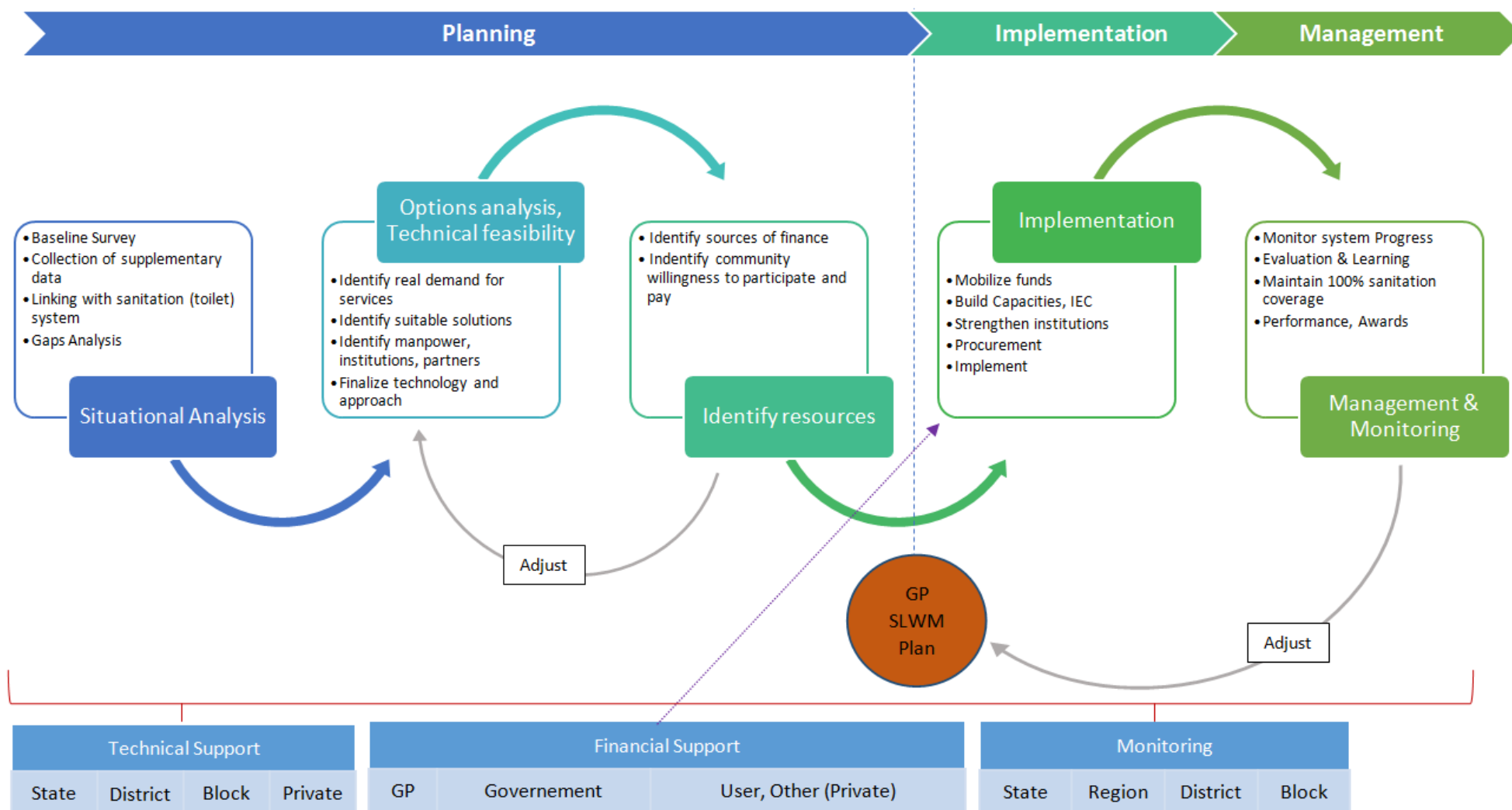


Figure 11: Schematic flow of different processes for developing and implementing a GP level SLWM Plan