

# **Lessons from Solid Waste Management Projects in India – A Historic perspective**

**by**  
**A.D. Bhide\***

## **Introduction**

The Indian Constitution groups the powers of the Central and the State Governments in three lists. List 1 is the Union list and the Parliament is authorized to enact the relevant laws. List 2 is the State list where the State Legislature is authorized to enact laws applicable in the relevant state. List 3 is the concurrent list of such areas where both Parliament and State Legislature can enact the laws.

Entry 5 in the State list relates to constitution of local authorities. In the same list the subject of public health and sanitation is at entry no. 6 and water supply at the entry no. 17 . Public health and Sanitation and Water supply are listed among obligatory duties of the local authorities. As the Solid Waste Management (SWM) is of local nature it is entrusted to local authorities. The local authorities carry out the solid waste management in areas under their control using mostly their own funds, staff and equipment. However, the provision and the manner in which these are provided are not adequate and the results are not satisfactory. Since the experience in the towns all over India has not been encouraging and since the states were not observed to take any specific initiative in this regard various committees were appointed by the Central Government and as a result of these committees various projects were initiated. This lecture describes the actions taken at different times and then indicates the lessons that can be drawn from the experience so gained.

---

\* Director grade Scientist (Retired), NEERI, Nagpur

The first effort to obtain an authentic idea about the existing solid waste management practices, quantities and characteristics of the Indian Municipal Solid Waste was made by NEERI in 1971. Extensive studies were carried out in 33 Indian cities scattered all over India during 1971-73. The studies involved collection and critical analysis of the data on existing management practices, characteristics and quantity. The information in this report is even now commonly referred in the documents at all India level.

### **Committee on Urban Waste**

Though a scheme on all India basis was sponsored in 1945 for preparation of compost from urban waste, the experience was not very encouraging. During 1970-71 four million tonnes of compost was estimated to be produced at 3100 centers out of which 2300 were urban centers. However, the quality of the compost and the SWM services provided to the urban population were not adequate and it was decided by the Government to set up a Committee to look into the whole problem and suggest possible solutions.

The Committee on Urban Waste was constituted by the Ministry of Health and Family Planning on 6-5-1972 under the Chairmanship of Mr. B. Sivaraman, Vice-Chairman, National Commission on Agriculture. The committee included a large number of experts from various fields. Initially a questionnaire seeking detailed relevant information was circulated by the committee to various urban local bodies . The information contained in the replies from 230 urban local bodies was verified by visits to different representative local bodies by members of the committee. The data received was critically analysed. Subcommittees were appointed for different aspects such as collection & transportation equipment , garages and mechanical composting plants. A subcommittee also visited a few South-east Asian countries namely Singapore, Thailand, Phillipines, Hongkong and Japan to get acquainted with the SWM practises and policies there,.

The report which was submitted in December 1975 was quite comprehensive and prescribes recommendations on various aspects of collection, transportation, composting – manual as well as mechanical, disposal, and legislation. The report also gives a comparative assessment of the Municipal Acts in some of the states and urban centers and brings out the need for enacting an improved model legislation.

As a result of this report, a central scheme on Solid Waste disposal was initiated in the year 1975 during the 5<sup>th</sup> plan period. The scheme involved provision of grants for efficient collection and transportation and for construction of compost plants. The Ministry of Agriculture provided capital subsidy to the extent of 33% of capital cost of the plants and the remaining cost was to be borne by the local bodies either from their own resources or by raising loan from nationalized banks. The Ministry of Works and Housing was to provide financial assistance to the Municipal authority to improve collection and transportation. Grants ranging from 25-50% of the computed cost for overcoming deficiency in infrastructure requirement (such as purchase of collection and transportation equipment and provision of workshop facility) which will ensure that the compost plant received the designed quantity of solid waste from the urban center was to be borne by the Ministry. A recurring grant to the extent of Rs. 1 lac/year was also to be given by the Ministry as financial support for technical personnel in the integrated scheme. This scheme was primarily aimed at cities with more than 3 lac population so as to enable them to collect and transport their waste and compost it in mechanical composting plants. About 10 mechanical composting plants were set up during the 5<sup>th</sup> plan period under this scheme. However, majority of them have since closed down for various reasons and presently only one of these plants is in operation at Delhi.

As this scheme was mainly aimed at a few large urban centers the situation in a large majority of the towns continued to deteriorate .In September 1994, a plague broke out in Surat due to the insanitary conditions in the city. This led to the temporary migration of nearly 70% of the city population resulting in large scare among the urban population in other cities also. It also resulted in financial loss to the extent of Rs 200 crores/day to the diamond city of India and reduced tourist traffic to the Country.

Consequently the Government of India appointed a committee in October 1994 with Prof. J.S. Bajaj, Member ,Planning Commission as its Chairman. The high power committee included in addition to out side experts , 3 more Members (incharge of Agriculture, Science and Technology and Ocean Development) of Planning Commission . The committee deliberated during a number of meetings and submitted its report on Urban Solid Waste Management in India in September 1995 wherein a long term strategy that needs to be adopted was delineated. Detailed recommendations on all aspects of solid waste management were also made.

A National Workshop was jointly sponsored by Ministry of Health and Family Welfare and CPHEEO in April 1995. The Workshop stressed the necessity to improve the Solid Waste Management as a priority. Various recommendations were made and one of it strongly recommended that the action on the recommendations should be taken in a time bound programme on Mission Mode.

To critically evaluate the existing situation, identify lacunae, and delineate the strategy to be adopted in future for the SWM, the World Bank in collaboration with MoEF and MoUD jointly sponsored a study at NEERI. Accordingly, the existing situation was critically analysed, problems associated with the system identified and prioritized. Alternate best practices and approaches were identified and selected. The strategy to be adopted for immediate ,short and long term was identified in the report finalised in Feb.1996

However, the conditions continued to deteriorate and hence a public interest litigation was filed in the Supreme Court of India in 1996 to direct the State and Central Government as well as the local bodies to improve the Municipal Solid Waste Management practices. The Burman Committee appointed by the Supreme Court for Class-I cities reviewed all aspects of the problem and made several recommendations in its interim report of June 1998 and the final report submitted in March 1999. The committee authorized the Government to exercise the powers under the Environment (Protection) Act of 1986 and also recommended the constitution of a technology mission for improving SWM practices in the country within five years.

Following the recommendations of the Committee the Ministry Urban Development, in August 1999, constituted a Technology Advisory Group on Solid Waste Management to collect information on various proven technologies for processing & disposal of wastes, identifying appropriate and cost effective technologies suitable to Indian conditions, and to suggest any pilot projects where felt necessary and to provide technical guidance to the State Governments and Urban Local Bodies for adopting and suggesting feasible technologies. It was also authorized to develop the IEC material for creating awareness among the masses through print media with the cooperation of State Governments and Urban Local Bodies, promotion of capacity building and human resource development in Urban Local Bodies. It was also entrusted with work of identifying training needs, developing mechanism to meet the training needs and to designate institutions in States / Regions as resource centers for providing such training. Any means for channeling and making optimum use of funds earmarked for solid waste management in various Ministries, Financial Institutions and International Donors were also to be considered by the TAG. The group met a number of times and formed three subgroups on

- 1) Appropriate technologies, R & D
- 2) Financial Resources and Private sector participation
- 3) Capacity building, HRD, Information, Education and communication.

These subgroups interacted with various interest groups and then prepared their reports. These were then discussed during a number of meetings of the TAG and finalised. The report giving detailed and exhaustive recommendations was finalized in November 2002.

As a follow up of the workshop held in 1996 the Ministry of Urban Development constituted an expert committee in February 1998 to prepare a detailed manual on Municipal Solid Waste Management. The committee comprised of a large number of experts in this field drawn from all over the country. The committee met several (12) times and prepared an exhaustive & detailed manual which covered all aspects of solid waste management and made detailed recommendations for use by the Municipal Authorities. The Manual published in May 2000 is serving as a main reference for the local bodies.

Based on the recommendations of the various committees and of the Supreme Court Committee the Ministry of Environment & Forests promulgated the Municipal Solid Waste (Management & Handling) Rules, 2000 under the Environment (Protection) Act of 1986. The Rules provide detailed guidelines on various aspects of Solid Waste Management and identifies the Central Pollution Control Board as the nodal agency to monitor its implementation directly in the Union territories and in the case of the States through State Pollution Control Boards. The Local bodies faced various difficulties during implementation of the Rules and made representations to the Govt. Hence CPCB constituted a committee comprising of representatives of various Pollution Control Boards, Ministries, experts in Solid Waste Management field and representatives of a few representative Municipal Agencies. The committee deliberated during various meetings and suggested various modifications to the Rules which are presently with the Ministry of Environment & Forests for final notification.

With a view to provide proper guidance to the local bodies in managing their solid waste, the Central Pollution Control Board has proposed to set up model facilities which will also provide the requisite guidance and expertise to the municipal agencies. The Central Pollution Control Board has taken up the project under the “Ecocity” program of the Ministry of Environment and Forests as the nodal agency and will execute the project through the concerned state agencies. The scheme was taken up with a view to set up model facilities which could later on be replicated. Since the environment involves various components either all the components could be taken up or only one of it can be taken up depending upon the local need. The objectives of the scheme are :

1. Demonstration
2. Replication
3. Institutionalisation
4. Spreading of experience gained

The solid waste management is one of the various areas to be covered in this programme. In this programme modern facilities are proposed to be set up in such select towns where the quantity of municipal solid waste is expected to be between 300-500 tonnes/day.. The proposed scheme is being implemented through State Pollution Control Boards who, besides acting as a facilitator will also share part of the cost. They will also ensure that the scheme is properly implemented, monitored regarding progress and maintenance of accounts both during execution and for a few years during operation. Chandigarh and New Barrackpore & Dumdum Municipal Corporations have already been selected in this programme which will be extended to at least one town in every state.

## **Solid waste management and drainage in Airfield towns**

This Centrally sponsored scheme covers 10 towns and has been approved at an estimated cost of Rs.99.3456 crore . The funds for capital expenditure will be provided by Central Government under this scheme as 100% grant while the operating expenses will be borne by concerned local bodies / State Governments. The scheme started in 2002-03 to enable the concerned towns to take action for proper SWM and drainage which will help avoid aircrashes. DPRs for Sirsa, Jodhpur and Gwalior have been submitted by NBCC and HUDCO and approved by CPHEEO and funds sanctioned for implementation. DPRs for Hindon, Pune and Tejpur are under scrutiny of CPHEEO. DPRs for Ambala, Adampur, Dundigal and Bareilly are being prepared by UP Jal Nigam, NBCC and HUDCO.

A centrally sponsored scheme for **infrastructure development in mega cities** was initiated during 1993-94 for the cities of Mumbai, Kolkata, Chennai, Bangalore and Hyderabad. The scheme was sponsored and various identified local authorities in the cities were designated as nodal agencies. The total cost of the project was to be shared between Central Government and State Governments at 25% each (both as grants) and the balance 50% was to be met from Institutional finance. The sanctioning committees in various states of all mega cities have approved 676 project at an estimated cost of Rs. 8666.2 crores out of which Rs. 4520.61 crores have already been spent. As the mega city scheme subsumed in JNNURM launched on 3-12-2005 no new proposals are being considered further.

## **Jawaharlal Nehru National Urban Renewal Mission (JNNURM)**

The aim is to encourage reforms and fast track development of identified cities. Focus is to ensure an efficiency in urban infrastructure and service delivery mechanisms, community participation and accountability of ULBs towards citizens. SWM is a part of the Sub-mission on the improvement in urban infrastructure and governance. The State Government through a locally constituted state level steering committee will identify, decide and

prioritise the projects for funding from various cities and recommend the same to the Central level National Steering Committee for funding. The monitoring of progress of the sanctioned scheme in a given state will be carried out by an identified state level nodal agency. A TAG will be constituted comprising of experts in all relevant fields and shall assist Central, State Level Committees, nodal agencies and urban local bodies. The funding pattern will be as follows.

Category	Population	No. of cities	Funding Pattern		ULBs share
			Grant from Centre Govt.	Grant from State Govt.	
A	>4million	7	35	15	50
B	1-4 million	28	50	20	30
C	Selected cities/ULBs with <1million population	28			
	For NE states, J&K		90	10	0
	Others		80	10	10

The Ministry of Urban Development shall be the repository of funds for the scheme which shall be released on the approval of the Central Steering Committee. As soon as the Memorandum of Agreement is signed by the State Government, 25% of the funds will be released and balance will be released in 3 installments after receipt of necessary utilization certificates.

The funds for the scheme are meant for all infrastructure projects related to roads, water supply, sewerage ,solid waste management etc. For availing of the funds the city should prepare a city development plan and specific DPR should be prepared for specific funding proposal. Detailed guidelines have been provided for preparation of city development plan and for preparation of DPR. One of the critical component of the guideline of DPR relates to financial aspects and sustainability. It requires that the project proposal shall present the cost benefit analysis incorporating a life cycle cost analysis. The cost benefit analysis for individual projects of Rs. 50 crores or

more shall demonstrate a positive net present value and an economic rate of return equal to or above the appropriate opportunity cost of capital. This requirement will not be applied to projects with non quantifiable benefit or those costing less than Rs. 50 crores. The requirement also lays down the introduction of tariffs in the form of user fee, tax or betterment levies. It also specifies restructuring of tariffs to recover O&M cost and their revision over the project period. The DPR should also identify reliable revenue sources and the expected funds to make the project sustainable.

### **Critical review of the schemes:**

On a review of the abovementioned reports and projects it can be seen that the projects in the past did not yield the expected improvement in solid waste management due to various reasons. Hence, the following action needs to be taken in future for ensuring a successful and effective solid waste management.

1. It is observed that presently more than one Ministry - Ministry of Urban Development, Ministry of Environment & Forests and Pollution Control Boards, Ministry of Health and in the states Local Self Government Department are responsible for providing the administrative and financial support to the solid waste management activity. This results in problems due to intersectoral co-ordination. It is hence necessary that a Nodal Ministry responsible for identifying and implementing actions and for providing necessary financial and other resources should be identified. The activity at municipal level should be carried out by an independent department headed by a trained Engineer provided with necessary organizational and financial support.

2. A majority of the Projects (except the Central Scheme on Solid Waste Disposal and Solid waste management and drainage in Airfield towns) were initiated and implemented for improvement in the urban infrastructure. In these projects, it was observed that the majority of efforts and resources were spent on other infrastructure activities such as roads, water supply, waste water disposal etc. and for various reasons, only a minor allotment was received by solid waste management. In solid waste management projects due to the short life of the equipment used the funds for capital as well as operation and maintenance expenditure have to be provided at frequent intervals. The projects for solid waste management activity should be accordingly framed by keeping this specific requirements in mind.

It is also desirable to provide necessary help to create a new revenue instrument – a dedicated solid waste management tax (different from the existing inadequate conservancy tax). This revenue instrument should be gradually introduced and an element of cross subsidy to the weaker sections of the society should be built in the system. ULBs can contract out certain activities on “build-own-operate basis” to reduce the financial burden on municipal resources.

3. A successful and efficient operation of solid waste management activity requires an active participation of citizens. Presently this is not available possibly due to the social stigma attached to this activity. It is hence necessary to provide specific funds for Citizen’s education and participation in the projects. It is observed that in the absence of such a provision (which is observed to occur in the case of majority of the existing projects) the activity suffers.

A sustained program involving citizens, NGOs and other organizations should be implemented to obtain citizens cooperation. Citizens forums should be formed in every ward. These should comprise of citizens representatives, social workers and concerned municipal officials. All decisions regarding location and capacity of community bins, cleansing frequency etc. should be taken in consultation with them.

Wastepickers play an important role in recycling of the waste. NGOs should be encouraged to provide organizational support and identity to the wastepickers so that better recycling occurs.

4. It is observed that the municipal authorities often do not have properly trained personnel for managing this activity. This has often resulted in failure of the latest equipment and facilities that were introduced in the past. It has also resulted in improper decisions being taken by persons who did not have the necessary expertise. It is hence necessary that suitably trained manpower be deployed which will ensure selection and optimal utilization of various equipments, vehicles and processes. A trained cadre of personnel should be provided at all levels.

The time spent in learning new procedures, methods and techniques will be more than compensated by improved performance. Orientation courses to new employees at the beginning will prevent costly mistakes and wasted time resulting in low output. Additional training should be arranged whenever new implements, equipments or systems have to be introduced.

5. The municipal byelaws should be modified and necessary provisions for levying of user charges, its recovery and penalty for non compliance and nonpayment be incorporated and adopted. The MSW Rules, 2000 need various modifications to provide specific guidance to the local bodies for proper implementation. The changes recommended by the Committee of CPCB need to be incorporated expeditiously.

Thus it can be seen that action needs to be taken expeditiously on the following –

1. A nodal Ministry should be identified and a coordinated approach be taken by various Ministries to provide necessary financial and administrative support to this activity both at the Central and State level.
2. Specific Projects be initiated specifically for improvement in solid waste management activity.
3. Long term programs for citizens education to ensure their cooperation need to be taken.
4. The facilities for providing necessary professional training should be substantially augmented.
5. The MSW Rules, 2000 should be made more user friendly.
6. The municipal byelaws should be modified to introduce specific revenue instruments for funding of this activity.

## **Bibliography –**

1. CPHERI, Nagpur (1973), Solid Waste in India, Final Report.
2. Report of Committee on Urban Wastes, Ministry of Works and Housing, Govt. of India, New Delhi, December 1975.
3. Proc. 'National Workshop on Solid Waste Management' Ministry of Urban Development and WHO, April 1995
4. 'Urban Solid Waste Management in India' Report of High Power Committee, Planning Commission, New Delhi, Sept. 1995
5. NEERI : "Strategy paper on solid waste management in India" Final Report, Feb.1996
6. Solid Waste Management in Class I Cities in India, Committee constituted by the Hon. Supreme Court of India – Draft Report, June 1998 and Final Report, March 1999.
7. "Manual on Municipal Solid Waste Management' CPHEEO, Ministry of Urban Development , May 2000.
8. Municipal Solid Waste (Management & Handling) Rules, 2000, Ministry of Environment and Forests, October 3, 2000.
9. Draft final report of the Technology Advisory Group on Solid Waste Management, CPHEEO Ministry of Urban Development, New Delhi, November 2002.
10. Report on Municipal Solid Waste Management in Asia, Asian Institute of Technology, 2004.
11. Ministry of Urban Development, Government of India, New Delhi.

JNNRU – Framework and Process

-Guidelines of project appraisal