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Management of Waste in India

(Performance Audit - Report No. 14 of 2008)

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PREFACE

This report of the Comptroller and Auditor General of India the for the year ended March 2007 containing the results of the Performance Audit on "Management of Waste in India" has been prepared for submission to the President of India under Article 151 of the Constitution.

The Performance Audit was conducted during July 2007 to December 2007 through document analysis, collection of responses to questionnaires, physical collection and testing of samples. Records and documents relating to the issue in the Performance Audit were examined:

- at the central level at the Ministry of Environment and Forests and Central Pollution Control Board between July 2007 to December 2007.
- at state level (in 24 states) and State Pollution Control Boards, State Forest Departments, State Urban Development Departments, municipalities, districts and hospitals. The sample consisted of 56 municipalities in 20 states, 56 districts in 20 states and 180 hospitals in 15 states.

The results of audit, both at the central level and the state level, were taken into account for arriving at audit conclusions. While framing the conclusions and recommendations, good practices regarding waste management in India and in other countries have also been quoted to illustrate the fact that these practices are possible in the field of waste management.

EXECUTIVE SUMMARY

The Ministry of Environment and Forests (MoEF), along with the Central Pollution Control Board (CPCB) is the nodal agency of the Government of India for planning, promotion, co-ordination and overseeing the implementation of environmental and forestry programmes and one of their principal activities is the control of pollution. Environment (Protection) Act, 1986 also empowers the Ministry to enact laws for the protection of the environment in India, which are also adopted by the states.

The Performance Audit revealed that MoEF/CPCB/states do not have complete and comprehensive data about all the various kinds of waste being generated in India. Further, the risks to health and environment had not been adequately assessed by MoEF/states, which could lead to insufficient recognition, both by policy makers as well as public, to the problems caused by ineffective management of waste. Despite being a signatory to Agenda 21 of the World Commission on Sustainable Development of the United Nations Conference on Environment and Development, waste management efforts in India were not directed by a clear-cut policy. The '3 Rs' model indicating the waste hierarchy of reducing, recycling and reusing waste has not been replicated. Instead, the focus has been on disposal of waste being generated. MoEF had also not adequately promoted the use of recycled and environmentally friendly products through its environment education, consumer information and environment labeling programmes.

Rules framed for safe disposal of waste did not cover many kinds of waste like construction & demolition waste, electronic waste, agricultural waste etc,. Despite being empowered by the Environmental (Protection) Act, 1986, instances of the polluter being held responsible for unsafe disposal of waste were very few, and thus, there was no effective deterrence for non-compliance, even with the framed rules.

The Performance Audit also revealed that there appeared to be an absence of a single body taking ownership of waste issues in India. Further, there was no clear identification of bodies for monitoring of waste rules at the Central Government level, which caused a mismatch/gap in responsibility and accountability and led to the rules for management of waste being rendered ineffective.

Study of compliance to municipal solid waste rules revealed that collection of waste by the municipalities was not taking place regularly and effectively and there was negligible segregation of waste after collection. Waste processing facilities and scientific landfills were almost non-existent, as a result, open dumping was the most common option for the disposal of waste. Municipalities did not adequately plan for closing of dumpsites and had not identified areas for landfills for scientific disposal of waste. In the absence of

landfills, open dumping of waste was likely to continue leading to harmful effect on health and environment.

Study of compliance to bio-medical waste rules revealed that hospitals/ private operators were running waste disposal facilities without authorisation and segregation of bio-medical waste according to categories was not being done. The waste treatment/disposal infrastructure created in the states was also inadequate. Study of compliance to plastic waste rules revealed ineffective enforcement of the rules by District Commissioners/District Magistrates and Pollution Control Boards in the states.

The problem of non compliance to rules for the management and handling of municipal solid waste, bio-medical waste and plastic waste was further compounded by lax and ineffective monitoring. In the absence of effective monitoring, violation of these rules escaped detection. Shortages of staff in municipalities/PCBs hampered the monitoring and implementation of the waste rules.

MoEF needs to take leadership in advancing the cause of environmentally responsible management of waste in India, which should necessarily incorporate the use of the '3 Rs' strategy in reducing the waste meant for final disposal. Keeping in view the gravity of the various findings in this report, it is recommended that MoEF set up a Committee to study the need for a separate waste management policy and suggest ways and means for its effective implementation and monitoring. This could go a long way in effective management of waste and reduce the threats posed to the environment and public health.

Keeping in view the audit recommendations, a committee to draw up a road map for the management of waste in India has been formed by MoEF in September 2008. The Committee consists of senior officials of MoEF, CPCB, representatives from NGOs and eminent persons in the field of waste management. The committee has been mandated to submit its report within three months.

HIGHLIGHTS AND SUMMARY OF RECOMMENDATIONS

1. Assessment of quantum of waste being generated in the country and identification of the risks to environment and health posed by waste.

- Neither MoEF nor the states had completely assessed the quantity of various kinds of waste like municipal solid waste, bio-medical waste, hazardous waste, e-waste etc., being generated in the country.

[Paragraph 2.1.1 & 2.1.2]

- MoEF was unable to make any projections about the amounts of waste that might be produced in future. Only 25 *per cent* of the sampled states had made projections about the growth in waste. Adequacy of capacity to handle waste currently and in the future was assessed only by 29 *per cent* of the states.

[Paragraph 2.2.1, 2.2.2 &2.3.2]

- MoEF/CPCB had not completely assessed the risks to environment and public health posed by waste. Only 25 *per cent* of the sampled states had assessed the risks to public health.

[Paragraph 2.4.1, 2.4.2, 2.5.1 & 2.5.2]

Recommendations

- *CPCB, as the nodal agency for pollution related issues should carry out, periodically, a comprehensive assessment of the amounts of waste being generated, according to the major waste types. All the states in India should be involved in this exercise so that a comprehensive database on waste is generated for aiding policy-making and intervention.*
- *MoEF, with involvement of all the states, may collect data about growth of the various kinds of waste, analyse the factors contributing to its growth and the increase in waste quantities to arrive at strategies for waste management.*
- *MoEF/CPCB, in conjunction with the states, may estimate the current capacity to handle all kinds of waste all over the country and ensure that additional capacity of waste infrastructure, if required, is created for safe disposal.*
- *MoEF may carry out waste related pollution impact monitoring, on a regular basis, to study the effects of improper disposal of waste on the environment. MoEF along with the states may also carry out regular surveillance including epidemiological surveillance of waste related impacts on public health.*

2. Existence of policies and strategies for management of wastes and reflection of priority to waste reduction and waste minimization as against waste disposal.

- Waste management efforts were not directed by a separate policy. MoEF has not adopted a hierarchical approach to waste management, in the order of environmental priority. No effective strategies have been introduced to implement the '3 Rs' (reduce, reuse and recycle), the current focus being only on disposal of waste. Only eight *per cent* of the sampled states had implemented the '3 Rs'.

[Paragraph 3.1.1, 3.1.2, 3.2.1 & 3.2.2]

- MoEF/CPCB as well as 79 *per cent* of the sampled states did not set any targets/timelines for reduction of municipal solid waste, bio-medical waste, plastic waste, hazardous waste etc,. In the absence of clear targets/timelines, efforts made by the government to reduce waste were not measurable.

[Paragraph 3.3]

- MoEF had not appropriately addressed the role of informal sector in handling waste. Only 17 *per cent* of the sampled states had recognised the role of ragpickers.

[Paragraph 3.5.1 & 3.5.2]

- MoEF and the states have not taken effective action to promote the use of recycled and environmentally friendly products. The implementation of MoEF's environment labeling programme called "ECOMARK" was tardy as "ECOMARK" was granted to only three product categories ever since the programme was introduced in 1991.

[Paragraph 3.6.1, 3.6.2, & 3.8.1]

Recommendations

- *MoEF may consider framing a specific policy for the management of wastes in India, incorporating the internationally accepted hierarchy for management of wastes.*
- *MoEF and the states may consider introducing effective strategies for the reduction and recycling of household waste like deposit refund schemes, promoting the use of jute bags rather than plastic bags, waste exchanges, etc., for reduction of waste at source.*
- *MoEF, in consultation with the states, should prepare an action plan for the reduction, reuse and recycling of waste with clearly defined numerical targets as well as timelines for the achievement of targets.*
- *MoEF should consider the introduction of Environmentally Preferred Purchases and lay down guidelines for the purchase of recycled products to promote the purchase of eco- friendly goods by the government and the agencies controlled by it.*
- *MoEF should include more products under the "ECOMARK" scheme and monitor adherence to environmental standards of these products. It should also prescribe*

standards for classifying products as environmentally friendly and carry out environmental impact studies of such products.

3. Existence of legislations specifically dealing with disposal of each kind of waste, incorporating penalty for violation.

- Laws have not been framed for all kinds of waste, leaving the safe disposal of many kinds of waste like construction and demolition waste, agricultural waste, e-waste etc., unmonitored.

[Paragraph 4.1.1]

- The polluters were not being effectively held responsible for unsafe disposal, thereby creating no deterrence for non-implementation of the rules. In only 25 *per cent* of the sampled states, some token action had been taken by PCBs/state governments against defaulters for illegal dumping of waste.

[Paragraph 4.2.1 & 4.2.2]

Recommendations

- *MoEF should consider framing laws/rules for the management of all major kinds of waste like construction & demolition waste, end of life vehicles, packaging waste, mining waste, agriculture waste and e- waste being generated in the country.*
- *Considering the fact that the provisions of Environment Protection Act are seldom used, both at the central and the state level for punishing the polluter, there is a need to incorporate the Polluter Pays Principle (PPP) in the waste rules/legislations itself. This would act as a deterrent against open dumping of waste.*

4. Allocation of clear responsibility and accountability to various agencies involved in the process of waste management.

- There was no single body taking ownership of waste issues both at the central level and at the state level, leading to diffusion of responsibility and weak accountability.

[Paragraph 5.1.1 & 5.1.2]

- Only 15 *per cent* of states constituted the Solid Waste Missions for implementation of municipal solid waste rules, despite directives of CPCB in 2004-05 that all states should set up such missions.

[Paragraph 5.2.2]

- There was no clear identification of bodies for monitoring of waste rules at the centre as none of the four central ministries, i.e., MoEF, Ministry of Urban Development, Ministry of Health and Family Welfare and Department of Petrochemicals took responsibility for monitoring of municipal solid waste, bio-medical waste rules and plastic waste rules.

[Paragraph 5.3.1]

- In the states, only 33 *per cent* of the sampled states had allocated responsibility to PCBs for monitoring of municipal solid waste rules; 46 *per cent* of the states had allocated responsibility for monitoring of bio-medical waste rules and only 37 *per*

cent of the sampled states were monitoring the implementation of the plastic waste rules.

[Paragraph 5.3.2]

Recommendations

- *Since waste causes pollution and pollution issues are necessarily the responsibility of MoEF, the Central Government should consider appointing MoEF as the nodal body for managing all kinds of waste.*
- *MoEF should clearly identify, at the central level, bodies which would be responsible for the implementation of the waste management rules relating to municipal solid waste, biomedical waste and plastic waste. The states should also clearly identify the agency responsible for implementation of the waste rules.*
- *Solid Waste Missions for dealing with overall issues relating to implementation of municipal solid waste rules should be set up in all the states.*
- *The government should assign clear responsibility to MoEF or any central body/agency for monitoring the implementation of all waste management rules throughout the country.*

5. Compliance to rules regulating municipal solid waste, bio-medical waste and plastic waste.

5.1 Compliance to Municipal Solid Waste rules

- **Collection:** Waste was regularly collected only in 22 *per cent* of the sampled municipalities.
- **Segregation:** Segregation of waste took place only in 10 *per cent* of the sampled municipalities.
- **Storage:** Only 17 *per cent* municipalities were able to ensure proper storage of waste.
- **Transportation:** Covered trucks for transportation of municipal solid waste were being used only in 18 *per cent* of sampled municipalities.
- **Processing:** Only 11 *per cent* municipalities had waste processing capabilities.
- **Disposal**: Only six municipalities out of the sampled 56 municipalities had established a landfill, leading to dumping of waste in open dumpsites in the states. The activity outlined in the Implementation Schedule for the development of landfills was carried out only in 14 *per cent* of the sampled municipalities.

[Paragraph 6.2.1b, c, d, e, f, g]

5.2 Compliance to bio-medical waste rules

- **Authorisation**: Waste disposal facilities were set up after getting authorisation from prescribed authority only in 29 *per cent* of the sampled hospitals.

- **Segregation**: Segregation as envisaged in the bio-medical waste rules was taking place in only 29 *per cent* of the sampled hospitals. Bio-medical waste, like effluents, needle sharps etc., were mixed with other wastes in 34 *per cent* of the sampled hospitals.
- **Labeling and storage**: Labeling took place only in 19 *per cent* of sampled hospitals and 17 *per cent* of sampled hospitals kept untreated waste beyond 48 hours.
- **Treatment /disposal**: Only 17 *per cent* of sampled hospitals were treating/disposing bio-medical waste as per the compliance criteria in the rules. More than 50 *per cent* of the hospitals sampled had inadequate waste processing/disposal infrastructure.

[Paragraph 6.2.2 b,c,d,e]

5.3 Compliance to plastic waste rules

- Actions were not being taken by District Collectors/District Magistrates for the enforcement of the rules and it was difficult to verify whether vendors were using carry bags or containers made of recycled plastic for storing, carrying, dispensing or packaging of foodstuffs.
- It was difficult to verify in audit whether recycling was being done according to specifications of Bureau of Indian Standards.
- None of the sampled states had complete database on the number of manufacturers of plastic carry bags/containers; thus, it was difficult to verify whether all manufactures had sought authorisation from PCBs for the manufacture of plastic carry bags/containers.

[Paragraph 6.2.3 (a) (i), (ii), (iii)& (iv)]

Recommendations

- *Segregation should be given greater emphasis by means of publicity and awareness campaigns and holding regular meetings with housing associations and NGOs. State governments could make waste segregation mandatory and the municipalities could be authorised to levy fines if segregated waste is not made available to the municipalities for collection.*
- *Waste processing should be made mandatory in each municipality. CPCB could help each municipality in identifying the waste processing technology best suited to the needs of the municipality. Sufficient funding should be provided by MoEF/MoUD to set up waste processing infrastructure in each municipality.*
- *All municipalities should take steps to improve the existing dumpsites to make them more sanitary and aesthetic. Dumpsites in residential areas and near water sources/water bodies should be closed down and periodic monitoring of dumpsites for contamination of environment should take place.*

- *Identification of land for setting up landfills should be done on a priority basis and each municipality, according to a time bound programme, should develop landfills. Landfilling should be restricted to non-biodegradable/inorganic waste.*
- *Registrations of those hospitals that do not set up treatment/disposal facility or join a common facility could be cancelled. New hospitals should not be allowed to commence treatment without making sure that it has a facility for treatment/disposal of bio-medical waste.*
- *Segregation of bio-medical waste according to its type should be ensured in each hospital. Measures should be taken to achieve 100 per cent segregation by each hospital.*
- *Hospitals could join a common facility for treatment/disposal of bio-medical waste and PCBs should ensure that each common facility has the requisite and complete infrastructure to handle waste safely.*
- *The plastic waste rules should clearly specify actions to be taken by the DCs/DMs for the enforcement of the plastic rules, relating to use, collection, segregation, transportation and disposal.*
- *Surprise checks should be conducted to verify whether vendors were following the provisions of the plastic waste rules. Database of manufacturers of plastic carry bags/containers should be built to ensure that all manufacturers seek authorization of PCB before they take up manufacture of such items.*

6. Effectiveness of monitoring in checking non-compliance.

- Monitoring of the municipal solid waste rules, bio-medical waste rules and plastic rules, at the central level, was not effective. Systems were also not in place to check non-compliance of rules by municipalities, hospitals and district authorities.

[Paragraph 7.1]

- State PCBs were not monitoring regularly whether municipal solid waste was being disposed in an environmentally safe manner and in a manner not to pose health risks.

[Paragraph 7.2(a) (i)]

- Monitoring by state governments was taking place only in 11 *per cent* of the sampled municipalities and as such, no effective check was being exercised to see that waste processing and disposal facilities meet the compliance criteria outlined in the municipal solid waste rules.

[Paragraph 7.2(a)(ii)]

- Only 13 *per cent* of sampled hospitals were being monitored for compliance to bio-medical waste rules.

[Paragraph 7.2(b) (v)]

- Only in 35 *per cent* of the sampled states, the District Collectors of the district were monitoring the implementation of plastic rules.

[Paragraph 7.2 (c) (i)]

- In ***Delhi***, analysis report of Bhalaswa open landfill showed that Total Dissolved Solids (TDS) and hardness content of the ground water was 800 *per cent* and 633 *per cent* respectively in excess of the desirable limits. TDS at Okhla open landfill site was also in excess of the desirable limit which showed that the ground water of both the open landfills sites has been critically contaminated with leachate generated from the landfill site.

[Paragraph 7.2 (a) (iv)]

- In ***Punjab***, samples of ground water from hand pumps at four places had been collected from the municipal solid waste open dumpsite in Amritsar. It revealed that none of the collected samples met the acceptable limit for drinking water and were thus, not fit for drinking purposes.

[Paragraph 7.2(a) (iv)]

- In ***Tamil Nadu***, two water samples collected from the dumpsite at Pallikaranai swamp area revealed that dissolved solids, chlorides and cadmium was far above the prescribed desirable limits.

[Paragraph 7.2 (a) (iv)]

Recommendations

- *At the central level, MoEF/CPCB/MoH&FW and at the level of the states, the PCBs should draw up comprehensive schedules for sustained monitoring of municipalities and hospitals.*
- *Regular monitoring of waste disposal facilities like compost plants, incinerators etc., should be done by CPCB/PCBs.*

7. Adequacy of funding and manpower for the implementation of rules on waste management.

- The states did not make enough provision for creating infrastructure for the management of waste. Only 30 *per cent* and 27 *per cent* of the sampled states made some provisions in the budget for management of municipal solid waste and bio-medical waste respectively.

[Paragraph 8.1]

- ***Chhatisgarh*** diverted Rs.60 lakh for the construction of drainage and mini stadium, though funds were released for management of municipal solid waste. Similarly, ***Karnataka*** diverted Rs.17.44 crore for purposes such as street lighting, road work etc., Instead of utilizing money for upgrading two dumpsites, Chennai Corporation in ***Tamil Nadu*** kept Rs.18 crore, released during 2003-05, in fixed deposits.

[Paragraph 8.1 (c)]

- There was a shortage of staff/technically qualified manpower in municipalities/PCBs. 55 *per cent* of the sampled states reported shortage of

manpower in the municipalities hampering municipal solid waste management, while, PCBs in 54 *per cent* of the sampled states had cited shortages hampering their work.

[Paragraph 8.2]

Recommendations

- *States should make provisions in the budget for waste management activities relating to municipal solid waste and bio-medical waste and ensure that municipalities and hospitals have adequate funds for waste management.*
- *State governments and PCBs may assess their manpower requirement and accordingly, raise a staff dedicated to the implementation and monitoring of waste management activities.*

PERFORMANCE AUDIT ON "MANAGEMENT OF WASTE IN INDIA"

CHAPTER 1

Introduction

1.1 Definition of waste

Wastes are substances or objects, which are intended to be disposed of, or are required to be disposed by the provisions of national laws[1]. Additionally, wastes are such items which people are required to discard, for example by law because of their hazardous properties. Many items can be considered as waste like household rubbish, sewage sludge, wastes from manufacturing activities, packaging items, discarded cars, old televisions, garden waste, old paint containers etc,. Thus, all our daily activities give rise to a large variety of different wastes arising from different sources. The rising quality of life and high rates of resource consumption patterns have had an unintended and negative impact on the environment- the generation of wastes far beyond the handling capacities of governments and agencies.

1.2 Kinds of waste

Municipal waste is waste generated by households and consists of paper, organic waste, metals etc,. The production processes, households and commercial activities generating waste are hazardous waste. Bio-medical waste is waste generated by hospitals and other health providers and consists of discarded drugs, waste sharps, microbiology & biotechnology waste, human anatomical waste, animal waste etc,. Construction and demolition waste arises from activities such as the construction and demolition of buildings, creation of infrastructure such as road planning and maintenance etc,. Mining waste arises from prospecting, extraction, treatment and storage of minerals. Waste electrical and electronic equipment[2] consists of end of life products and comprises of a range of electrical and electronic items such as refrigerators, washing machines, information technology and telecommunication equipment like computers and printers, televisions etc,. Radioactive waste is any material that contains a concentration of radionuclides greater than those deemed safe by national authorities, and for which, no use is foreseen. Other sources of waste include end-of-life vehicles, packaging waste, tyres, agricultural waste etc,.

1.3 Impact of waste on health and environment

Waste represents a threat to the environment and human health if not handled or disposed of properly. Surface and ground water contamination takes place when waste reach water bodies. Residues from waste can change the water chemistry, which can affect all levels of an ecosystem. The health of animals and humans are affected when they drink the contaminated water. A specific environmental hazard caused by waste is leachate, which is the liquid that forms, as water trickles through contaminated areas leaching out the

[1] According to the Basel Convention
[2] Commonly referred to as WEEE

chemicals. Movement of leachate from landfills, effluent treating plants and waste disposal sites may result in hazardous substances entering surface water, ground water or soil. Waste contaminates soil and can harm plants when they take up contaminants from their roots. Eating plants or animals that have accumulated soil contaminants can adversely affect the health of humans and animals. Emissions from incinerators or other waste burning devices and landfills can cause air contamination. Incinerators routinely emit dioxins[3], furans[4] and polychlorinated by-phenyls[5], which are deadly toxins, causing cancer and endocrine system damage. Landfills are a big source of release of green house gases, which are generated when organic waste decomposes in landfills. E-waste contains a mix of toxic substances such as lead and cadmium in circuit boards; lead oxide and cadmium in monitor cathode ray tubes; mercury in switches and flat screen monitors; cadmium in computer batteries; polyvinyl chloride in cable insulation that release highly toxic dioxins and furans when burned to retrieve copper from the wires. Thus, improper handling of waste has consequences both on the environment as well as on the health of the people.

1.4 Management of Waste

According to United Nations Environment Programme (UNEP), waste management includes both the components of prevention and disposal of waste. The waste management hierarchy can be traced back to the 1970s, when the environment movement started to critique the practice of disposal-based waste management. Rather than regarding 'waste' as a homogenous mass that should be buried, they argued that it was made up of different materials that should be treated differently i.e. some should not be produced, some should be reused, some recycled or composted, some should be burnt and others buried. According to this hierarchy, the priority of any country should be to extract the maximum practical benefits from products and prevent and minimize the waste that is generated. Thus, strategies for waste disposal should focus on waste prevention and minimization through the '3 Rs' - Reduce, Reuse and Recycle. According to this hierarchy, waste disposal strategies are 'end of the pipe' solutions and should be the least favored option. Emphasis on waste prevention and waste minimisation would ensure that less waste is being produced which needs to be disposed.

Waste prevention means measures aiming at the reduction of the quantity and harmfulness for the environment of diverse waste streams. Prevention is the most desirable waste management option as it eliminates the need for handling, transporting, recycling or disposal of waste. It provides the highest level of environmental protection by optimising the use of resources and by removing a potential source of pollution.

[3] Dioxins are known to increase the likelihood of cancer and are considered a serious threat to public health. Environmental campaigners describe dioxins as among the most dangerous poisons known.

[4] Furan is a colorless, flammable, highly volatile liquid with a boiling point close to room temperature. It is toxic and may be carcinogenic.

[5] Also called PCBs, these were used as coolants and insulating fluids for transformers and capacitors, stabilizing additives in flexible PVC coatings of electrical wiring and electronic components etc,. PCB production was banned in the 1970s due to the high toxicity of most products containing PCBs. PCBs are classified as persistent organic pollutants which bioaccumulate in animals.

- Reducing waste includes any process or activity that avoids, reduces or eliminates waste at its source or results in reuse or recycling.
- Reusing is using an article more than once. This includes conventional reuse where the item is used again for the same function and new-life reuse where it is used for a new function.
- Recycling involves the treatment or reprocessing of a discarded waste material to make it suitable for subsequent re-use either for its original form or for other purposes.

Waste disposal typically involves the collection, transportation and finally, disposal of waste. Disposing waste in a landfill is the most traditional method of waste disposal and a properly designed and well-managed landfill can be a hygienic and relatively inexpensive method of disposing waste materials in a way that minimises their impact on the local environment. Another byproduct of landfills is landfill gas (mostly composed of methane and carbon dioxide), which is produced as organic waste breaks down anaerobically. This gas can create odor problems, kill surface vegetation, and is a greenhouse gas. Incineration is a waste disposal method that involves combustion of waste at high temperatures. Waste materials that are organic in nature, such as plant material, food scraps, and paper products, are increasingly put through a composting and/or anaerobic digestion system to control the biological process to decompose the organic matter and kill pathogens. Gasification/Pyrolysis are two related forms of thermal treatment where waste materials are heated to high temperatures with limited oxygen availability.

1.5 Amount of waste being generated in India

As per the Tenth Plan document, India produces 48 million tones (MT) of urban solid waste annually, with solid waste generation being approximately 0.4 kg per capita per day. The Director General of Health Services estimates that 5.4 MT of bio-medical waste is being generated in the country every year; based on the generation figure of 250 grams/capita/day. The Tenth Plan document also estimates that around 7.2 MT of hazardous waste is being generated in the country. However, no estimates exist for the other kinds of wastes being generated in the country. Of mounting importance is the quantity of Waste Electrical and Electronic Equipment (WEEE), especially waste computers, TVs, printers etc. The e-waste inventory for the year 2005 has been estimated to be 0.15 MT and is expected to exceed 0.8 MT by 2012, according to CPCB estimates. No estimates or even guesstimates exist for construction and demolition waste, packaging waste, mining waste, waste from end-of-life vehicles and tyres, and agricultural waste.

1.6 Organisational Set up

1.6.1 Policy making

The Ministry of Environment and Forests (MoEF) is the nodal agency of the Government of India for planning, promotion, co-ordination and overseeing the implementation of environmental and forestry programmes. The principal activities undertaken by MoEF consist of conservation and survey of flora, fauna, forests and wildlife, prevention and

control of pollution, afforestation and regeneration of degraded areas and protection of environment, in the framework of legislations. MoEF is headed by the Secretary, Environment and Forests and is assisted by one Special Secretary, three Additional Secretaries and an Additional Director General, Forests who are responsible for the various divisions of MoEF like control of pollution, forest conservation, wildlife, ozone cell etc,. In the states, the Department of Environment and Forests undertake control of pollution.

Central Pollution Control Board (CPCB) was constituted in September 1974 as an autonomous body of MoEF under the Water (Prevention and Control of Pollution) Act, 1974 and was entrusted with the powers and functions under the Air (Prevention and Control of Pollution) Act, 1981. It serves as a field formation and provides technical services to MoEF for the provisions of the Environment (Protection) Act, 1986. Principal functions of CPCB are to promote cleanliness of streams and wells in different areas of the states by prevention, control and abatement of water pollution, to improve the quality of air and to prevent, control or abate air pollution in the country. A Chairman, a member Secretary and 13 members comprise CPCB. Member Secretary, CPCB reporting to the Chairman is responsible for the day to day functioning of CPCB. All states have a Pollution Control Board (PCB) whose functions are similar to CPCB.

1.6.2 Regulatory Framework for management of waste in India

To regulate the management and handling of waste, the government notified the following:

- In 2000, under the powers conferred by the Environment (Protection) Act, 1986, the ***Municipal Solid Wastes (Management and Handling) Rules*** were notified which made every municipality, within its territorial jurisdiction, responsible for management and handling of solid waste. In the report, for the sake of simplicity, the Municipal Solid Wastes (Management and Handling) Rules are referred to as municipal solid waste rules.
- To ensure proper management of bio-medical waste, ***Bio-Medical Waste (Management and Handling) Rules***, were notified in 1998 with amendments in 2000 and 2003. Under the rules, the institutions generating bio-medical waste were responsible for management and handling of bio-medical waste. In the report, for the sake of simplicity, the Bio-Medical Waste (Management and Handling) Rules are referred to as bio-medical waste rules.
- Plastics were also regarded as a major source of pollution to the environment and ***Recycled Plastics Manufacture and Usage Rules*** were notified in 1999 with an amendment in 2003 entrusting the District Commissioner/ District Magistrate of each district and PCB with the responsibility of managing plastic waste. In the report, for the sake of simplicity, the Recycled Plastics Manufacture and Usage Rules are referred to as plastic waste rules.
- The Government of India promulgated the ***Hazardous Waste (Management and Handling) Rules*** in 1989 through MoEF under the aegis of Environment

(Protection) Act, 1986. Subsequent amendments to the Rules followed in 2000 and 2003 defining the roles and responsibilities of the waste generator and waste monitoring agencies. In the report, for the sake of simplicity, the Hazardous Waste (Management and Handling) Rules are referred to as hazardous waste rules.

1.6.3 Implementing Agencies

The rules relating to management of municipal, bio-medical and plastic waste are implemented at the state level. It is the responsibility of the municipal authorities to implement the laws relating to collection, segregation, storage, transportation, processing and disposal of municipal solid waste. The rules regarding bio-medical waste management are to be implemented by the hospital authorities and the rules pertaining to the implementation of Recycled Plastics Manufacture and Usage Rules are to be implemented by the concerned District Magistrate/ District Commissioner. The central government has allowed private participation in the filed of municipal solid waste and bio-medical waste management, but the ultimate authority to implement these rules efficiently and effectively rests with the agencies of the government.

1.7 Scope of Audit

Performance Audit (PA) of "Management of Waste in India" sought to examine whether the government had identified waste as a risk to environment and health, accurately assessed the amount of different kinds of waste being generated in the country and drafted a policy on waste management which focused on waste minimisation and waste reduction, as compared to waste disposal, as the more effective ways to manage waste. In addition, the PA sought to examine whether all kinds of waste had been covered under legislation for safe disposal and whether agencies had been allocated responsibility and accountability for the management of waste. The PA also sought to check the compliance to rules relating to the implementation, monitoring and evaluation and adequacy of funding relating to municipal solid waste, bio-medical waste and plastic waste.

The scope of the PA excluded:

- the implementation, monitoring and evaluation of hazardous waste management rules due to its complexity and the multiplicity of agencies involved in its implementation and monitoring; and
- the implementation, monitoring and evaluation of radioactive waste due to the confidential nature of such wastes as well as their restricted use.

At the central level, audit scope covered policy, planning and legislation at MoEF and the implementation, monitoring and evaluation activities relating to management of waste at CPCB. At the state level, audit checked the records of 24 state government departments like Department of Environment/Forests, Urban Development etc,. 24 PCBs, 56 municipalities in 20 states, 60 districts in 20 states and 180 hospitals in 15 states to verify implementation and monitoring of municipal solid waste, bio-medical waste and plastic waste rules.

1.8 Audit objectives

Performance audit of "Management of Waste in India" covering the period from 2002-2003 to 2006-2007, was taken up with the objectives of assessing whether:

I. **the quantum of waste being generated in the country had been assessed and the risks to environment and health posed by waste had been identified;**

II. **a specific policy for management of waste existed and whether policies and strategies for the management of waste gave priority to waste reduction and waste minimisation as against waste disposal;**

III. **legislations specifically dealing with disposal of each kind of waste existed and whether penalty for violation had been incorporated in the legislations already enacted;**

IV. **various agencies involved in the process had been allocated clear responsibility and accountability for waste management and whether or not a mismatch/gap/overlap existed among the responsibility centers;**

V. **effective compliance to laws regulating municipal solid waste, bio-medical waste and plastic waste was taking place in the states;**

VI. **monitoring was effective in checking non-compliance; and**

VII. **funding and manpower were adequate for the implementation of rules on waste management and whether the funds/infrastructure were used economically, efficiently and effectively.**

The observations of audit with reference to each of the seven objectives of the PA have been presented in separate chapters i.e. Chapter 2 to Chapter 8.

1.9 Audit criteria

The main audit criteria used in the PA were:

- Agenda 21 document of the World Commission on Sustainable Development of the United Nations Conference on Environment and Development, held in Rio in June 1992;
- United Nations Environment Programme (UNEP) guidelines;
- Adherence to rules relating to the bio-medical waste, plastic waste and municipal solid waste;
- Implementation of the ECOMARK scheme;
- Adherence to system of periodic monitoring in MoEF, CPCB and PCBs relating to management of waste; and
- Policies, directives, legislations and good practices for management of waste in different countries.

1.10 Audit methodology

The initiation of the PA was with guidelines for audit, prepared in consultation with NGOs like Center for Science and Environment, Toxic Links, apart from stakeholders

like MoEF and CPCB. Guidelines of INTOSAI (International Organisation of Supreme Audit Institutions) on waste titled "Towards Auditing Waste Management" were also referred to while framing these guidelines. These guidelines facilitated audit effort in the sampled states.

The Performance Audit of "**Management of Waste in India**" commenced with an entry conference with MoEF in July 2007, in which the audit methodology, scope, objectives and criteria were explained. The audit methodology mainly consisted of document analysis, responses to questionnaires, physical collection and testing of samples. Records and returns relating to the issue were examined:

- at the central level at MoEF and CPCB between July 2007 to December 2007.
- at state level (in 24 states) in PCBs, state Forest Departments, state urban development department, municipalities, districts and hospitals between June 2007 to December 2007.

1.10.1 Sample selection

During pilot studies conducted before undertaking the Performance Audit, we had encountered a situation where the states opted not to give answers to certain issues raised during audit. Thus, we anticipated large number of 'non verifiable' responses as compared to a clear 'Yes' or 'No'. To ensure that we had a sufficient number of clear 'Yes' or 'No' responses, we considered a larger sample in terms of state coverage; hence the PA covered 24 out of 28 states (86 *per cent*) for reponses on policy for management of wastes, municipalities in 20 out of 28 states (71 *per cent*) for compliance to municipal solid waste/plastic waste rules and hospitals in 15 out of 28 states (54 *per cent*) for compliance to bio medical waste rules.

- Random sampling was used to select 24 states/PCBs from whom responses were sought on policy issues.
- Municipal solid waste: Stratified random sampling was used to select the municipalities for inclusion in the sample for audit. Three municipalities each in 20 states (1 municipality in Delhi, 1 municipality in Meghalaya, 5 municipalities from Chhattisgarh and no municipality in Sikkim (so the whole state was taken as one municipality) were selected by means of a stratified random sample where the sample was stratified according to population and municipalities were selected randomly from within the strata. 56 municipalities were sampled in total.
- Plastic waste rules: The districts in which the municipalities fell were taken as sample and 56 districts were sampled in total.
- Bio-medical waste: simple random sampling was used to select hospitals for inclusion in the audit sample. 180 hospitals were selected (12 hospitals each in 15 states) by means of random selection of four districts in each state and random selection of three hospitals from within the sampled district.

List of all sampled states, municipalities, hospitals and PCBs is attached as **Annexure 1**.

1.10.2 Reporting methodology

The results of audit, both at the central level and the state level, were taken into account for arriving at audit conclusions. While framing the conclusions and recommendations, good practices regarding waste management in India and in other countries have also been quoted to illustrate the fact that these practices are possible in the field of waste management. While it is recognised that not all these international practices can be easily implemented in India, however, they can serve as examples or best practices to policy makers while framing policies.

The affirmative responses to audit queries which were accompanied by supporting evidence have been reflected in the report as a 'Yes' response. Where the states have responded negatively to the queries, the same has been reflected as a 'No' response in the report. Cases where responses were not received or where no supporting evidence was furnished for affirmative responses, have been reflected as 'non verifiable' in the report. **The audit findings, conclusions and recommendations against each of the stated objective of the PA have been discussed in the following chapters.**

1.10.3 Acknowledgement

Entry Conference was held with MoEF/CPCB on 3 July 2007 which was not attended by the Secretary, MoEF. The cooperation of MoEF during the entry conference and course of audit was satisfactory. The draft PA report was issued to MoEF on 5 May 2008 and their reply was received on 1 August 2008. The replies given by MoEF have been suitably incorporated in the PA. The exit conference with MoEF/CPCB was held on 23 September 2008 in which the Secretary, MoEF informed that keeping in view the audit recommendations, a committee to draw up a road map for the management of waste in India has been formed. The Committee consists of senior officials of MoEF, CPCB, representatives from NGOs, representative of the C&AG and eminent persons in the field of waste management. The committee has been mandated to submit its report within three months. The initiative taken by the Secretary, MoEF in promptly addressing the issue of management of waste in India by constituting this committee is appreciated.

CHAPTER 2
Generation of Data and Risk identification

Objective 1: Whether the quantum of waste being generated in the country had been assessed and had the risks to environment and health posed by waste been identified.

Data provides information about the magnitude and scope of the problem faced. It can guide decision-making, and if broken down into various parameters of relevance, it becomes an accurate assessment of the quantum of any problem faced by the country. Hence, collection of data is the first step towards effective policymaking.

Articles 21.8, 21.9 and 21.11 of Agenda 21 of the World Commission on Sustainable Development (Rio 1992) emphasised the need for strengthening procedures for assessing waste quantity and composition changes of waste and declared that by the year 2000, countries should have the capacity to access, process and monitor waste trend information. It also emphasised the need for undertaking data gathering and analysis and to utilise data to assess the environmental soundness of national waste policies. According to United Nations Environment Programme (UNEP), the national government should develop and maintain a database on solid waste in the nation. Such database may include, among other things, data about generation, such as demographic information and quantities of waste generated, waste characteristics, such as waste composition etc,.

2.1 Assessment of waste being generated

2.1.1 At the central level

MoEF and CPCB were queried about the availability of data on the different kinds of waste generated in India for the period 2002-03 to 2006-07. The data provided by MoEF and CPCB is depicted in the table below:

Kinds of waste (in million Tonnes)	2006-07	2005-06	2004-05	2003-04	2002-03
Municipal solid waste	NA	NA	NA	NA	NA
Bio-medical waste	0.16	0.17	0.12	0.12	0.12
Hazardous waste	8.14	4.4	4.4	4.4	4.4
E waste	0.15	NA	NA	NA	NA
Waste from power plants	122.09	112.2	111.3	106.6	103.3

NA: Not available

In this regard the following observations are made:

(a) Municipal solid waste

MoEF did not make available data about quantum of municipal solid waste generated annually for the period under review and stated that the Ministry of Urban Development (MoUD) was the nodal ministry at the central level for solid waste issues. MoUD, while formulating proposals for the Twelfth Finance Commission, estimated that urban India produced approximately 48 million tonnes of municipal solid waste annually. This estimate did not include the amount of municipal solid waste generated in the rural areas. Thus, there was no comprehensive data either with MoEF or with MoUD about the amounts of municipal solid waste being generated in the country.

(b) Bio-medical waste

As per the information provided by MoEF/CPCB, the quantity of biomedical waste generated in India varied from 0.12 MT to 0.17 MT per annum during 2004-05 to 2006-07. These figures could not be confirmed with the Ministry of Health and Family Welfare (MoH&FW) as it did not maintain a database about the amount of bio-medical waste generated all over the country.

(c) Plastic Waste

Neither MoEF nor CPCB were aware about the amount of plastic waste being generated in the country. This information was also not available with the Department of Chemicals and Petrochemicals.

(d) Hazardous waste

According to the X plan document, India generated 7.2 MT of hazardous waste annually. As per the information provided by MoEF, the quantity of hazardous waste generated varied between 4.4 MT and 8.14 MT during 2002-03 to 2006-07.

(e) E-waste

CPCB stated that during 2006-07, the amount of e-waste was 0.15 MT. The amount of the e-waste generated for the other years under review were not available with CPCB.

(f) Other waste

For any of the years under review, MoEF had no information about the amounts of waste being generated by electrical items, construction & demolition waste/debris, agricultural waste, packaging waste, mining waste, end of life vehicles waste and waste tyres. As no separate legislation or rules have been laid down for safe disposal of these kinds of waste, the generation of these wastes would escape detection, leading to harmful health and environmental consequences.

Some of the possible parameters according to which data about waste can also be collected, like done in European Union (EU) countries, are population size and geographical size; size and number of main sectors generating waste; data about the amount of waste generated from activities like industries, commercial undertakings, agriculture and tourism; composition of waste according to seasonal fluctuations etc,. These parameters give an accurate picture about the sources of origin and amount of each kind of waste generated and thus, help in planning. It was observed in audit that such parameters were not taken into account while collecting data on waste.

Thus, MoEF and CPCB had incomplete information about the amounts of municipal solid waste, plastic waste, e- waste and other kinds of waste like construction and demolition waste, waste electrical items, end of life vehicles etc, being generated in the country. Waste data broken down into parameters of significance was also not available. This rendered any kind of trend analysis impossible. MoEF was also unaware of the amounts of various kinds of waste being generated in different states in the country.

2.1.2 At the state/ Pollution Control Board (PCB) level

(i) State governments and Pollution Control Boards (PCBs) in 24 states were queried about the availability of data on the different kinds of waste generated in India for the period 2002-03 to 2006-07. It was observed that no state or PCB, out of the sampled 24 states, had completely assessed the quantum of the different kinds of waste like municipal solid waste, bio-medical waste, hazardous waste, plastic waste, e-waste, construction and demolition waste etc., generated during the last five years. Amongst the sampled states, it was observed:

- Only 42 *per cent* of the sampled states had partial data on wastes. In the sample, ***Madhya Pradesh*** and ***West Bengal*** had the most comprehensive data wherein they had assessed the amounts of municipal solid waste, bio-medical waste and hazardous waste generated over a few years. ***Uttar Pradesh*** had assessed the amounts of municipal solid waste and bio-medical waste generated. ***Meghalaya*** had assessed the amounts of municipal solid waste and hazardous waste generated. ***Delhi, Gujarat, Rajasthan, Andhra Pradesh*** and ***Karnataka*** had assessed the amounts of municipal solid waste generated and ***Haryana*** had assessed the quantum of hazardous waste generated in the state.
- No data about the amounts of waste generated according to source was available in 42 *per cent* of the sampled states and was not verifiable in 16 *per cent* of the sampled states. List of the states is attached in **Annexure 2.**

(ii) In addition, it was observed that in the 24 sampled states, assessment of waste, according to population size and geographical area was done as follows:

- Assessment of waste, according to population size and geographical size of the area from which waste is generated was done by state government/PCB only in ***Madhya Pradesh, Maharashtra, Andhra Pradesh*** and partially in ***Delhi*** **and** ***J&K.***
- ***Delhi, Madhya Pradesh, Gujarat*** and ***Punjab*** had collected some data about the size and number of main sectors generating waste or data about the amount of waste generated from activities like industries, commercial undertakings, agriculture and tourism. ***Delhi*** stated that it had collected data under domestic and non-domestic categories and ***Uttar Pradesh*** stated it had collected data about hazardous waste generated from industries.
- Composition of waste according to seasonal fluctuations was either not analysed or could not be verified in audit.

Thus, even in the states, data about the various kinds of waste and its analysis was incomplete. Agenda 21 of the World Commission on Sustainable Development and UNEP had also emphasised the need for data gathering, analysis and maintenance of a detailed database on waste for the nation. MoEF/CPCB and state governments need to intensify efforts to build up a comprehensive database on waste.

With respect to municipal solid waste, MoEF replied in August 2008 that CPCB in association with the National Environmental Engineering Research Institute (NEERI) had carried out assessment of municipal solid waste generation in 35 metro cities and 24 State capitals during 2004-05 and the report in this regard had been published in April 2006. It also stated that assessment of waste generation at state level was the responsibility of the local bodies and that CPCB had emphasised the preparation of inventories on waste generation and characterisation by the PCBs. With respect to bio-medical waste, MoEF stated that since all the PCBs did not submit annual reports every year, data was not comprehensive and may not be comparable year-wise. With respect to plastic waste, MoEF stated that CPCB had not undertaken specific studies on assessment of plastic waste generation in the country. With respect to hazardous waste, MoEF stated that as per rules, it was the responsibility of the PCBs to maintain the records with regard to sector-wise hazardous waste generated in the respective states. However, as directed by the Supreme Court, presently, CPCB had requested all the PCBs for submission of the inventory of generation of hazardous wastes and the report are being received from the PCBs. MoEF had no comments to offer on the lack of data regarding e-waste, waste electrical and electronic items, other waste like construction & demolition waste, agricultural waste, waste from agriculture etc., MoEF also had no comments to offer on lack of waste data on significant parameters like population, geographical area etc,.

Thus, the fact remains that despite being the nodal body for the control of pollution, MoEF/CPCB did not have complete data about the amounts of waste being generated all over the country. They also did not have data according to parameters of significance affecting the increasing amount of waste and in the absence of this, planning for effective management of waste was deficient.

International good practices:

- ***Sweden, Germany, Norway, Spain, Poland*** and ***United Kingdom*** have a detailed waste database about various types of waste like packaging waste, construction & demolition waste, waste end of life vehicles, agricultural waste, waste from mining and quarrying etc,.
- ***Denmark's*** Information System for Waste and Recycling gives year-wise details of the total waste generation since 1994, the amount of waste analysed by source (households, manufacturing), type of waste (hazardous waste) and kind of treatment (recycling, incineration).
- ***Italy*** and ***Norway*** have database on amounts of waste generated by each sector like household, commercial, agriculture, manufacturing etc,.

Recommendations

- *CPCB, as the nodal agency for pollution related issues should carry out, periodically, a comprehensive assessment of the amounts of waste being generated, according to the major waste types. All the states in India should be involved in this*

exercise so that a comprehensive database on waste is generated for aiding policy-making and intervention.

- *Besides the total amount of waste being generated according to types, the waste data may also be collected according to parameters like geographical areas, sectors-wise (industrial, household, commercial, agriculture, tourism etc,.) and according to seasonal fluctuations to give accurate inputs for policy-making and intervention.*

2.2 Projections of the quantities of waste generated and identification of significant parameters affecting waste quantities

The kinds of waste and amounts may be significantly influenced, over time, by a number of parameters. In order to make realistic projections about the growth of waste in the future, the dominant parameters should be identified and their expected influence on the waste amounts should be described and evaluated. An absolutely certain and unambiguous forecast of future waste generation cannot be prepared but there is a need for some basis for creating additional capacity in the waste management methods to tackle the growth of waste over time.

2.2.1 At the central level

MoEF/CPCB did not make available information about the projected growth in quantity and composition of municipal solid waste, bio-medical waste, hazardous waste and plastic waste. Only projection figures were available for e-waste which was projected to increase to eight lakh tonnes by 2012 and that waste generated by power plants which would increase to 170 MT by the end of the XI plan period.

MoEF/CPCB also did not make available information to establish that it had collected information about or taken into account the increase in waste due to significant parameters that affect waste like:

- increase in waste due to increase in population,
- increase in waste due to greater economic growth,
- increase in waste due to increase in demand for consumer goods, and
- increase in waste due to changes in manufacturing methods.

2.2.2 At the level of states/PCBs

With respect to projections about growth in waste, it was observed in audit that out of the 24 sampled states:

- Only 25 *per cent* of the sampled states had made projections about the growth in waste. Among the sampled states, ***Delhi*** and ***Gujarat*** had projected growth of waste based on anticipated population growth. ***West Bengal*** had projected the growth in quantity of municipal solid waste, after taking into account the anticipated population growth in 41 out of 126 municipalities. ***Rajasthan*** and ***Meghalaya*** had also projected the growth in quantity of municipal solid

waste. In ***Karnataka***, geometric progression method was followed to arrive at projected increase in waste.

- 38 *per cent* of the sampled states had made no projections while it could not be verified in audit whether 37 *per cent* of the sampled states had made any projections. List of the states is attached in **Annexure 2.**
- Increase in waste due to factors like greater economic growth, increase in demand for consumer goods and changes in manufacturing methods was not estimated by any of the 24 sampled states, except in ***Delhi*** which stated that cognisance had been taken of factors like economic situation, demand for consumer goods, changes in manufacturing methods and new treatment methods. However, this could not be verified in audit.

All the factors discussed above can significantly increase the quantities of waste being generated and non-recognition of these factors would hamper any kind of planning. In the absence of such information with MoEF/states, it would be difficult to arrive at accurate estimations and specific strategies that can be tailored for waste management.

MoEF replied in August 2008 that estimations regarding the projected growth in quantity and composition of municipal solid waste and plastic waste were not available with CPCB. Hence, MoEF had not given recognition to these factors which affect the quantity of waste being generated and in the absence of such information, waste management plans and strategies were rendered ineffective.

International good practices:

- The Commission of the European Countries has predicted that municipal solid waste generation will grow until 2020 and the increase will be 42.4 *per cent* by 2020 compared to 1995 levels.
- **USA** has projected the trends on municipal solid waste generation, recovery & disposal and aggregate data on the infrastructure created for municipal solid waste management.

Recommendation

- *MoEF, with involvement of all the states, may collect data about growth of the various kinds of waste, analyse the factors contributing to its growth and the increase in waste quantities to arrive at strategies for waste management.*

2.3 Assessment of current and future capacity to handle waste

Assessment of waste currently being generated and the current waste disposal infrastructure like incinerators, landfills etc., help in assessing the adequacy of waste infrastructure. Projections about growth of waste would also indicate whether there is a need to create new facilities to handle the increase in waste in the coming years. This is

especially important as waste infrastructure is costly to build and requires planning in advance.

2.3.1 At the central level

(a) Municipal solid waste

MoEF stated that assessment of current capacity to handle municipal solid waste had been made and found to be inadequate to enable environmental friendly disposal of municipal solid waste. CPCB replied that no such assessment was done, as it would vary from one urban local body to the other. With respect to future estimation of disposal capacities for municipal solid waste, which needed to be created, while MoEF stated that it was carried out, CPCB replied that this estimation was under consideration. However, MoEF did not make available any reports that suggested that such estimation was carried out.

(b) Bio-medical waste

MoEF and CPCB did not make available any current or estimated future capacities for safe disposal of biomedical waste. CPCB stated that such estimation was the responsibility of the SPCBs/PCBs.

(c) Hazardous waste

MoEF had assessed the current capacity to handle hazardous waste and stated that there were 18 hazardous waste disposal facilities located in 7 states, which, according to MoEF, were inadequate. CPCB stated that future capacity, which needed to be created, was not estimated, as the PCBs were yet to submit hazardous waste generation data. MoEF stated that assessment of future capacity depended on receipt of inventory from the states. Thus, MoEF/CPCB did not have complete information as to the facilities, which needed to be created so that hazardous waste would not be dumped, with serious consequences to health and the environment.

(d) E-waste

No records were made available to show whether MoEF had assessed capacity to dispose e-waste. However, CPCB stated that being a new area, there are only two recycling facilities and recycling facilities were already coming up for the recycling of e-wastes.

(e) Other wastes

No rules existed for the management of other kinds of waste like packaging waste, agricultural waste, waste generated by construction & demolition activities, mining waste and waste generated by end of life vehicles. Hence, no records were available to suggest that assessment had been made by either MoEF or CPCB, of the current or the future capacity that were needed to be created for effective handling of such wastes.

2.3.2 At the level of states/PCBs

(i) Regarding current capacity to handle municipal solid waste, bio-medical waste and hazardous waste, it was observed that out of the 24 sampled states:

- Only 29 *per cent* of the states had assessed current capacity for handling some kinds of waste. ***Karnataka, Gujarat, Punjab*** and ***West Bengal*** governments/PCBs had assessed the current capacity to handle municipal solid waste, bio-medical waste, plastic waste and hazardous waste. ***Delhi*** and ***Meghalaya*** had assessed the current capacity to handle municipal solid waste; ***Madhya Pradesh*** has assessed the current capacity to handle bio-medical waste and hazardous waste.
- 42 *per cent* of the sampled states had not made this assessment, while it could not be verified in audit whether 29 *per cent* of the sampled states had made this assessment. List of the states is attached in **Annexure 2.**

(ii) Regarding creation of new and additional capacity to handle municipal solid waste, bio-medical waste and hazardous waste and plastic waste, it was observed that out of 24 sampled states:

- Only 33 *per cent* of the states had assessed the creation of new and additional capacity to handle waste safely. ***Delhi, Rajasthan, Tamil Nadu, Karnataka*** and ***Meghalaya*** had assessed whether creation of new and additional capacity to handle municipal solid waste safely in the near future was required. ***Gujarat*** had assessed the new capacity that needed to be created to ensure that municipal solid waste and bio-medical waste was treated safely in the near future and ***Madhya Pradesh*** had only assessed the new capacity that needed to be created to ensure that bio-medical waste and hazardous waste was treated safely in the near future. ***Punjab*** stated it had estimated that it had sufficient capacity to handle bio-medical waste for the next ten years and hazardous waste for the next 15 years.
- 38 *per cent* of the sampled states had not assessed the current and new capacity needed, while it could not be verified in audit whether 29 *per cent* of the sampled states had made this assessment. List of the states is attached in **Annexure 2.**

Assessment of the current capacity to handle waste and the future capacity that needed to be created for waste disposal was essential to ensure that all waste being generated was disposed off in an environmentally safe manner and that no waste remained untreated posing hazards to public health. In the absence of any meaningful assessment of current capacity and future capacity to handle waste by MoEF and the states, any waste management plan or programme would be rendered ineffective.

MoEF replied in August 2008 that as per the municipal solid waste rules, the Secretary-in-Charge of the Department of Urban Development of the State had the overall

responsibility for the enforcement of the provisions of these rules and that it was the role of the state to develop the necessary infrastructure for collection, storage, segregation, transportation, processing and disposal of municipal solid waste. MoEF also stated that with respect to municipal solid waste**,** CPCB had not categorically studied the capacities required by the local bodies for handling of waste generation at the state level and as per rules, each local body was required to prepare a detailed project report which would enable the local body to set up the requisite infrastructure and also to make provisions to handle the waste expected to be generated in future. With respect to hazardous waste, MoEF replied that at present there were 21 Treatment, Storage & Disposal Facilities (TSDFs) in the country spread in nine states and PCBs were in the process of finalisation of the inventory. MoEF did not offer any comments on the estimation of current and future capacity for bio-medical waste, e-waste and other waste.

However, MoEF being the nodal body for pollution control measures was expected to be aware of the current and future capacities which have to be created, so that waste being generated does not cause pollution. Also, as is evident, projections for future capacities were not taking place even at the level of the states, leaving the safe handling of waste doubtful. This would have deleterious effects on health of the public as well as the environment.

International good practices:

- ***Portugal*** estimates that it has sufficient capacity to handle all wastes till 2016. Thereafter, it will need to create 10 new biological treatment plants and a third incineration plant.

Recommendation

- *MoEF/CPCB, in conjunction with the states, may estimate the current capacity to handle all kinds of waste all over the country and ensure that additional capacity of waste infrastructure, if required, is created for safe disposal.*

2.4 Identification of risks to the environment posed by waste

Risk is exposure to a chance of loss or damage. Identification of risks is required to control loss or damage or to plan for the minimisation of damage or loss. Identification of risks to environment and health posed by waste is essential so that damage to health and environment can be minimised.

Article 21.29 of Agenda 21 of World Commission on Sustainable Development declared that by the year 2000, countries should establish sufficient capacity to undertake waste related pollution impact monitoring and conduct regular surveillance, including epidemiological surveillance[6]. Further according to UNEP, the disposal and treatment of

[6] Epidemiological surveillance is the systematic collection, analysis and dissemination of health data for planning, implementation and evaluation of public health programmes.

waste can produce emissions of several greenhouse gases (GHGs)[7], which contribute to global climate change. Landfill is the most common method for waste disposal and results in the release of methane from the anaerobic decomposition of organic materials. Methane is around 20 times more potent as a GHG than carbon dioxide. Landfills also have potential for soil acidification due to deposition of acid gases, increases in soil metals, vegetation damage due to oxides of nitrogen and sulphur dioxide etc,. Landfills can also result in contamination of ground and surface water with metals, organic compounds and bioaccumulation of toxic materials. These risks to the environment are compounded if the waste is dumped in open sites.

2.4.1 At the central level

MoEF did not make available records to show whether it had analysed and assessed the:

- Risks to quality of ambient air due to incinerators emitting noxious gases while disposing waste and the risks to environment from the green houses gases released by landfills/ dumpsites.
- Risks of contamination of ground water, rivers & streams and contamination of soil by wastes like bio-medical waste, industrial waste, plastic waste, municipal solid waste and other kinds of waste.

Thus, it could not be verified whether MoEF had assessed the environmental degradation that can be caused by improper handling and disposal of various kinds of waste.

While CPCB stated that it had assessed the risks to environment posed by hazardous waste, no assessment report was made available for review by audit. CPCB stated that it had not assessed the risks to environment posed by bio-medical waste. Further, CPCB was silent on whether it had assessed the risks to environment caused by other kinds of waste like municipal solid waste.

2.4.2 At the level of the state/PCBs

(i) Identification of all the risks to environment posed by waste like contamination of ground water and surface water, contamination of ambient air and contamination of soil, by state government/PCBs in 24 sampled states was not comprehensive as shown below:

- Only 50 *per cent* of the sampled states had partially identified some risks to the environment posed by waste. In the sample**,** the risks to environment posed by waste like contamination of groundwater and surface water, contamination of ambient air and contamination of soil was done by ***Rajasthan, Gujarat, Tamil Nadu*** (except contamination of soil) and ***Andhra Pradesh*** (except contamination of ambient air). ***Himachal Pradesh, Uttar Pradesh*** and ***Bihar*** had assessed the risks of contamination of ground water and surface water by waste while ***West Bengal*** had assessed the risks of contamination of soil by waste. ***Karnataka*** had carried out assessment of

[7] Greenhouse gases (GHGs) are gaseous constituents of the atmosphere, both natural and anthropogenic and are essential to maintaining the temperature of the Earth; without them the planet would be so cold as to be uninhabitable. An excess of GHGs can raise the temperature of a planet to lethal levels.

greenhouse gases for eight fast track cities while ***Assam*** and ***Orissa*** had assessed the risks of contamination of ground water by waste and ***Madhya Pradesh*** had assessed the risks of contamination of surface water by waste.

- 21 *per cent* of the sampled states had not assessed the risks to environment posed by waste while it could not be verified in audit whether 29 *per cent* of the sampled states had made this assessment. List of the states is attached in **Annexure 2.**

In the absence of comprehensive information at the apex as well as the state level about the risks to the environment caused by improper handling and disposal of waste, the potential damage to the environment would continue to escape detection.

MoEF replied in August 2008 that all landfill sites need authorisation from the concerned PCB, who in turn prescribe the conditions for monitoring of underground water and ambient air in the vicinity of the site and as per the Environment Impact Assessment Notification, 2006, environment clearance was needed for all such common sites. CPCB/PCBs were also required to be involved in monitoring, appraisal and interventions required from environmental angle.

The reply of MoEF has to be viewed in light of the fact that no risk assessment was carried out on the specific hazards to environment caused by waste. In the absence of such information, it was apparent that risks to environment would escape detection.

International good practices:

- ***United Kingdom*** has assessed that methane emission from biodegradable waste in landfills account for 40 *per cent* of the total methane emissions and 3 *per cent* of all greenhouse gas emissions in the country, with methane being 23 times as damaging a greenhouse gas as carbon dioxide.
- ***Canada*** has produced a document called *"Health and Environmental Effects of Burning Municipal Solid Waste"* which identifies specific risks to environment and health. It lists the pollutants from burning municipal solid waste like particulate matter, sulphur oxides, carbon monoxide, volatile organic compounds, CFCs etc., and states the damage to environment and health caused by each pollutant.

Recommendation

- *MoEF may carry out waste related pollution impact monitoring, on a regular basis, to study the effects of improper disposal of waste on the environment.*

2.5 Identification of risks to health posed by waste

Surface and ground water contamination and soil contamination have direct consequences on human health. Contaminants in the soil can harm plants when they take in the contamination through their roots. Ingesting, inhaling or touching contaminated soil, as well as eating plants or animals that have accumulated soil contaminants can

adversely affect the health of humans and animals. Leachate[8] is the liquid that forms as water trickles through contaminated areas, leaching out the chemicals. In agricultural areas, leaching may concentrate pesticides or fertilisers and bacteria may be leached from the soil. The movement of contaminated leachate may result in hazardous substances entering surface water, groundwater or soil. When wastes are incinerated at low temperatures or when plastics that contain polyvinyl chloride are incinerated, dioxins, furans, and other toxic air pollutants may be produced as emissions and/or fly ash. Exposure to dioxins, furans and polychlorinated by-phenyls may lead to adverse health effects.

2.5.1 At the central level

CPCB had not carried out any assessment of risks to public health posed by various kinds of waste. Further:

- Effects on health from the release of noxious gases from incinerators burning municipal solid waste, bio-medical waste, e-waste etc., were not assessed.
- Risks to human health from factors like contamination of soil and ground water and chemical poisoning from improper disposal of municipal solid waste, bio-medical waste, plastic waste or e-waste were not assessed.

Waste handlers are exposed to infectious and hazardous materials every day in the process of disposal of waste. Hence, they are at considerable risk while handling wastes like bio-medical waste, hazardous waste and even municipal solid waste. CPCB stated that it had studied the risks to waste handlers from municipal solid waste for Kolkata and Chennai only. It had not studied the risks to waste handlers from other kinds of waste.

2.5.2 At the level of states/PCBs

(i) Assessment of risks to public health posed by municipal solid waste, bio-medical waste, hazardous waste and other kinds of waste by the sampled 24 states revealed that:

- Assessment of risks was done partially only in 25 *per cent* of the sampled states. ***Karnataka*** had assessed health risks like spreading of vector borne diseases like dengue, chikungunya, malaria because of unclean garbage were identified while in ***West Bengal, Punjab*** and ***Himachal Pradesh****;* health risks due to bio-medical waste and municipal solid waste have been identified. In ***Bihar***, MoEF had sanctioned a project called "Environmental health Study" in Patna in October 2003 and the project was yet to be completed. ***Delhi*** had identified health risks to the general population because of dumping of waste.
- In 33 *per cent* of the sampled states, identification of health risks because of waste was not done, while it could not be verified in audit in 42 *per cent* of the sampled states whether health risks because of waste had been assessed. List of states is attached in **Annexure 2**

[8] Leachate is the liquid that drains or 'leaches' from a landfill; it varies widely in composition regarding the age of the landfill and the type of waste that it contains.

(ii) With respect to identification of risks to waste handlers, it was noticed that in the 24 sampled states:

- Only 8 *per cent* of the sampled states had identified health risks to waste handlers. ***Himachal Pradesh*** PCB in June 2007 has identified the risks to waste handlers that can arise due to handling of municipal solid waste, bio-medical waste and hazardous waste on a regular basis. ***Karnataka*** had made provisions for providing safety gear to municipal solid waste handlers, where handling of waste was outsourced as well as where waste was handled by municipality workers.
- 54 *per cent* of the states had not assessed the risks to waste handlers while it could not be verified whether assessment of risks to waste handlers had been carried out in 38 *per cent* of the sampled states. List of states is attached in **Annexure 2**.

(iii) It was also noticed in audit that none of the sampled states had a clear-cut law for the protection and safety of waste handlers against deleterious effects of waste handling.

Thus, in the absence of comprehensive studies by MoEF/CPCB and the states, on risks posed by waste to public health and improper disposal of waste, public would remain unaware of the health risks posed by waste.

MoEF replied in August 2008 that identification of the risks to the health posed by waste fall under the purview of the health departments at central/state level. Further, CPCB/MoEF has to carry out/ perform only the responsibilities stipulated under Schedule 7 of the hazardous waste rules. MoEF was silent on the lack of law/rule framed for the safety and protection of waste handlers.

However, being the nodal agency for pollution control, responsibility rests with MoEF to take a lead in undertaking such studies so that risks can be identified and safeguards be put in place in the pollution control laws, which are framed by MoEF for the control of such risks.

Good practices in India:

- ***Karnataka*** had formed a committee (IPD Saalappa committee) to look after the welfare and safety of waste handlers and its recommendations were implemented in the state by means of conditions built into tender documents to take care of safety of workers.
- In ***Punjab***, Post Graduate Institute, Chandigarh was carrying out an epidemiological study on the effect of open drains on health.

International good practices:

- ***Denmark*** has brought out a comprehensive study of environmental factors, including waste, on health. The report focuses on consequences of exposure from a

variety of factors including waste, how it affects human health and the extent of such effects on health.

- Department for Environment, Food & Rural Affairs (Defra) of the ***United Kingdom*** has reviewed the environmental and health effects of waste management in detail. The report has studied the health and environment impacts of emissions from various waste management methods and the consequent health impacts like asthma, cancer, respiratory disease etc,.

Recommendations

- *MoEF along with the states may also carry out regular surveillance, including epidemiological surveillance of waste related impacts on public health.*
- *MoEF may consider framing laws/ rules for protection of waste handlers.*

Conclusion

MoEF/states had not assessed completely the quantity of various kinds of waste being generated in the country, the different sources of waste and the points of origin of different kinds of waste. In addition, MoEF/states were not aware about the quantity of waste that would be generated in the coming years as the country moves towards greater industrialisation and consumerism. Hence, they were not in a position to make any assessment about the amounts of waste that might be produced in future and whether the capacity to handle waste currently and in the future was adequate. In the absence of data about waste, broken into parameters of significance, policy-making and waste management programmes would be rendered ineffective.

Risks to health and environment had not been adequately assessed by MoEF/states. Non identification of risks to health and environment caused by waste, would lead to insufficient recognition, both by policy makers as well as general public, to the problems caused by ineffective management of wastes.

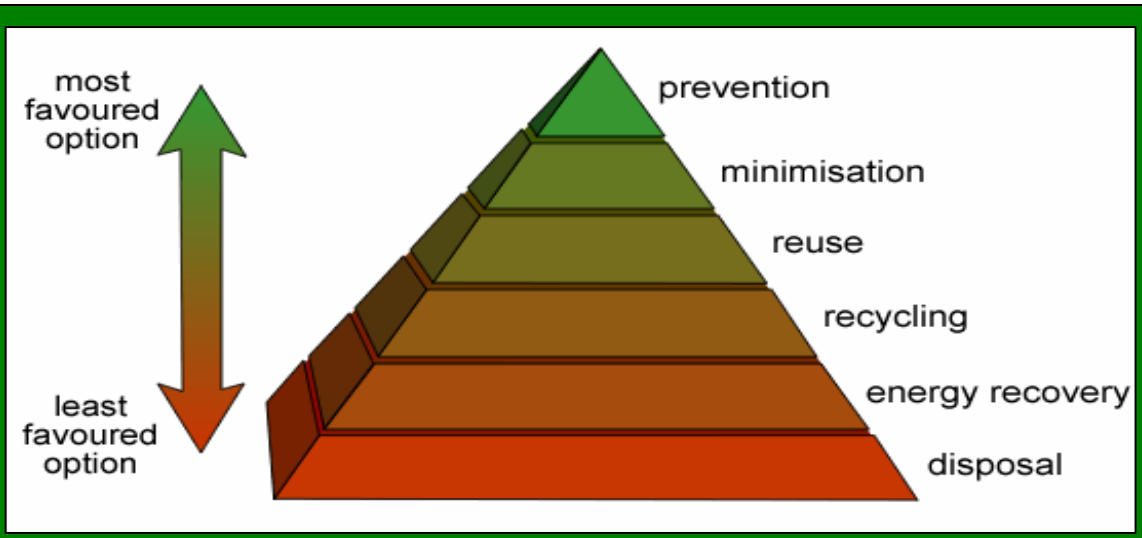
CHAPTER 3

Waste policy and strategies for waste reduction, reuse and recycling

Objective 2: Whether a specific policy for management of wastes existed and whether policies and strategies for the management of waste gave priority to waste reduction and waste minimisation as against waste disposal.

A policy is a deliberate plan of action to guide decisions and achieve rational outcomes and provides a focused thrust to the activities towards achievement of the desired results. Relevant and timely strategies aid in operationalising policy. United Nations Conference on Environment and Development, in 1989, affirmed that environmentally sound management of wastes was among the environmental issues of major concern in maintaining the quality of the Earth's environment and especially in achieving environmentally sound and sustainable development in all countries. Further, Agenda 21 stated that governments should "*promote waste prevention and minimisation as the principal objective of national waste management programmes*" and that governments should "*develop and implement national plans for waste management that take advantage of, and give priority to waste reuse and recycling*".

An overall national or regional ***waste policy*** determines and governs the framework for activities in the waste sector. A clear, concise and consistent policy is a necessary requirement for the waste industry to establish and set up waste management systems and make necessary investments. Thus, a well-established and supported ***waste policy*** is of crucial importance in waste management. According to UNEP, one element common to most waste policies is a ***waste hierarchy***. This hierarchy is a stepwise approach to waste management in the order of environmental priority for different waste management options as illustrated in the waste pyramid below.



Waste hierarchy pyramid

The general principles of the waste hierarchy are prevention, minimisation, reuse, recycling, energy recovery and disposal with prevention being the most favoured and disposal being the least favoured option.

3.1 Existence of a defined waste policy

3.1.1 At the central level

MoEF did not make available information as to whether it had framed a separate waste management policy. However, audit analysed all the policies, laws and rules framed by MoEF and it emerged that MoEF had not framed a separate policy governing the management of waste. Further, a clear hierarchy for the management of waste had also not been defined. In 2006, MoEF laid down the National Environment Policy (NEP) that did reflect some concerns on recycling and waste reduction strategies; but these were not organised into a coherent waste management policy, reflecting the waste hierarchy (further discussed in Paragraph 3.2.1).

Thus, due to absence of a policy on the management of waste, it was not apparent whether the objectives and programmes outlined in Agenda 21 of the World Commission on Sustainable Development had been adequately represented in the waste management programmes being implemented all over India.

3.1.2 By the states

In the absence of a waste policy framed by MoEF, which, as the nodal ministry for the control of pollution would guide the implementation of '3 Rs'[9] all over the country, it was noticed that the state governments had not paid sufficient attention to the implementation of 3Rs. Of the sampled 24 states it was observed in audit that:

- Only 16 *per cent* of the sampled states had accorded some priority to the '3 Rs'. ***West Bengal*** had made efforts for reduction of the use of plastic bags and reduction of some categories of industrial waste while in ***Rajasthan***, state government had framed waste management policy for utilisation of municipal solid waste and bio-medical waste in generation of power, compost and other products in 2001 and had also defined priority in the guidelines. State governments in ***Maharashtra*** and ***Gujarat*** had accorded priority to waste minimisation/reduction of municipal solid waste and industrial waste respectively.
- 38 *per cent* of the sampled states had not made any efforts to implement the '3 Rs' while it could not be verified in audit whether 46 *per cent* of the states had made any efforts to implement the '3 Rs'. List of states is attached in **Annexure 2**.

Thus, at the level of the states, disposal remained the most favoured solution to the management of waste, instead of waste minimisation and waste reduction. This was further brought out by the fact that only disposal of waste was taking place in the sampled municipalities and no attention was paid to waste processing, as discussed

[9] Waste reduction, reuse and recycle.

in Paragraph 6.2.1 in Chapter 6 of this Performance Audit report. Absence of separate waste management policy incorporating the '3 Rs' would mean that waste management initiatives would continue to be haphazard.

MoEF replied in August 2008 that with regard to policies for management of hazardous waste, MoEF had already prepared a National Environment Policy, 2006 which included management of hazardous waste keeping in view the importance of waste reduction/reuse/recycle and final disposal. It was silent on the issue of a separate waste policy, incorporating the waste hierarchy.

As reported by Audit in Paragraph 3.2.1, the action plan outlined in National Environment Policy, 2006 have remained only on paper and had not been translated into action. Also, MoEF had not enacted any policy for the management of waste as a whole, and especially municipal solid waste which is most amenable to reduction, reuse and recycle. As a result, policy initiatives do not drive waste reduction, reuse and recycling in India.

International good practices:

- ***Denmark*** follows the Lansink's ladder for preferences in managing waste: Prevention, Design for prevention and design for beneficial use, Product recycling (reuse), Material recycling, Recovery for use as fuel, Disposal by incineration and Disposal to landfill.
- *In* ***Japan,*** waste is seen not simply as things to be disposed off, but rather as a valuable resource. Japan has reinforced its policy measures toward tackling waste issues and strengthened its "3R" (recycle, reduce, and reuse) framework.
- ***Korea***'s waste management policy seeks to provide clean environment to people and the natural ecosystem by minimising waste generation, optimising waste recycle and treating waste generated in an environmentally sound manner and the strategic approach to promote '3 Rs' (reduce, reuse and recycle) is the core measure.
- ***South Africa***'s waste management policy seeks *"to reduce the amount of waste that is generated and, where waste is generated, to ensure that waste is recycled, reused or recovered in an environmentally sound manner before being safely treated and disposed off*".
- ***Ireland's*** policy is the *"integrated waste management"* approach, based on the internationally adopted hierarchy of options which places greatest emphasis on waste prevention, followed by minimisation, reuse, recycling, energy recovery and, finally, the environmentally sustainable disposal of residual waste.
- ***Philippines*** waste management policy promotes a systematic, comprehensive and ecological solid waste management programme, which ensures the protection of public health and environment, utilises environmentally sound methods that maximises the utilisation of valuable resources and encourages resource conservation and recovery.
- ***Finland's*** waste legislation defined waste management activities in the order of precedence i.e. preventing wastes and reducing their harmful impacts, recovering wastes - including primarily their material content and secondarily their energy content and finally safe treatment of wastes and the rehabilitation of any related damage.

Recommendation

- *MoEF may consider framing a specific waste policy for the management of wastes in India, incorporating the internationally accepted hierarchy for management of wastes. States may adopt this policy to give thrust to the '3 Rs' for the management of waste.*

3.2 Strategies for waste reduction/reuse/recycle

Strategies are required to achieve the objectives set out in the waste policy/legislation. They put a plan, policy or law into operation. Strategies to recycle, reuse and reduce waste lessen the amount of waste meant for final disposal and thus, the cost of disposal. Article 21.4 and 21.5 of Agenda 21 of World Commission on Sustainable Development states that *"environmentally sound waste management should focus on (a) minimising wastes (b) maximising environmentally sound waste reuse and recycling (c) promoting environmentally sound waste disposal and treatment and (d) extending waste service coverage."* According to Article 21.10 of Agenda 21, governments should initiate programmes to achieve sustained minimisation of waste generation and according to Article 21.9 (b) of Agenda 21, by the year 2000, all industrialised countries should have in place programmes to stabilise or reduce, if practicable, production of wastes destined for final disposal, including per capita wastes, at the level prevailing at that date; developing countries as well should work towards that goal without jeopardising their development prospects. Audit findings with respect to strategies for waste reduction/reuse/recycle are discussed below:

3.2.1 At the central level

As discussed in Paragraph 3.1.1, MoEF had not enunciated a separate waste management policy and had not laid down a waste hierarchy for the management of waste. It had framed rules for the management of bio-medical, municipal and hazardous waste, all of which focused only on the disposal of the generated waste. The rules do not talk about strategies to reduce, reuse or recycle waste. Thus, priority had not been given to '3 Rs' and waste disposal remained the most preferred solution to the problem of waste management. This was in contrast to the practice of '3 Rs' being followed internationally.

Government of India had enunciated a National Environment Policy (NEP) in 2006, which laid some waste reduction and minimisation strategies. Specifically, the NEP, 2006 declared that industrial and municipal waste is a major cause of soil pollution and proposed an action plan, which among other things, envisaged to:

- Strengthen the capacities of local bodies for segregation, recycling and the reuse of municipal solid waste;
- Give legal recognition to, and strengthen the informal sector systems of collection and recycling of various materials;
- Promote biodegradable and recyclable substitutes for non-biodegradable materials, and develop and implement strategies for their recycle, reuse, and final

environmentally benign disposal, including through promotion of relevant technologies, and use of incentive based instruments;

- Promote adoption of clean technologies by industry, in particular in the small and medium sector, through regulatory and fiscal measures, and standards setting;
- Consider use of revenue enhancing fiscal instruments to promote shifts to clean technologies in both existing and new units;
- Set up a mechanism to network technology research institutions in the country, public and private, for cooperation in technology research and development and adaptation, information, and evaluation of clean technologies. Create a database of such technologies, and promote dissemination of new technologies developed both in India and abroad.

MoEF did not state whether it had taken any action to implement the waste reduction strategies laid down in NEP. Thus, despite identifying industrial and municipal waste as a major source of pollution and laying down an action plan to reduce these wastes, it appeared that the government has not operationalised these strategies.

(a) Municipal Solid Waste

MoEF did not make available any information to show whether strategies to reduce municipal solid waste and plastic waste like deposit refund schemes[10], promoting the use of refill packs etc., had also been introduced in India which would be vital in reducing the generation of these wastes. Other strategies which were increasingly being used internationally, specially to reduce the waste generated by consumer and household goods like eco audit[11], life cycle analysis[12], extended producer responsibility[13], product stewardship[14] etc,. also appear not to have been introduced in India as MoEF did not make available any information to show that these had been proposed or introduced.

(b) Hazardous Waste

[10] These offer customers a financial incentive to return packaging for reuse.

[11] Eco auditing is most frequently thought of as an environmental management tool employed by businesses to facilitate better management of their environmental performance. It is the assessment made by a company or organisation of the financial benefits and disadvantages to be derived from adopting a more environmentally sound policy.

[12] The goal of Life Cycle Analysis is to compare the environmental performance of products and services, to be able to choose the least burdensome one. The term 'life cycle' refers to the notion that a fair, holistic assessment requires the assessment of raw material production, manufacture, distribution, use and disposal including all intervening transportation steps. This is the life cycle of the product.

[13] Extended Producer Responsibility (EPR) is a strategy designed to promote the integration of environmental costs associated with products throughout their life cycles into the market price of the products. Extended producer responsibility imposes accountability over the entire life cycle of products and packaging introduced in the market. This means that firms, which manufacture, import and/or sell products, are required to be financially or physically responsible for such products after their useful life.

[14] Product stewardship is a concept whereby environmental protection centers on the product itself, and everyone involved in the lifespan of the product is called upon to take up responsibility to reduce its environmental impact. For manufacturers, this includes planning for, and if necessary, paying for the recycling or disposal of the product at the end of its useful life. For retailers and consumers, this means taking an active role in ensuring the proper disposal or recycling of an end-of-life product.

It was also noticed during audit that though CPCB had proposed the introduction of strategies for the reduction and reuse of hazardous waste like promotion of clean technologies and products, establishment of technical standards to limit the presence of certain dangerous substances in products, reuse of scrap material, waste exchanges[15], ship to the point of use[16] and remanufacturing[17], no information was provided by MoEF to show whether these strategies had been made operational. In March 2003, MoEF signed Charter on "Corporate Responsibility for Environmental Protection (CREP)" with 17 categories of polluting industries for the prevention and control of pollution through various measures including waste minimisation. MoEF stated that the charter had resulted in commitment from the industries to reduce pollution and waste and to increase recycling. However, MoEF stated that since the CREP scheme had a voluntary compliance approach, it had led to mixed response from the various categories of industries. The effect of the CREP scheme in reducing pollution and waste could not be verified in audit in the absence of any records.

3.2.2 At the level of the states

(i) Most of the states in India had not introduced any strategy for the reduction, reuse and recycling of waste. Out of the 24 sampled states, it was observed that:

- Only eight *per cent* of the sampled states had introduced strategies for reduction, reuse and recycling. State government of ***Rajasthan*** had encouraged industrial units for the adoption of clean technology norms and ***Haryana*** had established technical standards to limit the presence of dangerous substances in products to reduce the quantum of waste being generated.
- Specific strategies like promotion of clean technologies and products, establishment of technical standards to limit the presence of certain dangerous substances in products, eco-audit, life-cycle analysis, reuse of scrap material, waste exchanges, ship to the point of use, remanufacturing, deposit refund schemes, promoting the use of refill packs, extended producer responsibility and product stewardship to reduce the quantum of waste being generated have not been implemented in 63 *per cent* of the sampled states. It could not be verified whether these strategies had been implemented in 29 *per cent* of the sampled states. List of the states is attached as **Annexure 2**.

(ii) With respect to charters/agreements/pacts signed by industries with the state governments/PCBs to introduce greener technologies which would lead to less waste, it was noticed that out of 24 sampled states:

[15] Where the waste product of one process becomes the raw material for a second process. Waste exchanges represent another way of reducing waste disposal volumes for waste that cannot be eliminated.
[16] Making deliveries of incoming raw materials or components direct to the point where they are assembled or used in the manufacturing process can minimise handling and the use of protective wrappings or enclosures.
[17] The most extensive reuse economies are "repair and overhaul" industries which take valuable parts, such as engine blocks , toner cartridges, "one use" cameras, aircraft hulls, and cathode ray tubes and refurbish them in a factory environment, hoping to meet the same specifications as new products.

- Only 17 *per cent* PCBs/state governments had signed charters/agreements with industries. In the sample, PCB of ***West Bengal*** had signed charters/agreements/pacts with industries for the introduction of greener technologies which would lead to less waste. The government had signed Charter on CREPs with 17 categories of industry like aluminim, cement, copper, distillery, pesticides, sugar, tannery etc,. These industries committed themselves to the introduction of greener technologies leading to less waste. Action points and targets with timelines were set for each of the 17 categories of industries. This Charter had lead to the introduction of norms, which are not necessarily limited to compliance of end of the pipe solutions and emission standards to be followed by industries to reduce pollution. CREPs was also signed in ***Uttarakhand*** where it was applicable to 17 categories of industries and this led to introduction of cleaner technology and reduction of water pollution by adopting chemical recovery plant in agro based paper mills, installing electrostatic precipitator and bag filters in sugar mills. CREPs was also signed in ***Orissa*** where it resulted in commitment from industries to reduce pollution and waste and increase recyling. ***Madhya Pradesh*** had cited a case where green technology was being used and stated that the process has resulted in clean technology norms and in decrease in pollution.
- 33 *per cent* of the sampled states had not signed charters/pacts/agreements with industries to reduce pollution and waste and introduce greener technology. It could not be verified in audit whether 50 *per cent* of the sampled states had done so. List of the states is attached as **Annexure 2**.

Thus, waste reduction, recycling and reuse strategies which are beginning of the pipe solution to the issue of waste management and which would result in lessening the amount of waste for final disposal, need to be introduced by MoEF and adopted more effectively by the states.

MoEF replied in August 2008 that the concept and strategy of waste reduction had already been very much envisaged in the bio-medical waste rules with necessary provisions such as segregation of infectious bio-medical waste from other wastes, packaging and colour coding. It was silent on lack of waste reuse, recycle and reduction strategies for other kinds of waste like municipal solid waste, plastic waste, hazardous waste etc,.

However, the bio-medical waste rules only talk about segregation of different kinds of bio-medical waste and its disposal, and do not talk about reduction, reuse and recycling. In addition, no strategies for reduction, reuse and recycling have been introduced for municipal solid waste, e-waste, hazardous waste etc., all of which are significant contributors to waste in India.

Good practices in India:

- ***West Bengal*** PCB along with India-Canada Facility, New Delhi undertook a scheme for adoption of clean technology norms by small and medium scale industries

and waste minimisation circles for the Kolkata metropolitan area which has led to reduction of particulate emission being generated by these small and medium scale industries by 98 *per cent*.

International good practices:

- ***Ireland's*** strategies include *kerbside collection* of recyclable materials in urban areas, *bring bank* for the collection of glass and aluminum materials, *Civic Amenity sites* for the collection of bulky recyclables and household hazardous wastes and *Materials Recovery Facilities & Transfer Stations* to support recovery facilities such as composting or thermal treatment plants.
- ***USA*** has introduced strategies like *Jobs Through Recycling programme* which awards grants for fostering recycling initiatives, *Pay as You Throw* which requires customers who place more solid waste at curb for disposal pay more for the collection and disposal service, *Resource Conservation Challenge* which seeks to increase the rate of municipal solid waste recycling and helping the country meet a national goal of 35 *per cent*. It also identifies targeted waste streams, proposes 2008 goals for each of the targeted streams and lists criteria for identifying projects that will help reach the goals.
- ***New Zealand*** employs strategies like *Design for the Environment* which involves developing tools and techniques of product design that reduce waste, *Clean Production* which focuses on production processes rather than on the product itself to improve resource efficiency and reduce waste generated during production, *Extended Producer Responsibility* which encourages businesses to prevent wastes at source and set up *Take back and recycling schemes*.
- In ***Netherlands***, producers are required to take back and reprocess their products; product recycling is encouraged by introducing refundable deposits.
- ***Korea's*** strategies include *Volume-Based Waste Fee System* which imposes the cost of waste disposal on individual waste generators to reduce the amount of waste, *Waste Charge System* which imposes charges on products that are hard to recycle or that contain hazardous chemicals, *Regulations on Packaging Material* which bans the use of some substances like PVCs and polysterene in packaging and encourages the use of environment friendly packaging material and *Deposit Refund System for Glass Bottles* and *Packaging Container Reuse System* to promote collection and reuse of used containers and packaging material etc,.

Recommendations

- *MoEF and the states may consider introducing effective strategies for the reduction and recycling of household waste like deposit refund schemes, promoting the use of jute bags rather than plastic bags, waste exchanges, etc., for reduction of waste at source.*
- *MoEF and the states may consider introducing programmes for the reduction of hazardous waste like incentive scheme for the introduction of cleaner technology, remanufacturing, reuse of scrap materials etc., for the reduction of waste at source.*

- *MoEF and the states may consider encouraging big manufacturers to introduce eco audits, life cycle analysis, product stewardship/ extended producer responsibility etc., to minimise the waste being produced.*

3.3 Targets/timelines set for the reduction and recycling of waste

Targets and timelines are indicators of the progress made towards achievement of objectives of waste management. They provide feedback whether a programme is effective or not. Article 21.18 of Agenda 21 declared that by the year 2000, all industrialised countries, and by the year 2010, all developing countries, have a national programme, including, to the extent possible, targets for efficient waste reuse and recycling. Audit findings with respect to setting of targets and timelines are discussed below:

3.3.1 At the Central Level

Reduction of Waste: MoEF/CPCB had not set any targets for the reduction of municipal solid waste, bio-medical waste, hazardous waste and e-waste. CPCB also stated that no targets had been set for the reduction of other kinds of waste like waste from power plants, plastic waste, waste electronic items etc,. While MoEF was silent on whether it had set timelines for the reduction of all kinds of waste, CPCB stated that no timelines were set for the reduction of all types of waste.

Recycling of Waste: As for recycling techniques, MoEF stated that they had prepared specific guidelines for recycling techniques only for non-ferrous metals and ship breaking activities. MoEF was silent with regard to recycling techniques for other wastes like municipal solid waste, which have high recycling potential.

3.3.2 At the level of the states

(i) With respect to setting up clear targets for the reduction of each kind of waste and timelines for reduction of municipal solid waste, bio-medical waste, plastic waste, hazardous waste, it was noticed in the 24 sampled states that:

- Targets/timelines had not been laid down for reduction of municipal solid waste, bio-medical waste, plastic waste, hazardous waste etc., by 79 *per cent* of the sampled states and it was not verifiable whether this was done in 21 *per cent* of the sampled states. List of the states is attached as **Annexure 2**.

(ii) As regards setting specific recycling techniques for different kinds of waste, out of the 24 sampled states, it was observed that:

- Specific recycling techniques for different kinds of waste had not been laid down by 54 *per cent* of the sampled states. It was not verifiable in audit whether 46 *per cent* of the sampled states had done so. List of the states is attached as **Annexure 2**.

Waste reduction and recycling strategies seek to prevent the generation of waste. Hence, these are the beginning of the pipe solutions to waste management. In the absence of plans, targets and timelines for waste reduction and waste recycling, MoEF and the states would neither be able to focus their efforts towards waste

reduction nor would they have a clear picture as to whether waste was actually being reduced.

MoEF did not furnish any reply on the issue of plans, targets and timelines for waste reduction and waste recycling.

International good practices:

- ***USA*** has set a national target of 35 *per cent* recycling rate for municipal solid waste through its Resource Conservation Challenge.
- ***Ireland*** has set targets to be achieved by 2013, which are - diversion of 50 *per cent* of household waste from landfill, minimum 65 *per cent* reduction in biodegradable wastes, recycling of 35 *per cent* of municipal waste, recycling of 85 *per cent* of construction and debris waste.
- ***Japan*** has targeted to reduce by 20 *per cent* the garbage discharged from households per person per day as compared with year 2000.

Recommendation

- *MoEF, in consultation with the states, should prepare an action plan for the reduction, reuse and recycling of wastes in India, with clearly defined numerical targets as well as timelines for the achievement of targets.*

3.4 Coordination with other ministries for introducing '3 Rs' strategies

Coordination with other ministries would also be essential in promoting recycling and reuse:

- Ministry of Finance (MoF) could be approached for promoting the procurement of recycled products by the government;
- Ministry of Commerce (MoC) could be approached for providing incentives for the reuse of products in manufacturing; and
- Department of Industries could be approached for promoting the use of recycled products and encourage industries to use cleaner technology, to undertake product stewardship and other such waste reduction, reuse and recycling strategies.

All of these initiatives would have to come from MoEF considering that one of its main roles is the control of pollution and waste is one of the major causes of pollution.

MoEF stated that it had approached MoF and Department of Industries for introduction of cleaner technology that would minimise waste. However, efforts made by MoEF did not lead to any significant policy decisions from MoF and Department of Industries with regard to promoting waste reduction, reuse and recycling strategies. MoEF also stated that it had not approached the MoC for providing incentives for the reuse of products in manufacturing.

Thus, MoEF needs to secure the cooperation of other ministries for promoting the use of cleaner technologies, modern recycling techniques, granting incentives for reuse of products in manufacturing etc., more effectively.

Recommendations:

- *MoEF should coordinate and impress upon the Ministry of Finance for promoting the procurement of recycled products by the government.*
- *MoEF should approach the Ministry of Commerce for providing incentives for the reuse of products in manufacturing.*

3.5 Role of the informal sector in recycling

According to Article 21.26 (b) of Agenda 21, governments should assist informal sector waste reuse and recycling operations. United Nations Commission on Sustainable Development, in its Working Paper for Agenda 21, recommended increased synergy between the formal and informal sectors and said that despite the significant role of the informal sector in solid waste management, there are few attempts to capitalise on this potential. It recommended that United Nations organisations should assist municipal authorities to recognise and integrate the potentials of the informal sector. The Asia-Pacific Environmental Innovation Strategies, an Asia-Pacific initiative to help realize the Plan of Implementation of the World Summit on Sustainable Development, studied the role of the informal sector in the waste management sector and found that in Asia, there are a large number of informal sectors engaged in garbage collection, which collect recyclable materials from individual households and sell them to the recycling market. Most of these informal sectors work in an unorganised manner. Therefore, their work of collecting these materials is not effective and sustainable. It suggested that it would be beneficial to formalise this sector in order to enhance its performance by developing a registration system and providing capacity building, thus to improve its efficiency and minimise the adverse social and environmental impacts from its operations. Audit findings with respect to efforts of MoEF/states in promoting the role of the informal sector in recycling are discussed below:

3.5.1 At the central level

MoEF had not recognised the role of ragpickers in recycling and reducing municipal solid waste formally by an Act/ legislation. Thus, any kind of legal protection was not envisaged for them. In addition, MoEF had not assessed the economic value of the role of ragpickers in recycling and reducing waste. Further, the health risks they were exposed to when sorting out garbage had also not been studied.

3.5.2 At the level of the states

(i) Regarding recognition given to ragpickers, it was noticed in the 24 sampled states that:

- Only in 17 *per cent* of the sampled states had the role of ragpickers been recognised. Governments of ***Delhi, Maharashta, Andhra Pradesh*** and ***Punjab*** recognised the role of ragpickers in recycling and reducing waste. In ***Maharashtra***, directives had been issued to all the municipalities to take the help of ragpickers for the segregation of waste.

- In 54 *per cent* of the sampled states, the role of ragpickers in reduction of waste has not been recognised while it was not verifiable whether in 29 *per cent* of the sampled states**,** this had been done. List of states is attached in **Annexure 2**

(ii) It was also noticed in audit that out of the 24 sampled states:

- The economic value of ragpickers in recycling and waste had not been regognised by 63 *per cent* of the sampled states while it was not verifiable in audit whether 37 *per cent* of the sampled states had done so. List of states is attached in **Annexure 2.**

Recommendation

- *MoEF/states should consider providing legal recognition to rag pickers so that recycling work becomes more organised and also ensure better working conditions for them.*

3.6 Government procurement

Since government procures a lot of goods and services, the role of the government as a purchaser is very significant. As a major purchaser, it can influence the providers of goods and services to provide more environmentally friendly goods and services. According to Article 4.23 of Agenda 21, *"governments themselves also play a role in consumption, particularly in countries where the public sector plays a large role in the economy and can have a considerable influence on both corporate decisions and public perceptions. They should, therefore, review the purchasing policies of their agencies and departments so that they may improve, where possible, the environmental content of government procurement policies, without prejudice to international trade principles."* The 1997 Programme for the Further Implementation of Agenda 21 further encourages governments to take the lead in changing consumption patterns by improving their own environmental performance with action-oriented policies and goals on procurement, the management of public facilities and the further integration of environmental concerns into national policy-making. More recently, the Plan of Implementation adopted at the World Summit on Sustainable Development called for promotion of public procurement policies that encouraged development and diffusion of environmentally sound goods and services. Audit findings with respect to efforts made by the government in procurement of environmentally friendly goods for its use are discussed below:

3.6.1 At the central level

There was no evidence on record to show that MoEF has (a) mooted the proposal that government procurement systems be altered to include Environmentally Preferable Purchasing (EPP) or sustainable procurement and (b) recommended practices for obtaining recycled products**.** Introduction of EPP would give a big boost to taking environmental aspects of products like printers, computers, paper etc., into consideration

and not just price, before any department of the government makes any purchase decision**.**

3.6.2 At the level of the states

With regard to alteration of government procurement systems in 24 sampled states, it was observed that:

- Government procurement systems had not been altered in 46 *per cent* of the sampled states to include EPP. It could not be verified if EPP had been introduced in 54 *per cent* of the sampled states. List of states is attached in **Annexure 2**

Thus, initiatives taken by MoEF and the states in promoting green procurement practices needs to be strengthened.

International good practices:

- ***Canada*** government's green procurement policy seeks to reduce the environmental impacts of government operations and promote environmental stewardship by integrating environmental performance considerations in the procurement process.
- ***Japan's*** Law concerning the Promotion of Procurement of Eco-friendly Goods and Services by the State and Other Entities aims to establish the necessary provisions to encourage the State and local governments to procure eco-friendly goods and to encourage a shift in demand towards eco-friendly goods.
- ***USA's*** Comprehensive Procurement Guidelines is a key component of the government's "buy-recycled" programme, which recommends recycled-content levels for items to be purchased.

Recommendation

- *MoEF should consider the introduction of Environmentally Preferred Purchases and lay down guidelines for the purchase of recycled products to promote the purchase of eco friendly goods by the government and the agencies controlled by it.*

3.7 Consumer information

Consumers as well as the general public need to be educated about the benefits of the '3 Rs' so that there is significant public support for recycling and reduction strategies.

Article 4.26 of Agenda 21 talks about reinforcing values that supports sustainable consumption. It says that governments should promote more positive attitudes towards sustainable consumption through education, public awareness programmes and such means. With reference to waste management, Article 21.20 (e), Agenda 21 says that governments should intensify efforts at collecting, analysing and disseminating to key target groups, relevant information on waste issues.

3.7.1 At the central level

MoEF was silent on the efforts undertaken for promotion of '3 Rs' through the audio-visual and the print media for municipal solid waste and plastic waste. MoEF was also

silent on the efforts undertaken to educate citizens on reuse and recycling of wastes and threats posed to environment and health by open dumping of waste. CPCB stated that it had promoted the '3 Rs' for bio-medical and hazardous waste, though no records were made available to support this claim in respect of bio medical waste.

3.7.2 By the states

Scrtutiny of the efforts made by the state governments in the 24 sampled states for the promotion of reduction, reuse and recycling of waste through the print or the audiovisual media and educating the citizens about the threat to environment and health posed by waste and how reuse, recycling can promote a cleaner and healthier environment, revealed that:

- Only 34 *per cent* of the sampled state governments had promoted reduction, reuse and recycling of waste through the print or the audiovisual media and to educate citizens about the threat to environment and health posed by waste. Eight *per cent* of sampled states had not conducted such publicity. There was no evidence to indicate whether any publicity had been carried out in 58 *per cent* of the sampled states. List of states is attached in **Annexure 2.**

Thus, efforts of MoEF and the states to create awareness about waste and '3 Rs' were inadequate. A sustained public awareness campaign would go a long way in creating more awareness about the necessity of inculcating the values of '3 Rs' which would, in turn, result in less generation of waste.

International good practices:

- ***Austria's*** traveling exhibition "entSORGEN", encourages Austrians to ask themselves questions such as "What can I do to avoid hazardous household waste?", "What are the alternatives?" and to motivate them to act.
- ***New Zealand's*** Life after waste programme is aimed at changing how the waste industry and the general public think about waste.
- ***Ireland's*** 'Race against Waste campaign' was launched in 2003 for better awareness and turning that awareness into action.

Recommendations

- *MoEF and the states should consider launching an effective and visible public awareness campaign to educate the general public about the advantages of recycling and reduction of waste, especially municipal solid waste.*
- *MoEF should take up the matter of introducing waste management concepts in schools with the Ministry of Human Resource Development and NCERT.*

3.8 Environment labeling

According to Article 4.20 of Agenda 21, Governments and international organisations, together with the private sector, should develop criteria and methodologies for the

assessment of environmental impacts and resource requirements throughout the full life cycle of products and processes. Results of those assessments should be transformed into clear indicators in order to inform consumers and decision makers. Governments, in cooperation with industry and other relevant groups, should encourage expansion of environmental labeling and other environmentally related product information programmes designed to assist consumers to make informed choices.

3.8.1 At the central level

MoEF introduced a scheme on environmental labeling called "ECOMARK" in 1991. The goal of the scheme was to provide accreditation and labeling for household and other consumer products which met certain environmental criteria along with quality requirements of the Indian Standards for that product. The specific objectives of the scheme were to provide an incentive for manufacturers and importers to reduce adverse environmental impact of products; to reward genuine initiatives by companies to reduce adverse environmental impact of their products; to assist consumers to become environmentally responsible in their daily lives by providing information to take account of environmental factors in their purchase decisions; to encourage citizens to purchase products which have less harmful environmental impacts and ultimately to improve the quality of the environment and to encourage the sustainable management of resources. As per the Scheme, a Steering Committee was set up in MoEF by the Central Government to decide the product categories to be taken up under the scheme, and to formulate the strategies for promotion, future development and improvement of this scheme. The product categories were to be notified from time to time.

India's ECOMARK

It was observed in audit that the Steering Committee was set up in MoEF and a Technical Committee in CPCB, as envisaged in the scheme. The Steering Committee chose the logo for the ECOMARK scheme and the Technical Committee and Steering Committee identified specific products and product categories for classifying the products as environment friendly. CPCB stated that 20 licenses to 15 companies under three product categories had been issued the ECOMARK label. MoEF stated that it had involved the industry in this programme as well as undertaken activities for the creation of mass awareness for promotion and acceptance of the scheme. However, the effectiveness of the ECOMARK scheme could not be evaluated by Audit as MoEF did not produce the records relevant to the working of the ECOMARK scheme.

Further, it was observed that neither MoEF nor CPCB had evaluated the environmental impacts of these products from time to time to ensure that there is continued adherence to the standards laid down. MoEF stated that the ECOMARK products were not being widely used.

Thus, the implementation of ECOMARK scheme had been ad hoc, even though it was launched as early as 1991. As a result, the government did not appear to be in a position to effectively promote the consumption of environment friendly products.

International good practices:

- ***Japan's*** Eco Mark was introduced in 1989 as a seal of approval programme that aims to spread information on the environmental effects of products and to encourage consumers to choose environmentally friendly products and has 64 product categories and has been awarded to 5,176 products.
- ***Germany's*** Blue Angel Programme was introduced in 1977, making Germany the first country to implement a national eco-labeling programme.
- ***Norway, Sweden, Finland, Iceland,*** *and* ***Denmark*** participated in a programme called 'The Nordic Swan', introduced in 1989 as a voluntary and neutral seal of approval programme. It has developed 60 product categories and awarded the label to over 1,200 products.
- ***Taiwan's*** Environmental Protection Administration launched Taiwan's Green Mark Programme in 1992. The programme aims to promote recycling, pollution reduction, and resource conservation and has 41 product categories and has awarded the label to 451 products.

Recommendation

- *The Ministry should review its ECOMARK scheme and include more products under it and monitor adherence to environmental standards of these products. It should also prescribe standards for classifying products as environmentally friendly and carry out environmental impact studies of such products.*

Conclusion

Many countries had a clearly enunciated waste management policy, which also spelt out the hierarchy that would govern the waste management efforts in their respective countries. Despite being a signatory to Agenda 21 of the World Commission on Sustainable Development of the United Nations Conference on Environment and Development, waste management efforts in India were not directed by a policy, which incorporated a clear-cut waste hierarchy. The order of priority for management of wastes had not been defined in India leading to the current focus being only on disposal strategies. No effective strategies have been introduced by MoEF or the states to implement the '3 Rs' (recycle, reduce and reuse).

The National Environmental Policy, 2006, which promoted certain waste reduction strategies, had not been translated into action. Further, role of informal sector in reducing waste had not been adequately addressed. In addition, MoEF had not taken effective action in promoting green procurement practices. Its environment education, consumer information and environment labeling programmes also need strengthening.

CHAPTER 4

Existence of Waste legislation

Objective 3: Whether legislations specifically dealing with disposal of each kind of waste existed and whether penalty for violation had been incorporated in the legislations already enacted.

Legislation is a means to secure compliance to government's policies and lays down the steps to be taken to implement policy. To be effective, legislation should also contain suitable penalty for violation, which can serve as deterrent to non-compliance. According to UNEP, *"apart from the adoption of a detailed and well-structured waste policy, the waste industry requires a legal framework that enables it to reach set objectives and targets. A well-elaborated legal framework will assist in the effective implementation of those targets. The legal framework must also be provided with an effective enforcement system."* In addition, according to Article 8.20 and 8.21(a) of Agenda 21, *"for developing effective national programmes for reviewing and enforcing compliance with national, state, provincial and local laws on environment and development, each country should have enforceable, effective laws, regulations and standards that are based on sound economic, social and environmental principles and appropriate risk assessment, incorporating sanctions designed to punish violations, obtain redress and deter future violations"*. Audit findings related to existence of legislations for all kinds of waste and penalty specified for violation of these legislations are discussed below:

4.1 Legislation for all kinds of waste

4.1.1 At the Central Level

The types of waste generally recognised by most countries are: household/municipal waste, bio-medical waste, e-waste, waste electronic & electrical equipment, waste from construction and demolition activities, waste from end of life cars, mining waste, waste from power plants, hazardous waste, waste from agriculture/forestry etc,.

MoEF had not enacted laws/rules that would govern the management of all kinds of waste in India. MoEF had enacted the following rules:

- Management and Handling of Municipal Solid Waste (2000),
- Management and Handling of Bio-Medical Waste (1998, amendment 2003),
- Management and Handling of Hazardous Waste (1989, amended in 2000 and 2003),
- Recycled Plastics Manufacture and Usage Rules (1999),
- Notifications for the disposal of fly ash, and
- Management and Handling of batteries.

In addition, it has circulated draft guidelines for the management of e-waste (2007). However, no rules/ guidelines had been enacted in India for the disposal of the following kinds of waste:

1. construction and demolition activities
2. end of life vehicles

3. packaging
4. waste tyres
5. agriculture/ forestry
6. waste electrical and electronic items.

Though MoEF claimed that rules had been enacted for the management of mining wastes, no supporting documents were furnished.

In the absence of legislation/rules governing the disposal of all kinds of waste, the possibility of waste disposal in a manner that is hazardous to the health of citizens and the environment cannot be ruled out.

MoEF stated in August 2008 that Municipal Solid Waste (Management & Handling) Rules, 2000 were already in place and these were in the process of revision for further improvement. MoEF also stated that the Plastics Manufacture, Sale & Usage Rules, 1999 as amended in 2003 mainly emphasises on sale and manufacture of plastics products and no specific clause exists on management and handling of plastics waste.

MoEF, however did not dispute the fact that laws/rules/guidelines for the disposal of waste from construction & demolition, end of life vehicles, packaging, waste tyres, waste electrical and electronic items and waste from agriculture/forestry have not been framed.

International good practices:

- ***Finland's*** waste legislation covers all types of waste like end of life vehicles, waste electrical and electronic equipment, construction waste, packaging and packing waste, etc., except certain special wastes such as radioactive wastes, which are controlled by separate laws.
- In ***Ireland, Portugal and United Kingdom,*** waste legislations exist for bio-medical waste, packaging, waste electrical and electronic equipment, end of life vehicles/tyres, batteries etc,.

Recommendation

- MoEF should consider framing laws/rules governing the safe disposal of all major kinds of waste like construction & demolition waste, end of life vehicles, packaging waste, mining waste, agricultural waste and e-waste being generated in the country.

4.2 Polluter pays principle

According to Article 21.40 of Agenda 21, governments should *"apply the polluter pays principle, where appropriate, by setting waste management charges at rates that reflect the costs of providing the service and ensure that those who generate the wastes pay the full cost of disposal in an environmentally safe way"*.

4.2.1 At the central level

No information was made available by MoEF to show whether the rules governing the management and handling of municipal solid waste, bio-medical waste, plastic waste, e-waste etc., incorporated penalty for violation of these rules. MoEF stated that the rules for

the management and handling of hazardous waste did incorporate penalty and CPCB claimed that all the rules governing waste in India incorporated a penalty for violation. However, audit scrutiny revealed the following:

(a) Municipal Solid Waste (Management and Handling) Rules, 2000 does not contain any provision for levying penalty on the generator of wastes or the operator of the facility for the collection, segregation, transportation, processing and disposal of municipal solid wastes, if the wastes are not disposed in the prescribed manner. Similarly, the Rules prescribe no penalty if the incinerator or landfills disposing municipal solid waste do not meet operating standards. Thus, there is no disincentive provided in the rules for the unsafe disposal of waste.

(b) Bio-medical Waste (Management and Handling) Rules, 1998 and its amendment in 2003 do not specify any penalty for hospitals and operators of waste disposal facilities if the autoclaves, incinerators, microwaves etc., do not meet the standards prescribed in the rules.

(c) Hazardous Wastes (Management and Handling) Rules, 1989 and its amendments in 2000 and 2003 do not contain any provision for penalty to be imposed for the violation of these rules, nor is the waste generator/ operator of the waste treatment facility to be held responsible for cleaning up the damage caused to the environment as a result of improper disposal of hazardous wastes. This needs to be viewed in light of the fact that improper disposal of hazardous waste can cause significant damage to the environment as well as public health.

The Environment (Protection) Act (EPA) introduced in 1986, sought to take steps for the protection of environment and prevention of hazards to human beings, other living creatures, plants and property. Section 15 of the act laid down that "*whoever fails to comply with or contravenes any of the provisions of this Act, or the rules made or orders or directions issued there under, shall, in respect of each such failure or contravention, be punishable with imprisonment for a term which may extend to five years or with fine which may extend to one lakh rupees, or with both, and in case the failure or contravention continues, with additional fine which may extend to five thousand rupees for every day during which such failure or contravention continues after the conviction for the first such failure or contravention*." Thus, EPA specified penalty for violations of act/rules made there under. The laws governing management of wastes in India - Municipal Solid Wastes (Management and Handling) Rules, 2000, Bio-medical Waste (Management and Handling) Rules, 1998 and its amendment in 2003 and Hazardous Wastes (Management and Handling) Rules, 1989 were all made in exercise of the powers conferred by section 3, 6 and 25 of the EPA, 1986. Thus, even though no specific provision was incorporated in the rules, MoEF/CPCB could always take recourse to EPA for punishing the violators of waste management rules. However, MoEF was silent when asked whether there had been cases of imposition of penalty for illegal dumping of wastes and if the polluter was held responsible for cleaning up the damage caused to the environment as a result of improper disposal of wastes.

4.2.2 At the level of the states/PCBs

Action taken by the PCBs/state governments for illegal dumping of waste and the polluter being held responsible for cleaning up the damage caused to the environment as a result of improper disposal of waste in the 24 sampled states was as follows:

- Only in 25 *per cent* of the states action had been taken by PCB/government for illegal dumping of waste. In the sample, only one case of imposition of penalty was seen in the last 5 years in ***West Bengal***. In ***Kerala***, penalty was levied in two sampled municipalities. In ***Karnataka***, one case had been filed for unauthorised dumping of municipal solid waste. In ***Himachal Pradesh***, notices were issued to municipalities for illegal dumping of waste and in ***Rajasthan***, cases were filed in the courts for illegal collection of bio-medical waste by kabadis. In ***Madhya Pradesh***, PCB filed court cases against 17 health care facilities for non-compliance of bio-medical waste rules.
- No cases of levy of penalty or the polluter being held responsible for cleaning up the damage caused to the environment as a result of improper disposal of wastes were found in 46 *per cent* of the sampled states. In 29 *per cent* of the sampled states, it could not be verified whether any penalty was levied or action taken by the PCBs for illegal dumping of waste, despite they being empowered to do so under EPA. List of states is attached in **Annexure 2.**

Rules for management of waste did not pin responsibility for degradation of the environment on the polluter and did not make him pay for restoring the environment. Even though provision existed in EPA for taking action against polluters, penalty was seldom imposed for violation of these rules, as could be seen from the situation prevailing in the states. Hence, open dumping of wastes as well their improper disposal had no deterrent effect in the rules.

MoEF stated in August 2008 that imposition of penalties were as per the provisions made under the Environment (Protection) Act, 1986 since the Municipal Solid Wastes (Management & Handling) Rules, 2000 were framed under this Act. MoEF also stated that as per Rule 16 of the Hazardous Waste Rules, 1989 as amended, liability lay with the occupier or operator of a facility or transporter of hazardous wastes for improper handling and disposal of hazardous wastes, including restoration of damage caused to the environment. MoEF also stated that penalties could also be imposed as per the provisions of Environment Protection Act since hazardous waste rules were made under this Act. In addition, MoEF stated that in the existing rules, provision for Polluter Pay Principle (PPP) was not available and that CPCB was suggesting inclusion of the Extended Producer Responsibility (EPR) in the amendments to the rules. According to MoEF, National Environment Policy–2006 also recommended that the polluter should, in principle, bear the cost of pollution with due regard to the public interest.

International good practices:

- **Sweden** charges a "Nitrogen Oxide Charge on Energy Production" on large combustion plants in which heating plants, power plants, and combustion plants run by

pulp and paper industry, chemical industry and incineration plants which exceed capacity of 10 MW or annual energy production exceeding 50 GWh pay a charge of SEK 40 per kilogram of nitrogen dioxide emitted.

- **Finland, Sweden, Denmark** levy a carbon dioxide tax for emissions of carbon dioxide above a limit fixed by the government.
- **United Kingdom** levies a fuel duty escalator based on the load carried by trucks, as heavier trucks use more fuel and contribute more to emissions.

Recommendation

- *Considering the fact that the provisions of Environment Protection Act are seldom used, both at the central and the state level for punishing the polluter, there is a need to incorporate the Polluter Pays Principle (PPP) in the waste rules/legislations itself. This would act as a deterrent against open dumping of waste.*

Conclusion

Laws/rules were not framed for all kinds of waste, leaving the safe disposal of many kinds of waste unmonitored. In addition, the polluter was not effectively held responsible for unsafe disposal, thus creating no deterrence for non-implementation of the rules. Non-levy of penalty may result in no deterrence for illegal dumping of waste; which would have a harmful impact on health and environment.

CHAPTER 5

Allocation of responsibility and accountability

Objective 4: To assess whether various agencies involved in the process had been allocated clear responsibility and accountability for waste management and whether or not a mismatch/gap/overlap existed among the responsibility centers.

Allocation of roles, responsibilities and accountability to agencies is important to ensure that the rules/laws are being implemented in line with the desired objectives. According to UNEP, one of the roles of state/provincial/regional governments in integrated solid waste is to establish agencies to implement and to regulate solid waste management practices. Thus, apart from policy and legislation, allocation of responsibilities to various actors for policymaking, implementation and monitoring in the waste management process is essential in securing the implementation of national legislation and policies. Audit findings with respect to allocation of responsibilities and accountability for waste management at the central level and at the level of the states are discussed below.

5.1 Nodal body for waste management and policy making on waste issues

According to UNEP, *"The national government should establish an environmental protection agency that includes a department that is responsible for solid waste management. This agency and/or department should be responsible for developing and updating environmental legislation and policies and monitoring and coordinating these activities at an international level."*

5.1.1 At the central level

MoEF stated that it was the nodal body only for hazardous waste management legislation. However, CPCB stated that MoEF is the nodal agency for waste management legislation and it was the role of MoEF to bring legislations regarding waste management at the central level to protect the environment. Thus, MoEF takes ownership of management of hazardous waste only and there is no ownership of other kinds of waste like municipal solid waste, bio-medical waste, e-waste etc., for which it has, however, framed rules.

In the absence of a single body taking ownership of waste issues in India, the efforts made to manage waste would largely remain ineffective.

5.1.2 At the level of the states

(a) Municipal solid waste

Out of the 24 states sampled, it was observed that:

- In 54 *per cent* states, certain departments were assigned responsibility for municipal solid waste management. In ***Assam***, certain specific departments were assigned responsibility for municipal solid waste management. In ***West Bengal***, Department of Environment stated that PCB was allocated responsibility for management of municipal solid waste, whereas PCB stated it was the responsibility of the Department of Municipal Affairs and Urban

Development Department. Thus, no agency in ***West Bengal*** owned responsibility. In ***Sikkim***, Urban Development Department and Housing Department had been assigned the responsibility and in ***Delhi,*** Department of Environment Management Services was allocated responsibility. In ***Maharashtra***, the government had established the Solid Waste Management Cell. In ***J&K, Rajasthan*** and ***Uttar Pradesh*** urban local bodies were assigned this responsibility and in ***Andhra Pradesh and Bihar*** municipalities were assigned this responsibility. In ***Madhya Pradesh***, PCB and district administration were assigned this responsibility. In ***Gujarat***, the Gujarat Urban Development Corporation was assigned responsibility for municipal solid waste management.

- In 21 *per cent* of the sampled states, no agency was assigned responsibility for the management of municipal solid waste and in 25 *per cent* of the sampled states; records were not made available to audit to verify whether any department/body had been assigned responsibility for the management of municipal solid waste. List of states is attached in **Annexure 2.**

(b) Bio-medical waste

Out of the 24 states sampled, it was observed that:

- In 42 *per cent* states, responsibility for the management of bio-medical waste was allocated to the respective PCBs. Responsibility for management of bio-medical waste was not allocated to any body/agency in 21 *per cent* of the sampled states and in 37 *per cent* of the states, it was difficult to verify which body had been allocated this responsibility. List of states is attached in **Annexure 2.**

(c) Plastic waste

Out of the 24 states sampled, it was observed that:

- Responsibility for the management of plastic waste had been allocated to bodies in 37 *per cent* of the sampled states.
- Responsibility for the management of plastic waste had not been allocated to any body or agency in 38 *per cent* of the sampled states while in 25 *per cent* of the sampled states, it was not verifiable whether any body or agency had been assigned responsibility for the management of plastic waste. List of states is attached in **Annexure 2.**

(d) Hazardous waste

Out of the 24 states sampled, it was noticed that:

- Responsibility for the management of hazardous waste had been allocated to bodies only in 29 *per cent* of the sampled states.
- Responsibility for the management of hazardous waste had not been allocated to bodies in 25 *per cent* of the sampled states. In addition, it could not be verified whether bodies had been allocated responsibility for the management

of hazardous waste in 46 *per cent* of the sampled states. List of states is attached in **Annexure 2.**

There was thus, some kind of uncertainty in MoEF/CPCB as to their exact role, and this uncertainty may not be conducive to providing effective leadership on these issues. At the state level, though different bodies were allocated responsibilities for the management of various kinds of waste, it was not clear whether there was a nodal body to deal with waste, as a single issue, in a holistic manner.

MoEF replied in August 2008 that with regard to municipal solid waste, since the responsibility of municipal solid waste management was with the local urban bodies which were under the Ministry of Urban Development, it is suggested that Ministry of Urban Development may be designated as the nodal point for management of municipal solid waste. With respect to bio-medical waste, MoEF stated that it was the nodal body for all waste management legislations, in which CPCB acts as technical advisor. MoEF further added that since PCBs had been notified as the prescribed authority for implementation of the provisions of the bio-medical waste rules in the states, so PCBs had the responsibility for implementation of the provisions of the bio-medical waste rules and the management of bio-medical waste generated. With respect to plastic waste, MoEF stated that responsibility of "Implementation of Plastics Manufacture, Sale & Usage Rules, 1999 as amended in 2003" lies with the PCBs and that CPCB had taken initiatives for facilitating PCBs to take effective steps on plastics waste management.

The reply of MoEF needs to be viewed in the light of the fact that being the nodal body for pollution control issues, the onus for addressing all waste related issues rested with it. It is also pertinent to note here that MoEF wants the Ministry of Urban Development to be designated as the nodal point for management of municipal solid waste. However, MoUD had already stated that MoEF was the responsible ministry. This pointed to lack of clarity in demarcation of role and responsibilities in dealing with major waste issues in a holistic manner.

International good practices:

- In ***Finland***, Ministry of the Environment is the nodal body for waste management, formulates waste management policies and carries out strategic planning. It is also responsible for preparing legislation and setting binding standards.
- In ***Austria***, the Federal Ministry of Agriculture and Forestry, Environment and Water Management is the nodal body for waste management and is charged with issuing and publishing a Federal Waste Management Plan for the whole of Austria.
- In ***New Zealand***, central government takes a lead in developing and implementing all national waste policies.

Recommendations:

- *Since waste causes pollution and pollution is necessarily the responsibility of the MoEF, the Central Government should consider appointing MoEF as the nodal body for*

managing all kinds of waste. A body/division within MoEF could be created to separately handle all issues related to waste.

- *MoEF at the central level and Environment Departments at the state level should clearly delineate the responsibilities of the various bodies/agencies for managing different kinds of waste.*
- *The states should have a nodal department for dealing with issues related to all kinds of waste.*

5.2 Implementing bodies

Laws/ rules should specify implementing agencies as it makes the process of implementation effective and streamlined, apart from aiding accountability. Where waste rules exist in India, bodies for the implementation of waste rules had been identified in the rules itself. Hospitals were responsible for the safe disposal of biomedical waste; municipalities were responsible for the safe disposal of municipal solid waste; industries generating hazardous waste were responsible for its safe disposal and districts were responsible for implementing the plastic rules. Thus, responsibility has been allocated to bodies for the safe disposal of some kinds of waste. However, many kinds of wastes have been left outside the legislative ambit of MoEF and thus, no agency is responsible for its safe disposal.

5.2.1 At the central level

At the central level, MoEF stated that the Ministry of Urban Development was the nodal agency responsible for implementation of the municipal solid waste rules and that the Ministry of Health and Family Welfare was the nodal agency for the implementation of rules relating to bio-medical waste. It was silent about the nodal ministries for implementation of plastic waste, e-waste and hazardous waste rules.

Thus, though MoEF was responsible for policy-making with respect to municipal solid waste, it did not take responsibility for its implementation. This was an anomalous situation as MoEF would be unaware whether the rules it had framed were facilitating the safe management of municipal solid waste. In addition, if there was any violation of the waste rules by a hospital or by a municipality, there was no authority at the central level to invoke sanctions against them. In the absence of a central agency responsible for implementation, there would be lack of coordinated activity to deal with implementation issues, which were often spread across two or more municipalities/ hospitals across states. This issue assumed more importance in light of the fact that Ministry of Urban Development, Ministry of Health and Family Welfare and Department of Chemicals and Petrochemicals stated that it was not their responsibility but the responsibility of MoEF to monitor the implementation of waste rules as discussed in Chapter 7.

5.2.2 At the level of the states

(a) Municipal solid waste

CPCB had recommended in 2004-05 that all states set up a Solid Waste Mission to look at common facilities, which could be developed at the municipal level. Audit observed that among the 20 sampled states:

- Only 15 *per cent* of the states had set up the Solid Waste Missions. ***West Bengal*** had set up the Solid Waste Mission, ***Kerela*** had set up the Clean Kerela Mission and ***Maharashtra*** had set up the Solid Waste Management Cell.
- Solid Waste Missions had not been set up in 60 *per cent* of the sampled states and it could not be verified in audit whether the Mission had been set up in 25 *per cent* of the sampled states. List of states is attached in **Annexure 2.**

(b) Bio-medical waste

According to the Bio-Medical Waste (Management and Handling Rules), 2000, the government of every State/Union Territory shall constitute an advisory committee to advise the Government of the State/Union Territory about matters related to the implementation of these rules. The committee was to include experts from the field of medical and health, animal husbandry and veterinary sciences, environmental management, municipal administration and any other related department or organisation including non-governmental organisations. Out of the 15 sampled states, it was observed that:

- Advisory committees have been set up in 60 *per cent* of the sampled states, not been set up in 20 *per cent* of the sampled states and it could not be verified in audit whether 20 *per cent* of the sampled states had set up the advisory bodies. List of states is attached in **Annexure 2.**

Thus, there is lack of clarity at the central level as to which agency would be responsible for the implementation of the waste rules. In addition, bodies have not been set up at central and more importantly, at the state level for the implementation of rules relating to specific kinds of waste.

MoEF stated in August 2008 that CPCB had requested PCBs to co-ordinate with the state urban development departments to explore the possibility to set up common waste disposal sites and that CPCB had indicated that states may follow the methodology as adopted by the Gujarat government. MoEF also stated that the constitution of Advisory Committees is the responsibility of the respective State/UT Government.

MoEF did not clear the confusion regarding responsibility for implementation of the waste rules, at the central as well as the state level. In the absence of clear responsibility for implementation, accountability would be diffused, leading to poor performance.

International good practices:

- In ***Philippines***, The Commission on Solid Waste oversees the implementation of solid waste management plans and prescribes policies to achieve the objectives of Ecological Solid Waste Management Act of 2000.
- In ***Slovenia***, Environmental Agency is responsible for the implementation of waste legislation, waste management information system development and maintaining, licensing in the waste management field.
- In ***Austria,*** since 1 October 1995, it has been mandatory for all companies with 100 or more employees to appoint a qualified waste officer and a deputy in writing and to report their names to the authorities. The duties of the waste officer include monitoring of compliance with the stipulations of the Waste Management Act.

Recommendations

- *MoEF should clearly identify, at the central level, bodies which would be responsible for the implementation of the waste management rules relating to municipal solid waste, biomedical waste and plastic waste. The states should also identify the agency responsible for implementation of the waste rules.*
- *MoEF should have a formal mechanism in place for discussions with MoUD and MoH&FW regarding implementation of the rules and whether the rules need modification, based on the problems encountered by the municipalities and hospitals in implementation of these rules.*
- *Solid Waste Mission for dealing with overall issues relating to implementation of municipal solid waste rules should be set up in all the states.*

5.3 Monitoring bodies

Monitoring bodies keep a check on implementation and thus, are good feedback mechanisms on the efficacy of any law/rule.

5.3.1 At the central level

Despite framing the rules for the management and safe disposal of municipal solid waste, bio-medical waste, plastic and hazardous wastes, MoEF did not own responsibility for monitoring the implementation of these rules.

(a) Municipal solid waste

MoEF stated that it was the responsibility of Ministry of Urban Development to monitor the implementation of the municipal solid waste rules. However, according to the Ministry of Urban Development, it was the responsibility of MoEF to monitor the implementation of the Municipal Solid Waste (Management and Handling) Rules. Ministry of Urban Development had not set up any body for monitoring the implementation of these rules and did not provide any waste related data or monitoring reports to MoEF. It also did not receive any reports from CPCB on waste management and did not have a formal coordination mechanism for sharing information with MoEF.

In the absence of clarity about the agency that would be responsible for monitoring of these rules, it was noticed in audit that monitoring was ineffective as discussed further in Chapter 7.

(b) Bio-medical waste

MoEF stated that it was the responsibility of Ministry of Health and Family Welfare to monitor the implementation of the bio-medical waste rules. However, according to Ministry of Health and Family Welfare, it was not its responsibility to monitor the implementation of Bio-Medical Waste (Management and Handling) Rules. It did not have a mechanism/ body to monitor the implementation of these rules and it neither sent any bio-medical waste related information to MoEF nor did it receive any data regarding waste from MoEF/CPCB. It also does not have a coordination mechanism for sharing bio-medical waste information with MoEF. In the absence of clear allocation of responsibility to any agency for monitoring these rules, it was noticed in audit that monitoring was ineffective as discussed further in Chapter 7.

(c) Plastic waste

According to the Department of Chemicals and Petrochemicals, MoEF had issued the notification and the information regarding monitoring could be obtained from MoEF. However, MoEF was silent about its role of monitoring of implementation of plastic rules.

5.3.2 At the level of the states/PCBs

(a) Municipal solid waste

With respect to monitoring of solid waste rules, it was noticed that out of the 24 sampled states,

- Bodies like PCBs had been allocated responsibility for monitoring in 33 *per cent* of the sampled states while in 21 *per cent* of the sampled states, bodies had not been allocated responsibility for monitoring the implementation of municipal solid waste rules. In 46 *per cent* of the sampled states, it was not verifiable in audit whether any body had been allocated this responsibility. List of states is attached in **Annexure 2.**

(b) Bio-medical waste

With respect to monitoring of bio-medical waste, it was noticed that out of the 24 sampled states,

- State PCBs / Pollution Control Committees were monitoring the implementation of the bio-medical waste rules in 46 *per cent* of the sampled states while in 13 *per cent* of the states; no agency was monitoring implementation of bio-medical waste rules. It was not verifiable by audit whether bodies were monitoring the implementation of bio-medical waste rules in 41 *per cent* of the sampled states. List of states is attached in **Annexure 2.**

(c) Plastic waste

As regards monitoring of implementation of plastic waste, out of the 24 sampled states, it was observed in audit that:

- Bodies were monitoring implementation of rules in 37 *per cent* of the sampled state while in 13 *per cent* of the sampled states; no body/agency was allocated this responsibility.
- It was not verifiable in audit whether bodies in 50 *per cent* of the sampled states were monitoring the implementation of rules related to plastic waste. List of states is attached in **Annexure 2.**

(d) Hazardous waste

As regards bodies monitoring the implementation of hazardous waste rules, it was observed that out of the 24 sampled states:

- In 17 *per cent* of the sampled states**,** there were bodies for monitoring the implementation of hazardous waste rules while in eight *per cent* of the sampled states, bodies were not monitoring the implementation of hazardous waste rules.
- In 75 *per cent* of the sampled states, there was not enough evidence to show whether bodies were monitoring implementation of hazardous waste rules. List of states is attached in **Annexure 2.**

It, thus, seems that agencies responsible for monitoring the implementation of municipal solid waste, bio-medical waste and plastic waste rules had not been clearly identified at the state and the central level. MoEF was also unaware of its responsibility regarding monitoring of these rules. In the absence of regular and sustained monitoring, it would be difficult to assess whether the rules for the disposal of wastes were being followed. In addition, there appears to be no central monitoring Ministry, which can ensure the safe disposal of all kinds of waste by different agencies and flag major non-compliance issues and environmental issues at the central level.

MoEF replied in August 2008 that with respect to municipal solid waste, as per the rules, CPCB owed responsibility of submitting Annual Reports based on the consolidated reports received from the PCBs and that the overall responsibility at the state level lay with the Secretary, Urban Development Department. It also stated that CPCB was coordinating with PCBs by providing standards for operation of waste processing and disposal facilities. With respect to bio-medical waste, MoEF stated that PCBs were the prescribed authority to implement the provisions of the bio-medical waste rules and monitor the compliance. With respect to plastic waste, MoEF stated that responsibility for implementation of plastic waste rules lay with PCBs and that CPCB had taken initiative for facilitating PCBs to take effective steps on plastics waste management.

The reply of MoEF has to be viewed in light of audit observation that there was no central monitoring body for the waste rules to ensure the safe disposal of all kinds of waste by different agencies and to flag major non-compliance issues and environmental issues at the central level. With respect to monitoring at the level of states, though agencies have been prescribed in the rules, monitoring was either not taking place by the prescribed agencies or monitoring was very weak, as further commented by Audit in Chapter 7. This pointed to the fact that monitoring agencies needed to clearly delineated and responsibility and accountability allocated to them to ensure effective monitoring.

International good practices:

- The ***Finnish*** Environment Institute 'SYKE' monitors and maintains a master register of waste data and is thus the primary monitoring agency for waste legislations/rules.
- In ***Philippines***, the National Solid Waste Management Commission reviews and monitors the implementation of local solid waste management plans.
- In ***USA***, the Office of Solid Waste regulates waste under the Resource Conservation and Recovery Act.
- In ***New Zealand***, monitoring and evaluating progress towards targets is carried out by the Ministry for the Environment, in collaboration with local governments.

Recommendations

- *The government should assign clear responsibility to MoEF or any central body/agency for monitoring the implementation of all waste management rules throughout the country.*
- *MoEF must also put in place a mechanism by which performance of the states could be monitored and ensure penalty for weak compliance by states.*
- *Bodies should be clearly allocated responsibility for monitoring the implementation of all the waste rules at the state level so that violations to rules can be regularly identified.*

Conclusion

Identification of nodal agencies/bodies and the allocation of responsibility and accountability among them are essential for ensuring smooth and effective compliance with laws and rules. In the absence of clear ownership of waste management in totality, there appears to be an absence of a single body taking ownership of waste issues in India. Further, there was no clear identification of bodies for monitoring of waste rules at the centre. This caused a mismatch/gap in responsibility and accountability and led to the rules for management of waste being rendered ineffective.

CHAPTER 6

Compliance to rules governing municipal solid, bio-medical and plastic waste

Objective 5: Whether effective compliance to rules/laws regulating municipal solid waste, bio-medical waste and plastic waste was taking place in the state.

The United Nations Conference on Human Environment held in Stockholm in June 1972 led to decision on part of India to enact a law on the protection of the environment. As a result, the Environment (Protection) Act was promulgated in 1986 in order to take appropriate steps for the "*protection and improvement of human environment*" and to implement decisions relating to "*protection and improvement of the environment and for the prevention of hazards to human beings, other living creatures, plant and property*". Though there is no specific provision addressing waste in this Act, the Act gave power to the central government to take measures for protecting the quality of the environment and preventing, controlling and abating environment pollution. It also defined environmental pollutant as any solid, liquid or gaseous substance present in such concentration to be injurious to the environment and environment pollution as the presence in the environment of any environment pollutant.

Realising the seriousness of the problem of waste management and therefore, to regulate the management and handling wastes in India, the government notified the following under the powers conferred by the Environment (Protection) Act, 1986:

- *Municipal Solid Wastes (Management and Handling) Rules, 2000*: The objective of this rule is to make every municipal authority, within the territorial area of the municipality, responsible for the implementation of the provisions of these rules, and for any infrastructure development for collection, storage, segregation, transportation, processing and disposal of Municipal Solid Wastes. The State Pollution Control Board was given responsibility for granting authorisation for setting up waste disposal facilities and monitoring to ensure that disposal of municipal solid waste meets the compliance criteria set out by the Central Pollution Control Board in the rule.
- To ensure proper *Bio-Medical Waste Management*, The Bio-Medical Waste (Management and Handling) Rules, were notified in 1998 with an amendment in 2003.The institutions generating bio medical waste were given the responsibility of ensuring that all such waste is segregated, transported, processed and disposed off without any adverse effect to human health and the environment. It had set up a time schedule for ensuring that institutions set up waste disposal and processing facilities that were to be authorised by a body to be set up by the state governments and compliance to the waste disposal methods as specified in the rules were to be monitored by the PCBs.

- The *Recycled Plastics Manufacture and Usage Rules* were notified in 1999 with an amendment in 2003. The responsibility for enforcement of rules relating to use, collection, segregation, transportation and disposal of plastic waste was entrusted to the District Commissioner/ District Magistrate of each district and SPCBs were given the responsibility for monitoring of these rules.
- The *Hazardous Waste (Management & Handling) Rules* were notified in 1989 with amendments in 2000 and 2003. The role and responsibilities of the waste generator, state/central pollution controls boards and state Government was clearly defined in these rules. The rules were further amended in 2000, placing stringent curbs on the export and import of waste into India.

Compliance to rules governing municipal solid waste (Municipal Solid Wastes (Management and Handling) Rules, 2000), bio-medical waste (The Bio-Medical Waste (Management and Handling) Rules) and plastic waste (The Recycled Plastics Manufacture and Usage Rules) were studied in 20 states across India. The PA also sought to check compliance with the rules governing management and disposal of municipal solid waste, bio-medical waste and plastic waste in 56 municipalities in 20 states and 180 hospitals in 15 states, which were audited to verify implementation and monitoring of municipal solid waste, bio-medical waste and Recycled Plastics Manufacture, and Usage rules. Audit observations regarding role of MoEF, state governments and municipalities/hospitals/districts are brought out in the succeeding paragraphs.

6.1 At the Central level

Though MoEF had notified the waste rules but the implementing agencies specified in these rules like municipalities, hospitals and district authorities did not fall into the administrative or financial control of MoEF. As such, MoEF did not have the powers to ensure compliance by these implementing agencies. Thus, coordination with the ministries under whose administrative jurisdiction these agencies fall was crucial for ensuring better implementation of waste rules and in ensuring that waste management received the desired thrust and emphasis by the government.

Municipalities responsible for the implementation of the Municipal Solid Waste Rules came under the administrative control of the Ministry of Urban Development (MoUD); support of MoUD would be essential in ensuring better compliance to Municipal Solid Waste Rules. Similarly, hospitals fell under the overall jurisdiction of the Ministry of Health and Family Welfare (MoH&FW) and support of MoH&FW would be crucial in ensuring better compliance to the Bio-Medical Waste Rules. Though MoEF stated that it had approached MoUD and MoH&FW for taking action on implementation of municipal solid waste rules and bio-medical waste rules respectively, however no records were produced to enable Audit to verify the proposed action by MoEF and to determine whether these ministries had complied with the action proposed by MoEF.

Thus, the role of MoEF was reduced to making rules for the handling and disposal of municipal solid waste and bio-medical waste, without being aware whether the

rules were properly implemented or required modification in light of difficulties faced during implementation.

6.2 At the level of the states

6.2.1 Compliance to Municipal Solid Wastes (Management and Handling) Rules, 2000

The Municipal Solid Wastes (Management and Handling) Rules, 2000, in Rule 4 and 5 allocated responsibilities to state governments and municipal authorities of the states for proper management of municipal solid waste.

According to Rule 4, every municipal authority shall, within the territorial area of the municipality, be responsible for the implementation of the provisions of these rules, and for any infrastructure development for collection, storage, segregation, transportation, processing and disposal of municipal solid wastes. In addition, the municipal authority or an operator of a facility had to make an application for the grant of authorisation for setting up waste processing and disposal facility including landfills from PCB of the state. According to Rule 5, the state government shall have complete responsibility for the enforcement of the provisions of these rules. According to Rule 6, PCB of a state shall be responsible for monitoring compliance and issuing authorisations for waste processing and disposal facilities. Thus, the rules only state the specific action to be taken by municipalities and PCBs but do not lay down specific action to be taken by the state governments. According to the rules, the state government shall be responsible only for the enforcement of the provisions of these rules. Thus, the role of the state government in planning and setting up of waste processing and disposal facilities was negligible and as such, the state government cannot be held responsible if municipalities do not have a waste management plan in place or if municipalities do not set up municipal solid waste management systems.

Audit observations relating to compliance to municipal solid waste rules by 56 sampled municipalities in 20 states is discussed below:

(a) Authorisation

According to Rule 4(2), the municipal authority or an operator of a facility shall make an application for grant of authorisation for setting up waste processing and disposal facility including landfills from the State PCB and the state PCB shall issue the authorisation after stipulating compliance criteria. Hence, municipal solid waste rules envisage that all waste processing and disposal facilities should be set up after authorisation from the state PCB.

It was noticed in audit that out of the 56 sampled municipalities, in 59 *per cent* of the sampled municipalities, waste processing/disposal facilities were running without authorisation from PCB. It was also seen that sampled municipalities in ***Jharkhand, UP, Meghalaya, Assam, Punjab, Maharashtra, Orissa, Uttarakhand, Bihar, West Bengal, Tamil Nadu, Chhattisgarh*** and ***Andhra Pradesh*** were running waste disposal facilities without authorisation from PCBs.

Waste processing and disposal facilities, which were running without authorisation from PCBs, might cause harm to health as well as contamination to the environment as there was no assurance of following the compliance criteria that have to be met by the municipality. Thus, waste processing and disposal facilities running without authorisations were a matter of concern.

(b) Collection

The implementation schedule (Schedule II) in the municipal solid waste rules specified activities to be taken by the municipality/operator to ensure that all waste that is generated in the municipality is collected. This would ensure that uncollected waste would not pose risks to health and contaminate the environment. It was verified in audit whether the 56 sampled municipalities carried out the activities related to collection of municipal solid waste as specified in the implementation schedule. The results are depicted in the table below:

Activities related to collection of municipal solid waste to be done by municipality/operator	**Done**	**Not done**	**Not verifiable**	**Total**
1. Organise house-to-house collection of municipal solid wastes on a regular basis.	21	19	16	56
Most complete collection in *Karnataka, Kerala, Andhra Pradesh*; in *West Bengal, Rajasthan*, though all municipalities organised house-to-house collection, all the wards were not completely covered.				
2. Collect waste from slums and squatter areas or localities including hotels, restaurants, office complexes and commercial areas on a regular basis.	12	7	37	56
Most complete collection in *Karnataka.*				
3. Collect regularly wastes from slaughter houses, meat and fish markets, fruits and vegetable markets, which are biodegradable in nature.	19	10	27	56
Most complete collection in *Karnataka, West Bengal, Maharashtra*				
4. Ensure that bio-medical wastes and industrial wastes are not mixed with municipal solid wastes.	9	13	34	56
Ensured largely by *Karnataka* and *Uttar Pradesh*				
5. Ensure that horticultural and construction or demolition wastes or debris are collected separately regularly.	8	23	25	56
Most completely in *Karnataka, Uttarakhand* and *Bihar*				
6. Notify waste collection schedule and the likely method to be adopted for public benefit in a city or town.	13	25	18	56
Most complete in *Karnataka* and *Kerala,*				
7. Ensure waste (garbage, dry leaves) are not burnt.	4	17	35	56
This action was difficult to verify as few municipalities had issued instructions but it was not possible to verify follow-up action.				
Total	86	114	192	392
Per cent	22	29	49	

Thus, it can be seen that only in 22 *per cent* of the municipalities, waste was collected and in 29 *per cent* municipalities, the municipal authorities could not ensure regular collection of waste as envisaged in the municipal solid waste rules. The activities for collection organised by the municipalities was ineffective as out of sampled municipalities, waste was being regularly collected only in nine municipalities, i.e., only in 16 *per cent* of the sampled municipalities.

(c) Segregation

The implementation schedule (Schedule II) in the municipal solid waste rules specified activities to be taken by the municipality/operator to ensure that segregation of municipal solid waste takes place. This would ensure that collected waste is segregated and processed accordingly; with the organic waste being processed (by composting, pelletisation etc,.) and non-organic waste being disposed in landfills. It was checked in audit whether the 56 sampled municipalities carried out the activities related to segregation of municipal solid waste as specified in the implementation schedule. The results are depicted in the table below:

Mixing of construction debris with municipal solid waste at open dump site in Karnataka

Activities for segregation to be done by municipalities	**Done**	**Not done**	**Not verifiable**	**Total**
1. Organisation of awareness programmes for segregation of wastes.	12	26	18	56
Done completely in sampled municipalities in *Karnataka* and *Kerala*				
2. Holding regular meetings at quarterly intervals with representatives of local resident welfare associations and non-governmental organisations to ensure community participation in waste segregation.	10	24	22	56
Done completely in sampled municipalities in *Maharashtra* and *Kerala*				
Total	**22**	**50**	**40**	**112**
Per cent	***20***	***44***	***36***	

Thus, it is evident from the table above that only 20 *per cent* of the selected municipalities organised awareness programmes and 44 *per cent* did not. This is reflected in the fact that out of 56 municipalities, segregation was taking place only in 10 *per cent* of the sampled municipalities and segregation was not taking place in 73 *per cent* of the sampled municipalities.

Thus, segregation at source was not taking place, leading to different kinds of waste being mixed together for dumping. This would limit the possibility for processing of recyclable waste.

(d) Storage

The implementation schedule (Schedule II) in the municipal solid waste rules specified activities to be taken by the municipality/operator to ensure that storage of municipal solid waste takes place, after collection and segregation and before it is transported for processing and disposal. This would ensure that collected and segregated waste is properly stored, in a manner not to cause any hazards to public health or to the environment. Municipal authorities, according to the schedule, should establish and

maintain storage facilities in such a manner, that they do not create unhygienic and unsanitary conditions around it. It was checked in audit whether the 56 sampled municipalities carried out the activities related to storage of municipal solid waste, as specified in the implementation schedule. The results are depicted in the table below:

Activities for storage to be undertaken by the municipality	**Done**	**Not done**	**Not verifiable**	**Total**
1. Storage facilities established based upon the quantities of waste generated	12	22	22	56
Most complete in *Himachal Pradesh, Karnataka, Kerala* and *Uttarakhand*				
2. Storage facilities so designed that wastes stored are not exposed to open atmosphere and are aesthetically acceptable and user-friendly.	9 (includes 2 municipalities in Kerala which are bin free[18] cities)	27	20	56
Performance of most municipalities poor				
3. Bins for storage of biodegradable wastes have been painted green, those for storage of recyclable wastes painted white and those for storage of other wastes painted black.	8	33	15	56
Most complete in the sampled states of *Gujarat, Maharashtra* and *Kerala*				
4. Storage facilities set up by municipal authorities attended daily for clearing of wastes and the bins or containers cleaned before they start overflowing	8 (includes 2 municipalities in Kerala which are bin free cities)	17	31	56
Most complete in sampled municipalities in *Kerala* and *Assam*				
Total	**37**	**99**	**88**	**224**
Per cent	***17***	***44***	***39***	

It can be seen that performance of the sampled municipalities in ensuring proper storage of collected waste was very poor; with only 17 *per cent* municipalities able to ensure proper storage and 44 *per cent* unable to ensure proper storage.

In addition, it was noticed that out of 56 sampled municipalities, manual handling of waste was taking place in 33 municipalities (59 *per cent*) while it did not take place in four (7 *per cent*) municipalities. In rest of the 19 municipalities, it could not be verified whether manual handling of waste was taking place. In the 33 municipalities where manual handling of waste was taking place, only 24 *per cent* had taken proper precautions for safety of workers, 55 *per cent* had not done so and it was not verifiable whether any precautions was taken by seven municipalities (21 *per cent*) where manual handling of waste was taking place.

Manual Handling of Waste in Karnataka

Evidently, waste was not being properly stored which would lead to unhygienic conditions, causing problems to health and contamination of the environment. The

[18] Daily collection of waste ensures that no rubbish collects and thus, no bins are needed.

problem of poor storage of waste was further compounded by non clearing of storage bins on a daily basis.

(e) Transportation

The implementation schedule (Schedule II) in the municipal solid waste rules specified activities to be undertaken by the municipality/operator to ensure that transportation of municipal solid waste for processing/disposal takes place in a hygienic manner and does not cause littering of waste. It was checked in audit whether the 56 sampled municipalities carried out the activities related to transportation of municipal solid waste, as specified in the implementation schedule.

It was seen that out of 56 sampled municipalities, only 18 *per cent* of sampled municipalities were using covered trucks for transportation and 43 *per cent* were not using covered trucks. Position was not verifiable in case of the remaining 39 *per cent*.

Thus, usage of uncovered trucks would cause scattering and result in the collected and stored waste not reaching the destination point for processing/disposal.

(f) Processing

The implementation schedule (Schedule II) in the municipal solid waste rules specified that municipal authorities adopt suitable technology or combination of such technologies to make use of wastes to minimise burden on landfill. Criteria to be followed included composting, vermi-composting, anaerobic digestion or any other appropriate biological processing for biodegradable waste. Incineration with or without energy recovery including pelletisation could also be used for processing wastes in specific cases. Municipal authority or the operator of a facility wishing to use other state-of-the-art technologies had to approach CPCB to get the standards laid down before applying for grant of authorisation. The role of municipalities in relation to establishment of processing facilities was examined in audit in 56 sampled municipalities. The results are depicted in the table below:

Activities for processing of waste to be undertaken by the municipality	**Done**	**Not done**	**Not verifiable**	**Total**
1. Biodegradable wastes processed by composting, vermi-composting, anaerobic digestion or any other appropriate biological processing for stabilisation of wastes.	10 (includes partial composting in 1 municipality in Karnataka, 2 composting plants in Orissa out of which 1 is defunct.	33	13	56
Composting was only taking place in sampled municipalities of *Kerala, Karnataka, Delhi, Orissa* and *Himachal Pradesh*.				
2. Use of incineration with or without energy recovery including pelletisation for processing wastes in specific cases	1	43	12	56
Only 1 sampled municipality in *Gujarat* created this facility				
3. Waste processing or disposal facilities include composting, incineration, pelletisation, energy recovery or any other facility duly approved by	7	39	10	56

Activities for processing of waste to be undertaken by the municipality	Done	Not done	Not verifiable	Total
CPCB.				
Only composting was taking place in states like *Kerala* and *Karnataka*. No other method of waste processing was adopted.				
Total	**18**	**115**	**35**	**168**
Per cent	***11***	***68***	***21***	

It can be seen that waste processing facilities were almost non existent; with only 11 *per cent* municipalities having waste processing capabilities while a huge 68 *per cent* did not have any waste processing facilities. Only municipalities in *Kerala*, *Karnataka*, *Delhi*, *Orissa*, *Gujarat* and *Himachal Pradesh* had compost plants for processing of waste. Thus, hardly any waste processing facilities existed in the selected municipalities. This would only aggravate the landfilling operations.

(g) Disposal

The implementation schedule (Schedule II) in the municipal solid waste rules specified that landfilling should be restricted to non-biodegradable, inert waste and other waste that are not suitable either for recycling or for biological processing and that landfilling of mixed waste should be avoided. The implementation schedule specified that landfilling should be done only under unavoidable circumstances or till installation of alternate facilities and that landfilling should be done following norms given in Schedule–III of the rule. 56 municipalities were test checked to study their actions in relation to the objectives specified in the implementation schedule. Even though it was envisaged in audit that landfills would be studied to see whether all the specifications, as given in the rules, were being met, however, none of the sampled municipalities had sanitary landfills. As a result, no landfill was subject to audit scrutiny.

Rag-pickers in the open dumpsite at Bhalaswa, Delhi

Cows in the open landfill site at Okhla, Delhi

It was seen in audit that only six landfills were established in the sampled 56 municipalities and the states resorted to dumping of waste in open dumpsites. The waste disposal infrastructure (landfills/open dumpsites) in the states sampled for municipal solid waste rules is shown in the table below:

State	Landfills (whole state)	Open dumpsites in selected municipality
Himachal Pradesh	0	3 in sampled municipalities, 14 in whole state

Jharkhand	0	NA
Karnataka	5	12 in sampled municipalities, 183 in whole state
Kerala	0	37 in whole state
Bihar	0	21 approx in whole state
Uttarakhand	0	3 in sampled municipalities, 68 in whole state
Assam	0	3 in sampled municipalities,
Delhi	0	3
Gujarat	0	4
Maharashtra	0	5
Orissa	0	6
Punjab	0	6
West Bengal	0	5 in sampled municipalities, 120 in whole state
UP	0	6
Meghalaya	0	1
Rajasthan	1	4
Tamil Nadu	0	4
Sikkim	0	3
Chhattisgarh	0	Not verifiable
AP	0	7

Thus, it can be seen that no landfills have been set up in the sampled states and waste was being dumped into open, unsanitary dumping grounds in the sampled states. This posed immense risks to public health as well as causing contamination of the environment.

The dumpsites needed to be monitored to make sure that the open dumping of waste did not cause contamination of the environment or spread disease in areas around the dumpsites. However, it was observed that out of the 20 sampled states:

- Monitoring of dumpsite took place only in ***Karnataka, Gujarat*** **and** ***Himachal Pradesh***.
- No monitoring of dumpsites was taking place in ***Meghalaya, Jharkhand*** and ***Uttarakhand***.
- In 14 states, though municipalities claimed that monitoring of dumpsites was taking place, no monitoring reports were produced to Audit to enable Audit to verify whether monitoring took place.

Thus, not only was waste being dumped in open areas, no monitoring of the dumpsite took place to verify whether these dumpsites caused contamination of the environment.

The status of disposal activities which had to be taken as per Schedule II of the municipal solid waste rules, by the sampled 56 municipalities is depicted in the table below:

Activities for disposal of waste to be undertaken by the municipality	**Done**	**Not done**	**Not verifiable**	**Total**
1. Municipal authorities ensured that landfilling is restricted to non-biodegradable, inert waste and other waste that are not suitable either for recycling or for biological processing.	5	45	6	56
As there was no segregation taking place, all kinds of waste was being dumped. Only *Gujarat* made				

Activities for disposal of waste to be undertaken by the municipality	Done	Not done	Not verifiable	Total
some attempts to send only non- biodegradable waste to dumpsites.				
2. Municipalities transferred or earmarked land for setting up sites for landfills.	13	15	28	56
Only *Karnataka, Gujarat* and *Kerala* have made attempts				
3. Municipality carried out improvement of existing landfill sites/ open dumpsites as per provisions of these rules by the due dates.	4	37	15	56
Only took place in *Delhi, Maharashtra* and *Karnataka*				
4. Municipality carried out identification of landfill sites for future use and making site (s) ready for operation by the due date.	12	25	19	56
Done only in *West Bengal, Karnataka* and *Kerala*				
5. Plan with municipalities to close the open dumpsites and move the waste to a sanitary landfill.	7	25	24	56
Plans exist only in *Delhi, Maharashtra, Karnataka* and *Kerala* municipalities.				
Total	**41**	**147**	**92**	**280**
Per cent	***14***	***53***	***33***	

It could be seen that the activities outlined in the Implementation Schedule for the development of landfills were carried out only in 14 *per cent* of the sampled municipalities and not done in 53 *per cent* municipalities. Thus, it is apparent that in the absence of waste processing and scientific landfilling, the open dumping of waste would continue; not only causing contamination of the environment but also public health hazard due to unsanitary conditions.

(h) Specific cases of violation in states

Some individual cases of violation of municipal solid waste rules noticed in the states are as under:

Orissa

- Berhampur municipality was granted (December 2002) authorisation by SPCB, Orissa to set up and operate waste processing and disposal facilities at a specified site. However, it was observed that the waste was not segregated and the municipality had not set up waste processing and disposal facilities till the date of audit. The storage points were located in a busy market and in a residential area and were exposed to stray animals, creating nuisance. Waste was transported in open vehicles through the

Bargarh Dumpsite situated inside residential area (Orissa)

residential areas and was dumped at the specified site. SPCB had also pointed out this violation in July 2007.

- Cuttack Municipal Corporation did not carry out segregation of wastes and the wastes were not processed before disposal. The municipal corporation had two compost plants both of which were lying defunct. Waste was being transported in open vehicles and dumped in an open site which was at the side of the road. PCB, in August 2007, had observed that violation of municipal solid waste rules was taking place and had urged the corporation to obtain authorisation from PCB for the development of waste processing and disposal facility.
- In Bhubaneshwar, unsegregated wastes were being transported in open vehicles and dumped in four open sites. Three of these were in residential areas and lacked space for further dumping. In these dumpsites, it was also found that unsegregated wastes were often burnt in the presence of municipal authorities. Though the municipal corporation was authorised in January 2004 to operate waste disposal facilities at Tulsideipur, Barang, the Municipal Corporation had not taken any steps for setting up this facility.

Chhattisgarh

- The Municipal Council of Bhatapara had not yet received authorisation for operation of waste disposal facilities due to non allotment of landfill site by district authority. As a result, waste is being dumped in three open dumpsites which posed a serious risk to health and environment. The Municipal Corporation in Raipur, Bhilai, Durg and Rajnandgaon had been authorised to set up and operate waste processing/disposal facilities at landfill site for composting but no composting is being carried out.

Gujarat

- It was noticed that there were 174 municipalities in the state but only 142 had sought and received authorisation for setting up waste disposal facilities. Only four municipalities had waste disposal facilities, three vermiculture and one composting plant. No secured landfill site was developed and commissioned in the state.

Punjab

- According to municipal solid waste rules, waste processing and disposal facilities were to be set up by the municipal authorities by December 2003 and the performance of these facilities was to be monitored once in six months. However, it was noticed that no waste processing and disposal facilities have yet been set up in the state till November 2007. Thus, open dumping of waste continues throughout the state in violation of the municipal solid waste rules. In addition, it was noticed in municipal corporations in Patiala and Amritsar that 81 *per cent* and 29 *per cent* of the vehicles transporting municipal solid

waste were uncovered leading to waste being exposed to the open environment and littering.

Karnataka

- Karnataka Compost Development Corporation (KCDC, a state government undertaking) was manufacturing compost by utilising the municipal solid waste from Bangalore City area. It had an installed capacity of 300 tonnes per day but was operating at only 150 tonnes per day. It was seen that the compost plant received more than 300 tonnes of waste per day, which was beyond the capacity of the plant. The excess waste was dumped in the premises. It was also noticed that the waste was unsegregated and uncovered. Due to huge accumulation of municipal solid waste, garbage had piled up to a height of 30 to 40 feet and leachate was flowing in an area that was close to a water body. Though KCDC had requested funds to buy additional machinery, the same was not provided to KCDC. According to municipal solid waste rules, waste processing facilities should be equipped with a leachate treatment system and leachate should not be let out. It was noticed that though Brahat Bangalore Mahanagar Palike had entrusted the work of laying of underground hume pipes, however the pipes were not laid even after a year.

Burning of waste at Udupi, Karnataka

- Udupi municipality authorities dumped unsegregated municipal solid waste into the Kalmadi riverbed sides during 2004-06. The riverbed, being a coastal regulation Zone III area, the dumping of waste there was in violation of provisions of Coastal Regulation Zone Act as well as EPA. The dumping resulted in blocking the natural flow of Kalmadi river. Department of Forest and Ecology and Karnataka Coastal Zone Management Authority had requested the Secretary, UDD to take action against the Commissioner, Udupi and take steps for the removal of the dumped waste. However, no action has been taken so far.

West Bengal

- Kolkata Municipal Corporation (KMC) dumped its collected municipal solid waste at Dhapa since 1980. Dhapa is located within the East Kolkata Wetlands, an internationally identified wetland under the Ramsar Convention and in the vicinity of four villages engaged in agriculture and fishing. On an average, KMC dumps 3000 tonnes of waste a day and there is no processing plant to reduce the load of waste dumped everyday. In April 2006, subsidence of a portion of a landfill area took place resulting in bulging of flat land and

the ground level adjacent to the water body was raised by more than a meter in height. In addition, several cracks developed resulting in damage of the newly constructed surface drain for the conveyance of leachate. A committee, constituted by KMC, recommended action for damage control but did not recommend any measures for creating outlet for methane and carbon dioxide produced when anaerobic digestion takes place. The emission of methane from municipal solid waste dumped in Dhapa was 63.23 thousand tonnes per year and that of carbon dioxide was 13.28 lakh tonnes. Records also revealed that the soil underlying the site consisted of very soft silts and clay. This condition, combined with elevated pore pressure (due to presence of water body) may result in stress conditions leading to failure of the slope and causing untoward incidents. Despite this, KMC had not yet initiated any action to process municipal solid waste or at least stop dumping municipal solid waste at Dhapa.

Tamil Nadu

- Chennai Corporation had no scientific landfill and the waste was being dumped in two open dumpsites at Perungudi and Kodungaiyur. The dumpsite at Perungudi is at the Pallikaranai swamp area, which also houses a large number of species of plants and animals. Dumping had been taking place in this area for more than 15 years and almost 25 *per cent* of the marshland has been lost due to indiscriminate dumping. A study by the PCB in 2005 showed that the marsh water was not fit to support fish/wild life and drinking/bathing.

Dumpsite in Chennai, Tamil Nadu

MoEF replied in August 2008 that Schedules I and II of the municipal solid waste rules provided time limits for implementation of various activities and compliance criteria and for collection, segregation, storage, transportation, processing and disposal of municipal solid waste. According to MoEF, even though the system was expected to be in place by December 2002, due to various constraints, very few states had complied hundred per cent in this regard. MoEF also stated that it was the responsibility of the local bodies to identify the best suited waste processing technologies for the area under their jurisdiction. MoEF also stated that the recommendations in this regard in the draft audit report have been noted for initiating appropriate actions and these would be communicated to the PCBs.

Recommendations

- *The rules should specify action to be taken by the states, and not just municipalities for improving the management of municipal solid waste in the state.*
- *Authorisations for setting up waste processing and waste disposal facilities should be made mandatory for each municipality.*
- *States and municipalities should make greater efforts to collect, regularly and completely, the municipal solid waste generated. Waste generated by activities like dairies, slaughter houses, restaurants etc., should also be collected and each municipality should aim for collection of 100 per cent of the municipal solid waste generated.*
- *Segregation should be given greater emphasis by means of publicity and awareness campaigns and holding regular meetings with housing associations and NGOs. State governments could make waste segregation mandatory and the municipality could be authorised to levy fines if segregated waste is not made available to the municipality for collection.*
- *Waste processing should be made mandatory in each municipality. CPCB could help each municipality in identifying the waste processing technology best suited to the needs of the municipality. Sufficient funding should be provided by MoEF/MoUD to set up waste processing infrastructure in each municipality.*
- *All municipalities should take steps to improve the existing dumpsites to make them more sanitary and aesthetic. Dumpsites in residential areas and near water sources/water bodies should be closed down and periodic monitoring of dumpsites for contamination of environment should take place.*
- *Identification of land for setting up landfills should be done on a priority basis and landfills should be developed by each municipality according to a time bound programme. Landfilling should be restricted to non-biodegradable/inorganic waste.*

6.2.2 Compliance to Bio-Medical Waste (Management and Handling) Rules, 1998

The bio-medical waste rules specify in Rule 4, that it shall be the duty of every occupier of an institution generating bio-medical waste which includes a hospital, nursing home, clinic, dispensary, etc., to take all necessary steps to ensure that such waste is handled without any adverse effect to human health and the environment and according to Rule 5, bio-medical waste shall be treated and disposed of in accordance with Schedule I, and in compliance with the standards prescribed in Schedule V of the rules. Further, every occupier, where required, shall set up in accordance with the time-schedule in Schedule VI, requisite bio-medical waste treatment facilities like incinerator, autoclave, microwave system for the treatment of waste, or, ensure requisite treatment of waste at a common waste treatment facility or any other waste treatment facility. In addition, according to Rule 7, the government of every State shall establish a prescribed authority with such members as may be specified for granting authorisation and implementing these rules. In all the states, the state PCBs were the prescribed authority.

(a) Establishment of prescribed authorities

According to Rule 7 of the bio-medical waste rules, the state governments had to establish a prescribed authority for granting authorisation and implementing the bio-medical waste management and handling rules within one month of bio-medical waste rules coming into force. It was noticed that out of 15 sampled states:

- ***Delhi, Maharashtra, Tamil Nadu*** and ***West Bengal*** established the prescribed authority, that is, PCBs of the states as defined in the Rules, by 2002. ***Orissa*** established prescribed authority in June 1999. ***Assam*** established prescribed authority in 2005 after the due date.
- Audit could not verify if the prescribed authority had been set up within the time limit in ***Gujarat***, ***Punjab***, ***Rajasthan***, ***Uttar Pradesh***, ***J&K***, ***Haryana***, ***Andhra Pradesh***, ***Tripura*** and ***Tamil Nadu***.

According to Rule 9 of the bio-medical waste rules, state governments had to constitute an advisory committee to advise the government of the state and the prescribed authority on matters related to the implementation of these rules. As already discussed in Chapter 5, paragraph 5.2.2(b), out of the 15 sampled states, only 60 *per cent* of the sampled states had set up the advisory committees.

Thus, the bodies mandated by the bio-medical waste rules were not constituted in most of the states, thereby impacting on the effectiveness of implementation of the bio-medical waste rules.

(b) Authorisation

According to Rule 8 of the bio-medical waste rules, every institution generating, collecting, receiving, storing, transporting, treating, disposing and/or handling bio-medical waste and every operator of a bio-medical waste treatment facility, had to seek authorisation from the prescribed authority of the state for handling and disposal of bio-medical waste. Hence, biomedical waste handling and disposal facilities could be set up by a hospital/ health institutions/ private operators only after receipt of authorisation by the prescribed authority. Out of the 180 hospitals sampled in audit, it was noticed that:

- Only in 29 *per cent* of the sampled hospitals, waste disposal facilities were set up after getting authorisation from prescribed authority.
- In 31 *per cent* of the sampled hospitals, waste disposal facilities were set up before getting authorisation from prescribed authority.
- In 40 *per cent* of the sampled hospitals, it could not be verified whether waste disposal facilities were set up subsequent to authorisation.

Authorisations by prescribed authority specify the compliance criteria and are subject to verification by PCB. Hospitals/ private operators running waste disposal facilities without authorisation would mean that the compliance criteria would not be adhered to, which might result in hazards to public health as well as contamination of the environment.

(c) Segregation

Used blood transfusion kits thrown in drains (West Bengal)

According to Rule 6, biomedical waste was not to be mixed with other waste and had to be segregated into containers/bags at the point of generation in accordance with Schedule II prior to its storage, transportation, treatment and disposal by the hospitals/operators. It was noticed in audit that out of 180 sampled hospitals:

- In 34 *per cent* of the sampled hospitals, bio-medical waste, like effluents, needle sharps etc., were mixed with other wastes.
- In 33 *per cent* of the sampled hospitals, bio-medical waste was not mixed with other waste.
- In 33 *per cent* of the sampled hospitals, it could not be verified whether bio-medical waste was mixed with other kinds of waste.

Segregation of waste into 10 categories according to type and putting them into different coloured bags was specified in the Schedule 1 of the bio-medical waste rules. This had to be undertaken by the hospitals/operators being the generators of the waste for its safe handling under the rules. The activities envisaged under segregation and the performance of the 180 sampled hospitals with reference to these activities of segregation are depicted in the table below:

Activities for segregation of bio-medical waste to be undertaken by the hospital/operator	Done	Not done	Not verifiable	Total
1. Human Anatomical Waste segregated as Category I waste and put in Yellow plastic bag.	92	58	30	180
2. Animal Waste segregated as Category 2 and put into yellow plastic bag.	No veterinary hospital in sample			
3. Microbiology & Biotechnology Waste segregated as Category 3 and put into red disinfected container/ plastic bag.	53	49	78	180
4. Waste sharps segregated into category 4 and put into Blue/White translucent Plastic bag/puncture proof container.	53	55	72	180
5. Discarded medicines and cytotoxic drugs segregated as Category 5 and put into black plastic bag.	39	50	91	180
6. Solid waste segregated into Category 6 and put into red disinfected container/ plastic bag.	70	41	69	180
7. Solid waste segregated into Category 7 and put into Blue/White translucent Plastic bag/puncture proof container.	41	55	84	180
8. Liquid Waste segregated as Category 8.	39	57	84	180
9. Incineration Ash segregated as Category 9 and put into black plastic bag.	Most hospitals don't have incinerators or incinerators are not in working condition and in Madhya Pradesh, incinerator ash is mixed with municipal solid waste.			
10. Chemical waste segregated as Category 10 and put into black plastic bag.	31	41	108	180

Activities for segregation of bio-medical waste to be undertaken by the hospital/operator	Done	Not done	Not verifiable	Total
Total	**418**	**406**	**616**	**1440**
Per cent	***29***	***28***	***43***	

It could be seen that segregation as envisaged in the bio-medical waste rules was taking place in only 29 *per cent* of the sampled hospitals while it was not taking place in 28 *per cent* of the sampled hospitals. Segregation needs to be enforced in all the hospitals so that bio-medical waste does not go untreated, causing health hazards.

(d) Labeling, storage and transportation

According to Rule 6 of bio-medical waste rules, if a container is transported from the premises where bio-medical waste is generated to any waste treatment facility outside the premises, the container should carry the label prescribed in Schedule III and untreated biomedical waste should be transported only in such vehicle as may be authorised for the purpose by the competent authority as specified by the government. Further, no untreated bio-medical waste shall be kept stored beyond a period of 48 hours and if, for any reason, it becomes necessary to store the waste beyond such period, the authorised person must take permission of the prescribed authority and take measures to ensure that the waste does not adversely affect human health and the environment.

With respect to labeling, audit check of a sample of 180 hospitals revealed that:

- Labeling took place only in 19 *per cent* of sampled hospitals. It did not take place in 34 *per cent* of sampled hospitals while it was not verifiable in 47 *per cent* of sampled hospitals.
- In ***Tripura***, labeling did not take place in all the sampled hospitals while in ***West Bengal, J&K*** and ***Madhya Pradesh***, only one, three and two sampled hospitals respectively labeled the bio-medical waste.

With respect to storage of waste, audit check of 180 sampled hospitals revealed the following:

- 30 *per cent* of sampled hospitals did not keep untreated waste beyond 48 hours. However, 17 *per cent* of sampled hospitals kept untreated waste beyond 48 hours.
- In 53 *per cent* of sampled hospitals, it could not be verified whether waste was being stored beyond 48 hours.

With respect to transportation, it was observed that:

- In ***West Bengal***, no proper transportation existed in eight out of the 12 sampled hospitals. In ***Tripura*** and ***J&K***, transport facility was not available with government hospitals. In ***Orissa,*** out of 12 sampled hospitals, six hospitals did not have authorised vehicles and were dumping the bio-medical waste either in deep burial pits or in open sites inside the hospital premises. In

Tamil Nadu, 11 out of 12 sampled hospitals did not have authorised vehicles for transportation.

The hospitals need to take appropriate action for labeling, storage and transportation so that bio-medical waste does not pose any risks to human health or lead to contamination of the environment.

(e) Treatment and disposal

According to Rule 5(2) of the bio-medical waste rules, every occupier, where required, shall set up in accordance with the time-schedule in Schedule VI, requisite bio-medical waste treatment facilities like incinerator, autoclave, microwave system for the treatment of waste, or, ensure requisite treatment of waste at a common waste treatment facility or any other waste treatment facility. According to the Schedule VI in the rules, the due dates were between December 1999 to 2002, for different categories of hospitals.

Bio-medical waste dumped outside containment area (Orissa)

Despite the due dates ending, at the latest by December 2002, it was noticed that waste treatment/disposal infrastructure had not been set up in the sampled hospitals. Sampled hospitals in states like ***Tripura***, ***West Bengal***, ***Tamil Nadu, J&K***, ***Punjab***, ***Gujarat***, ***Assam*** and ***Maharashtra*** had less than one processing/disposal facility. Thus, even though the due dates for setting up bio-medical waste processing/disposal infrastructure was long past, more than 50 *per cent* of the hospitals sampled had inadequate waste processing/disposal infrastructure.

Bio-medical waste being burnt in a hospital (West Bengal)

Test check of 180 hospitals to assess whether bio-medical waste was being treated and disposed off by the hospital or the operator in accordance with the rules and in compliance with standards prescribed in the rules revealed that:

- Only 17 *per cent* of sampled hospitals were treating/disposing bio-medical waste as per the compliance criteria in the rules.
- 43 *per cent* of sampled hospitals were not treating/disposing the bio-medical waste in accordance with the criteria in the rules.

- In 40 *per cent* of sampled hospitals, records were not made available to verify whether bio-medical waste was being treated/disposed off in accordance with the rules.

Thus, bio-medical waste rules were being violated, which may have serious consequences for public health as well as environment.

(f) Specific cases of violation in states

Some individual cases of violation of bio-medical waste rules noticed in the states are as under:

Orissa

- Four district headquarters hospitals in Bhubaneshwar, Dhenkanal, Sambalpur and Jagatsinghpur were not granted authorisation by the PCB for the period 2002-07 to collect, receive, store, transport, process and dispose bio-medical waste on the grounds of inadequate management of bio-medical waste. These hospitals were provided with autoclaves and plastic shredders during February to May 2005 for disinfecting/treating the bio-medical waste generated and to stop reuse of bio-medical waste. However, these equipment were lying unused due to lack of trained/skilled manpower as reported by the hospitals. It was also noticed that in the hospitals in Dhenkanal and Jagatsinghpur, the untreated bio-medical waste was being dumped outside the containment area within the hospital premises, exposed to stray animals and visiting patients/escorts of the patients. In the hospital at Sambalpur, the containment area was seldom used and bio-medical waste was dumped inside the hospital campus by the hospital due to water logging of the deep burial pits of the containment area. In the district hospital at Bhubaneshwar, the containment area was damaged and waste was being dumped in an uncontrolled manner within the hospital premises, according to a report by the PCB.

Autoclave lying unused (Orissa)

Rajasthan

- Scrutiny of reports compiled by PCB revealed that 12784 kg of bio-medical waste was generated daily by 1864 identified health care facilities during 2006, out of which only 9079 kg of waste was treated daily leaving the rest untreated.

- The work for creation of Common Treatment Facilities (CTF) was allotted in February 2005 to be completed within four months. However, it was noticed that only six out of 11 CTFs were completed by April 2007. It was also noticed in audit that bio-medical waste generated by health care facilities in Barmer and Jaisalmer could not be covered under CTF.
- The state advisory committee directed the Secretary, Animal Husbandry Department to identify the veterinary units and slaughter houses generating waste and to cover these units under the rules for handling and disposal of waste. However, this was not yet done, leading to animal wastes generated by these units being disposed off in an unscientific manner.
- According to bio-medical waste rules, used plastic bottles and I.V. sets are to be shredded before being put into bags for final disposal. Further, bio-medical waste cannot be stored beyond a period of 48 hours. Audit noticed that in M.B. Hospital and P.D. Mahila Hospital in Udaipur, used empty plastic bottles and I.V. sets were found stored in the hospital premises and auctioned through open bids. Storage of waste beyond 48 hours and auction was a clear violation of the rules as well as posing hazards to health.

Madhya Pradesh

- It was noticed that four incinerators were being operated in M.Y Hospital, Indore; NSCB Medical College Hospital, Jabalpur; Hamadiya Hospital, Bhopal and District Hospital, Ratlam without authorisation from PCB, in the heart of the city, in residential areas. It was also noticed that waste was being incinerated without attaining the desired temperatures in the primary and secondary chambers; leading to possibility of causing public health hazard as well as risk to the environment.
- Under Section 21(5) of the Air Act, it is obligatory for incinerators to install and operate efficient Air Pollution Control Device (APCD). It was noticed that out of 35 incinerators installed in the state, nine incinerators were running without APCD and no action was taken by the PCB against the operators.
- Most of the Common Bio-medical Waste Treatment Facilities (CBWTF) did not have autoclaves, microwaves, hydroclaves and shredders for treatment and mutilation of category wise waste. There were no effluent treatment plants to treat waste before discharge. CBWTF operators in Indore, Ratlam, Bhopal and Jabalpur district mixed the incineration ash with other wastes and dumped it in municipal solid waste sites.
- It was found that authorisation for collection, reception, storage, transportation, treatment and disposal of bio-medical waste generated in Ratlam Christian College was renewed for the period 1999-2007, without PCB ascertaining whether the hospital had the facility for the safe disposal of bio-medical waste.

West Bengal

- It was noticed in Durgapur S.D.Hospital that bio-medical waste was segregated and kept in different colored bags and dumped daily by the scavenging contractor into a locked vat lying in the hospital premises. This untreated waste is cleared only once a week by the municipal authority and dumped into an open dumping ground without treatment. During inspection of the vat by the audit team, it was found unlocked and not in regular use. Waste was being dumped in front of the vat and cleared from there. The audit team noticed presence of one rag picker, who was collecting reusable articles. In Asansol SD hospital, the existing deep burial pit was filled up and untreated waste was lying unattended in the hospital premises, which was ultimately disposed once a week by the municipal authority.

MoEF stated in August 2008 that vide amendment to the bio-medical waste rules in 2003, PCBs had been notified as the prescribed authority in the respective states and, thus, all states had PCBs as the prescribed authorities. MoEF also stated that it had no comments to offer on the issue of compliance of the states to bio-medical waste rules.

Good Practices in India

- In ***Gujarat***, the Gujarat Pollution Control Board (GPCB) was the prescribed authority for bio-medical Waste (Management and Handling) Rules. GPCB conducted a survey and prepared an inventory of biomedical waste generating units, and, based on the inventory; it authorized 12 CBWTFs at different places in the state on the criteria of 10000 beds or 150 km radius. An MoU bound the facilities to finally treat and dispose biomedical waste collected by it. This ensured the treatment of bio-medical waste within 48 hours of its generation. Trainings and seminars were also organised by GPCB with the help of Medical Council of Gujarat State and other NGOs to train and propagate awareness in the generators of biomedical waste.
- In ***Gujarat***, the government decided to upgrade the standards of eight Civil Hospitals, one teaching hospital and six laboratories of all Government Teaching Hospitals as per standards. To enforce this, it entered into service agreement with Quality Council of India, New Delhi. The standards included standards of Hospital Infection Control and compliance with regard to provisions of Biomedical Waste (Management and Handing) Rules, 1998. This established a benchmark for bio-medical waste generating units in the State.

Recommendations

- *Advisory bodies should be set up in each state and it should be consulted regularly on matters relating to implementation of the bio-medical waste rules.*
- *Registrations of those hospitals that do not set up treatment/disposal facility or join a common facility could be cancelled. New hospitals should not be allowed to commence*

operation without making sure that it has a facility for treatment/disposal of bio-medical waste.

- *Segregation of bio-medical waste according to its type should be ensured in each hospital. Measures should be taken to achieve 100 per cent segregation by each hospital.*
- *Based on the kind of waste being generated in the hospitals, waste treatment/disposal infrastructure should be created. Advisory bodies and CPCB can be consulted in this regard. Hospitals could join a common facility for treatment/disposal and PCBs should ensure that each common facility has the requisite and complete infrastructure to handle waste safely.*

6.2.3 Compliance to the Recycled Plastics Manufacture and Usage Rules, 1999 and Recycled Plastics Manufacture and Usage (Amendment) Rules, 2003

According to Rule 3, the prescribed authority for enforcement of the provisions of the rules related to manufacture and recycling shall be the State PCBs and the prescribed authority for enforcement of the provisions of these rules related to the use, collection, segregation, transportation and disposal shall be the District Collector/Deputy Commissioner of the concerned district. Further, according to Rule 4, no vendor shall use carry bags and containers made of recycled plastic for storing, carrying, dispensing or packaging of foodstuffs. Rule 6 stipulates that recycling of plastics shall be undertaken strictly in accordance with the Bureau of Indian Standards specification and Rule 8 states that no person shall manufacture carry bags or containers irrespective of its size or weight unless the manufacturer has registered the unit with the PCB.

Plastic waste mixed with other waste in Uttarakhand

(a) Implementation

(i) According to Rule 3, prescribed authority/DC/DM of districts had to take steps for enforcement of rules relating to use, collection, segregation, transportation and disposal of plastics. Out of the 20 sampled states, it was noticed that:

- In ***Sikkim***, the use of plastics was banned.
- Steps by DCs/DMs for the enforcement of rules was taken only in ***Orissa*** (in 2 out of 3 sampled districts), ***Karnataka*** (in 2 out of 3 sampled districts), ***Uttar Pradesh*** (1 district), ***Punjab*** (in 1 out of 3 sampled districts) and ***Uttarakhand*** (in 1 out of 3 sampled districts)
- No steps were taken for enforcement of the rules in ***West Bengal*** and ***Himachal Pradesh.*** In ***Himachal Pradesh*** though the government had prohibited plastic bags, plastic was still getting mixed and disposed with solid waste.

- Steps taken by the DMs/DCs for the enforcement of the rules were not verifiable in ***Assam, Delhi, Gujarat, Maharashtra, Rajasthan, Chhattisgarh, Jharkhand, Kerala, Bihar, Andhra Pradesh, Tamil Nadu*** and ***Meghalaya***.

Plastic waste mixed with other waste in Uttarakhand

Since it is not specified what kind of action is required to be taken by DMs/DCs for the enforcement of the rules, as such, action taken by them was difficult to verify in audit. In most of the cases, orders/ circulars were issued for the enforcement of these rules and no follow-up was done to check the implementation of these orders/ circulars.

(ii) According to Rule 4, no vendors should use carry bags or containers made of recycled plastics for storing, carrying, dispensing or packaging of foodstuffs. Out of the 20 sampled states, it was noticed that:

- Vendors were using carry bags or containers made of recycled plastic for storing, carrying, dispensing or packaging of foodstuffs only in ***Assam*** (1 out of 3 sampled districts), ***Orissa*** (1 out of 3 sampled districts), ***Himachal Pradesh*** (1 out of 3 sampled districts) and ***Karnataka*** (1 out of 3 sampled districts).
- Vendors were not using carry bags or containers made of recycled plastic for storing, carrying, dispensing or packaging of foodstuffs in ***Bihar, Kerala*** and ***Sikkim***.
- It was not verifiable in audit whether in ***Gujarat, Maharashtra, Punjab, Rajasthan, Chhattisgarh, Jharkhand, Meghalaya, Andhra Pradesh, Delhi, West Bengal, Tamil Nadu, Uttar Pradesh*** and ***Uttarakhand*** vendors were using carry bags or containers made of recycled plastic for storing, carrying, dispensing or packaging of foodstuffs.

(iii) According to Rule 6, recycling of plastic waste had to be undertaken strictly in accordance with the Bureau of Indian Standards specification. Audit of 20 sampled states revealed that:

- Recycling of plastic waste strictly in accordance with the Bureau of Indian Standards specification was being done only in the sampled municipalities in ***Himachal Pradesh*** and in one district each (out of 3 sampled) in ***Karnataka*** and ***Tamil Nadu***.
- It was not being done in ***Orissa, West Bengal, Bihar*** and ***Sikkim***.

- It could not be verified in audit in ***Assam***, ***Delhi***, ***Gujarat***, ***Maharashtra***, ***Punjab***, ***Rajasthan***, ***Chhattisgarh***, ***Andhra Pradesh***, ***Jharkhand***, ***Kerala***, ***Meghalaya***, ***Uttarakhand*** and ***Uttar Pradesh*** whether recycling was being done according to specifications of Bureau of Indian Standards.

(iv) According to Rule 8, no person shall manufacture carry bags or containers irrespective of its size or weight unless the persons/manufacturer had registered the unit with the PCB. Out of the 20 sampled states, it was noticed that:

- Only in ***Himachal Pradesh***, from February 2006 onwards units manufacturing carry bags/ containers had registered themselves with the PCB. In ***Chhattisgarh***, in the sampled municipality one unit was registered with the PCB. In ***Rajasthan***, out of two units in Jodhpur, one unit had applied for registration. In ***West Bengal***, the PCB had not prepared full list of manufacturers and had granted registration to all the 25 units that applied for registration. In ***Karnataka***, 181 units out of 269 units applied for registration.
- In ***Rajasthan***, ***Tamil Nadu*** and ***Sikkim***, units manufacturing carry bags/containers from virgin plastic or recycled plastic or both had not applied for registration with PCBs.
- It could not be verified in audit in ***Assam***, ***Delhi***, ***Gujarat***, ***Maharashtra***, ***Punjab***, ***Andhra Pradesh***, ***Jharkhand***, ***Kerala***, ***Meghalaya***, ***Uttarakhand,*** ***Orissa, Bihar*** and ***Uttar Pradesh*** whether units manufacturing plastic had registered themselves with the PCBs.

(b) Specific cases of violation in states

An instance of these rules being violated in the states is as follows:

- In ***Chhattisgarh***, rules pertaining to plastic waste were to be implemented by the District Magistrate/District Collector. A surprise inspection in Rajnandgaon, conducted in September 2007, at the instance of Regional Office, Environment Control Board, Bhilai disclosed that three industrial production units were manufacturing polythene bags of less than 20 micron thickness. This matter was reported to the District Collector but action taken has not been intimated to the Environment Control Board.

MoEF stated in August 2008 that CPCB was coordinating with PCBs in implementation of plastic waste rules. Out of 34 States/UTs, 23 States/UTs had completed inventory of plastic manufacturing and recycling units. Further, there were 2793 industries, of which, 1134 had been granted registration by respective PCBs. It also stated that eight states had brought out separate notification in respect of increase of thickness of plastic bags.

The reply has to be viewed in light of the fact that implementation of the plastic waste rules in the states is poor as shown by audit, which need to be more effectively addressed by MoEF.

Recommendations

- *The plastic waste rules should clearly specify actions to be taken by the DCs/DMs for enforcement of the rules relating to use, collection, segregation, transportation and disposal of plastics.*
- *Surprise checks should be conducted to verify whether vendors were following the provisions of the rules.*
- *Database of manufacturers of plastic carry bags/containers should be built to ensure that all manufacturers seek authorisation of PCB before they take up manufacture of such items.*

Conclusion

Compliance to Municipal Solid Waste rules*: Collection of waste by the municipalities was not taking place regularly and effectively. There was negligible segregation of waste and performance of the sampled municipalities in ensuring proper storage of collected waste was very poor. In addition, daily clearing of storage bins was not taking place, leading to accumulation of waste and creation of unhygienic conditions. Transportation was taking place mostly in uncovered trucks, which would lead to scattering of collected and stored waste. Waste processing facilities were almost non-existent and the burden on landfilling, as envisaged in the municipal solid waste rules, was not minimised. Landfills had not been established and open dumping was the most common option for the disposal of waste. No monitoring of dumpsites was taking place and municipalities did not plan for closing of dumpsites and identifying areas for landfills, which would facilitate scientific disposal of waste. This is a matter of grave concern as no waste processing facilities were being developed. Thus, in the absence of waste processing and scientific landfilling, the open dumping of waste would continue; not only causing contamination of the environment but also public health hazard due to unsanitary conditions. Thus, overall compliance to the municipal solid waste rules in the states was poor.*

Compliance to bio-medical waste rules: *The bodies mandated by the bio-medical waste rules were not set up in most of the states, affecting the implementation of the bio-medical waste rules. Hospitals/ private operators were running waste disposal facilities without authorisation and segregation of bio-medical waste according to categories was not taking place completely. This resulted in various categories of bio-medical waste not being treated according to the methods specified in the rules. The waste treatment/disposal infrastructure created in the states was insufficient. Thus, compliance to bio-medical waste rules was weak, which would not only affect public health but also lead to contamination of environment.*

Compliance to plastic waste rules: *Compliance to plastic waste rules was weak. Action was not being taken by DCs/DMs for the enforcement of the rules and it was difficult to verify whether vendors were using carry bags or containers made of recycled plastic for*

storing, carrying, dispensing or packaging of foodstuffs. It was difficult to verify in audit whether recycling was being done according to specifications of Bureau of Indian Standards. None of the sampled states had complete database on the number of manufacturers of plastic carry bags/containers; thus, it was difficult to verify whether all manufactures had sought authorisation from PCBs for manufacturers of plastic carry bags/containers.

CHAPTER 7
Effectiveness of Monitoring

Objective 6: To assess whether monitoring was effective in checking non-compliance.

Monitoring is a means of ensuring that compliance to rules is taking place. Since municipalities, hospitals and districts all over the country implement the waste rules, it is important to ensure, through monitoring, that implementing bodies at the state level are following the prescribed rules. According to Agenda 21, monitoring is a key prerequisite for keeping track of changes in waste quantity and quality and their resultant impact on health and the environment and governments should develop and apply methodologies for country-level waste monitoring.

Agenda 21 also states, "*Standard setting and monitoring are two key elements essential for gaining control over waste-related pollution.*" Audit findings with respect to effectiveness of monitoring are discussed below:

7.1 At the Central level

(a) Municipal solid waste

As stated in Chapter 5, paragraph 5.3.1, MoEF was of the view that the Ministry of Urban Development was the nodal agency, at the central level, responsible for implementation of the municipal solid waste rules. However, Ministry of Urban Development opined that it was the responsibility of MoEF to monitor the implementation of the Municipal Solid Waste (Management and Handling) Rules. Ministry of Urban Development had not set up any body for monitoring the implementation of these rules and does not provide any waste related data or monitoring reports to MoEF. Thus, the municipal solid waste rules were not being monitored by Ministry of Urban Development. It was noticed in audit that monitoring of the municipal solid waste rules by MoEF was also weak as discussed below.

According to Rule 8 of Municipal Solid Waste (Management and Handling) Rules, CPCB had to prepare a consolidated annual review report on management of municipal solid wastes and forward it to the Central Government along with its recommendations before 15 December every year. It was observed in audit that the review reports submitted by CPCB to MoEF did not contain any reports on the monitoring of the waste disposal facilities like incinerators, landfills etc., nor did it contain any report on whether municipalities were disposing waste according to the standards laid down in the rules. Thus, MoEF was unaware whether the waste disposal facilities were meeting the standards prescribed in the rules and whether waste was being disposed in a manner that was safe for health of the people as well as the environment.

MoEF was silent on the query of Audit as to whether MoEF had satisfied itself that implementation of municipal solid waste rules was taking place as envisaged in the central rules. MoEF stated that it has conducted a review on the working of the municipal solid waste rules; however, no records were produced to Audit to verify whether the

review took place. MoEF/CPCB also stated that independent evaluation of the working of the Municipal Solid Waste (Management and Handling) Rules had not taken place. An evaluation, whether conducted by MoEF/CPCB or by any independent agency, would have resulted in an impartial assessment of the efficacy of these laws and action could have been taken to plug the lacunae pointed out by the independent evaluation, which would have led to better management of municipal solid waste.

(b) Bio-medical waste

As stated in Chapter 5, paragraph 5.3.1, MoEF was of the view that Ministry of Health and Family Welfare was the nodal agency for the implementation of rules relating to bio-medical waste. However, Ministry of Health and Family Welfare opined that it was not its responsibility to monitor the implementation of Bio-Medical Waste (Management and Handling) Rules. It did not have a mechanism/ body to monitor the implementation of these rules and it had not sent any bio-medical waste related information to MoEF. Nor did it receive any data regarding waste from MoEF/CPCB. Thus, MoH&FW was not monitoring compliance to bio-medical waste rules.

According to CPCB, the PCB in each state was the prescribed authority to check whether the hospitals/ operators were complying with the Bio-Medical Waste (Disposal and Handling) Rules and CPCB conducted monitoring in some cases. CPCB further stated that based on its monitoring, it had issued show cause notices during 2006-08 to Common Bio-Medical Waste Treatment Facilities for the violation of bio-medical waste rules. However, no records were made available to show whether hospitals were being monitored by CPCB. In the absence of continuous monitoring of hospitals, it was not clear how MoEF/CPCB had satisfied themselves that biomedical waste rules was being implemented by the hospitals. MoEF also confirmed that it was not satisfied with the implementation of the Bio-Medical Waste Rules. Thus, monitoring of the bio-medical waste rules appeared to be ineffective.

(c) Plastic waste

There was no mechanism in place to ensure that monitoring of the Recycled Plastics Manufacture and Usage Rules was taking place. No review or independent evaluation of the efficacy of these Rules has been done.

Thus, the monitoring of the municipal solid waste rules, bio-medical waste rules and plastic rules, at the central level, did not appear to be effective. Systems were not in place to check compliance to rules by municipalities, hospitals and district authorities. Lack of systems checking compliance would lead to disposal of waste in a manner causing harm to health and environment.

7.2 At the level of the states/PCBs

(a) Municipal solid waste

(i) According to Article 6 of Municipal Solid Waste Rules, PCBs in each state shall monitor the compliance of the standards regarding ground water, ambient air, leachate quality and the compost quality including incineration standards as specified under the

rules. This was required to make sure that waste disposal methods did not lead to contamination of air, ground water and surface water. It was noticed in audit that out of 24 sampled states, activities undertaken for monitoring by PCBs were as follows:

- Monitoring of compost plants and other waste processing facilities was done by the PCBs of ***Karnataka, Delhi, Orissa*** and ***West Bengal*** while it was not done in ***Himachal Pradesh, Punjab, Uttarakhand, Sikkim, Bihar, Uttar Pradesh*** and ***Kerala***.
- Monitoring of ground water, ambient air, leachate quality and compost quality was being done only partially in ***Delhi, Orissa*** **and** ***Himachal Pradesh***.
- Further, monitoring of emission standards was done only in ***Gujarat***.
- In rest of the 12 states, it could not be verified whether any kind of monitoring activities were undertaken by the PCBs.

It appeared that PCBs of the states were not monitoring regularly whether municipal solid waste was being disposed in an environmentally safe manner and in a manner not to pose health risks.

(ii) Audit checked records of 56 municipalities/municipal corporations in the 20 states to verify the effectiveness of monitoring of the municipal solid waste rules by the PCBs, state governments and municipalities. Test check of activities related to monitoring revealed the following inadequacies:

Activities for monitoring of municipal solid waste rules	Done	Not done	Not verifiable	Total
Action to be taken by PCBs in the sampled municipalities				
1. Monitor compliance of standards regarding ground water, ambient air, leachate quality and the compost quality including incineration standards of the waste processing and disposal facility set up in the municipality.	2	38	16	56
2. Cancellation of authorisation for violation.	0	34	22*	56
Action to be taken by the municipalities				
1. Municipal authorities ensure that compost or any other end products comply with standards as specified in Schedule-IV of the Act.	4	34	18**	56
2. To prevent pollution problems from compost plant and other processing facilities, municipal authorities monitor according to provisions in the rules.	4	26	26**	56
4. Ambient air quality monitoring, monitoring of compost quality and monitoring of disposal leachates done by municipal authorities as envisaged in the rules.	0	36	20**	56
5. Incinerators met the operating and emission standards as specified in the rules.	1	8	47***	56
Action to be taken by the state government				
1. State government monitors the performance of waste processing and disposal facilities of the municipality once in 6 months.	6 (11 *per cent*)	29	21	56
*also includes those municipalities which did not get authorisations ** includes those municipalities which do not have composting/ processing facilities *** includes those municipalities which do not have incinerators				

It could be seen that there was hardly any monitoring by PCBs, state governments and municipalities, as no checks were being exercised to see that waste processing and disposal facilities meet the compliance criteria outlined in the municipal solid waste rules. In the absence of effective monitoring, contamination of the environment and hazards to public health cannot be ruled out.

(iii) With respect to independent evaluation of municipal solid waste rules, out of 20 states sampled, it was noticed that:

- Independent evaluation of the implementation of the Municipal Solid Waste (Management and Handling) Rules, 2000 was not conducted by 70 *per cent* of sampled states.
- It could not be verified in audit whether 30 *per cent* of the sampled states had conducted independent evaluation of the implementation of the Municipal Solid Waste (Management and Handling) Rules, 2000. List of states is attached in **Annexure 2.**

(iv) Analysis of leachate and ground water samples from landfill sites in some states revealed the following:

- In ***Delhi***, analysis report of Bhalaswa landfill showed that TDS[19] of ground water was 800 *per cent* more than the desirable limit and hardness content of the ground water was 633 *per cent* in excess of the permissible limit. Analysis of leachate from Bhalaswa landfill site revealed that TDS was 2000 *per cent* in excess of the permissible limit and the hardness content was 533 *per cent* in excess. The presence of high chlorides 4100mg/l and 10995mg/l against the desirable limit of 250mg/l also indicates the critical condition of Bhalaswa landfill site. TDS at Okhla landfill site was also 244 *per cent* in excess of the desirable limit. This shows that the ground water of landfill sites has been critically contaminated with leachate generated from the landfill site. Ambient air quality monitoring work for the year 2005 has been conducted which indicates critical levels of air pollution.
- In ***Punjab***, samples of ground water from hand pumps at four places had been collected from the Municipal solid waste open dumpsite near Bhagatanwala gate, Amritsar on 31 October 2007, in the presence of the nominee of the municipality of Amritsar and Punjab Pollution Control Board. These samples were sent to the Environmental Laboratory of the SPCB at Patiala for analysis. The State Pollution Control Board, Amritsar, intimated that none of the samples collected from the dumpsite at Bhagtanwala, Amritsar, met the acceptable limit for drinking water and were thus, not fit for drinking purposes.

[19] Total Dissolved Solids.

- In ***Tamil Nadu***, two water samples collected from the dumpsite at Pallikaranai swamp area revealed that dissolved solids, chlorides and cadmium were far above the prescribed desirable limits.

Evidently, monitoring of municipal solid waste rules was lax and it could not be ensured that disposal of municipal solid waste took place in an environmentally safe manner and so as not to cause public health problems.

(b) Bio-medical waste

(i) According to Section 11 of Bio-Medical waste (Management and Handling) Rules, every authorised person[20] shall maintain records related to the generation, collection, reception, storage, transportation, treatment, disposal and/or any form of handling of bio-medical waste in accordance with these rules and any guidelines issued. Further all records of hospitals/operators shall be subject to inspection and verification by the prescribed authority at any time. Of the 15 states sampled for bio-medical waste, it was noticed that:

- State government of only 33 *per cent* of sampled states ensured that records of operators were inspected.
- No such inspection was carried out by the state governments of 33 *per cent* of sampled states.
- It could not be verified in audit whether 34 *per cent* of sampled state governments ensured that the Authority for granting authorisation inspected records of the operator. List of states is attached in **Annexure 2.**

(ii) Prescribed authorities (PCBs) were given power to inspect records and cancel authorisations for violation of the bio-medical waste Rules. With respect to cancellation of authorisations by PCBs for improper management of bio-medical waste, it was noticed in the 15 sampled states that:

- In 27 *per cent* of the sampled states, authorisations to hospitals were cancelled by PCBs.
- No authorisations were cancelled by PCB in 60 *per cent* of the sampled states.
- It was not verifiable whether authorisations were cancelled in the rest of the 13 *per cent* of the sampled states. List of states is attached in **Annexure 2.**

(iii) With regard to state governments/PCBs checking the compliance to bio-medical waste rules by hospitals, it was noticed in audit that out of the 15 states sampled,

- Only the state governments/PCBs in 47 *per cent* of sampled states had checked whether the hospitals/operators were complying with the provisions of bio-medical waste rules, specially the compliance criteria.

[20] A person who had received authorisation to operate a bio-medical waste treatment facility; can be a hospital or an operator.

- No such checking was done by state government/PCBs in 20 *per cent* of the sampled states.
- It could not be ensured whether checking for compliance by state government/PCB took place in 33 *per cent* of the sampled states. List of states is attached in **Annexure 2.**

(iv) With respect to independent evaluation, out of the 15 sampled states it was observed that:

- 80 *per cent* of the sampled states did not conduct an independent evaluation of the Bio-Medical Waste (Management and Handling) Rules, 1998.
- It could not be ensured whether the independent evaluation took place in 20 *per cent* of the sampled states. List of states is attached in **Annexure 2.**

(v) Audit checked the records of 180 hospitals in 15 states. Only 13 *per cent* of sampled hospitals were being monitored as brought out in the table below:

Monitoring of bio-medical waste rules in the hospitals	Done	Not done	Not verifiable	Sampled hospitals
Assam	0	0	12	12
Delhi	0	0	12	12
Gujarat	0	0	12	12
Maharashtra	0	12	0	12
Orissa	8	2	2	12
Punjab	0	12	0	12
Rajasthan	0	12	0	12
West Bengal	4	8	0	12
Tripura	0	0	12	12
J&K	0	0	12	12
Haryana	0	0	12	12
Madhya Pradesh	0	12	0	12
Andhra Pradesh	9	3	0	12
Tamil Nadu	0	12	0	12
Uttar Pradesh	2	10	0	12
Total	**23**	**83**	**74**	**180**
Per cent	**13**	**46**	**41**	

Thus, monitoring of bio-medical waste rules was lax and the state governments/PCBs could not seek an assurance whether bio-medical waste disposal was taking place in line with the rules.

(c) Plastic waste

(i) According to Article 3 of Recycled Plastics Manufacture and Usage Rules, the prescribed authority for enforcement of the provisions of rules related to the use, collection, segregation, transportation and disposal shall be the District Collector/Deputy Commissioner (DCs) of the concerned district. It was observed in 20 states sampled that:

- Only in 35 *per cent* of the sampled states, DCs of the district were monitoring the implementation of these rules.
- No monitoring was being done by DCs in 15 *per cent* of the sampled states.

- It could not be verified whether monitoring was done by DCs in 50 *per cent* of the sampled states. List of states is attached in **Annexure 2.**

(ii) Effectiveness of monitoring was also studied by audit in 60 districts around the country. It was noticed in audit that:

- Monitoring by DCs of the districts or the state government/PCB as to whether vendors were following the provisions of this rule took place only in two districts of ***Gujarat*** and ***Uttar Pradesh***.
- No monitoring took place in two districts of ***Punjab, West Bengal,*** three districts of ***Karnataka*** and one district in ***Uttarakhand***.
- In ***Assam, Delhi, Maharashtra, Orissa, Chhattisgarh, Himachal Pradesh, Jharkhand, Kerala, Andhra Pradesh*** and ***Bihar*** it was not verifiable whether any monitoring was done by DCs of the districts or the state government/PCB as to whether vendors were following the provisions of this rule.

Thus, monitoring of the plastic rules was also lax.

MoEF (August 2008) did not offer any comments on the poor monitoring of municipal solid waste rules as pointed out by Audit. However, MoEF explained that the presence of high TDS in the ground water around the landfill does not conclusively indicate that the source for the same is landfill and that unless baseline data at the time of setting up of landfill was available and thereafter a change towards higher trend was observed, then only the possibility of leachates due to landfill could be thought of. MoEF further stated that to find the reason for the higher TDS needs a wider review and analysis. With regard to bio-medical waste, MoEF stated that CPCB had monitored inspection of few hospitals and as a follow up, either show-cause notices were issued to the defaulters or the concerned prescribed authority had been asked to take necessary follow-up action. With respect to plastic waste, MoEF stated that CPCB was coordinating with PCBs in implementation of plastic waste rules.

The reply has to be viewed in light of the fact that monitoring of the municipal solid waste, bio-medical waste and plastic waste rules was weak, as commented upon by Audit. Both at the central level and at the state level, monitoring was not taking place as envisaged in the rules. Poor monitoring would lead to violations of the waste rules, which would cause environmental damage as well as affect health of citizens. As for the analysis results which showed high TDS levels, the fact remains that such monitoring of ground water needed to be undertaken by CPCB itself to ensure that there was no deterioration of water quality. No evidence was found to show that CPCB had undertaken this exercise, and the deteriorating water quality validates audit observations on weakness of CPCB and MoEF in monitoring environmental degradation.

Recommendations

- *At the central level, MoH&FW/MoEF/CPCB and at the level of the states, the PCBs should draw up comprehensive schedules for sustained monitoring of*

municipalities and hospitals.

- *Regular monitoring of waste disposal facilities like compost plants, incinerators etc., should be done by CPCB/PCBs.*

Conclusion

Monitoring of the municipal solid waste, bio-medical waste and plastic waste rules was lax and ineffective. In the absence of effective monitoring, violation of rules would escape detection. Violation of rules would also result in contamination of the environment, besides posing risks to human health.

CHAPTER 8

Adequacy of funding and infrastructure

Objective 7: Whether funding and manpower were adequate for the implementation of rules on waste management and whether the funds/infrastructure was used economically, efficiently and effectively.

In order to effectively implement laws/rules, implementing agencies need to be provided with human and financial resources to undertake the responsibilities allocated to them. Audit observed the following:

8.1 Funding

(a) Municipal solid waste

(i) The Twelfth Finance Commission (TFC) had recommended grants amounting Rs.5,000 crore for municipalities in the states and stated that at least 50 *per cent* of the grants-in-aid provided to each State for the urban local bodies should be earmarked for the scheme of solid waste management through public-private partnership. Out of the 20 states sampled for municipal solid waste, it was noticed that in 60 *per cent* of the sampled states, municipalities received funds from TFC for the creation of solid waste management infrastructure, whereas, 20 *per cent* of the sampled states did not receive any funds from TFC. Position could not be verified in 20 *per cent of* the sampled states. List of states is attached in **Annexure 2.**

(ii) Only 30 *per cent* of the sampled states had made provisions in the budget for management of municipal solid waste and governments in 35 *per cent* of the sampled states did not make any provisions for waste management in their budgets. Position could not be verified in 35 *per cent* of the sampled states. ***Karnataka*** stated that the state government had spent Rs. one crore on waste management activities during the last five years. List of states is attached in **Annexure 2.** None of the states could indicate the amount spent on waste management activities, citing different reasons like expenditure not made explicit in budget, funds transferred directly to municipalities etc,.

(b) Bio-medical waste

Regarding bio-medical waste, out of the 15 sampled states, it was noticed that only state governments in 27 *per cent* of the sampled states had made allocation in their budget and 60 *per cent* of the sampled states had not made any allocations in their budget. Position could not be verified in 13 *per cent* of the sampled states. List of states is attached in **Annexure 2.** None of the states could arrive at the total amount spent, citing reasons like funds not provided by state governments, no allocations made under this head of account etc,.

Thus, enough provision had not been made by the states for creating infrastructure for the management of solid waste as well as bio-medical waste. It was also difficult to assess how much the states were actually spending on waste management.

(c) Some cases of financial irregularities in the states as noticed by Audit are mentioned below:

- Rs.39.52 crore received by the state government of ***Orissa*** from TFC during 2005-07 were released to 103 urban local bodies for the management of municipal solid waste. Audit scrutiny revealed that Rs.13.61 crore released to three municipalities (Berhampur Municipality, Bhubneshwar Municipal Corporation and Cuttack Municipal Corporation) remained unutilised till the end of December 2007 due to delay in the finalisation of tender for procurement of solid waste management equipment/machinery.
- Urban Local Bodies (ULBs) in ***Kerala*** were earmarked a grant of Rs.149 crore during 2005-10 for solid waste management schemes. Out of this, Rs.59.60 crore was received by the state during 2005-07. The state was required to spend at least Rs.29.80 crore during 2005-07.The guidelines issued by the Ministry of Panchayati Raj required annual certification by the State Finance Commission of the amount spent by the Urban Local Bodies on the scheme of solid waste management. Audit scrutiny revealed that none of the 58 ULBs were aware of the TFC allocation and conditions of utilisation. The Finance Department of the state government claimed that the TFC grants were released to the ULBs along with other eligible grants. But the ULBs reported, on being queried by Audit, that they had not received this grant. Further there was no evidence of the transfer of the TFC grant by the state government to the ULBs as no distinct heads of accounts were provided in the state budget/accounts and no directions by the state government regarding utilisation of these funds by the ULBs was issued by the government. Thus, the TFC grant provided specifically for solid waste management during 2005-07 were not applied for the intended purpose.
- In ***Chhattisgarh***, Directorate of Urban Administration and Development Department, Raipur released Rs.40 lakh to the Raipur Municipal Corporation in 2003 for waste management. Audit scrutiny revealed that Rs.20 lakh was diverted for the construction of drainage in Buddha Talab on the demand of the Raipur Municipal Corporation. It was also noticed that in 2003-04, Rs.2.86 crore was released by the Ministry of Urban Development for the management of municipal solid waste. Out of this, Rs.40 lakh was diverted for the construction of a mini stadium.
- ***Karnataka*** was provided funds for municipal solid waste works by the Eleventh and Twelfth Finance Commission. The total amount of funds provided to urban local bodies (except Brahat Bangalore Mahanagar Palike) during 2002-03 to 2006-07 was Rs.120.04 crore. A review of the ULBs (apart from BBMP) in September 2007 revealed that the ULBs in the state had spent only 44 *per cent* of the funds allotted to them. Delay was attributed by the Department of Municipal Affairs to various reasons like delay in developmental work at landfill site due to public protest, substantial time spent for preparation of estimates, delay in purchase procedures etc,. Audit observed that the grant of Rs.2 crore allotted to BBMP by TFC still remained unutilised.

- For works relating to solid waste management, ***Karnataka*** government released only Rs.57.44 crore to ULBs in 2002-04 out of Rs.74.88 crore, received under Eleventh Finance Commission. The balance funds worth Rs.17.44 crore were diverted to other purposes such as street lighting, road works etc,. No allocation was made in the budget for the subsequent years for the balance amount. The Department of Municipal Affairs stated that the diversion took place as there was slow progress of works under solid waste management. Thus, funds were not utilised for the purpose of solid waste management as intended by the Eleventh Finance Commission.
- In ***Tamil Nadu***, the state government released a sum of Rs.18 crore to the Chennai Corporation during 2003-05 for upgrading the two dumpsites in the Chennai Corporation area. However, instead of utilising the money, the corporation kept the money in fixed deposit right from the date of receipt of the funds. The Commissioner, Chennai Corporation was unable to furnish utilisation certificates for the work done till date for upgradation of the dumpsites.

Recommendations

- *All funds, whether provided to municipalities for municipal solid waste management or to hospitals for bio-medical waste management, should be routed through the state budget to ensure clear accounting and estimation of funds being spent on waste management activities.*
- *States should make provisions in the budget for waste management activities relating to municipal solid waste and bio-medical waste and ensure that municipalities and hospitals have adequate funds for waste management.*

8.2 Manpower

Adequacy as well as quality of staff is paramount in implementation and monitoring of projects/programmes. Audit attempted to arrive at a conclusion whether waste management activities and monitoring were hampered due to shortage of technically qualified people. Audit observed that:

- Only state governments of ***Karnataka*** and ***Meghalaya (for Shillong)*** assessed the requirement of staff for implementation and monitoring of municipal solid waste and plastic waste rules, whereas, no assessment was made by 40 *per cent* of the sampled states. The position could not be verified in remaining 50 *per cent* of the sampled 20 states. List of states is attached in **Annexure 2.**
- 55 *per cent* of the sampled states reported shortage of manpower in the municipalities hampering municipal solid waste management. It could not be verified whether there was a shortage of manpower in 45 *per cent* of the sampled 20 states. List of states is attached in **Annexure 2.**
- As regards assessment of requirement of technically qualified people to monitor the implementation of the waste rules, it was noticed that PCBs in only 21 *per cent* of the sampled states (out of 24) had done this assessment, whereas, PCBs in 42 *per cent* of the sampled states had not done this assessment. Position could not be

verified in 37 *per cent* of the sampled states. While PCBs in 54 *per cent* of the sample had shortages hampering their work, position could not be verified in 46 *per cent* of the sample states. List of states is attached in **Annexure 2.**

States and PCBs did not assess requirement of staff for efficient and effective implementation and monitoring of waste rules. There was shortage of staff/technically qualified manpower in municipalities/PCBs that was hampering the implementation and monitoring of the waste rules.

MoEF stated in August 2008 that all the municipal bodies were being funded by the Ministry of Urban Development for management of municipal solid waste under the Jawahar Lal National Urban Renewal Mission. MoEF also acknowledged the fact that scientific and technical staff as well as the supporting staff for management of wastes needs to be enhanced.

Recommendation

- *State governments and PCBs may assess their manpower requirements and accordingly, raise a staff dedicated to the implementation and monitoring of waste management activities.*

Conclusion

Adequate provision had not been made by the states for creating infrastructure for management of solid waste as well as bio-medical waste. It was difficult to assess how much the states were actually spending on waste management. In addition, there was shortage of staff in municipalities/PCBs, which was hampering the implementation and monitoring of the waste rules.

(RAJ G. VISWANATHAN)
Principal Director of Audit,
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New Delhi
Dated:

Countersigned

New Delhi
Dated:

(VINOD RAI)
Comptroller and Auditor General of India

Annexure 1 (Reference: Chapter 1, Paragraph 1.10.1)

1. Policy issues

Sample for state government/PCBs for policy issues on waste (a total of 24 states)
1. Assam
2. Delhi
3. Gujarat
4. Maharashtra
5. Orissa
6. Punjab
7. West Bengal
8. Andhra Pradesh
9. Rajasthan
10. Tamil Nadu
11. Uttar Pradesh
12. Chhattisgarh
13. Himachal Pradesh
14. Jharkhand
15. Karnataka
16. Kerala
17. Meghalaya
18. Bihar
19. Sikkim
20. Uttarkhand
21. Tripura
22. Jammu & Kashmir
23. Haryana
24. Madhya Pradesh

2. Municipal solid waste and Plastic waste

Sample for Municipal Solid Waste: 56 municipalities spread over 20 states **Plastic waste rules**: 56 districts spread over 20 states	
Name of state	**Municipalities/districts sampled**
1 Jharkhand	Ranchi, Hazaribagh, Dhanbad
2 Kerala	Thiruvananthapuram, Kozhikhode, Alappuzha
3 Uttar Pradesh	Lucknow, Agra, Faizabad
4 West Bengal	Kolkata, Burdawan, Darjeeling
5 Himachal Pradesh	Shimla, Solan, Mandi
6 Meghalaya	Shillong
7 Gujarat	Surat, Rajkot, Gandhinagar
8 Assam	Guwahati, Dibrugarh, Silchar
9 Delhi	Municipal Corporation of Delhi
10 Punjab	Amritsar, Patiala, Ludhiana
11 Maharashtra	Mumbai, Pune, Aurangabad

Sample for Municipal Solid Waste: 56 municipalities spread over 20 states **Plastic waste rules**: 56 districts spread over 20 states	
Name of state	**Municipalities/districts sampled**
12 Bihar	Patna, Muzaffapur, Munger
13 Rajasthan	Jaipur, Jodhpur, Ajmer
14 Orissa	Bhubneshwar, Cuttack, Berhampur
15 Uttarakhand	Dehradun, Nainital, Haridwar
16 Tamil Nadu	Chennai, Vellore, Coimbatore
17 Sikkim	No municipality, hence taken as one.
18 Karnataka	Bangalore, Belgaum, Udupi
19 Chhattisgarh	Bhilai, Raipur, Bhatapara, Rajnandgaon, Durg
20 Andhra Pradesh	Hyderabad, Visakhapatnam, Nellore

3. Bio-medical waste

Sample for bio-medical waste rules: 180 hospitals in 15 states (12 hospitals in each of the 15 states)	
Name of state	**Hospitals sampled**
1. Tripura	1) Ranirbazar PHC, West Tripura 2) Mohanpur Rural Hospital, West Tripura 3) Kalyanpur Rural Hospital, West Tripura 4) Manubankul PHC, South Tripura 5) Kalacherra PHC, South Tripura 6) Maharani PHC, South Tripura 7) RGM District Hospital, North Tripura 8) Pacharthal PHC, North Tripura 9) Kadamtala PHC, North Tripura 10) Manikpur PHC, Dhalai 11) Salema PHC, Dhalai 12) Nakashipara PHC, Dhalai
2. Jammu& Kashmir	1) Lalla Deb Hospital Srinagar 2) SMHS Hospital Srinagar 3) Bone and Joint Hospital, Srinagar 4) GMC Hospital, Jammu 5) SMGS, Jammu 6) Medical Hospital, Gandhinagar, Jammu 7) District Hospital, Udhampur 8) Chopra Nursing Home, Udhampur 9) Mother Care Clinic, Udhampur 10) District Hospital, Kathua 11) Astha Charitable Hospital, Kathua 12) Gupta Nursing Home, Kathua

Sample for bio-medical waste rules: 180 hospitals in 15 states (12 hospitals in each of the 15 states)	
Name of state	**Hospitals sampled**
3. West Bengal	1) S.S.K.M. Medical College and Hospital, Kolkata 2) N.R.S.Medical College and Hospital, Kolkata 3) Medical College and Hospital, Kolkata 4) Bardhaman Medical College and Hospital, Bardhaman 5) Durgapur Sub-Divisional Hospital, Durgapur 6) Asansol Sub-Divisional Hospital, Asansol 7) District Hospital, Darjeeling 8) District Hospital, Siliguri 9) North Bengal Medical Collage and Hospital, Sushrut Nagar, Siliguri 10) Murshidabad District Hospital, Baharampur, Murshidabad 11) Baharampur General Hospital, Murshidabad 12) Sub-Divisional Hospital Lalbagh, Murshidabad
4. Andhra Pradesh	1) Gandhi Hospital, Hyderabad 2) ESI Hospital, Erragadda, Hyderabad 3) Global Hospitals Private Limited, Hyderabad 4) King George Hospital, Visakhapatnam 5) Seven Hills Hospital, Visakhapatnam 6) ESI Hospital, Visakhapatnam 7) Government General Hospital, Vijayawada 8) Usha Cardiac Centre Ltd., Vijayawada 9) ESI Hospital, Vijayawada 10) DSR Government District Headquarters Hospital, Nellore 11) Govt. WFTB & CD Hospital, Nellore 12) Bollineni Super Specialty Hospital, Nellore
5. Uttar Pradesh	1) Preeti Hospital, Allahabad 2) Jeewan Jyoti Hospital, Allahabad 3) Swarooprani Hospital, Allahabad 4) Jeevan Jyoti Hospital, Siddharth Nagar 5) CHC Hospital, Siddharth Nagar 6) District Joint Hospital, Siddharth Nagar 7) District Hospital (Male), Barabanki 8) District Hospital (Female), Barabanki 9) Ahuja Nursing Home, Barabanki 10) Rural Institute of Medical Sciences and Research, Saifai, Etawah 11) Chandrakiran Hospital, Etawah 12) Saryu Devi Nursing Home, Etawah
6. Madhya Pradesh	1) Civil Hospital Bairagarh, Bhopal 2) Hamediya Hospital, Bhopal 3) Sultaniya Janana Hospital, Bhopal 4) Choithram Hospital, Indore 5) ESI General Hospital, Indore 6) M.Y. Hospital, Indore

Sample for bio-medical waste rules: 180 hospitals in 15 states (12 hospitals in each of the 15 states)	
Name of state	**Hospitals sampled**
	7) Jabalpur Hospital and Research Centre, Jabalpur 8) N.S.C.B. Medical College Hospital, Jabalpur 9) Seth Govind Das (Victoria) Hospital, Jabalpur 10) District Hospital (with a link unit of Civil Hospital Jaora), Ratlam 11) Ratlam Christian Hospital, Ratlam 12) Western Railway Divisional Hospital, Ratlam
7. Assam	1) Guwahati Medical College and Hospital, Kamrup district 2) Mohendra Mohan Choudhury Hospital, Guwahati, 3) Rangia Community Health Centre, Kamrup district 4) B.P. Civil Hospital, Nagaon district 5) Hojai CHC, Nagaon district 6) Kampur CHC, Nagaon district 7) Silchar Medical College and Hospital, Cachar District 8) S.M. Dev Civil Hospital, Silchar 9) Kalain CHC, Cachar District 10) Assam Medical College and Hospital, Dibrugarh 11) Rajgarh, CHC, Dibrugarh District 12) Naharkatia CHC, Dibrugarh District
8. Gujarat	1) Civil Hospital, Ahmedabad 2) Gujarat Cancer and Research Institute, Ahmedabad 3) Sterling Hospital, Ahmedabad 4) Pandit Din Dayal Upadhyay (Civil) Hospital, Rajkot 5) B.T. Savani Kidney Hospital, Rajkot 6) Dhakaan Hospital, Rajkot 7) Civil Hospital, Godhra 8) Jahnavi Orthopedic Hospital, Halol 9) Rachna Medical Nursing Home, Halol 10) New Civil Hospital, Surat 11) BDM Mahavir Heart Institute, Surat 12) Metas Adventist Hospital, Surat
9. Maharashtra	1) Ghati, Aurangabad 2) MGM, Aurangabad 3) K.N.Bajaj, Aurangabad 4) D.Y. Patil, Kolhapur 5) CPR, Kolhapur 6) Adar, Kolhapur 7) IGMC, Nagpur 8) GMC, Nagpur 9) Super Specialty, Nagpur 10) KEM, Pune 11) YCMC, Pune 12) Sasoon, Pune

Sample for bio-medical waste rules: 180 hospitals in 15 states (12 hospitals in each of the 15 states)	
Name of state	**Hospitals sampled**
10. Orissa	1) Capital Hospital, Bhubaneswar 2) Neelachal Hospital, Bhubaneswar 3) Krishna Nursing Home, Bhubaneswar 4) DHH, Dhenkanal 5) Kalyani Poly Clinic, Dhenkanal 6) Sanjeevani Nursing Home, Dhenkanal 7) DHH, Jagatsinghpur 8) Shakti Nursing Home, Jagatsinghpur 9) Paradeep Port Trust Hospital, Jagatsinghpur 10) DHH, Sambalpur 11) Samleshwari Nursing Home, Burla 12) Hirakud Hospital, Sambalpur
11. Punjab	1) Civil Hospital, Amritsar 2) Civil Hospital, Jandiala at Mannawala 3) Civil Hospital, Ajnala 4) Civil Hospital, Bathinda 5) Civil Hospital (Women & Children), Bathinda 6) Civil Hospital, Rampura Phul 7) Civil Hospital, Patiala 8) Civil Hospital, Rajpura 9) Civil Hospital, Nabha 10) Civil Hospital, Ludhiana 11) Civil Hospital, Samrala 12) Civil Hospital, Khanna
12. Rajasthan	1) Government Mahila Hospital, Jaipur 2) Santokhba Durlabhji Memorial Hospital, Jaipur 3) SDM Government Satellite Hospital, Bikaner 4) PD Mahila Hospital, Udaipur 5) MB Hospital, Udaipur 6) MN Hospital, Bikaner 7) Tara Bai Desai Eye Hospital, Jodhpur 8) MG Hospital, Jodhpur 9) Chain Raj Sawant Raj Lodha Hospital, Udaipur 10) Ummed Hospital, Jodhpur 11) PBM Hospital, Bikaner 12) SMS Hospital, Jaipur
13. Haryana	1) Civil Veterinary Hospital, Sonepat 2) Civil Veterinary Hospital, Gohana 3) Shri Baba Mast Nath Charitable Eye Hospital, Rohtak 4) Pt B.D. Sharma P.G. Institute of Medical Sciences, Rohtak 5) General Hospital, Hissar 6) BK Hospital, Faridabad 7) ESI Hospital, Faridabad

Sample for bio-medical waste rules: 180 hospitals in 15 states (12 hospitals in each of the 15 states)	
Name of state	**Hospitals sampled**
	8) Comprehensive Rural Health Services Project, AIIMS, Civil Hospital, Ballabgarh 9) Civil Hospital, Sonepat 10) General Hospital, Rohtak 11) NC Jindal Institute of Medical Care and Research, Hisar 12) TB Hospital, Hisar
14. Tamil Nadu	1) Coimbatore Medical College Hospital 2) Government Headquarters Hospital, Tiruppur 3) Government ESI Hospital, Coimbatore 4) Government Hospital Gopichettipalayam 5) Government Hospital, Bhavani 6) Government Headquarters Hospital, Erode 7) ESI Hospital, Vellore 8) Government Hospital Arakkonam 9) Government Medical College Hospital, Vellore 10) Government Hospital, Tindivanam 11) Government Headquarters Hospital, Villupuram 12) Government Hospital, Kallakurichi
15. Delhi	1) Dr Baba Saheb Ambedkar Hospital, Rohini, Delhi 2) Satyavadi Raja Harishchandra Hospital, Narela, Delhi 3) Bhagwan Mahavir Hospital, Pitampura, Delhi 4) Deendayal Upadhyaya Hospital, Harinagar, Delhi 5) Guru Govind Singh Government Hospital, Raghuveer Nagar, Delhi 6) Acharya Bikshu Government Hospital, Moti Nagar, Delhi 7) GB Pant Hospital, Jawahar Lal Nehru Marg, Delhi 8) MAMC Dental College, Delhi 9) Dr NC Joshi Memorial Hospital, Karol Bagh, Delhi 10) Guru Teg Bahadur Hospital, Dilshad Garden, Delhi 11) Institute of Human Behaviour & Allied Sciences, Delhi 12) Rajiv Gandhi Super Specialty Hospital, Tahirpur, Delhi

Annexure 2

Activity	Done	Not done	Not verifiable
Chapter 2			
Para 2.1.2 (i)			
Availability of data about the amounts of waste generated according to source.	Done partially in Madhya Pradesh, West Bengal, Uttar Pradesh, Delhi, Gujarat, Rajasthan, Andhra Pradesh, Meghalaya, Haryana and Karnataka.	Tamil Nadu, Assam, Chhattisgarh, Jharkhand, Sikkim, Uttarakhand, Orissa, J&K, Maharashtra and Himachal Pradesh.	Punjab, Bihar, Kerala and Tripura.
Para 2.2.2			
Whether projections made about growth in waste.	Done partially in Delhi, Karnataka, Gujarat, Rajasthan (Municipal Solid Waste), Meghalaya (Municipal Solid Waste) and West Bengal.	Assam, J&K, Sikkim, Orissa, Himachal Pradesh, Andhra Pradesh, Madhya Pradesh, Bihar and Jharkhand.	Chhattisgarh, Tamil Nadu, Uttar Pradesh, Uttarakhand, Maharashtra, Punjab, Kerala, Tripura and Haryana.
Para 2.3.2 (i)			
Assessment of current capacity to handle municipal solid waste, bio-medical waste and hazardous waste.	Karnataka, Punjab, Gujarat and West Bengal (municipal solid waste, bio-medical waste and hazardous waste), Delhi (municipal solid waste), Meghalaya (Municipal Solid Waste for Shillong and Tura towns), Madhya Pradesh (bio-medical waste and hazardous waste).	Assam, Rajasthan, Sikkim, J&K, Himachal Pradesh, Maharashtra, Andhra Pradesh, Uttarakhand, Bihar and Jharkhand.	Tripura, Orissa, Chhattisgarh, Haryana, Tamil Nadu, Uttar Pradesh and Kerala.

Activity	Done	Not done	Not verifiable
Para 2.3.2 (ii)			
Assessment of whether new and additional capacity to handle municipal solid waste, bio-medical waste and hazardous waste and plastic waste required.	Karnataka, Delhi, Rajasthan, Tamil Nadu (municipal solid waste), Meghalaya (Municipal Solid Waste for Shillong and Tura towns), Madhya Pradesh (bio-medical waste and hazardous waste), Punjab (bio-medical waste) and Gujarat (municipal solid waste and bio-medical waste).	Assam, West Bengal, J&K, Himachal Pradesh, Sikkim, Uttarakhand, Maharashtra, Bihar and Jharkhand.	Orissa, Tripura, Haryana, Uttar Pradesh, Andhra Pradesh, Chhattisgarh and Kerala.
Para 2.4.2(i)			
Identification of all the risks to environment posed by waste like contamination of groundwater and surface water, contamination of ambient air and contamination of soil, by state government/PCBs.	Tamil Nadu (done except in respect of contamination of soil), Andhra Pradesh (done except in respect of contamination of ambient air), Himachal Pradesh, Uttar Pradesh and Bihar (risks of contamination of ground water and surface water by waste), West Bengal (risks of contamination of soil by waste), Karnataka (assessment of greenhouse gases) , Assam ,Orissa (assessed the risks of contamination of ground water by waste), Madhya	State/PCBs in J&K, Sikkim, Meghalaya, Kerala and Uttarakhand.	Delhi, Maharashtra, Punjab, Chhattisgarh, Jharkhand, Tripura and Haryana.

Activity	Done	Not done	Not verifiable
	Pradesh(assessed the risks of contamination of surface water by waste), Rajasthan and Gujarat.		
Para 2.5.2 (i)			
Assessment of risks to public health posed by municipal solid waste, bio-medical waste, hazardous waste and other kinds of waste.	Done partially in Karnataka, West Bengal, Punjab Himachal Pradesh, Bihar and Delhi.	Meghalaya, Orissa, Sikkim, Uttarakhand, Andhra Pradesh, Rajasthan, Madhya Pradesh and Tripura.	Assam, Gujarat, Maharashtra, Chhattisgarh, Jharkhand, Haryana, Kerala, Uttar Pradesh, Tamil Nadu and J&K.
Para 2.5.2 (ii)			
Identification of risks to waste handlers.	Himachal Pradesh PCB (identified the risks to waste handlers that can arise due to handling of municipal solid waste, bio-medical waste and hazardous waste), Karnataka (made provisions for providing safety gear to municipal solid waste handlers).	Delhi, West Bengal, Jharkhand, Tripura, Tamil Nadu, Uttar Pradesh, Uttarakhand, Andhra Pradesh, Madhya Pradesh, Rajasthan, Meghalaya, Bihar and J&K.	Assam, Gujarat, Orissa, Haryana, Sikkim, Kerala, Punjab, Chhattisgarh and Maharashtra.
Chapter 3			
Paragraph 3.1.2			
Whether accorded priority to waste minimisation and waste reduction by adopting the “3 Rs”	West Bengal (efforts made for reduction of the use of plastic bags and reduction of some categories of industrial waste), Rajasthan (state government framed waste management policy for utilisation of municipal solid waste and bio-	Delhi, Orissa, Himachal Pradesh, Jharkhand, Sikkim, Uttarakhand, , Tripura, Karnataka, and J&K.	Punjab, Assam, Chhattisgarh, Kerala, Bihar, Andhra Pradesh, Tamil Nadu, Uttar Pradesh, Madhya Pradesh, Meghalaya and Haryana.

Activity	Done	Not done	Not verifiable
	medical waste in generation of power, compost and other products in 2001 and had also defined priority in the guidelines), Maharashtra and Gujarat (accorded priority to waste minimisation/reduction of municipal solid waste and industrial waste respectively).		
Para 3.2.2 (i)			
Whether introduced any strategy for the reduction, reuse and recycling of waste.	Rajasthan (encouraged industrial units for the adoption of clean technology norms) and Haryana (established technical standards to limit the presence of dangerous substances in products to reduce the quantum of waste being generated).	Orissa, Punjab, West Bengal, Jharkhand, Kerala, Sikkim, Tripura, Madhya Pradesh, Uttar Pradesh, Andhra Pradesh, Meghalaya, Himachal Pradesh, Assam, Karnataka and Uttarakhand.	Gujarat, Maharashtra, Chhattisgarh, Bihar, Delhi, Tamil Nadu and J&K.
Para 3.2.2 (ii)			
Whether charters/agreements/pacts signed by industries with the state governments/PCBs undertaking to introduce greener technologies which would lead to less waste.	PCB of West Bengal (signed charters/agreements/pacts with industries for the introduction of greener technologies which would lead to less waste, (CREPs) signed with 17 categories of industries),	Himachal Pradesh, Karnataka, Kerala, Sikkim, Maharashtra, Meghalaya, Tripura and J&K.	Assam, Delhi, Andhra Pradesh, Tamil Nadu, Gujarat, Punjab, Chhattisgarh, Jharkhand, Rajasthan, Uttar Pradesh, Bihar and Haryana.

Activity	Done	Not done	Not verifiable
	Uttarakhand (CREPs) applicable to 17 categories of industries), Orissa (CREPs signed) and Madhya Pradesh (clean technology norms).		
Paragraph 3.3.2 (i)			
Whether targets/timelines laid down for reduction of municipal solid waste, bio-medical waste, plastic waste, hazardous waste.	None	Delhi, Orissa, Punjab, Rajasthan, West Bengal, Himachal Pradesh, Jharkhand, Karnataka, Sikkim, Uttarakhand, J&K, Uttar Pradesh, Meghalaya, Andhra Pradesh, Gujarat, Haryana and Madhya Pradesh, Tamil Nadu and Tripura (targets were not set).	Kerala, Bihar, Assam, Maharashtra and Chhattisgarh.
Paragraph 3.3.2 (ii)			
Whether specific recycling techniques for different kinds of waste set.	None	Orissa, Punjab, Kerala, Sikkim, Uttarakhand, West Bengal, Tamil Nadu, Meghalaya, Uttar Pradesh, Tripura, Jharkhand, Himachal Pradesh and Madhya Pradesh.	Assam, Gujarat, Maharashtra, Rajasthan, Chhattisgarh, Karnataka, Bihar, Andhra Pradesh, Delhi, J&K and Haryana.
Paragraph 3.5.2(i)			
Whether recognition given to ragpickers.	Delhi, Maharashta, Andhra Pradesh and Punjab.	Orissa, Rajasthan, West Bengal, Himachal Pradesh, Jharkhand, Tripura, J&K, Kerala, Uttarakhand, Tamil	Sikkim, Uttar Pradesh, Assam, Gujarat, Chhattisgarh, Bihar and Haryana.

Activity	Done	Not done	Not verifiable
		Nadu, Meghalaya, Karnataka and Madhya Pradesh.	
Paragraph 3.5.2(ii)			
Whether recognition of economic value of ragpickers in recycling and waste.	None	Orissa, Rajasthan, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Uttarakhand, West Bengal, Tripura, J&K, Andhra Pradesh, Tamil Nadu, Meghalaya, Uttar Pradesh and Madhya Pradesh.	Assam, Gujarat, Maharashtra, Punjab, Chhattisgarh, Bihar, Andhra Pradesh, Delhi, and Haryana.
Paragraph 3.6.2			
Whether alteration of government procurement systems.	None	Karnataka, Kerala, Sikkim, Uttarakhand, Tripura, Madhya Pradesh, Punjab, West Bengal, Andhra Pradesh, Meghalaya and Himachal Pradesh.	J&K, Assam, Maharashtra, Orissa, Rajasthan, Chhattisgarh, Jharkhand, Bihar, Tamil Nadu, Uttar Pradesh, Delhi, Haryana and Gujarat.
Paragraph 3.7			
Whether efforts made by the state governments for the promotion of reduction, reuse and recycling of waste through the print or the audiovisual media and education of citizens about the threat to environment and health posed by waste and how reuse, recycling can promote a cleaner and healthier environment.	Karnataka, Delhi, Rajasthan, Andhra Pradesh, Kerala, Gujarat, Himachal Pradesh (state governments promoted reduction, reuse and recycling of waste through the print or the audiovisual media and to educate citizens about the threat to environment and	Orissa and Tripura.	Assam, Maharashtra, Punjab, Chhattisgarh, Jharkhand, Bihar, Sikkim, Tamil Nadu, Uttar Pradesh, Meghalaya, Uttarakhand, Madhya Pradesh, J&K and Haryana.

Activity	Done	Not done	Not verifiable
	health posed by waste and how reuse, recycling can promote a cleaner and healthier environment) and West Bengal (publicity only on the Environment Day).		
Chapter 4			
Paragraph 4.2.2			
Whether action taken by the PCBs/state governments for illegal dumping of waste and the polluter being held responsible for cleaning up the polluted site.	West Bengal, Kerala, Karnataka, Himachal Pradesh, Rajasthan and Madhya Pradesh.	Orissa, Punjab, Jharkhand, Tripura, Andhra Pradesh, Uttarakhand, Gujarat, Assam, Bihar, Delhi and J&K.	Meghalaya, Maharashtra, Chhattisgarh, Uttar Pradesh, Sikkim, Haryana and Tamil Nadu.
Chapter 5			
Paragraph 5.1.2 (a)			
Whether assignment of responsibility for municipal solid waste management done.	Assam (specific departments), Karnataka (Directorate of Municipal Administration and District Urban Development Cells in the districts), West Bengal (Department of Environment stated that PCB was allocated responsibility for management of municipal solid waste, whereas PCB stated it was the responsibility of the Department of Municipal Affairs and Urban	Himachal Pradesh, Punjab, Jharkhand, Uttarakhand and Meghalaya.	Chhattisgarh, Kerala, Tamil Nadu, Orissa, Tripura and Haryana.

Activity	Done	Not done	Not verifiable
	Development Department), Sikkim (UD&HD), Delhi (Department of Environment Management Services), Maharashtra (Solid Waste Management Cell), J&K, Rajasthan and Uttar Pradesh (urban local bodies) Andhra Pradesh, Bihar (municipalities), Gujarat (Gujarat Urban Development Corporation Limited) and Madhya Pradesh(PCB and district administration).		
Paragraph 5.1.2 (b)			
Whether responsibility for the management of bio-medical waste assigned to any body/agency.	Assam, Delhi, Gujarat, Punjab, Uttar Pradesh, West Bengal, Haryana, Andhra Pradesh, Madhya Pradesh and Karnataka.	Uttarakhand, Himachal Pradesh, Bihar, Meghalaya and J&K.	Maharashtra, Orissa, Rajasthan, Chhattisgarh, Jharkhand, Kerala, Sikkim, Tamil Nadu and Tripura.
Paragraph 5.1.2 (c)			
Whether responsibility for the management of plastic waste assigned to any body/agency.	Sikkim, Assam, Gujarat, Maharashtra, Andhra Pradesh, Delhi, Madhya Pradesh, Rajasthan and Haryana.	West Bengal, Bihar, Himachal Pradesh, Jharkhand, Orissa, Uttarakhand, Meghalaya, Kerala and J&K.	Uttar Pradesh, Punjab, Chhattisgarh, Karnataka, Tamil Nadu and Tripura.
Paragraph 5.1.2 (d)			
Whether responsibility for the management of hazardous waste assigned to any body/agency.	Karnataka, Andhra Pradesh, Punjab, West Bengal, Gujarat, Madhya	Sikkim, Uttarakhand, Orissa, Tripura, Bihar and Meghalaya.	Himachal Pradesh, Assam, Kerala, Chhattisgarh, Maharashtra, Rajasthan,

Activity	Done	Not done	Not verifiable
	Pradesh and Haryana.		Jharkhand, Tamil Nadu, Uttar Pradesh, Delhi and J&K.
Paragraph 5.2.2 (a)			
Whether Solid Waste Mission set up.	West Bengal (Solid Waste Mission), Kerala (Clean Kerala Mission) and Maharashtra (Solid Waste Management Cell).	Karnataka, Sikkim, Uttarakhand, Assam, Orissa, Punjab, Himachal Pradesh, Tamil Nadu, Gujarat, Uttar Pradesh, Meghalaya and Jharkhand.	Delhi, Rajasthan, Chhattisgarh, Andhra Pradesh and Bihar.
Paragraph 5.2.2 (b)			
Whether an advisory committee was constituted.	West Bengal, Orissa, Maharashtra, Rajasthan, Tripura, Haryana, Andhra Pradesh, Tamil Nadu and Madhya Pradesh.	Gujarat, Assam and J&K.	Delhi, Uttar Pradesh and Punjab.
Paragraph 5.3.2 (a)			
Whether bodies for monitoring of solid waste rules set up.	Karnataka, Sikkim, Assam, Punjab, Rajasthan, Delhi, Madhya Pradesh and West Bengal.	Uttar Pradesh, J&K, Gujarat, Maharashtra and Orissa.	Tripura, Haryana, Andhra Pradesh, Tamil Nadu, Kerala, Bihar, Uttarakhand, Chhattisgarh, Himachal Pradesh, Jharkhand and Meghalaya.
Paragraph 5.3.2 (b)			
Whether bodies for monitoring of bio-medical waste rules set up.	Karnataka, Gujarat, Haryana, Andhra Pradesh, Maharashtra, Orissa, Rajasthan, Uttar Pradesh Punjab, Madhya Pradesh (state PCB) and Delhi (Pollution Control Committee).	Uttarakhand, West Bengal and Meghalaya.	Assam, Chhattisgarh, Himachal Pradesh, Jharkhand, Bihar, Sikkim, Tripura, J&K, Tamil Nadu, and Kerala.

Activity	Done	Not done	Not verifiable
Paragraph 5.3.2 (c)			
Whether bodies for monitoring of implementation of plastic waste set up.	Gujarat, Haryana, Delhi, Punjab, Himachal Pradesh, Karnataka, West Bengal, Madhya Pradesh and Kerala.	Meghalaya, Bihar and Uttarakhand.	Sikkim, Tripura, J&K, Rajasthan, Tamil Nadu, Uttar Pradesh, Andhra Pradesh, Assam, Maharashtra, Orissa, Chhattisgarh and Jharkhand.
Paragraph 5.3.2 (d)			
Whether bodies monitoring the implementation of hazardous waste rules.	Karnataka, Andhra Pradesh, Madhya Pradesh and Haryana.	Meghalaya and Uttarakhand.	Kerala, Bihar, Sikkim, Tripura, J&K, Rajasthan, Tamil Nadu, Uttar Pradesh, Delhi, Assam, Gujarat, Maharashtra, Orissa, Punjab, West Bengal, Chhattisgarh, Jharkhand and Himachal Pradesh.
Chapter 7			
7.2(a)(iii)			
Whether independent evaluation of the implementation of the Municipal Solid Waste (Management and Handling) Rules, 2000 done.	None.	Assam, Punjab, Rajasthan, West Bengal, Himachal Pradesh, Jharkhand, Karnataka, Tamil Nadu, Meghalaya, Sikkim, Andhra Pradesh, Kerala, Gujarat and Uttarakhand.	Delhi, Maharashtra, Orissa, Chhattisgarh, Uttar Pradesh and Bihar.
Paragraph 7.2(b)(i)			
Whether state governments ensured that records of operators were inspected.	Andhra Pradesh, Gujarat, Maharashtra, West Bengal and Haryana.	Assam, Orissa, Tripura, J&K and Madhya Pradesh.	Delhi, Punjab, Tamil Nadu, Uttar Pradesh and Rajasthan.
Paragraph 7.2(b)(ii)			

Activity	Done	Not done	Not verifiable
Whether PCBs cancelled authorisations for violation of the bio-medical waste Rules.	Maharashtra (PCB cancelled 4 authorisations to hospitals for non compliance), Gujarat (2 cases), Haryana and Delhi.	Rajasthan (no cancellation was done. Only refusal for authorisation in two cases was done), Assam, Orissa, West Bengal, Tripura, J&K, Madhya Pradesh, Andhra Pradesh and Tamil Nadu.	Uttar Pradesh and Punjab.
Paragraph 7.2(b)(iii)			
Whether state governments/PCBs checking the compliance of bio-medical waste by hospitals.	Rajasthan, Andhra Pradesh, Gujarat, Assam, Maharashtra, J&K and Haryana.	Orissa, West Bengal and Madhya Pradesh.	Delhi, Punjab, Tamil Nadu, Uttar Pradesh and Tripura.
Paragraph 7.2(b)(iv)			
Whether independent evaluation of bio-medical waste rules done.	None	Assam, Delhi, Gujarat, Orissa, Punjab, Rajasthan, West Bengal, Tripura, J&K, Andhra Pradesh, Tamil Nadu and Madhya Pradesh.	Maharashtra, Uttar Pradesh and Haryana.
Paragraph 7.2(c)(i)			
Whether DCs/DMs of the district were monitoring the implementation of these rules.	Assam, Maharashtra, Rajasthan, Bihar, Orissa, Gujarat and Himachal Pradesh.	Karnataka, Sikkim, and Uttarakhand.	Delhi, Punjab, Kerala, West Bengal, Chhattisgarh, Andhra Pradesh, Uttar Pradesh, Meghalaya, Tamil Nadu and Jharkhand.
Chapter 8			
Paragraph 8.1 (a)(i)			
Whether funds provided to municipalities by TFC for waste management activities.	West Bengal (during 2005-06 and 2006-07 received funds from TFC for the creation of Urban	Punjab, Jharkhand, Kerala and Sikkim.	Maharashtra, Chhattisgarh, Uttar Pradesh and Delhi.

Activity	Done	Not done	Not verifiable
	Infrastructure), Himachal Pradesh, Rajasthan, Orissa, Karnataka, Andhra Pradesh, Gujarat, Bihar, Meghalaya, Assam, Tamil Nadu and Uttarakhand.		
Paragraph 8.1(a)(ii)			
Whether the state government in its budget made any yearly allocations.	Orissa, West Bengal, Kerala, Assam (Rs.10 lakh during 2003-04), Gujarat and Karnataka.	Maharashtra, Punjab, Rajasthan, Uttarakhand, Andhra Pradesh, Tamil Nadu and Meghalaya.	Jharkhand, Bihar, Chhattisgarh, Himachal Pradesh, Sikkim, Uttar Pradesh and Delhi.
Paragraph 8.1(b)			
Whether yearly allocations were made by the state government in its budget for bio-medical waste management.	Assam, Haryana, Orissa and Uttar Pradesh.	Gujarat, Maharashtra, Punjab, West Bengal, Tripura, J&K, Andhra Pradesh, Madhya Pradesh and Tamil Nadu.	Delhi and Rajasthan.
Paragraph 8.2			
Whether assessment made of how many people would be required to implement and monitor the municipal solid and plastic waste rules.	Meghalaya (for Shillong only) and Karnataka.	Orissa, Gujarat, Rajasthan, Himachal Pradesh, Sikkim, Andhra Pradesh, Uttarakhand and Tamil Nadu.	Uttar Pradesh, Bihar, Delhi, Assam, Maharashtra, Punjab, West Bengal, Chhattisgarh, Jharkhand and Kerala.
Paragraph 8.2			
Whether shortage of manpower in municipalities was hampering municipal solid waste management.	Orissa, Punjab, Rajasthan, Himachal Pradesh, Jharkhand, Andhra Pradesh, Gujarat, Meghalaya, Karnataka,	None	Assam, Delhi, Maharashtra, West Bengal, Chhattisgarh, Kerala, Bihar, Uttar Pradesh and Tamil Nadu.

Activity	Done	Not done	Not verifiable
	Sikkim and Uttarakhand.		
Paragraph 8.2			
Whether PCBs had made an assessment as to how many technically qualified people would be needed to monitor the implementation of the waste rules.	Andhra Pradesh, Gujarat, Rajasthan, West Bengal and Kerala.	Assam, Delhi, Orissa, Himachal Pradesh, Karnataka, Bihar, Uttarakhand, Madhya Pradesh, Uttar Pradesh and Meghalaya.	Maharashtra, Punjab, Chhattisgarh, Jharkhand, Sikkim, Tripura, J&K, Haryana and Tamil Nadu.
Paragraph 8.2			
Whether shortage of manpower hampered functioning of PCBs.	Shortages in Andhra Pradesh, Gujarat, Rajasthan, Assam, West Bengal, Jharkhand, Karnataka, Kerala, Sikkim, Uttarakhand, Tripura, Madhya Pradesh and Delhi.	None	Orissa, Himachal Pradesh, Bihar, Maharashtra, Punjab, Tamil Nadu, Uttar Pradesh, Chhattisgarh, Meghalaya, J&K and Haryana.