

GHANA AUDIT SERVICE (SAI, GHANA)

CALL FOR PAPERS, WGEA

MANAGEMENT OF SOLID WASTE BY ACCRA METROPOLITAN ASSEMBLY (AMA)

Related to the topic for WG 16: Updating guidance “Toward Auditing waste management”

Background and audit planning

- **Motivation**

AMA estimates that on daily basis, between 1,800 and 2,000 tonnes of solid waste are generated in the Metropolis. The Waste Management Department (WMD) and 14 private solid waste contractors are able to collect between them, 1,500 and 1,800 tonnes at an average daily expenditure of GH¢ 18,000.00 (US\$ 12,000.00) This means that between 300 and 500 tonnes of waste remain uncollected daily, resulting in littering and unsightly environments, cholera outbreaks, stench and seepage of leachate into water bodies.

- **Audit scope and objective**

The audit examined the collection and disposal of solid waste by WMD of Accra Metropolitan Assembly from 2005 to 2008 and the audit was carried out from October 2008 and August 2009. The audit was undertaken to determine how effectively AMA was managing solid waste in the Metropolis.

Methodology

The team carried out interviews; reviewed documents, inspected dumping sites and refuse collection points within the metropolitan area to gather evidence for the audit.

Findings and recommendations

We found that although AMA has put in place some measures to enhance the management of solid waste, it has not been able to collect and dispose of all solid waste generated in the city due to the following challenges:

- **Absence of strategic plan to regulate waste management services**

AMA has not developed and implemented the Strategic Environmental Sanitation Plan required by the 1999 policy document. Consequently, issues such as attitude of the public,

equipment and operational funds for waste management activities are addressed on ad hoc basis

We recommended that, AMA develops and implements a sanitation plan.

➤ **AMA is unable to effectively maintain its waste management equipment**

WMD's equipment holdings reduced over the audit period as it had not created operational funds for their replacement. Additionally, it had neither prepared nor kept a periodic maintenance schedule to enable it keep the holdings in good working condition. As a result, WMD has not been able to fulfil its responsibility to manage 20% of the waste generated.

We recommended AMA budgets for additional equipment and keep a strict periodic maintenance schedule for the equipment.

➤ **WMD is unable to properly monitor solid waste contractors**

WMD has neither the personnel nor the logistics to effectively monitor the performance of contractors. This has hindered performance evaluation of the contractors, application of sanctions and access to complaints from service beneficiaries. This has led to repeated complaints of non-lifting of refuse, over flow and spillage of refuse in central container sites.

We recommended AMA provides the Monitoring Unit with the commensurate logistics to carry out effective monitoring.

➤ **Payment to contractors are delayed**

At the time of audit, WMD was in arrears of 15months of payment to contractors. As a result, WMD was unable to enforce performance standards as the contractors attribute every non-performance to delay of WMD in paying for their services. Consequently, contractors are unable to buy fuel, maintain equipment and pay staff salaries, leading to low morale and low performance.

We recommended that management of WMD set up operational funds, initiate a policy to charge realistic tariffs for residents of Accra who patronize the central container system and renew contracts with the private collectors.

➤ **AMA has not been able to acquire and operate a sanitary landfill site**

WMD uses available ‘pits’ from sand winning or quarrying activities as dumping sites instead of acquiring and developing a sanitary landfill site which should have a minimum life span of ten years. These ‘pits’ however have short life span, which has led to frequent movements from one dumping site to the other.

These frequent movements make it difficult for WMD to practice good landfill operation such as the daily covering of refuse with sand to reduce odour and littering, gas monitoring to prevent ground and surface water pollution.

We recommended that the management of WMD should properly acquire land and develop a proper sanitary landfill, take steps to legalise the dumping sites in use and practice proper landfill operations.

➤ **Waste is not treated by WMD before final disposal**

WMD does not treat solid waste before final disposal and this reduces the life span of the dumping sites. Because the waste is also not treated, it is not sanitized thus, causing a multiplication of pathogens in the waste, which become a threat to the workers at the disposal sites and residents.

We recommended that management of AMA should consider waste treatment methods in the waste stream like recycling, composting and reuse.

Impact and results

• **Actions taken to respond to the audit’s results**

- The audit entity has reduced the number of contractors and introduced a fee and performance based approach to the contracting agreement. This is an off shoot of the polluter pay principle in that, instead of the entity being responsible for the collection and central government bearing the cost, the polluters, this time around, pay for the waste they generate directly to the contractors. Fees are however harmonized for all contractors based on the quantity of waste generated.
- The entity has restricted its involvement in waste management to monitoring. In that light, the monitoring unit has been beefed up with additional staff and logistics. This is to help the office effectively monitor the activities of the contractors under the fee and performance based approach.
- The entity has prepared environmental sanitation plans for seven of the sub metropolitan areas under their jurisdiction. These plans have however not been made

comprehensive to cover the entire metropolis and therefore help coordinate the activities of waste managers.

- Private participation in the treatment of solid waste has been improved as more private people are now involved in various forms of recycling and reuse activities.
- **Environmental benefits as a result of the audit and government action**
- Ghana Audit Service is yet to carry out a follow up to assess the benefits accrued as a result of the audit.

Challenges and barriers

- **What challenges did you face?**
- There was a challenge with access to information as the client had not documented most of the processes and transactions they undertook.
- Reluctance to fully disclose information by staff of the entity.
- The team could not address the technical challenges such as ground water pollution from leachate spills and air pollution from uncollected gases (methane) as we were not in the position to assess or measure them.
- Moving through the disposal sites without the requisite protective clothing such as nose masks and wellington boots and therefore putting the team at risk.
- **Did you overcome them?**
- Not all the challenges. We could not go round the technical challenges therefore we restricted the audit to the tangible effects and dangers such as littering as a result of not covering disposed waste with laterite and its related consequences.

Lessons learned

- The team did not use INTOSAI guidance documents in the preparation of this report. It could also not delve into the technical issues as the team lack the technical skills and the equipment to assess them. The report would have been better if INTOSAI guidance documents on Waste Management and expertise to assist in assessing technical issues in solid waste had been employed.



Management of Waste in India: SAI India

1. Significance of the topic

Waste represents a threat to the environment as well as to human health. If not handled or disposed of properly, surface and ground water contamination takes place when waste reaches water bodies. Residues from waste can change the water chemistry, which can adversely affect all components of an ecosystem. A specific environmental hazard caused by waste is leachate, which is the liquid that forms, when water trickles through contaminated areas leaching out the 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 through their roots. Eating plants 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 dioxins¹, furans² and polychlorinated by-phenyls³, which are deadly toxins, causing cancer and endocrine system damage. Landfills are a big source of release of greenhouse gases which are generated when organic waste decomposes in landfills. E-waste contains a mix of toxic substances such as lead, cadmium, lead oxide, mercury, polyvinyl chloride etc. PVC in cable insulation releases 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.

Improper management of waste leads to pollution of the environment and also has damaging effects on biodiversity and public health. Since effective waste management has become a big challenge in most cities of India, mainly due to increased population, unplanned urbanization and reckless building activities, Performance Audit of Management of Waste in India was taken up.

2. Audit Scope, objectives, criteria

Audit scope:

¹ 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.

² Furan is a colorless, flammable, highly volatile liquid with a boiling point close to room temperature. It is toxic and may be carcinogenic.

³ 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 bio-accumulate in animals.



In India, policy and laws are made at the federal level, by the Ministry of Environment and Forests (MoEF). The implementation of these policies and laws takes place at provincial and local levels.

Performance audit of “Management of Waste in India” covering the period from 2002-2003 to 2006-2007, was taken up focusing mainly on municipal solid waste, bio-medical waste and plastic waste. Performance Audit (PA) of “Management of Waste in India” sought to examine whether the government had evolved an effective policy on waste management covering different kinds of waste. The PA also sought to check the compliance to laws and rules relating to waste management.

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.

The audit took place at the federal and provincial levels. At the federal/central level, audit scope covered policy, planning and legislation at MoEF and monitoring and evaluation of the activities relating to management of waste carried out by pollution control bodies. At the provincial/state level, audit checked the records of 24 state government departments like Department of Environment/Forests, Urban Development etc., 24 state level pollution control bodies, 56 municipalities in 20 states (for implementation/monitoring of rules relating to solid waste), 60 districts in 20 states (for implementation/monitoring of rules relating to management of plastic waste) and 180 hospitals in 15 states to verify implementation/monitoring laws related to bio-medical waste.

Audit Objectives: Performance audit was carried out to assess whether:

Performance audit of “Management of Waste in India” was taken up with the objectives of assessing whether:

- I. 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. 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.

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;
- 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 indifferent countries.

As sufficient audit criteria for benchmarking performance of waste management processes were not available in India, rules, policies, strategies and good practices for management of waste in different countries were also used to benchmark the performance of the different environment protection agencies in waste management.

Audit sampling

PA covered 24 out of 28 states (86 per cent) for Responses 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 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.

3. Methodology

The initiation of the PA was with guidelines for audit, prepared in consultation with Non-Government Organizations (NGOs) like Center for Science and Environment, Toxic Links, apart from stakeholders like MoEF and Central Pollution Control Board (is a technical/monitoring body to advise MoEF on environment and pollution control measures).

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.

A total of 100 audit personnel were involved in this audit.

4. Findings and recommendations

	Issue 1 Assessment of quantum of waste being generated in the country and identification of the risks to environment and health posed by waste.
Audit findings	<ul style="list-style-type: none"> • Federal ministry/state governments had not 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. <ul style="list-style-type: none"> • The Federal ministry was unable to make any projections about the amounts of waste that might be produced in future and 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. • The Federal ministry/federal pollution control board had not completely assessed the risks to environment and health posed by waste



	and only 25 per cent of the sampled states had assessed these risks; that too, partially.
International Good practices	<ul style="list-style-type: none"> • Sweden, Germany, Italy, Norway, Spain, Poland and United Kingdom have a detailed database on different kinds of waste. • The Commission of the European Countries and USA has projected trends in growth in waste. • Portugal has estimated its capacity to handle all wastes for the future.
Good practices in India	<ul style="list-style-type: none"> • Karnataka and Punjab had carried out detailed studies on the effect of waste on health and environment.
Recommendations	<ul style="list-style-type: none"> • Federal ministry/Federal Pollution Control Board, 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 should be involved in this exercise so that a comprehensive database on waste is generated for aiding policy-making and intervention. • Federal ministry/Federal Pollution Control Board, 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 along with the states should carry out regular surveillance, including epidemiological surveillance of waste related impacts on public health.
Issue 2	Existence of policies and strategies for management of wastes and reflection of priority to waste reduction and waste minimisation as against waste disposal.
Audit findings	<ul style="list-style-type: none"> • Waste management efforts in India were not directed by a specific waste policy, which incorporated a clear-cut waste hierarchy, which gave priority to reduction, recycling and reuse of waste instead of only waste disposal (as depicted in the Waste hierarchy pyramid). • 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 to implement the 3 R's (recycle, reduce and reuse) were being followed by MoEF and only 8 per cent of the sampled states had introduced such strategies. • The National Environmental Policy, 2006, which promoted certain waste reduction strategies, had not been translated effectively into action. • The Federal ministry had not taken effective action on greening government procurements to promote the use of recycled and environmentally friendly products and government procurement systems had not been altered in 46 per cent of the sampled states to include Environment Preferable Purchasing. • The Federal ministry 's environment labeling program started in 1991 was a failure as the label was granted to only three product categories in more than 15 years of its existence.



International good practices	<ul style="list-style-type: none"> • Denmark, Japan, Korea, South Africa, Ireland, Philippines and Finland have a separate waste policy which emphasises on 3R's. • Ireland, USA, New Zealand, Netherlands and Korea have effective reduction, reuse and recycling strategies. • USA, Ireland, Japan and Denmark have set specific targets and timelines for waste reduction and recycling. • Canada Japan and USA have introduced green practices in government procurement.
Good practices in India	<ul style="list-style-type: none"> • West Bengal has effective waste minimisation programmes.
Recommendations	<ul style="list-style-type: none"> • The Federal ministry may consider framing a specific policy for the management of wastes in India, incorporating the internationally accepted hierarchy for management of wastes in the policy. • The Federal ministry/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. • The Federal ministry should consider the introduction of Environmentally Preferred Purchases and lay down guidelines for the purchase of recycled products to promote the purchase of ecofriendly goods by the government and the agencies controlled by it.
Issue 3	Existence of legislations specifically dealing with disposal of each kind of waste incorporating of penalty for violation.
Audit findings	<ul style="list-style-type: none"> • Laws in India were not framed for all kinds of waste, leaving the safe disposal of many kinds of waste like construction and demolition waste, agriculture and forestry waste, e-waste etc., unmonitored. • Polluters were not being effectively held responsible for unsafe disposal, thereby creating no deterrence for non-implementation of the rules. Only in 25 per cent of the sampled states, some token action had been taken by pollution control board/government against defaulters for illegal dumping of waste.
International good practices	<ul style="list-style-type: none"> • Finland and Ireland have comprehensive waste legislations which covers all kinds of waste. • Finland, Sweden and Denmark adopted the polluter pays principle by levy of a Carbon Dioxide tax for emissions above a particular limit.
Recommendations	<ul style="list-style-type: none"> • The Federal ministry 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 and forestry waste and e waste being generated in the country to promote safe disposal of waste. • The Federal ministry should consider incorporating punishment/penalty as well as responsibility of the polluter in the specific rules governing management of each kind of waste so that there is a strong deterrent for violation of the rules.



Issue 4	Allocation of clear responsibility and accountability to various agencies involved in the process of waste management.
Audit findings	<ul style="list-style-type: none"> • There was no single body taking ownership of waste issues both at the federal and state level, leading to dispersal of responsibility and weak accountability. • Only 15 per cent of states constituted the Solid Waste Mission for implementation of municipal solid waste rules, despite directives of government in 2004-05. Similarly, advisory committees to advise the state governments on the implementation of bio-medical waste rules were set up only in 47 per cent of the sampled states. • There was no clear identification of bodies for monitoring of waste rules at the centre as none of the four federal ministries, i.e., Ministry of Environment and Forests, 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. • In the states, only 33 per cent each of the sampled states had allocated responsibility to bodies/agencies 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.
International good practices	<ul style="list-style-type: none"> • <i>Finland, Austria and New Zealand have central nodal bodies for waste management.</i> • <i>Philippines, Slovenia and Austria have bodies at the central level to implement waste management plans and polices.</i> • <i>Finland, Philippines, Slovenia, USA and New Zealand have bodies at the central level to monitor implementation of waste management policies and programmes.</i>
Recommendations	<ul style="list-style-type: none"> • Since waste causes pollution and pollution issues are necessarily the responsibility of the federal Ministry of Environment and Forests, the Central Government should consider appointing Ministry of Environment and Forests as the nodal body for all kinds of waste. • The Federal Ministry of Environment and Forests 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.
Issue 5	Compliance to rules regulating municipal solid waste, bio-medical waste and plastic waste.
Audit findings	<p>5.1 Compliance to Municipal Solid Waste rules</p> <ul style="list-style-type: none"> • Collection: Regular collection only in 22 per cent of the sampled municipalities. • Segregation: Took place only in 10 per cent of the sampled municipalities.



	<ul style="list-style-type: none"> • 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 two states out of the sampled 20 states had established a landfill, leading to dumping of waste in open dumpsites in the states. <p>5.2 Compliance to bio-medical waste rules</p> <ul style="list-style-type: none"> • Authorization: Only 29 per cent of the sampled hospitals had set up waste disposal facilities only after getting authorisation from the prescribed authority. • Segregation: Segregation was taking place in only 29 per cent of the 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 hospital 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. <p>5.3 Compliance to plastic waste rules</p> <ul style="list-style-type: none"> • Actions were not being taken designated authorities for the enforcement of the rules and it was difficult to verify whether vendors were using carry bags or containers made of recycled plastics for storing, carrying, dispensing or packaging of foodstuffs. • It was difficult to verify in audit whether recycling was being done according to specifications. • It was difficult to verify whether all manufactures had sought authorisation from pollution control boards for the manufacture of plastic carry bags/containers.
<p>Recommendations</p>	<ul style="list-style-type: none"> • 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. The federal pollution control board could help each municipality in identifying the waste processing technology best suited to the needs of the municipality. • 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. Plans should be developed by each municipality for closing the dumpsites and moving the waste to a sanitary landfill.



	<ul style="list-style-type: none"> • 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. • It should be ensured that each hospital has the full waste treatment/disposal infrastructure to treat each category of bio-medical waste generated. Alternatively, each hospital could join a common facility for treatment/disposal and PCB should ensure that each common facility has the requisite and complete infrastructure to handle waste safely.
Issue 6 Effectiveness of monitoring in checking non-compliance.	
Audit findings	<ul style="list-style-type: none"> • Monitoring of the municipal solid waste rules, bio-medical waste rules and plastic rules, at the central level, was not effective. Systems were not in place to check non-compliance of rules by municipalities, hospitals and district authorities. • Pollution control boards 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. • Only 13 per cent of sampled hospitals were being monitored for compliance to bio-medical waste rules. • Only in 20 per cent of the sampled states, the designated authorities were monitoring the implementation of plastic rules. • In Delhi, analysis report 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 another 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. In Punjab, samples of ground water from hand pumps at four places from the municipal solid waste open dumpsite in Amritsar revealed that that none of the samples collected from the dumpsite met the acceptable limit for drinking water and were thus, not fit for drinking purposes. In Tamil Nadu, two water samples collected from the dumpsite at a swamp area revealed that dissolved solids, chlorides and cadmium was far above the prescribed desirable limits.
Recommendations	<ul style="list-style-type: none"> • At the central level, the federal ministry of environment and forests and at the level of the states, the pollution control boards should draw up a schedule of monitoring of municipalities and hospitals and monitor them not less than once in 6 months.
Issue 7 Adequacy of funding and manpower for the implementation of rules on waste management.	



Audit findings	<ul style="list-style-type: none"> • The provision for management of waste in the state budgets was low and only 30 per cent and 27 per cent of the sampled states made some provisions for municipal solid waste and bio-medical waste management. • 55 per cent of the sampled states reported shortages in manpower in the municipalities hampering municipal solid waste management while pollution control boards in 54 per cent of the sampled states had cited shortages hampering their work.
Recommendations	<ul style="list-style-type: none"> • States should make provisions for waste management activities, both municipal solid waste and bio-medical waste in the budget to ensure that municipalities and hospitals have adequate funds for waste management. • State governments and pollution control boards should assess manpower requirement for implementing the waste rules and accordingly, raise a staff dedicated to the implementation and monitoring of waste management activities.

5. Impact

On the receipt of recommendations contained in the Performance audit, the Federal Ministry for Environment and Forest constituted a committee to draw up a road map for the management of waste in India. The terms of reference of the Committee is to make recommendations for evolving a policy and mechanisms for effective implementation and monitoring of waste in India keeping in view the recommendations made in the Performance audit. The Committee consists of senior officials of the Government involved in waste management, Federal Pollution Control Board, representatives from Non-Governmental Organisations, and eminent persons in the field of waste management. A representative of the C&AG was also invited to attend the meetings. Committee made more than 100 recommendations which are being put into practice now. The impacts were:

- New rules: E waste management rules introduced
- Rules were revised: Biomedical waste rules, municipal solid waste rules revised
- Bodies set up: Advisory bodies now set up for advising on better management of waste
- New methodology introduced: city plans drawn up with site for landfills as well as plans for processing of waste
- Capacity building programmes of pollution control bodies was put in place to ensure quality staff was in place for undertaking monitoring activities.



6. Challenges and barriers

Some of the challenges faced were:

- Waste management systems was very dispersed, with each state adopting a different practice. To understand the accountability relationships and responsibility centers was time consuming.
- There were more than 100 audit personnel who were conducting this audit simultaneously. It was a challenge to coordinate their efforts and manage effectively the teams which were in the field level, going to municipalities and hospitals to collect records. Use of standardized audit questionnaires gave a quality assurance as well as help build standardization into the reporting mechanism and increased the control over the audit teams.
- Collating their results and writing the report was also a challenging due to the huge amount of data generated during the course of this audit.
- There were no rules for the management of waste like e waste, packaging waste etc., so fixing audit criteria was difficult.

We overcame these barriers by:

- holding a capacity building sessions for the whole team before audit, also through mid-term reviews and regular assessment of quality of audit work
- Problems of criteria were worked out in consultation with MoEF by using international best practices/international accords which India is a signatory to.
- We also cited international best practices while reporting on the different issues in the report to help the executive understand the range of activities relevant in the field of waste management.

- Importance of standardized audit questionnaires to guide the audit teams dispersed across India
- The value of mid-term reviews of audit work to enable course corrections
- Importance of associating with stakeholders like academics, Civil Society Organisations et., in framing audit questions
- Using IT tools to collate, relate and report the extensive data collected (Access was used)
- INTOSAI guidance “Towards Auditing Waste Management “was used.

The Experience of the Court of Accounts of the Republic of Moldova on Environmental Audits

Court of Accounts of the Republic of Moldova as a Supreme Audit Institution plays an important role on the association at best standards and practices for the implementation of the international and European Union standards regarding the best results in External Public Audit.

Conforming to good practices, the Court of Accounts of the Republic of Moldova initiated and conducted environmental audits in accordance to unique role of the environmental audit and its deficiency that have a national importance. Thus, beginning with 2009 were initiated and carried out environmental audits in areas of strategic importance for the Republic of Moldova:

Solid Waste Management

The importance of auditing in this area was due to the volume of accumulated wastes at the landfills in the country which increase year by year thus requiring urgent and prioritized action to remedy the situation by developing and implementing policies and strategies in the domain of solid wastes and responsibility of institute waste management system based on collaboration between organization of central and local public administration ensuring compliance with legal competence according to the set tasks.

The audit determined that the system of regulation and management of solid waste collection and disposal from the Republic of Moldova is not effective and does not minimize negative effects of environment from waste disposal. However, at the time of the audit, it was determined that the legal framework contains many holes and imperfections, legal framework being general, elusive and outdated and the lack of relevant regulations determine: inefficiency of the system for monitoring and managing the solid waste, not ensuring their reduction; the creation of non-compliant landfills to European directives; and impossibility to prevent and timely to liquidate the negative consequences.

The result of the audit mission of specialized central authority has developed Waste Management Strategy for the years 2013-2027, being established activities related to sector planning, achievement and prospects for solid waste management, it was designed an integrated system of waste management economically efficient

and which assure environment protection and human health. Also are in the process of feasibility study on the construction of transfer stations and regional warehouses into two sub-regions of the country.

During the audit mission on **carrying out the state policy objectives on renewable energy**, it was found that this area is at the early stage, not being provided (stable) constant means and oriented to achieve domain goals. At the same time the audit found that renewable energy is not funded stable, existing sources are temporary and mainly from foreign donors. Creating Energy Efficiency Fund as a source of financing activities in the field of energy efficiency and the renewable energy was made late. So, the domain of renewable energy is funded at the level of separate projects and not as a set of actions that would contribute to promoting the use of renewable energy sources, respectively, to achieve in time the state objectives.

In accordance with the recommendations of the audit, the responsible institutions have developed and adopted (June 2014) Law on the promotion of energy from renewable sources, law which encourages companies, and private consumers such as farms to invest in their own facilities to generate electricity or heat energy.

The result of implementing the Law is expected to create the legal framework that will allow 17% of consumed energy in Moldova to come from renewable sources. At the same time the population will have the right to produce energy by using biofuels, wind and sunlight. Law's implementation will help reduce imports of energy resources, attracting investments, diversification of energy sources, harnessing renewable energy, create new jobs and sustainable development of the national economy.

Under **environmental audit performance on water supply and sanitation of settlements**, the audit found that the structure of the water management district does not ensure implementation of sector policies and does not have sufficient and efficient tools to achieve the set objectives. Also responsible institutions have not fully exercised the stated duties because they do not have relevant and sufficient information for this which makes the delay in achieving the objectives of stepped ensuring population with drinking water and the environment protection, in some cases people having not minimum conditions for physiological needs.

The result of the audit mission and development of water supply and sanitation sector, creation of the necessary framework of gradual insurance until 2028, the access to safe water and adequate sanitation for all localities and population of the Republic of Moldova was adopted the Strategy for Water Supply and Sanitation in the country for 2014-2028.

The result of the mission on **the protection and sustainable use of water from rivers** audit established that the mechanisms for managing water resources in rivers and streams do not ensure effective implementation of sector policies, instruments in this respect not being finalized. Management of aquatic resources is not sustainable, in some cases having a major impact on aquatic ecosystems. Importance of the audit mission was due to insufficient knowledge of the issues on agricultural land in the country, given the fact that its surface occupies more than 55% of the territory also being necessary to determine the gaps on the current use of the land fund.

Efficient implementation of objectives needed for the protection and sustainable use of water from rivers and streams is a vital condition in the process of ensuring to obtain the beneficial results in the domain. Although specialized central authority has taken some measures on the protection of surface waters, this, through the assigned powers and responsibilities, not always made activities for a good management in this field.

The result of the audit the Ministry of Environment initiated the elaboration of the River Basin Districts Management Plans, which involve representatives of the central public authority of the Millennium Challenge Corporation, and representatives of local public authorities, civil society and water users. Thus were established objectives and planned activities on preventing deterioration of surface water and groundwater, protection and improvement of state water resources and as a result of state aquatic ecosystems, terrestrial ecosystems and wetlands directly depending on aquatic ecosystems. Also aims the progressive reduction of pollution from point and diffuse sources of water resources both surface and groundwater.

Also in the context of this audit, based on the interests of coastal riparian states to a river which run through 19 European countries (Danube) and taking into account the need to review progress under the Convention on Cooperation for the

Protection and Sustainable Use of the Danube River, was established achievement country's commitments under the Convention.

The **audit environment for the sustainable management of agricultural land** has been established that the absence of special legal framework of land involves fragmentation functions of field officers, this causes deficiency of integrated agricultural land activities and therefore need additional tools of good agricultural practices and favorable to environment. At the same time, it is very important to establish specific objectives and detailed measures for achieving characteristic activities for a sustainable use of agricultural land.

The audit made recommendations: finalization and approval of the legal framework relevant to this field; creating an information system for soil quality; finalize the institutional framework that will regulate activities on agricultural land management control; the inventorying and creation of risk registers on systematic records of pollutants factors of agricultural land; the mechanisms establishment and implementation and continuous activities of control and management on the use of fertilizers in agricultural activities including the preparation and systematization of special registers in this domain.

Environmental audits by the Court of Accounts of the Republic of Moldova often were focused on the environmental performance of government programs, audit of environmental management systems and environmental programs and policy evaluation.

For undertaken environmental audits were designed methodologies which allow to draw acceptable conclusions while being used techniques of audit such as interviews, document analysis, visits on the ground, etc.

Sources of audit criteria during the mission were legal framework general standards accepted and established by recognized national and international bodies, existing codes of professional practice. Meanwhile there are used unauthorized sources of criteria such as academic literature and external experts. Thus, for example in the case of sustainable land management audit ISA has requested the services of an expert from a specialized institute in soil science accomplishing this field trips together with the audit team and contributed to the formulation of audit findings. To this chapter states that at one stage of the audit became necessary to

change this expert, given the existence of an unsatisfactory past its collaboration with the auditee, in this case there remains a conflict with it.

Environmental audits are guided by INTOSAI framework documents and those approved by the SAI in accordance with them.

One of the most significant problems in achieving environmental audits by SAIs Moldova is to define the criteria by which they will evaluate the statements of the audited entities or their performance. To reduce the problems in this chapter there are organized working meetings with the auditee where are obtained assurances that the selected criteria will be generally accepted as relevant, comprehensive and easy to understand.

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