SAI Nepal's Experience on
Auditing Solid Waste Management in Kathmandu Metropolitan City

1. Background and Audit Planning

❖ Why was the audit topic important?

Importance of Topic: All living organisms, humans in particular, generate one or another type of waste. The waste cause health, safety and economic problems. To ensure healthy and safe lives of the citizens and to manage earth's ecosystem, the government and public institutions should make arrangements to manage wastes. In some of the countries, e.g. Nepal, right to live in a clean and healthy environment has been recognized as one of the fundamental rights of the citizen. Amongst the wastes humans produce, the solid waste is one major and common one. Such solid wastes come from kitchen to other wide varieties of activities we do daily. The solid waste has been increased day by day due to population growth, rapid urbanization and availability and use of various physical facilities. Establishment of factories and industries, development and expansion of trade and commerce, advancement of technology and changes in consumption pattern have caused increase in waste generation as well as change in nature and composition of solid waste in the Kathmandu Metropolitan City (KMC). The increased volume of domestic waste, industrial waste, chemical waste, health institution related waste or harmful waste in KMC posed challenges to the environment. In this context, whether the KMC and other institutions responsible are managing solid waste in appropriate manner is of a matter of importance to ensure healthy and safe lives of the citizens.

❖ What were the audit's scope, targets, objectives, and criteria?

Audit Objective: The main objective of the audit is to assess the efficiency and effectiveness of the Solid Waste Management (SWM) carried out by the KMC and to provide conclusions and recommendations for the remedy of the weaknesses found. The secondary objectives are as follows:

- To assess the relevant activities carried out by the KMC, Solid Waste Management Technical Support Center (SWMTSC) and other concerned entities,
- To test compliance of the SWM Act & Rules,
- To assess the collection and transportation of solid waste,
- To evaluate the steps taken for reduction, reuse and recycling of solid waste,
- To assess the operation of transfer station and landfill site,
- To verify institutional and managerial aspects of SWM.

Audit Scope: The scope of the audit is the SWM activities carried out by the KMC, comprising of collection and transportation system of solid waste, reduction, reuse and recycling of solid waste, operation of transfer centre and landfill site during the fiscal year 2011/12 to 2014/15. The audit is also covering institutional and managerial aspects relating to SWM. The relevant activities of the SWMTSC and other concerned entities are also included in audit scope.

2. Methodology

❖ Did we try something new?

A problem and result oriented approach was used to achieve the audit objectives. The methodology used included the document review, interviews and questionnaires, observation in the field, as well as review of secondary literature. In this regards, policy and legal arrangement related to SWM, operational process, annual plan and progress reports have been reviewed.

Information were collected through questionnaires, interviews and focus groups discussions (FGDs) to substantiate the matter of potential significance (MOPS) and risk areas through the evaluation of risk assessment of SWM activities carried out by the KMC. Similarly, field observation of transfer centre, landfill site and two wards were done. Two FGDs with concerned stakeholders and interviews with 150 stakeholders of different segments namely, householders, waste collectors, drivers and helpers of waste transportation vehicles and people affected by transfer centre were held.

As a guidance material Environmental Audit Guide prepared by OAGN, which is in compliance in material respects to related ISSAI, was used. Typical feature used was decision tree model and audit design matrix included in the guide.

3. Findings and recommendations

❖ What did we find?

Positive findings - Street sweeping on the main road and historical areas, door to door waste collection and existence of transfer centre and landfill site and conducting awareness programs are major positive aspects of the KMC regarding SWM.

Areas for Improvements – Some of the areas needing improvements are as below:

1. KMC has not conducted survey and the study to establish the per capita waste generation, waste composition and density. In the absence of such survey and study, planning of collection, storage, transportation and disposal of waste could be based on unrealistic estimation and may hamper the efficiency and effectiveness of solid waste management.
2. The KMC lacks the policy and program for encouraging waste generators to segregate waste at source. To address this issue, the municipal council seems decided to distribute compost and segregation bin at subsidized rate, however, there seems insufficient numbers of bin distributed or no distribution and in some other cases no continuation in policy in subsequent council meeting. The KMC has not initiated a system of collecting organic and inorganic waste separately at the source. In contrary to insufficient number of distribution of segregation bin, the SWMTSC has kept stock of 13,638 segregation bin procured in FY 2013/14 without providing KMC for distribution.
3. The KMC has operated 7 trucks, 1 power trailer and 130 manual carts for collecting waste from the source. The KMC has prescribed various 134 routes for waste collection by vehicles throughout the municipal area. According to the KMC the number of vehicles available is insufficient for collecting waste. During the field visit of Environment Department of the KMC at Teku, a number of Hermetic Self Discharging Garbage Trucks are found unused since they were received in 2010. During field visit, municipal truck was found collecting waste in two wards where private sector was responsible to collect waste where it was collecting service fees from the households.
4. As per SWM Law, the KMC may fix service charge and realize from the concerned waste generators for management of the solid waste on the basis of quantity, weight and nature of solid waste. Accordingly, the KMC seems estimated to collect sanitation and environment charge in annual budget. However, the KMC seems not been able to realize estimated charges as estimates were not based on relevant survey and study.
5. The SWM law states that the local body may fix any location as a transfer centre to manage the solid waste collected at the primary site taking into consideration the environment and public health. The KMC has operated one transfer centre in Teku having a capacity of 10,000 ton in open space surrounded by residential area. The audit team observed at transfer centre that vehicles collecting waste from the sources unloading onto the ground and then it was scooped up again by using excavators and later on transported to Sisdol landfill site by large vehicles. The transfer centre was originally constructed with infrastructure for segregating various wastes and composting organic waste. However, it is

observed that those infrastructures were not used. Being unable to use constructed infrastructure KMC could not strengthen the waste handling efficiency, reduce the transportation cost to landfill site and generate revenue from use of waste resources.

The nearby people have complained that they are suffering from health related problems like symptoms of vomiting, allergy, respiratory problem, bad odour etc. The situation of Teku transfer centre becomes severe when the Sisdol landfill is closed resulting in more waste remained at transfer centre for several days. As per information obtained from the KMC, the landfill site remained closed for 51 days (19 days due to festivals, 9 day due to local disturbance, 12 day due to poor road condition and 11 due to other reason) during 15 March 2013 to 14 March 2015.

6. As per SWM laws, while transporting wastes from transfer centers to landfill sites, the waste should not be visible, should not fall out and there should no seepage of liquid materials, no leach and odor should come out of the solid waste, solid waste should be easily loaded and unloaded, and should be conducive to road capacity and condition. Audit team observed wide variation in daily amount of waste transported ranging from 27 to 194 trips on a normal day. Substantial portion of vehicles used for transportation are run by the private sector waste collectors which do not comply with the criteria prescribed. The interview with drivers involved in transportation reveals incompatible figures on what KMC says waste collected and transported.
7. The SWM law prescribes that the KMC should encourage people to reduce, reuse and recycle the waste by issuing necessary directives and through awareness programmes. The data obtained from KMC shows that the major portion of the waste is organic which can be reduced by segregating and composting at household level, in collection centre and transfer station. At the same time, the large proportion of plastic, paper, glass and other materials provides a great opportunity of reuse and recycling. But the KMC found neither issuing directives nor operate compost plant for reducing organic waste.
8. The local body e.g. the KMC is responsible, as per SWM Laws, to manage sanitary landfill sites. However, there is SWMTSC which involved in land acquisition, distribution of compensation and physical construction of landfill site, whereas KMC has involved in day to day operation of the landfill site. The involvement of two institutions for managing the same site could overlap or avoid activities essential for environmental protection and mitigation measures.
9. As per SWM Technical Guideline, there should be a provision of leachate collection and treatment by construction of leachate liner, estimation of quantity and quality of leachate, collection and treatment system to manage water, land and air pollution around the land fill site caused by leachate generated in landfill site. The audit team observed that the landfill leachate management system was in poor condition. The leachate liner was found in almost collapsed, flowing leachate here and there on the road and other open spaces. The responsible authorities have not made estimate of quantity and quality of leachate production. Even though, there are two leachate treatment ponds, the leachate is flowing directly into nearby river. The generator used for leachate treatment had already stolen and other machine left waiting for maintenance.

   It was observed that there were no gas venting facilities in the landfill to minimize hazardous conditions that may result from the uncontrolled accumulation and dispersal of highly inflammable methane gas.

❖ **What did we recommend?**

1. The KMC should conduct survey and study on waste generation and its characteristics and density in regular time interval so as to estimate total waste in its territory and prepare solid waste management plan on the basis of this estimate.

2. The KMC should manage the waste through segregation of waste at source by launching awareness and other incentive programs.
3. Based on the waste generation rate, composition and density and the extent of work assigned to private parties, the KMC should arrange for required numbers of vehicles. Further, it should make optimum use of available resources (vehicles).
4. As per provision of law, the KMC should charge service fee to all service-receivers on the basis of quantity, weight and nature of solid waste as per polluters' to pay principle.
5. The KMC should operate the existing infrastructure for segregating various wastes and compost plant according to environmental regulations. The necessary resources should be managed for segregating and recycling waste at transfer centre. Conduct feasibility study for transforming the open transfer centre into a closed one by developing necessary infrastructures as well as should make sufficient efforts to control foul odour and leachate flow.
6. The KMC should make arrangement for transportation of waste from transfer center complying with the criteria prescribed. It should ensure sufficiency of vehicles for waste transportation.
7. As provisioned under the Act, 3Rs (Reduce, Recycle and Reuse) should be promoted to significantly reduce the amount of waste to be disposed of at landfill sites, thereby saving costs for final disposal and reducing public health and environmental risks. The public awareness on segregation of waste at sources, operation of composting and recycling plants in municipal and community level have been introduced and should be scaled up.
8. There should not be overlapping between institutions regarding selection, development and management of landfill sites.
9. The landfill site should be operated efficiently as prescribed the environmental laws with prescribed mitigation measures suggested by the Environmental Impact Assessment Reports.

❖ **Were there any innovations or solutions to the environmental problem?**

Government has enacted Solid Waste Management Act, 2011 and Rules, 2013, Environment Protection Act, 1997 and Rules, 1998. Similarly, Local Self-Governance Act, 1999 has made provisions relating to environment protection and made local bodies like KMC responsible for environment management. Government has established the Environment Department and so done at KMC as well. The Government has formulated Solid Waste Management Policy 1996 which encourages local bodies and community to get engaged in waste management.

4. Impact and results

❖ **What actions were taken to respond to the audit's results?**

The KMC and the SWMTSC have agreed on audit recommendation and expressed commitments to implement audit recommendation. They have said they will incorporate actions required to implement audit recommendation into their annual and periodical plan.

❖ **Were there environmental benefits as a result of the audit and government's action?**

There were environmental benefits as a result of the audit. This has helped to create awareness amongst stakeholders local people affected, drivers and cleaning staffs interviewed or involved in FGD which has ultimately resulted in some sort of pressure to the KMC, the SWMTSC and the government to address the issues identified and reported by the auditors.

5. Challenges and barriers

❖ **What challenges did we face?**

The subject matter under audit was the function/responsibility of Kathmandu Metro City (KMC) requiring auditors to obtain audit evidences or information from KMC, however as per Local Self-Governance law of the country KMC is not an entity mandated to be audited by the OAGN. This fact posed some challenges.

Since this was first Environmental Audit conducted by SAI Nepal, auditors had no previous knowledge, experience and skill.

❖ **How did we overcome them?**

Though audited entity was not under financial audit mandate of OAGN, the subject matter; solid waste management had direct impact in lives of citizen and was a matter of public interest. Further, KMC was headed by the Executive Officer deputed by the Ministry of Federal Affairs and Local Development. So, the auditors held meeting with the Executive Officer and Head of Environment Department of KMC and discussed the issue and obtained full commitment to support audit team.

Since this was first Environmental Audit conducted by SAI Nepal, auditors had no previous knowledge, experience and skill. So, this audit was performed as joint cooperative audit with support of SAI Norway. SAI Norwegian team provided required technical support to the Nepalese counterpart.

6. Lessons learned

❖ **What did we learn?**

This was a first environmental audit conducted by the SAI Nepal and this has helped us to realize our responsibility towards citizens' right to live in clean environment. We have greater realization of need of conducting more environmental audits as these are directly related with the lives of the citizen. We also learned that we need to have competent staffs to conduct varieties of environment audits.

❖ **Did we use INTOSAI guidance documents?**

Audit was conducted in accordance with Draft Environmental Auditing Guide prepared by the SAI Nepal with support of SAI Norway which is in compliance, in material respects, with the INTOSAI guidance document.

❖ **Do we have any comments we would like to share about our experience?**

We as supreme audit institutions have to demonstrate our on-going relevance to the citizen. We think when we audit and report the matters which directly affect lives of citizen and contribute to hold government accountable can be a greater tool to demonstrate our relevance. In this context auditing environmental issues should be one of highly prioritized area of the SAI among other audits.