Solid Waste Management in Nepalese Municipalities

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Solid Waste Management in
Hetauda Municipality

His Majesty's Government
Ministry of Local Development
Solid Waste Management and Resource Mobilisation Center

Clean Energy Nepal

Environment and Public Health Organisation

Preface

Solid Waste Management in Hetauda Municipality[1] is one among a series of 58 reports, which briefly describes the current situation of solid waste management in each of the 58 municipalities in Nepal. The information presented in this report was obtained from a review of relevant literature, interviews with key municipal staff as well as other stakeholders, and a waste generation and composition survey. As the report is based on information collected over a short period, including a one-week field visit conducted in September 2003, this is not a comprehensive study, but it provides a brief overview of the solid waste management situation in the municipality.

This study was commissioned by Solid Waste Management and Resource Mobilisation Centre (SWMRMC) of the Ministry of Local Development. A team of four experts, Dr. Nawa Raj Khatiwada, Bhushan Tuladhar, Ashok Tuladhar and Dinesh Raj Manandhar, coordinated the study. The field investigations in each of the 58 municipalities were conducted by a team of environmental officers under the guidance of the coordination team.

This series of reports will be valuable for researchers as well as planners and managers of solid waste management systems. An analysis of the key findings from all the 58 municipalities is presented in a separate report published by SWMRMC.

Clean Energy Nepal (CEN) and Environment and Public Health Organization (ENPHO) wishes to thank Mr. Surya Man Shakya, General Manager of SWMRMC, for taking this bold and innovative initiative of gathering information on the solid waste management situation in all the 58 municipalities of Nepal for the first time. We also wish to thank the coordination team, as well as Mr. Murali Ranjit and Mr. Nirmal Acharya of SWMRMC, for their valuable input. Finally, we are very grateful to all the environmental officers who visited the municipalities to collect the required information and the municipal staff and the local people who have provided us with this information.

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[1] This report was prepared by Bhushan Tuladhar based on field investigations conducted by Paras Acharya.

1 Introduction

Hetauda is a mid-sized municipality located in the Inner-Terai Region of the Central Development Region. It is the Headquarters of Makwanpur District, as well as Narayani Zone. It lies on the bank of the Rapti River. Because Mahendra (East-West) Highway and Trivuban Highway pass through the city, Hetauda has developed as a major commercial and industrial town as well as administration centre.

Table 1: Background Information

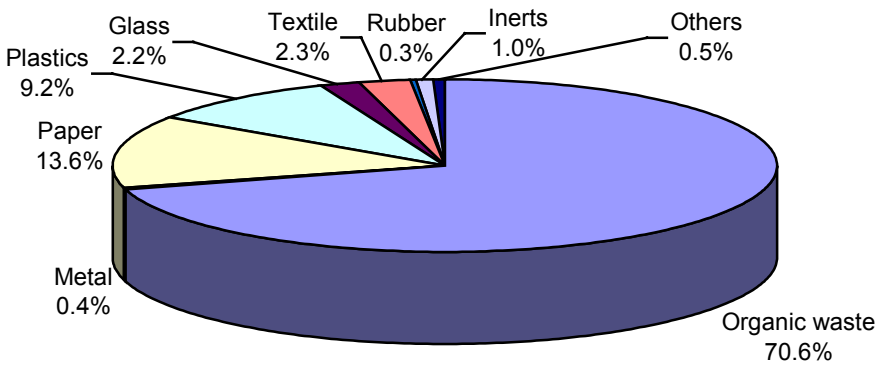
NAME	HETAUDA MUNICIPALITY
District	Makwanpur
Year of Establishment	2048 B.S.
No. of Wards	11
No. of Urban Wards	5
No. of Rural and semi urban Wards	6
Total Area	47.77 sq. km
Built-up Area	1664.52ha
Major Rivers and Ponds	Rapti, Samari, Karra
Total Road length	Black-topped: 2.57 km Graveled: 51.78 km Earthen: 70km Mule Track: 29 km
Population (2001)	68,482
No. of Households (2001)	14,271
No. Shops	893
No. of Restaurants, hotels and shops	25
Annual Population Growth Rate (1991-2001)	2.4 percent
Estimated Population for 2003	71,809
Population Density	1433.58 per sq. km

2 Waste Generation and Composition

According to the field survey done in 2003, the average per capita household waste generation rate in Hetauda was 0.25 kg/person/day. This is exactly same as the average waste generation rate in urban areas of Nepal. Considering the total population of Hetauda in 2003, which is estimated to be 71,858, the total amount of household waste generated in the municipality comes out to be 17.96 tons per day. If we assume that household waste makes up about 75 percent of the total municipal waste, then the total amount of municipal waste generated in Hetauda becomes 24 tons per day. The actual amount of household waste generated is probably a bit lower because about half of Hetauda's population live in relatively rural areas and their waste generation rate is probably a bit lower.

The same survey indicated that more than 70 percent of Hetauda's waste consists of organic materials. Similarly, 13.6 percent is paper and 9.2 percent is plastics. These figures indicate that the characteristics of Hetauda's waste are similar to the average waste composition in Nepalese municipalities. The average organic content in waste from Nepalese municipalities is approximately 65 percent and the average amount of paper and plastics is approximately 8.9 and 8.0 percent respectively.

Figure 1 Waste Composition



The loose density of household waste in Hetauda was calculated to be 296 kg per m3.

Information on Hetauda's waste generation and composition is based on waste collected from 91 households in Harikunj Road Tole and Milijuli Tole of ward 2, that had waste from 610 people.

3 Waste Collection

Field survey of Hetauda municipality's waste collection system indicated that the city collects approximately 9 tons of waste per day. The municipality has two tippers, which have a volume of 3 m3 each and they each make trips per day. Similarly, the municipality has two tractors, which make two trips per day. One of the tractor has a 3 m3 trailer, while the other has a 2.25 m3 trailer. Assuming these vehicles filled to capacity in each trip, they will carry a total of 28.68 m3 of waste per day. Further assuming that the on-truck density of waste is 0.35 tons/m3, the total amount of waste collected by the two trucks and two tractors of Hetauda Municipality comes out to be 10.03 tons. Assuming that the total amount of waste generated in Hetauda is 24 tons per day, the city is collecting about 38 percent of the total waste generated. Most of the waste that is not being collected is probably waste from rural areas within the municipality.

Hetauda Municipality has 66 sweepers, 42 of whom are permanent employees, who sweep approximately 8 km of city streets on a daily basis and approximately 3 km of streets in central Hetauda is swept twice a day.

Sweeping is done using ordinary brooms with long handles and the waste is collected in handcarts and wheelbarrows using shovels. The Municipality has a total of 30 of handcarts, with a capacity of 0.27 m3 and two rickshaws with capacities of 0.53 m3 and 0.94 m3. Once the carts are filled, the waste is loaded on to a tractor trailer or truck. The Municipality has two tractors with trailers (3.03 m3 and 2.25 m3) and two trucks (3.02 m3 capacity).

The Municipality does not have bulk containers or door-to-door collection system. As a result, all the waste is placed on to the roadside for pick up by the municipal sweepers.

For the purpose of street sweeping and waste collection, the city is divided into 20 routes and sweepers are assigned to each of these routes.

4 Final Disposal

The collected waste is a disposed in a crude dumping site on the banks of the Rapti River, about 3 km from the city. The site with an area of 1.35 ha has been used for the past three years. Previously, waste was also dumped in ward 11, Sukumbasi Tol.

The Municipality has plans to construct a landfill site at Ward 10 Sisnughari, but requires financial and technical assistance for this purpose. The proposed site is located at a distance of 3 km from the city and has an area of about 3.4 ha. The municipality feels that this site, if developed, can be used for about 50 years.

5 Composting and Recycling

Hetauda Municipality is actively promoting recycling and composting at the household level. The city has distributed household composting bins to over 400 households and provides regular training. The compost bins are made locally from plastic containers and come in two sizes. One is of 100-litre capacity and the other is 60 litres. The cost of the 100-litre bin is Rs. 550 and the 60-litre bin costs Rs. 250. The bins are sold to local people with a 50 percent subsidy and following a training programme.

Hetauda also has a special plastic recycling programme. A few years ago, Hetauda Municipality had attracted the attention of the nation when they banned plastic bags within the city. After experiencing difficulties in completely banning plastic bags, the city has now adopted the strategy of effectively managing plastic waste by promoting reduction and recycling. The city has distributed a piece of wire with a hook called “Suiro” to all households and has requested the citizens to collect their plastic waste in this Suiro. The municipality buys the collected plastic bags at Rs. 6 per kg. The municipality has also banned the use of plastic bags that are less than 20 microns in thickness and has also distributed cloth bags.

The recycling and composting programme is done in close collaboration with NGOs and community groups. The city also has scavengers and scrap dealers involved in recycling.

6 Special Waste Management

Hetauda Municipality, in collaboration with General Welfare Pratisthan, an NGO, has developed a system for collecting and managing medical waste separately. Every generator of medical waste (hospital, clinic and drugstores) is provided with a separate bin. The waste is segregated into three categories: (a) syringe (b) cotton guages and other hazardous waste (c) plastic and glass. While plastic and glass is buried, the syringe and other infectious and hazardous waste is burned in an incinerator made from concrete rings and the ash is buried. A separate rickshaw is used to collect medical waste and transport it to the incinerator.

The medical waste management programme, which was initiated in 2002, has received some assistance from Programme for Appropriate Technology in Health, USA and the total operation cost is estimated to be about Rs. 50,000 per

year. Initially, the programme faced difficulties in convincing waste generators to segregate their waste. Now the NGO managing the service is considering expansion of the programme.

Although there is room for improvement in Hetauda's medical waste management system, the system is a very good initiation and needs to be promoted further.

The city does not have any system to collect other types of special waste such as construction/demolition debris, industrial waste and dead animals.

7 Community Mobilization

Hetauda Municipality is actively working with local communities and NGOs in conducting activities to raise awareness on waste management and promote recycling and composting. It has published several brochures/pamphlets and organized several interaction and training programmes.

In order to coordinate the activities of various NGOs and community groups, the municipality has formed a Environmental Improvement Coordination Committee, which includes representatives from various organizations within Hetauda. The committee has 13 members and the head of the Environment Division of the Municipality serves as the member secretary of the committee. The committee was formed on 3rd Paush 2059 (December 2002). Since then the committee has met several times and has prepared a list of programmes that it will initiate with support from the municipality and the local people. The Committee has also formed ward level environment committees.

Some of the NGOs involved in waste management in Hetauda are as follows:

Navajeevan Jyoti Club has been active in managing plastic waste for several years. The club initiated the successful Suiro programme to collect plastic waste from households and now similar programmes have been initiated in other municipalities as well. Mr. Shyam Shrestha from the Club is currently the coordinator of the Environment Improvement Coordination Committee.

Ratnanagar Samaj Sewa Sanstha, a local club located in ward 5, has been involved in waste collection and recycling since 2002.

General Welfare Pratisthan has been involved in medical waste management since 2002. The NGO is involved in collecting and incinerating medical waste.

Hetauda Municipality has also been receiving support from the Urban Development Through Local Efforts programme (UDLE) of GTZ, which is mainly providing technical and financial support in promoting household composting.

8 Organizational and Financial Aspects

The main responsibility for solid waste management lies with the Environment Sanitation and Community Development Section of Hetauda Municipality. Mr. Dhruba Bhujel, the head of the Section comes from an administrative background but has received a six-month training and several other training programmes on waste management from UDLE. The section has two supervisors and 66 sweepers.

The municipality spends approximately Rs. 450,000 in waste management each year. This however, does not include staff salary. The salary for 69 staff involved in waste management is expected to cost Rs. 2.5 million. Therefore the total cost of waste management in Hetauda is approximately Rs. 3 million. This is approximately 5 percent of the total budget of the municipality, which is about Rs. 63 million.

9 Major Problems and Issues

The main problem associated with waste management in Hetauda is the lack of a sanitary landfill and compost plant. The municipality has selected a site for a central compost plant and landfill but it does not have the necessary resources to develop the site.

The municipality also requires additional vehicles and collection equipment.

10 Conclusion & Recommendations

Hetauda Municipality has so far done a remarkable job on solid waste management by effectively mobilizing local communities and initiating innovative programmes such as plastic recycling, medical waste management and compost bin distribution. The local staff seem to be committed to improving the waste management system and willing to learn new things. But they need additional resources to follow up on their programmes and improve the waste collection system. Hetauda also needs support to materialize their plans for a central composting and landfilling facility at Sisnughari.

Recommendations:

1. SWMRMC should assess the proposed landfill site at Sishnughari and provide technical and financial assistance in developing the site for composting and landfilling.

2. The waste collection system should be improved so that waste is collected door-to-door to the extent possible. With an effective waste collection system, it will not be necessary to sweep the streets twice a day. This can save valuable resources.

3. The municipality has plans to introduce source-separated collection. This should be implemented in a phased manner. In order to make this effective, it should be supplemented by a public awareness campaign.

4. The hand carts that are currently being used seem to be very small. Larger carts or rickshaws with detachable containers would probably be more effective.

5. The community mobilization activities at Hetauda seem to be very effective. Therefore, this should be used as a model for other municipalities as well and staff from Hetauda can be used as resource person for training in other municipalities. Hetauda municipality should continue these activities by expanding the scale and regular follow up. The municipality should also include school-based programmes.

6. The Municipality should also explore the possibility of involving the private sector in waste management in order to make the SWM system

more efficient and effective. This initiative should also aim to raise the cost of waste management from the people who receive the service.

For more information please contact:

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Annex 1: Photographs

Waste Collection from Street Bins

Transfer of Waste from Hand Carts to Tractor

Different Rickshaws Used to Collect Ordinary Waste, Plastics and Medical Waste

Plastic Waste Collected by Municipality for Recycling

Compost Bins Being Manufactured Locally

Unloading of Waste from a Tipper

Waste Dumping Site