

## Solid Waste Management in **Dharan 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 Dharan Municipality**<sup>1</sup> 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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<sup>1</sup> This report was prepared by Bhushan and Gopal Raj Joshi based on field investigations conducted by Sabin Raj Joshi.

## 1 Introduction

Dharan is a mid-sized municipality located in Sunsari district, Koshi zone of the Eastern Development Region. It was established in 2017 B.S. Dharan is one of the fastest growing cities in the nation and a major urban centre of eastern Nepal. Dharan lies on the southern slope of Mahabharat mountain range immediately north of the Charkoshe Jungle and the terai. The municipality is bordered by Panchakanya VDC in the east, Bishnupaduka VDC in the west, Vedetar VDC and Panchkanya VDC in the north and Charkoshe Jhadi in the south. With the establishment of the B. P. Koirala Teaching Hospital, Dharan is becoming a centre for education and health facilities.

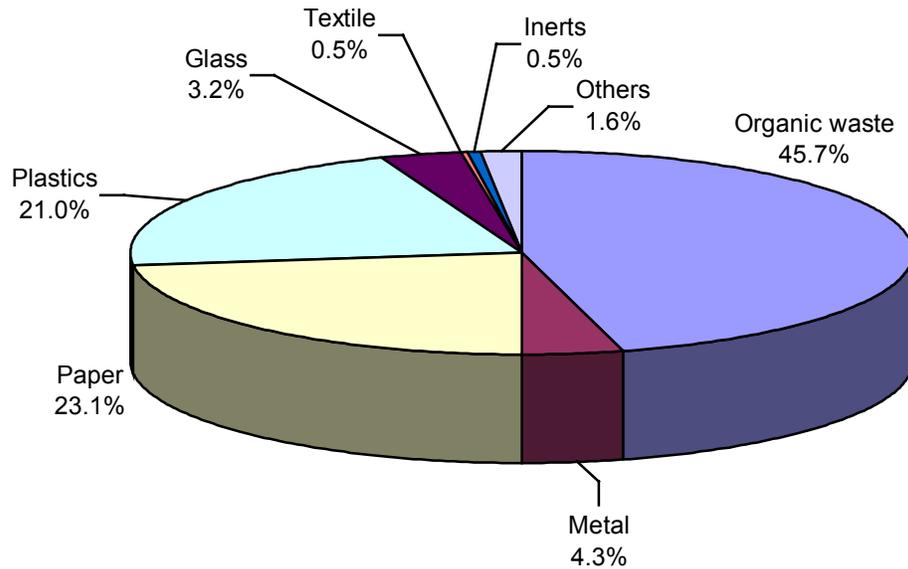
**Table 1: Background Information**

NAME	DHARAN MUNICIPALITY
District	Sunsari
Year of Establishment	2017 B.S.
No. of Wards	19
No. of Urban Wards	17
No. of Rural and semi urban Wards	2
Total Area	103.38 sq. km
Built-up Area	789.74 ha
Major Rivers and Ponds	Sardu river, Sweti river
Total Road length	Black topped: 52Km Gravel: 13.21Km Earthen: 120.5 Km
Population (2001)	95,332
No. of Households (2001)	20428
No. Shops	1950
No. of Restaurants, hotels and shops	128
Annual Population Growth Rate (1991-2001)	3.72
Estimated Population for 2003	102,517
Population Density (2001)	922.15 per sq. km

## 2 Waste Generation and Composition

According to a field survey done in 2003, the average per capita household waste generation rate in Dharan was 0.36 kg/person/day. This is higher than the average waste generation rate in urban areas of Nepal, which is 0.25 kg/person/day. Considering the population of Dharan in 2003, which is estimated to be 102,466, the total amount of household waste generated in the municipality comes out to be 36.9 tons per day. If we assume that 75 percent of the total municipal waste is generated from households, then the total amount of municipal waste generated in Dharan becomes 49 tons per day. The actual waste generation rate is probably lower because the per capita waste generation rate calculated during the field survey is quite high.

**Figure 1 Waste Composition**



The composition of waste shows that although organic waste is the largest portion of the waste stream, the percentage of organic waste is relatively low compared to other municipalities. On average, the amount of organic materials in waste from Nepalese municipalities is 65 percent. Similarly, the portion of plastics and paper is very high compared to the average of 8.9 percent in Nepalese municipalities.

The loose density of household waste in Dharan was calculated to be 180.40 kg per m<sup>3</sup>.

Information on Dharan's waste generation and composition is based on waste collected from 79 households in Mahendrapath, Mangalbare and Chimeki Line areas of wards 3, 5, 11 and 12. These sampled households that had waste from 365 people.

### 3 Waste Collection

According to the municipality, it is collecting approximately 7 tons of waste per day with the present waste collection system. If we assume that the total amount of waste generated in Dharan is 49 tons per day, the city is collecting about 14 percent of the total waste generated. This is a very low collection rate. Either the figures are incorrect or the municipality is doing a poor job in waste management. One possible explanation is that the actual waste generation rate is probably much less than 49 tons per day.

Previously the municipality had awarded contract (for approximately 7 months) to a local NGO for waste management services, but it was discontinued because of opposition from staff. At present, the municipality carries out cleansing service with the help of 61 sweepers, 12 of whom are permanent employees, who sweep approximately 3 km of city streets on a daily basis and approximately 3 km of streets is swept once a week. The municipality also launches campaign sweeping on the need and demand basis.

The municipality has imposed restriction for throwing waste on the roadside. So the local people are requested to collect the waste in the waste bin in their home and directly throw in the garbage collection vehicle. The municipality used to provide container service by placing containers in the different corners of the city. Later on the municipality removed all the containers as people started to misuse the containers by throwing waste outside also. But some NGOs and CBOs have placed about 150 containers in the core part of the city.

Sweeping is done using ordinary brooms with long handles and the waste is collected in handcarts using shovels. The municipality has a total of 4 of handcarts, with a capacity of 0.62 m<sup>3</sup>. Once the carts are filled, the waste is loaded on to a tractor-trailer or tipper. The municipality has two tractors with trailers (1.33m<sup>3</sup> capacity) and one tipper (4.21 m<sup>3</sup> capacity).

For the purpose of street sweeping and waste collection, the city is divided into 2 routes. The sweepers assigned to each of these routes carry out sweeping and collection of waste in the morning (5-11 AM) and evening (1-5PM).

## **4 Final Disposal**

The collected waste is disposed in a crude dumping site on the banks of the Sweti River, about 5 km from the city. According to the municipality, the site with an area of 1 bigha, has been used for more than 43 years. At present the municipality is disposing the waste in temporary open piles. As this has negative environmental impacts, the Municipality is trying to bury waste on the same place with the consensus of the District Forest Office, who is the owner of the present dumping site.

The municipality does not have any plans to construct a landfill site.

## **5 Composting and Recycling**

Dharan Municipality is actively promoting recycling and composting at the household level. The city has conducted various training programmes on solid waste management and household composting practices for city health volunteers, women volunteers and local households. The municipality has also established the local community-based groups called Tole Utthan Samuh in various wards. One such group in ward no 12 is very active in promoting composting. The group conducts training programmes and also carries out regular follow up. At present, 77 households of ward no 12 are successfully practicing composting. The training and regular monitoring is being done with the help of the municipality and Urban Development Through Local Effort (UDLE).

The municipality also plans to build a compost plant at Satrangi Park, which is 5-km away from the city. According to the Municipality the plant will be set up and operated within a year.

Dharan also has a special paper and plastic recycling programme. A few years ago, Dharan Municipality has adopted a strategy to effectively managing plastic waste by promoting reduction and recycling. The city has distributed a piece of wire with a hook called "Suiro" to households of main market area and has requested the citizens to collect their plastic waste in this Suiro.

The municipality has also established a paper recycling plant with the help of UDLE. A local NGO called Samajik Sudhar and Batabarniya Bikash Manch has

been awarded the contract to operate the plant. The paper recycling plant is located at ward no.10, Putali line. The plant collects recyclable paper from the different offices, schools, campuses and other organization situated inside the municipality. The recycled paper is used to prepare different office stationery, greeting cards and other handicrafts.

The city also has individual scavengers and scrap dealers involved in recycling. It is estimated that there are approximately 10 scrap dealers with in the city.

## **6 Special Waste Management**

Dharan Municipality does not have any system for collecting and managing medical waste separately. There are altogether 26 institutions providing health cares services. BP Koirala medical college, the largest hospital in the city, has a double-chambered incinerator where waste is burned and the ash is buried.

But other hazardous waste generators do not have incinerators. The municipality used to collect and dump such waste mixing with other municipal waste. But now the municipality has stopped doing so. The municipality has compelled all the health institutions to manage their waste by themselves. They burn their waste or bury it.

The municipality also plans to collect the hazardous waste separately and burn it in the incinerator of the BP Koirala Medical College. For this, the municipality will charge a certain amount of service fee from the waste generators.

The city does not have any system to collect other types of special waste such as construction/demolition debris, industrial waste, and dead animals. The dead animals are simply buried in the jungle. The construction and demolition waste is used for filling low land.

## **7 Community Mobilization**

Dharan 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 an Environmental Improvement Coordination Committee, which includes representatives from various organizations within Dharan. The committee has conducted different programmes involving the municipality and the local people. The Committee has also formed ward-level environment committees.

Some of the NGOs and CBOs involved in waste management in Dharan are as follows:

Tole Development Committees have been active in managing waste since 1997. At present such committees have been established in ward no.12, 17, 19 and 8.

Samajik Sudhar Tatha Batabaran Bikash Manch, a local NGO located in ward 10, has been involved in paper recycling. Previously it was also involved in waste collection and disposal with a formal contract with the municipality.

Tole Utthan Mahila Samuha has been set up in ward in 12, 15 and 8. The Samuha comprises of highly motivated women of the ward. The group is involved in street cleaning, sanitation and household composting. It organizes training and interaction programs to raise awareness among the local community.

The municipality, however, lacks school-based programs to promote environment friendly behaviour in students.

Dharan Municipality has been receiving support from the UDLE of GTZ, and the SEAM-N project supported by the Finnish government in community-based solid waste management. UDLE is 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 and Sanitation Sub-Section of Dharan Municipality. The Sub-Section has three supervisors and 61 sweepers. Some of the staff have received training on solid waste management.

The municipality spends approximately Rs. 35,00,000 in waste management each year, which is about 7 percent of its total annual expenditure of about Rs. 50 million. The municipality collects approximately Rs. 5,33,000 per year as sanitation service fee from the households, which is about 15 percent of the total expenditure on waste management. For the collection of sanitation tax, the municipality has three different categories having different tax rate namely commercial area, residential area and core area.

## **9 Major Problems and Issues**

The main problem associated with waste management in Dharan is the lack of a sanitary landfill and compost plant. The municipality is dumping the waste on the bank of the Sewati River, which is not a good practice. The lack of necessary resources (financial, technical and manpower) is another important issue. The municipality requires additional vehicles, collection equipment and trained manpower.

## **10 Conclusion & Recommendations**

Dharan Municipality has so far done a fairly good job on solid waste management by effectively mobilizing local communities and initiating innovative programmes such as plastic, paper recycling and compost bin distribution. The municipality seems to be committed to improving the waste management system and willing to adopt new practices. But it needs additional resources to follow up on their programmes and improve the waste collection system. Dharan also needs support to materialize their plans for a central composting and landfilling facility.

Recommendations:

The Municipality should stop crude dumping of the waste on the bank of the Sewati River. The waste should at least be covered.

The Municipality urgently needs a landfill site and a compost site. There are some efforts underway to develop a compost plant and landfill site three

municipalities in the region, Biratnagar, Itahari and Dharan. SWMRMC should assess this initiative and provide technical and financial assistance if it seems feasible.

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 daily. This can save valuable resources. The municipality should also plan to introduce source-separated collection. Two types of the buckets should be distributed to collect organic and inorganic waste separately. This should be implemented in a phased manner. In order to make this effective, it should be supplemented by a public awareness campaign.

1. The Environment and Sanitation Sub-Section should be equipped with additional vehicles, collection equipment and trained manpower.
2. The training and awareness programmes to promote household composting should be extended throughout the city. The municipality should provide subsidy on compost bins.
3. The handcarts that are currently being used seem to be very small. Larger carts or rickshaws with detachable containers would probably be more effective.
4. The community mobilization activities at Dharan seem to be very effective. Therefore, Dharan municipality should continue these activities by expanding the scale and regular follow up. The municipality should also include school-based programmes.

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**Annex 1: Photographs**



**Waste Collection in Truck**



**Tractors Used for Waste Collection**



**Unloading of Waste at the Dumping Site**



**Waste dumped at Sweti River**