

## Solid Waste Management in **Triyuga 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 Triyuga 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 Tuladhar and Bhumika Vaidya based on field investigations conducted by Anil Shrestha.

## 1 Introduction

Triyuga is a new municipality established in 2053 B.S by combining the village development committees (VDCs) of Deuri, Bhumarsuwa and Gaighat. It is located in the Inner Terai region of Udaypur district in Sagarmatha zone. The municipality is bordered by Jogidaha VDC to the east, Bhalayadada and Rauta VDCs to the west, Saune VDC to the north and Saptari district to the south. Although declared a municipality, only the areas of Gaighat, Bokse, Deuri and Jaljale within the Municipality have some urban characteristics, the rest of the areas are still rural.

**Table 1: Background Information**

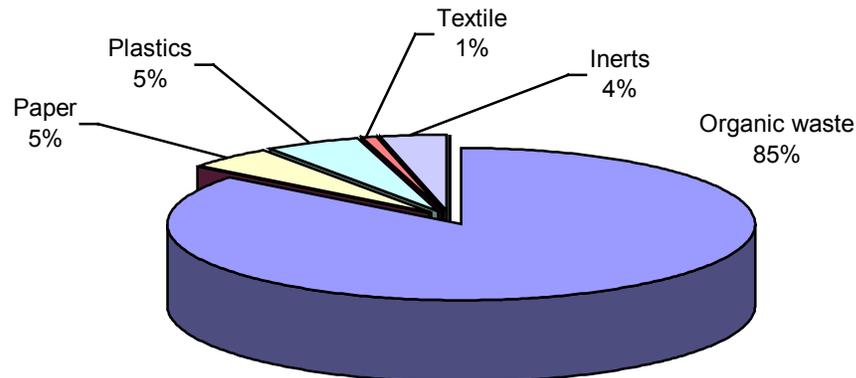
NAME	TRIYUGA MUNICIPALITY
District	Udayapur
Year of Establishment	2053 B.S
No. of Wards	17
No. of Urban Wards	NA
No. of Rural Wards	NA
Total Area	319.88 sq. km (CBS data)
Built-up Area	NA
Major Rivers and Ponds	Triyuga, Baruwa and Luhale River
Total Road length	Total: 221 km Black topped: 15 km Gravelled: 26 km-
Population (2001)	55291 (CBS data)
No. of Households (2001)	10506 (CBS data)
No. of Shops	NA
No. of Restaurants, hotels and lodges	27 / 16 / 6
Annual Population Growth Rate (1991-2001)	4.0
Estimated Population for 2003	59,803
Population Density	172.85 per sq. km (CBS data)

## 2 Waste Generation and Composition

According to the field survey done in 2003, the average per capita household waste generation rate in Triyuga was 0.098 kg/person/day. This is much lower than the average waste generation rate in urban areas of Nepal, which is estimated to be 0.25 kg/person/day. Considering the estimated total population of Triyuga in 2003, which is 59,752, the total amount of household waste generated in the municipality comes out to be 5.85 tons per day. Assuming that 75 percent of the total municipal waste is generated by households, the total amount of waste generated in Triyuga comes out to be 7.8 tons per day.

The composition of waste shows that organic waste is the largest portion of the waste stream, the percentage of organic waste is slightly higher than other municipalities. The average organic content in waste from Nepalese municipalities is about 65 percent.

**Figure 1 Waste Composition**



The loose density of household waste in Triyuga was calculated to be 171.7 kg per m<sup>3</sup>.

Information on Triyuga's waste generation and composition is based on waste samples collected from 76 households in ward no. 2 (Mulchowk) that had waste from 418 people.

### **3 Waste Collection**

The municipality estimates that it is collecting about 3 m<sup>3</sup> of waste per day, which is equivalent to about 0.5 tons per day, if we assume a waste density of 171 kg/m<sup>3</sup> as calculated by the field survey. The on-vehicle density of the collected waste however may be much higher. Experience from Kathmandu indicates that the on-truck density of municipal waste is normally about 400 kg/m<sup>3</sup>. If we assume that the density is 400 kg/m<sup>3</sup> then the amount of waste collection is about 1.2 tons per day. If we were to assume that the waste generation is rate is 7.8 tons per day and the collection rate is approximately 1 ton per day then the collection rate is approximately 13 percent.

Triyuga Municipality has 6 permanent sweepers, who sweep 4 km of street and public open spaces thrice a week. The municipality has two-tractor trailers with a capacity of 3 m<sup>3</sup> for waste collection. The municipality has roadside pick up service thrice a week.

### **4 Final Disposal**

The collected waste is disposed in a crude dumping site on the bank of the river. The site with an area of 2 ha has been used since the past 5 years. The site is approximately 1.5 km from the city. The estimated life span of the site is 5 years. The municipality has no plans to construct a landfill site.

### **5 Composting and Recycling**

The Municipality claims that 90 percent of the households are practicing composting. But the field survey indicated that the organic waste in the waste stream is very high.

The municipality does not have any composting/recycling programmes of its own but it allows scavenging in collection and disposal site.

## **6 Special Waste Management**

Triyuga Municipality has 1 hospital, with 15 beds, and 5 clinics, which generate medical waste. The Municipality buries the medical waste. The dead animals are also buried. There is no system to manage construction/demolition waste and industrial waste.

## **7 Community Mobilization**

There is no community-based program and no private organization is involved in solid waste management in Triyuga.

## **8 Organizational and Financial Aspects**

Triyuga municipality does not have a separate section for solid waste management.

Reportedly, the average annual budget allocation for solid waste management is Rs. 2,50,000 per year, and the expense is Rs 1,96,000 per year. This is about 5.6 percent of the annual municipal total expenditure.

## **9 Major Problems and Issues**

The main problem associated with waste management in Triyuga is the lack of adequate institutional arrangements for solid waste management and proper landfill site. The Municipality also lacks sufficient equipment and resources for solid waste management. Lack of awareness among local people has also been identified as a major problem.

## **10 Conclusion & Recommendations**

Though solid waste management does not seem to be a big problem for Triyuga Municipality at present, with increasing urbanization, the problem is bound to increase in the future. Therefore, Triyuga Municipality needs to start developing appropriate structures and system for effective waste management.

Recommendations:

1. The Municipality should establish a unit responsible for solid waste management within its organizational structure and equip it with adequate resources and trained staff.
2. Proper waste collection system should be developed so that waste is initially stored at the source and then collected directly on to collection vehicles so that open piles on the streets are discouraged.
3. Municipality should construct a simple landfill site in order to dispose the collected waste in a safe manner.

4. Along with the construction of landfill site municipality should also promote composting and recycling.
5. As the municipality has limited resources, it should involve local community as well as private organization in waste management

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**Annex 1: Photographs**



**Waste Pile on the Street**



**Waste Collection in a Tractor**



**A Compost Pile**



**Dumping Site**