

## Solid Waste Management in **Inaruwa 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 Inaruwa 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 Arun Acharya.

## 1 Introduction

Inaruwa is a small municipality located in Sunsari district in the Terai region of eastern Nepal. Established in 2043 B.S., the municipality has 10 wards, out of which only 4 wards are in urban area.

**Table 1: Background Information**

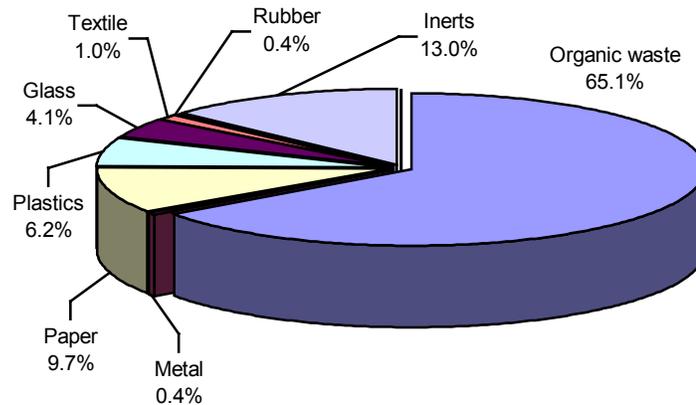
NAME	INARUWA MUNICIPALITY
District	Sunsari
Year of Establishment	2043
No. of Wards	10
No. of Urban Wards	4
No. of Rural Wards	6
Total Area	22.36 sq. km (CBS data)
Built-up Area	NA
Major Rivers and Ponds	Sunsari, Jarna River
Total Road length	43.5 km
Population (2001)	23200 (CBS data)
No. of Households (2001)	4497 (CBS data)
No. of Shops	885
No. of Restaurants, hotels and lodges	20/2/2
Annual Population Growth Rate (1991-2001)	2.3 percent
Estimated Population for 2003	24,279
Population Density	1037.57 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 Inaruwa was 0.42 kg/person/day. This is higher than the average waste generation rate in urban areas of Nepal, which is only 0.25 kg/person/day. Considering the total population of Inaruwa in 2003, which is estimated to be 24,262, the total amount of household waste generated in the municipality comes out to be 10.2 tons per day. The actual amount of household waste generated is probably lower than this amount because most of Inaruwa's population live in rural areas, where the waste generation rate is probably lower. 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 Inaruwa becomes 13.6 tons per day.

The composition of waste in Inaruwa is similar to most other municipalities in Nepal with about 65 percent organic waste.

**Figure 1 Waste Composition**



The loose density of household waste in Inaruwa was calculated to be 505.02 kg per m<sup>3</sup>. This is a slightly high figure.

Information on Inaruwa's waste generation and composition is based on waste sample collected from 70 households in wards 1, 2 and 7, that had waste from 455 people.

### **3 Waste Collection**

Inaruwa Municipality estimates that it collects approximately 10 m<sup>3</sup>, equivalent to about 3.8 tons of waste, per day. If we assume that the total waste generation rate is 13.6 tons per day, then the municipality is collecting about 28 percent of the waste that is generated.

Inaruwa Municipality has 1 supervisor, 6 permanent and 2 temporary sweepers responsible for solid waste management. The sweepers sweep about 2.5 km of road daily, 2 km thrice a week and 200 m thrice a week.

The Municipality has a tractor with capacity of 3.24 m<sup>3</sup> and 3 carts with capacity of 0.7 m<sup>3</sup> for waste collection. The municipality also provides roadside pick-up service daily.

### **4 Final Disposal**

The collected waste is disposed in a crude dumping site, which is about 2 km from the city. The site has been used for 20 years and its lifespan is not known. Before this site, the bank of Ganan River was used as a dumping site. The Municipality has no plans to construct a landfill site.

### **5 Composting and Recycling**

Although the Municipality does not have any composting or recycling programmes of its own, it estimates that about 40 percent of the total households practice composting using traditional methods. Municipality also allows scrap dealers for scavenging in collection and dumping site.

## **6 Special Waste Management**

Inaruwa Municipality has 1 hospital, 10 clinics and 5 laboratories. As there is no system for managing special waste, the municipality dumps hospital waste, dead animals and industrial waste, along with the regular municipal waste. Construction and demolition waste sometimes reused as filling material.

## **7 Community Mobilization**

Awareness raising activities is occasionally done by the Municipality but there are no regular programmes and there are no community groups or NGOs involved in waste management.

## **8 Organizational and Financial Aspects**

Community Development Section is responsible for waste management in Inaruwa Municipality.

Reportedly, the Municipality spends approximately Rs. 2,44,000 in waste management per year. This is about 5 percent of the total annual municipal expenditure.

## **9 Major Problems and Issues**

The problems associated with waste management in Inaruwa are the lack of proper landfill site, recycling facilities and adequate resources (financial and human). The lack of a proper waste collection system and awareness among the local people are major issues. Community involvement in waste management, composting and recycling and proper medical waste management is also lacking.

## **10 Conclusion & Recommendations**

As Inaruwa is a small municipality, solid waste management may not be a priority issue. However, with increasing population and urbanization it will be a problem if not managed properly. Therefore, Inaruwa Municipality needs to start developing structures and system for effective waste management. Also involvement of private sector and community should be given preference.

Recommendations:

1. The municipality should establish basic statistical records related to waste management to formulate effective plans and strategy.
2. A simple landfill site should be developed, where waste can be buried.
3. Along with construction of landfill site, municipality should also promote composting and recycling programs.
4. The municipality should involve local CBOs, NGOs, and private parties in waste management.
5. The waste collection system should be improved so that waste is collected door-to-door to the extent possible and discourage open piles on the streets.

6. Medical waste should be managed separately. It should either be burned in a controlled manner or buried.
7. Municipality should invest in waste collection vehicle, equipments and skilled manpower for waste management.
8. SWM awareness campaigns should be done in community, schools and municipality staffs. Local groups can be mobilized for this purpose. The municipality should also launch school-based awareness campaigns.

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**Annex 1: Photographs**



**Waste Container Made from Concrete Rings**



**Rickshaw Used for Waste Collection**



**Tractor Used for Waste Collection**



**Dumping Site**



**Waste Dumping Site**



**Waste Dumping Site**