European Commission

SUNYA – Towards Zero Waste in South Asia

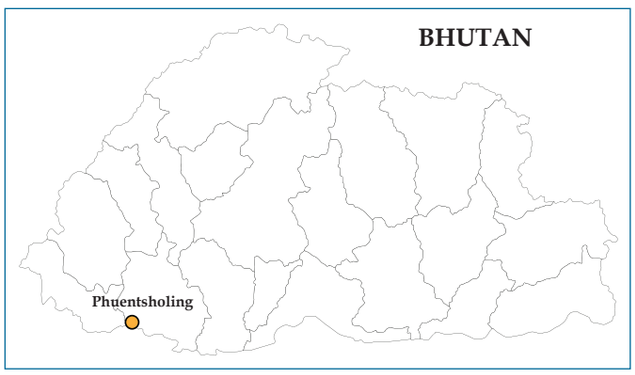
A Step Towards Decentralized Waste Management in Educational Institutions: A Case Study in Phuentsholing, Bhutan

City Profile

Phuentsholing is the second largest urban centre of Bhutan located in the South-Western part of the country 330m above the sea level. A perennial river named Om Chuu passes through the city, dividing the city into two parts. The city experiences a subtropical to temperate climate.

- Area: 19.68 sq.km
- Total Number of Wards (Constituencies): 6
- Population: 40,600
- Floating Population: 10,000
- Number of Households: 7590
- Total Number of Markets (Commercial properties/ settlements): 3
- Total Number of Industries (paper, textile or other large, medium & small industries): 250
- Total Number of Institutions (Schools, Colleges, Offices etc.): 60-80

Phuentsholing is home to numerous small, medium and large industries and acts as the economic capital of Bhutan. The town lies opposite the Indian town of Jaigoan and cross-border trade has resulted in a thriving local economy. The city is famous for its modern architecture and monasteries.



Location of Phuentsholing in Bhutan

Phuentsholing Thromde is responsible for the administration of the city and for providing basic civic services and ensuring sustainable development of the city.

Rationale for Selection of this Pilot Project

Rapid urbanization and increasing population have led to a drastic increase in waste generation in the city of Phuentsholing. The city generates about 14 tonnes of waste per day. The waste is heterogeneous in nature consisting of paper, plastic, cloth, metal, glass, ash etc. The entire municipal area is divided into three zones for waste collection: zone 1 is the core city area, with daily collection & transportation of waste, while the other two zones have a collection frequency of four times a week or once in two days. There is no material recovery and processing facility and the collected mixed waste is dumped directly at the sanitary landfill 8 km away from the city. A small amount of recyclable material is recovered by the waste collectors or rag pickers while the rest goes to the landfill.

Under the "SUNYA - Towards Zero Waste in South Asia" project supported by the European Commission, during stakeholder consultations by the Thromde, it was decided to demonstrate a successful initiative of decentralized solid waste management in the College of Science and Technology (CST). The College is located in Rinchending about 5 km away from the city with 682 people residing in the campus. There was no segregation of waste, waste was collected in open community bins, giving rise to foul odour and stray animals were creating a menace. The mixed waste from CST was taken to Toribari landfill for direct disposal.

The CST – Environmental/Nature club aimed to make the campus a zero waste campus with support from the college community. In conjunction with officials from Phuentsholing Thromde, this pilot was planned and implemented to achieve this objective.

Objective

The overall objective of the project is to demonstrate a viable working model of decentralized waste management system in the city of Phuentsholing by adopting 3R principles of waste management. The pilot project has the following objectives:

- To introduce segregation of waste at various levels: at the source and at the common collection point
- To recover reusable and recyclable materials from municipal solid waste
- To develop a system of collection and sale of recyclable wastes to generate revenues
- To process biodegradable waste in a compost yard in the campus, thereby reducing waste going to the landfill

Approach

The pilot project introduced waste segregation at source coupled with collection and transport of dry waste for recycling, while wet waste was composted within the campus. The project was implemented jointly by the CST Environmental Club members and Phuentsholing Thromde. While the CST Environmental Club implemented the project, Phuentsholing Thromde monitored the process. The project was designed to promote segregation through awareness generation activities, designing and planning collection of segregated waste, and processing of wet waste through composting while the dry waste is sold as recyclable waste.

Methodology

The pilot initiative was carried out in the CST campus in various steps. The main steps in the project include the following:

Awareness Campaign

An intensive awareness generation campaign was conducted by the CST Environmental Club with support from Phuetsholing Thromde to encourage people to segregate waste at source and dispose it in appropriate bins. This campaign included door to door campaigning by Environmental Club members, both in the households on campus as well as mass awareness generation activities in the town. Cleaning campaigns, meetings and discussions were held with the community. The campaign helped to generate awareness regarding reducing, reusing and recycling waste, waste segregation

CST Environmental Club awareness generation campaign

at source, method of proper disposal in community bins and disposal of wet and dry waste.

Regular mass cleaning campaigns were also organised, which aimed not only at cleaning the environs but also at generating awareness on the difficulties of waste collection and segregation if there is rampant littering. Members of the Environmental Club also conducted awareness campaigns in schools to inculcate sustainable waste practices at a young age. Mass "waste marches" were also conducted on special occasions.

Waste Collection Points

Prior to the project, the CST campus had open community bins for collection of waste, which produced foul smell and created unhygienic conditions. Through the pilot intervention, the Phuenthsoling Thromde and the CST Environmental Club selected 4 collection points in the Campus, based on the accessibility of the common collection points to residents, the clustering of houses, and feasibility of placing bins at a particular location. Each common point now has five bins each for recyclables, non-recyclables, Bio-degradable, medical waste and hazardous wastes. The bins were labelled to help people dispose segregated waste in the appropriate bin.

Segregation of Waste

Each house hold was given 2 bins, red to store dry waste and green for wet waste. Households are required to dispose off medical and domestic hazardous wastes in the collection bins directly. The segregated waste is collected at fixed hours in the morning. Further segregation is carried out at the collection points where

the club members segregate any residual unsegregated waste, twice a week.

Segregated waste is stored in the club store house. When adequate amount of waste is collected, club members segregate the recyclables into different saleable fractions, such as paper and cartons, mineral water bottles, glass bottles, plastic scrap etc. This segregated recyclable waste is sold to the "Sangay Scrap Dealer" in Phuentsholing. Biodegradable waste is composted on-site. The inert waste is disposed by the Thromde in the landfill.

Segregated waste collection points at CST campus

The proceeds from the sale of recyclables are used to support awareness campaigns such as art competitions, plantation activities, purchase of dustbins for distribution etc.

Waste generated from different sources

Source	Type of waste generated
Residents	Food waste, plastics, papers, bottles, cartons
Hostels	Papers, Plastic bottles, Cans, Plastics, cartons
Mess	Food waste, cartons, cans, tins
Administration blocks	Papers , bottles
Canteen	Food waste, cans, plastics

Processing of Biodegradable Waste – Composting

On an average, per capita biodegradable waste generation is about 0.34 kg/day. Excluding the biodegradable waste from the mess, biodegradable waste in the campus constitutes about 10% of the total waste generated. The environment club associated with local farmers who required the biodegradable waste as feed for their cattle. These farmers provided the college with cow dung and Tar-chu (diluted curd) on occasions. Remaining biodegradable waste was composted. A crude compost shed was constructed by the Environmental Club to experiment with different composting methods and for assessing the resulting compost quality.

The municipality and the environment club had little experience in composting, and were experimenting to achieve a suitable method for them by modifying the Takakura Composting Method. However, with intervention from experts provided under the SUNYA project, an aerobic composting method similar to windrow composting has been proposed and is currently in practise. The Phuentsholing Thromde, as a part of the SUNYA pilot project constructed an appropriate shed for composting in the CST campus.

Results/Outcomes

This pilot project is the first initiative on 3R of waste management, and has generated awareness among citizens regarding segregation and on-site waste management. Subsequent to the pilot initiative, there is no requirement for disposal of biodegradable waste from the CST. Thromde officials and members of the environment club have now gained experience in planning and developing localized segregated waste collection and disposal mechanisms. Based on the success of this pilot project, the Thromde has also started a similar initiative in the National Pension & Provident Fund (NPPF) Colony. Through the implemented decentralised waste management system, no biodegradable waste is sent to the landfill for disposal. Recyclable waste is also diverted from the landfill. The pilot project also demonstrated a successful business model for generating income from waste which is supporting different activities of the Environmental Club in CST, such as school visits and campaigns for SWM segregation and against littering.

At the city level, the SUNYA project has achieved a demonstrated reduction in waste going to the landfill; from 73.85% of the total waste generated in the city to 31.84%. This is a result of the awareness generation activities, increased effectivity in segregation of recyclables by municipal waste collectors and due to pilot implementation in CST college and NPPF colony.

Success Factors

- The success of this project was dependent on the awareness generation activities that were undertaken in the area. A strong campaign encouraged community participation and ensured proper segregation and collection of waste.

- Involving the Environmental Club of CST in the project resulted in an effective and sustained IEC campaign.
- Involvement of municipal officials and regular monitoring of project activities helped to keep the project on track.

Lessons Learnt

Implementing the project in the city has shown that involvement of the community in waste management is essential for successful waste management. It is beneficial to involve the community from the planning stage itself to ensure acceptability of the project.

Sustainable waste management is beneficial environmentally and economically. Sale of recyclables can generate funds for further action on solid waste management.

There is a lack of authentic data on waste generated in the city and its composition. This needs further assessment to develop an effective waste management strategy in the city.

Sustained awareness generation campaigns are required to ensure public participation, until such time that the community imbibes the concepts of waste minimization and recycling, segregated waste disposal and on-site waste management. Involvement of students is beneficial in not only providing required manpower but also to harness their capacity as significant agents of change.

Sustainability and Replication

The pilot initiative is a first of its kind in Bhutan where 3R principles were promoted and proper segregation and collection of waste was achieved. Consequently, the CST University has become a model for implementation of an effective and sustainable SWM system. The environment club is also encouraging other schools and institutions to replicate their model to ensure sustainable decentralised waste management. The Phuentsholing Thromde is also looking for funds to replicate the implementation of 3R principles in the entire city.

The decentralized waste management model demonstrated under this project can be easily replicated in all the colleges, schools and government institutions in the city. If construction of individual processing facilities for colleges/institutions is not feasible, then a cluster approach of one processing unit for 3 to 4 institutions can be adopted. This will help in reduction of a significant amount of waste going to the landfill.

Project Partners

European Commission

Project Partners

ICLEI Local Governments for Sustainability

large Müllvermeidung Gemeinnütziger Verein Association for Waste Prevention

vvsg

About SUNYA

SUNYA - Towards Zero Waste in South Asia is a project supported by the European Commission conducted in the South Asian countries of India, Nepal, Bhutan, Bangladesh and Sri Lanka. The seven cities of Shimla, Coimbatore, Hetauda, Tansen, Phuentsholing, North Dhaka and Matale partnered in the project, which was led by Municipal Association of Nepal and technically supported by ICLEI South Asia, VVSG (Association of Flemish Cities and Municipalities, Belgium) and ARGE (Association of Waste Prevention, Austria). The project focused on introduction of principles of 3R for municipal solid waste management, promoting reduction, reuse and recycling of waste through community mobilization and involvement, and scalable pilot demonstrations of reduction of waste generation and sustainable management. For more information, please visit: http://www.sunyaproject.org/

This document has been produced with the financial assistance of the European Commission. The contents of this document are the sole responsibility of the SUNYA – Towards Zero Waste in South Asia and can under no circumstances be regarded as reflecting the position of the European Commission.

Contact

Phuentsholing Thromde
Pelkhil Lam, Chukha, Phuentsholing
Bhutan
Phone: +975-5-254312
Email: tshetendorji80@yahoo.com