



Sustainable Solid Waste Management in Rural Areas

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ABSTRACT: In this paper we have studied solid waste management in a cluster of villages near Tekanpur area on NH-75. The study is based on a cluster of six villages. Our study shows that about 287gms of residential/agriculture solid waste per capita is generated in these villages every day. We found that street sweeping, grass cutting, agricultural waste, cattle dung, drain and public toilet cleaning contribute most to waste generation in these villages. Most common practices of waste processing are uncontrolled dumping which causes mainly water and soil pollution. The qualities of both solid & liquid wastes are increasing and if the wastes are disposed in an uncontrolled manner these may cause adverse impact on public health & environment. Therefore, the solid wastages are still a major problem in these rural areas. To overcome these problems, we have proposed to implement vermicomposting.

Key words: Solid waste, vermicomposting, liquid wastes,

INTRODUCTION

Solid waste has become one of the biggest problems and its management is one of the major issues now days for our environment. The problem is not restricted to a single place rather it covers all parts of the environment which leads to toxic pollutants. Developing countries face major problem i.e. solid waste management in urban as well as in rural areas. The most obvious environmental damage caused by solid waste is aesthetic. A more serious risk is the transfer of pollution to ground water and land as well as the pollution of air from improper burning of waste. Many waste activities generate greenhouse gases like landfills generate methane and refuse fleets are significant sources of carbon dioxide and nitrous oxide. Leachate from unlined and uncovered dumpsites contaminates surface and ground waters (Photograph no.1). It is necessary to have accurate information on planning a proper solid wastes management in rural areas of country. On the other hand, lack of knowledge on the unfavorable health outcomes of solid wastes has increased the occurrence of infectious diseases [1].

In order to improve the quality of life of rural population, water supply and environmental sanitation need to be improved. Both solid and liquid waste management come under environmental sanitation. The objective of solid waste management in rural areas is to collect the waste at the source of generation, recovery of recyclable materials for recycling, conversion of organic waste to compost and secured disposal of remaining waste [2]. Inorganic recyclable solid wastes

are to be collected separately from residential houses through sensitization and motivation.

Recyclable items would be sold to generate fund. In our study we suggest composting and vermicomposting for solid waste management. These technologies are ideal technologies. These are inexpensive and less time consuming as well.

MATERIALS AND METHODS

In our study area incineration is the most common opted method for solid waste management. Incineration of both hazardous and harmless wastes may cause emissions of substances which pollute air, water and the soil and have harmful effects on human health (Photograph no.2). To maintain the proper management of MSW, a survey was carried out using a predesigned questionnaire which involved randomly selected households. The questionnaire was designed to assess the source, quantity, composition of the waste generated per person per day (Photograph no. 3 & 4). Information obtained from each questionnaire was complemented by interviewing responsible government official for solid waste management in these villages in relevant department (Jan Sampark Kendra) (photograph no. 5). The purpose of this survey is to implement a technology for solid waste management in rural areas.

Disposal of solid waste can be carried out by number of methods. Vermicomposting is the technique for

Converting the solid organic waste into compost. An innovative discipline of vermin culture technology, the breeding and propagation of earthworms and the use of its castings has become an important tool of waste recycling the world over. Essentially, the vermin culture provides for the use of earthworms as natural bioreactors for cost effective and environmentally sound waste management [3].

RESULTS AND DISCUSSIONS

Solid wastage is always a leading problem in the surrounding environment due to human activities. Its maintenance and management were some important factors for a healthy environment. In both urban and rural areas dumping of different solid waste is a common problem [4]. Solid waste is the result of human activities (Photograph no. 6). If an appropriate management system is not used for this problem, it may lead to environmental pollution adversely affecting the human health [5, 6]. The activities associated with the management of solid waste from the generation point to final disposal have been divided in to number of groups i.e. no. of household, total population, details about shops, markets, commercial establishments etc., existing system of solid waste

Management and quantity of solid waste generation (Table-1). Composting can be done in concrete tanks. It is preferable to select a composting site under shade, in the upland or an elevated level to prevent water stagnation in tanks during rains. Vermicomposting is set up by first placing a basal layer of vermibed comprising broken bricks or pebbles (3-4 cm) followed by a layer of coarse sand to a total thickness of 6-7 cm. To ensure proper drainage, a 15 cm moist layer of loamy soil follows. Into this soil 100 earthworms are inoculated. Small lumps of cattle dung (fresh or dry) are than scattered over the soil and covered with a 10 cm layer of hay. Water is sprayed till the entire set up is moist but not wet. Less water kills the worms and too much water chases them away. Watering the unit is continued and the unit is monitored for 30 days. The appearance of juvenile earthworms by this time is a healthy sign. Organic refuse is added from the 31st day as a spread on the bed. Addition of refuse can be done twice a week, watering to requirement. After a few applications, the refuse is turned over without disturbing the bed. The day enough refuse has been added into the unit, watering is continued and 45 days later the compost is ready for harvest. The organic refuse changes in to a soft, spongy, sweet smelling dark brown compost [7].

Table 1: Residential solid waste generation rate, population and number of houses in these villages.

Name of Village	No. of house hold	Total population	No. of Commercial establishment	Existing System for waste Mgt.	Quality of solid waste generation
Tekanpur	700	15,000	150	Door to door collection & incineration	4305 kg/day
Makoda	250	1150	30	Door to door collection & incineration	330 kg/day
Kalyani	600	7000	50	Door to door collection & incineration	2209 kg/day
Bona	314	1327	35	Door to door collection & incineration	380 kg/day
Churuli	662	3159	40	Door to door collection & incineration	906 kg/day
Jaurasi	650	12000	70	Door to door collection & incineration	3440 kg/day



Photograph no.1: Ground water polluted by Solid Waste.



Photograph no.2: Incineration Process for Solid Waste.



Photograph no.3: A Survey was carried out by our Team.



Photograph no.4: A Survey was carried out by our Team.



Photograph no.5: Jan Sampark Kendra, Tekanpur



Photograph no.6: Solid Waste Dumped in Open Residential Area.

CONCLUSION

Vermicomposting is a well known technology. As a process for handling organic residuals, it represents a better approach for solid waste management. In this sense, vermicomposting is compatible with sound environmental principles that value conservation of resources and sustainable practices. The main aim of our study is to generate source of income for women of rural areas using vermicomposting for solid waste management. Further we have planned to conduct social awareness programmes in nearby villages for keep their surroundings clean and green [3].

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