

# Wealth from Waste an Initiative for Solid Waste Management in Rural Areas of Haryana: Issues, Challenges and Way Forward

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## How to cite this article:

Sandeep Kumar, Hardeep Rai Sharma. Wealth from Waste an Initiative for Solid Waste Management in Rural Areas of Haryana: Issues, Challenges and Way Forward. Indian Journal of Waste Management. 2019;3(2):61-67.

## Abstract

Solid waste management has become a common problem in rural areas now a day. Huge quantities of biodegradable and non-biodegradable solid waste are generated which needs proper disposal. The problem is more associated with non-biodegradable waste in the form polythene, plastic, bottles, thermocol items, paper, glass etc. Heaps of dung's are commonly visible in villages surrounding which provide favourable breeding place of vectors. According to Ministry of Drinking Water and Sanitation, Government of India (MDWS) approximately 0.3 to 0.4 million tonnes of solid waste is generated per day in rural India. Improper disposal and management of solid waste causes environmental problems as well unpleasant scene. Several initiatives have been taken by state government for effective management of solid waste. The present paper seeks to analyze and discuss Wealth from Waste (*Kachre Se Kamai*) project for solid waste management in rural areas of Haryana.

**Keywords:** Waste to Wealth; Rural areas; Solid waste; Gram panchayat; Waste disposal.

## Introduction

Solid waste can be defined as any waste other than human excreta, urine and waste water. Solid waste can also be defined as the organic and inorganic waste materials produced by households, commercial and industrial establishments for which owner have no economic value.<sup>1</sup> Depending upon land holding and house type solid waste in rural areas generally includes paper, plastic, cloths, broken glass, metal, rubber, house sweeping, kitchen waste, garden waste, cattle dung and waste

from cattle sheds, agro waste, waste from markets and shopping areas, hotels, etc. The rural organic waste includes agricultural, domestic and rural industrial wastes. Agricultural waste is preliminary originated from animals (excreta and by products of dead animals) and plants (leaves, stalks, stubbles and shells).<sup>2</sup> A survey carried in a Devan village of Hisar district showed that the different type of waste generated from households or residential areas were mainly biodegradable.<sup>3</sup> The household waste also mainly comprises of biodegradable waste consisting of kitchen waste mixed with ash, paper, stationary and books, clothes, urine and animal

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**Received on** 24.08.2019, **Accepted on** 23.10.2019

dung, and remainder of fodder of by animals and usually not considered hazardous by the villagers. The non-biodegradable waste items like left over pesticides and their empty containers, paint, batteries and medicines perceived as hazardous waste by villagers.

### **Problem statement**

Solid waste has become one of the biggest problem worlds over and its management especially in rural areas is of major concern. Dumping of waste in open and uncontrolled burning continue to be the principal method of waste disposal in India.<sup>4</sup> The objective of solid waste management in rural areas is to collect the waste at the source, recovery of recyclable materials for recycling, conversion of organic waste to compost and secured disposal of remaining waste.<sup>5</sup> In order to manage the solid waste in rural areas in the Haryana state, a project named "*Wealth from Waste*" was initiated under the "*Nirmal Bharat Abhiyan (NBA)*" of Ministry of Drinking Water and Sanitation (MDWS) in 2012. The present research paper analyzes and discusses status and implementation of *Wealth from Waste (Kachre Se Kamai)* project for solid waste management in rural areas of Haryana.

### **Materials and Methods**

#### **State profile**

Haryana a landlocked North Indian state stands 21<sup>st</sup> in terms of its area with about 44,212 km<sup>2</sup>. It lies is between 27°39' to 30°35' N latitude and between 74°28' and 77°36' E longitude and altitude varies between 200-1200 metres above sea level. As of 2011 Census of India, the state is eighteenth largest by population with 25,353,081 inhabitants. Literacy rate in the state has seen an upward trend and is 76.64% with a male and female literacy of 85.38% and 66.67%, respectively. The state is divided into six divisions for administrative purposes i.e. Ambala, Rohtak, Gurugram, Karnal, Faridabad, and Hisar, having 22 districts, 73 sub-divisions, 93 tehsils, 47 sub-tehsils, 126 blocks, about 154 cities and towns and 6,841 villages. The state has 416 Zila Parishad members in 22 districts, 2997 Panchayat Smitis Members in 141 Blocks, 6184 Sarpanches and 60436 members Panchayat.<sup>6</sup>

#### **Data generation**

Estimation of the nature, type and quantum of wastes generated by different category of people viz. households, tea stalls, restaurants, marriage

halls, vegetable market, fish market, bus stand, temples, and schools etc. is important for collection, transport, and manpower requirements point of view. The existing arrangement for waste disposal is also taken into account before starting the project. The requirements of Tri-cycles or (solar) battery operated vehicles for waste collection uniform and gears (jacket, gloves, cap, water bottle, first aid kit) for the workers, segregation shed, compost yard for wet waste, storeroom to lay in dry waste, tools and equipments are also estimated based upon number of households and quantum of waste generated.

The secondary data regarding detail of project sanctioned, constructed and functional status of these projects was taken from Minutes of Meeting of State Level Scheme Sanctioning Committee (SLSSC) for Swachh Bharat Mission-Gramin, Development and Panchayat Department, Haryana held on 14 January 2019, at Chandigarh. The detail of projects is mentioned in Table 1. Simple statistical tools have been applied for data analysis. The primary information on existing solid waste disposal and management has been generated during field visits, focused group discussion and filling of performa's during capacity building programme organized at Haryana Institute of Rural Development (HIRD), Nilokheri a nodal agency for capacity building for PRI's in the state. Seven training programmes of duration 03 days each were conducted on ODF Sustainability and SLWM from January 2017-2019. A total of 248 functionaries under SBM-G from different district, block and village level participated in these programmes (Table 2).

### **Results and Discussion**

#### **Government initiatives for solid waste management in Haryana**

The Central Government started the Central Rural Sanitation Programme (CRSP) in 1986 primarily with the objective of improving the quality of life of the rural people and also to provide privacy and dignity to women. The concept of sanitation was expanded to include personal hygiene, home sanitation, safe water, garbage disposal, excreta disposal and waste water disposal. With this broader concept of sanitation, CRSP adopted a "demand driven" approach with the name "Total Sanitation Campaign" (TSC) with effect from 1999. The revised approach emphasized more on information, education and communication (IEC), human resource development, capacity development activities to increase awareness among the rural people and generation of demand

**Table 1:** Physical Status of SWM Projects in Haryana up from 2014- September, 2019

Sr. No.	Districts	Total Villages taken up	No. of Works					In Progress	Not Started
			Sanctioned	Completed					
				Functional	Non-Functional	Total			
1	Ambala	41	41	8	28	36	0	5	
2	Bhiwani	71	71	0	11	11	0	60	
3	Dadri	31	31	0	0	0	3	28	
4	Faridabad	31	31	5	20	25	0	6	
5	Fatehabad	50	50	10	30	40	7	3	
6	Gurugram	56	56	0	24	24	29	3	
7	Hisar	92	92	0	68	68	1	23	
8	Jhajjar	119	119	44	0	44	29	46	
9	Jind	89	89	28	0	28	14	47	
10	Kaithal	124	124	0	15	15	3	106	
11	Karnal	73	73	2	23	25	4	44	
12	Kurukshetra	52	52	28	0	28	2	22	
13	Mahendergarh	17	17	0	16	16	0	1	
14	Mewat	24	24	0	18	18	3	3	
15	Palwal	15	15	7	7	14	1	0	
16	Panchkula	31	31	9	20	29	0	2	
17	Panipat	34	34	15	3	18	3	13	
18	Rewari	64	64	20	0	20	6	38	
19	Rohtak	47	47	0	21	21	13	13	
20	Sirsa	81	81	3	42	45	13	23	
21	Sonapat	90	90	6	35	41	8	41	
22	Yamunanagar	104	104	76	20	96	8	0	
	<b>Total</b>	<b>1336</b>	<b>1336</b>	<b>261</b>	<b>401</b>	<b>662</b>	<b>147</b>	<b>527</b>	

Source: Minutes of Meeting of SLSSC for SBM-G held on 14.01.2019 at Chandigarh.

**Table 2:** Training programmes on ODF sustainability and SLWM during January, 2017 to January, 2019

Name of Training Programme	Number of Training Programme Conducted	Number of Participants attended	Male	Female	General Category	Schedule Caste	Backward Class
03 Days Training Programme on ODF Sustainability and SLWM	07	248	227	21	105	66	77

Source: Haryana Institute of Rural Development, Nilokheri (Karnal)

for sanitary facilities. Assistance was also extended for construction of school toilet units, Anganwadi toilets and Community Sanitary Complexes (CSC) apart from undertaking activities under Solid and Liquid Waste Management (SLWM) project.

To give a boost to the TSC, Government of India also launched the Nirmal Gram Puraskar (NGP) that sought to recognise the achievements and efforts made in ensuring full sanitation coverage. NBA envisages covering the entire community for saturated outcomes with a view to create Nirmal Gram Panchayats with priorities of providing

Individual Household Latrine (IHHL) of both below poverty line (BPL) and identified above poverty line (APL) households within a Gram Panchayat along Solid and Liquid Waste Management (SLWM) for proposed and existing Nirmal Grams for overall cleanliness in the rural areas.

The Prime Minister of India launched the Swachh Bharat Mission on 2<sup>nd</sup> October, 2014 to bring about an improvement in the general quality of life by promoting cleanliness, hygiene and eliminating open defecation along with scientific Solid and Liquid Waste Management (SLWM) systems for

overall cleanliness in the rural areas. The total assistance under (SBM-G) for SLWM projects shall be worked out on the basis of total number of households in each Gram Panchayat (GP), subject to a maximum of ₹7 lakh for a GP having up to 150 households, ₹12 lakh up to 300 households, ₹15 lakh up to 500 households and ₹20 lakh for GPs having more than 500 households.<sup>7</sup>

### ***Steps for Solid Waste Management Planning at Gram Panchayat Level***

#### *Community involvement*

First of all a meeting was kept with Village Council President (*Sarpanch in native language*), Panchayat Secretary (*Gram Sachiv in native language*) and other ward members to know their willingness and support for this project. After taking their consent a meeting of village residents (*Gram Sabha in native language*) is convened to discuss and pass a resolution of clean village in such a way that everybody should cooperate. The resolution include various measures like: (i) use of cloth bags and avoid use of carry bags (ii) tea stalls to use only stainless steel glasses and no use of plastic and use-and-throw cups (iii) a by-law in this regard can be prepared and passed as well. After the *Gram Sabha* meeting, various segments of the community (waste generators) were educated and trained separately. It included the households, Self Help Groups SHGs, shopkeepers, tea stalls owners, local restaurants owners, school children, marriage and community halls caretakers etc. Community was made aware about about bio-degradable and non bio-degradable wastes, recyclable and hazardous wastes and ways of primary segregation at households level.

#### *Manpower planning*

Solid waste management is labour intensive work. On the basis quantum waste generated one worker per 150 households was planned to depute. Manpower requirement also depends on the settlement pattern. One worker was deployed for every garbage collection vehicle to covers 150 households every day. After collecting the waste the workers carried out secondary segregation at the shed made for this purpose quite far from all the habitation.

#### *Technical planning*

Technical planning is about processing and treatment of collected wastes. Usually composting of biodegradable waste was done with simple windrow composting and vermin-composting

methods. The dry waste is segregated and sold as recyclables to local buyer who deals in scrap sales/ waste recyclable items periodically.

#### *Financial planning*

Budget is an estimated income and expenditure statement of the project and is a very essential exercise must be done before finalization of the project. This shall indicate the likely expenditure to be incurred, and sources of income available to cover the expenditure so that the project becomes financially sustainable. This involves two types of costs: (a) Capital cost for setting up the facility, and (b) Operational cost for meeting out the recurring expenses month after month. The financial planning also involved a budgeting exercise for the smooth running and self sustaining of the project. Under "Wealth from Waste" project capital cost include construction of shed, purchase of tricycles, uniform and gloves, instruments / equipments etc. The recurring expenditure includes remuneration of workers, operation and maintenance cost while the income includes service fees, sale of recyclables and compost, fine and penalties etc.

#### *Technical aspects of waste management*

In the context of SWM in rural areas simple composting method like NADEP composting as first invented by a farmer named N. D. Pandharipande (also popularly known as "Nadepkaka") or vermin-composting are the good options for treating the biodegradable waste. The inert and hazardous waste can be send to landfill whereas the recyclable waste can be sold to local vendor.

#### ***District wise detail of Wealth from Waste projects***

The shed was constructed under the guidelines of Nirmal bharat Abhiyan and Swachh Bharat Mission- Gramin as a component of solid and liquid waste management in rural areas. The shed consists of brick masonry structure measuring 24 × 36 feet for the storage and processing (segregation) of waste. The shed has 8–10 pits inside, 04 of which were used for vermin-composting and remaining were used to store non-biodegradable material. The shed has a provision of restroom and toilet for sanitary workers.

There exist a lot of inter district variation in terms of total number of projects sanctioned, completion of sanctioned projects, functional status of completed project, initiation of work in terms of in-progress of the sanctioned project and the project not started at all. As per analysis of

available data a total number of 1336 solid waste management projects have been sanctioned in 22 districts of Haryana from the year 2014 to till date as mentioned in Table 1. The maximum numbers of 121 projects were sanctioned in Kaithal district followed by Jhajjar and Yamunanagar districts, respectively whereas least number of projects was sanctioned in the Palwal, Mahendergarh and Mewat districts, respectively. Out of the total sanctioned projects 49.55% have been completed, 11% are in progress of construction and 39.44% are not yet started. It further analyzed that out of the total 662 completed projects only 39.42% projects were functional. As per data analysis (Table 1 and Fig. 1), 12 district namely Ambala, Faridabad, Fatehabad, Hisar, Mahendergarh, Mewat, Palwal, Panchkula, Kurukshera, Panipat, Sirsa and Yamunanagar have completed more than 50% of total projects sanctioned while Bhiwani and Kaithal hadn't

completed 20% of their total sanctioned projects. The completed projects were reported to be fully functional in the Jhajjar, Jind and Kurukshetra districts while in Panipat and Yamunanagar district more than 75% of projects were operational. In Panchkula district about 50% of the projects were functional whereas in rest of the districts functional projects are less than 50%. In eight districts of Haryana namely Bhiwani, Dadri, Gurugram, Hisar, Kaithal, Mahendergarh, Mewat and Rohtak none of the completed project is functional. In all the districts except Gurugram less than 50% of projects are under in-progress status of total sanctioned projects while in six districts namely Biwani, Dadri, Jind, Kaithal, Karnal and Rewari work has even not started on less than 50% of the projects sanctioned. Yamunanagar is the only district where the work has started on all sanctioned projects.

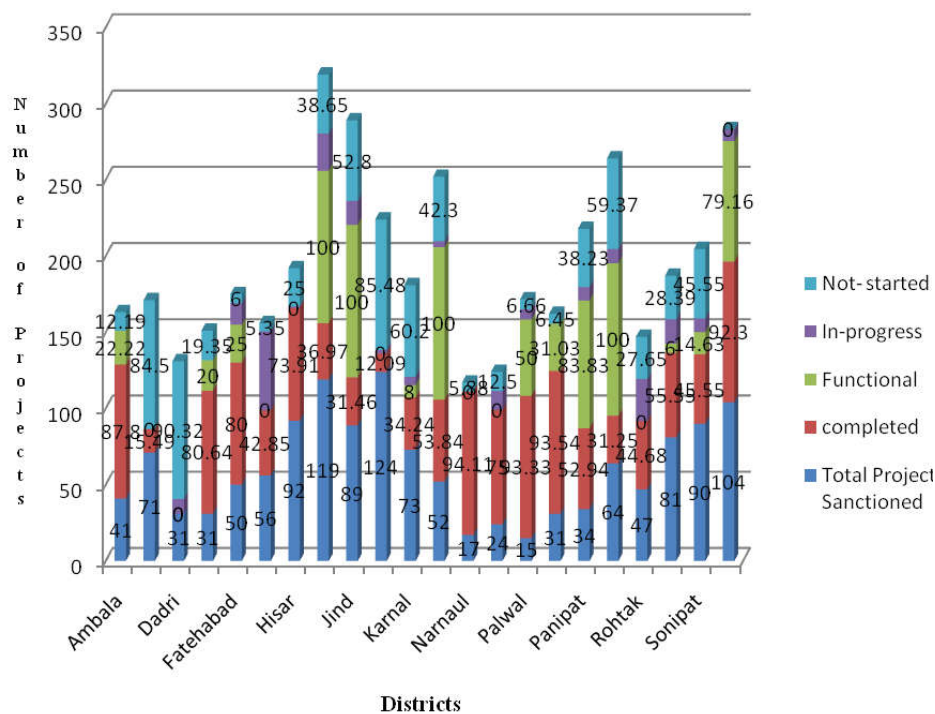


Fig. 1: Progress of SWM projects in different districts of Haryana during 2014-2019

**Issues and challenges at Gram Panchayat Level:**

*Segregation of solid waste*

As observed, reported and discussed during training programmes, most of the time solid waste was handover to sanitary worker in an un-segregated form and only animal dung is separated. Also in majority of cases households retains plastic bottles, metals containers and other saleable item

for the vendors. Improper segregation at source level requires additional manpower to segregate and needs more time.

*Lack of common land and funds*

It was pointed out by the functionaries during the training programme that various Gram Panchayats do not have any source of income (village fund) except grant from the state government. The project

once built and started from central government funds under SBM-G also needs recurring expenditure to pay remuneration of sanitary workers, equipments maintenance etc. As a result, the project suffers crunch of funds and thus become non-functional. Further many Gram Panchayats has no land availability or the land has been encroached by villagers thereby the shed cannot be constructed<sup>[8]</sup> which could be a factor behind non-starting of project in many Gram Panchayats.

#### *Lack of proper planning during project preparation*

The solid waste management project preparation requires detail survey, focus group discussion and Participatory Rural Appraisal (PRA) exercise but many Gram Panchayats start the project without proper planning and survey as also observed in implementation projects of Liquid waste Management in the state<sup>[9]</sup>. The project can never be successful without proper estimation of solid waste generation, manpower requirement, and vehicles needed for transportation. PRA exercise must be exercised seriously for people participation and to know their willingness to pay for the services provided. It was pointed out that the lack of proper project planning was the main reason behind failure of project. Even the shed site selections were also found inappropriate in many villages. Either the sheds were constructed at distant location from the residential areas or very close vicinity to village ponds, which inundated during rainy season.

#### *Sale of compost and recyclable*

After door to door collection the waste is transported to shed where segregation of biodegradable and non-biodegradable waste was carried out. The biodegradable fraction was converted into compost or vermi-compost whereas non-biodegradable was stored for sale to the local vendor. As important issue raised by many functionaries and elected members that the remaining non-biodegradable dry waste i.e. polythene, rubber, plastic PVC, paper, glass etc. has very low economic value and therefore not purchased by any local purchaser and remained as storage in the shed for long period. This resulted into space shortage in the shed thereby cause hindrance in normal routine activities. Further, in many Gram Panchayat the compost has no local buyer and hence no income generation which also affects the sustainability of the project.

#### *Lack of priority by Gram Panchayats*

Even the centre and state government are giving top priority and providing funds for rural sanitation though many Gram Panchayats are not taking it

seriously. They are still interested in traditional practice of construction of streets and drains. There is a need to change the mindset of elected representative of PRI's to focus on this issue.

#### *Reluctant behaviour of households to pay service fees and insanitary behaviour*

This issue was raised by Gram Panchayat who has started the SWM project in their villages. A large fraction of people in rural areas are reluctant to pay service fees if Gram Panchayat makes any arrangement of door to door collection and transportation of waste. Insanitary behaviour of people is also big hurdle as households dispose un-segregated waste many times and generally kept all their waste to polythene bags and a tie up a knot before disposal. Segregation of waste into dry and wet is prerequisite in SWM. It requires lot of time in with additional manpower and expenditure in segregation of solid wastes after collection.

#### *Lack of technical skill*

Solid waste management require technical skills. It was found that the sanitary workers lack technically skill. The dry waste collected from households composed of variety of mixed electronic and hazardous waste and must be stored separately, but it is was kept in mixed form in dry pits. For vermi-composting, organic wastes and animal dung, moisture and earthworm are required in proportionate manner and needs turning after regular interval of time. As reported the lack of scientific skills causes death of earthworms and thus compost so produced is also of inferior quality.

## **Conclusion and recommendations**

Solid waste management is one of the important mandate of Gram Panchayat listed in XI<sup>th</sup> schedule of Haryana Panchayati Raj Act, 1994. The Ministry of Environment Forest and Climate Change (MOEF & CC) has framed new Solid Waste Management Rules, 2016 which cover all urban local bodies in the country, all urbanized villages having a population of 5000 (census town). As per rules, it is the duty and responsibility of village panchayat to prepare plan of solid waste management and to arrange door to door collection of segregated waste from all the households and to direct the waste generator not to litter any waste or burn or burry. The National Green Tribunal has also ordered for compliance of solid waste management rules and allied issues on dated 06.03.2019. Waste to wealth project can be proven very effective tool

in management of solid waste in rural areas with some improvement in current practice of planning and implementation. However, these projects need proper planning with detail information on various aspects like quantity and quality of waste generated, requirement of manpower, location of shed etc. PRA exercise should be done and suggestion of people should be considered and incorporated after proper discussion and analysis. People should be motivated towards payment of service fees to keep the village clean and green. People should be made aware about segregation of waste at household level which is responsibility of waste generator. Waste processing facility should be set up at cluster level and regular monitoring should be done. The sanitary staff should be trained technically for effective management of solid waste. The left out waste after sale and composting should be disposed off to sanitary landfill.

#### **Acknowledgement**

Authors are thankful to the Office of Haryana State Swachh Bharat Mission, Development & Panchayat Department, Chandigarh for providing data on solid waste management.

**Conflict of Interest:** The authors declares no conflict of interest

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