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Characterization and Quantification of Solid waste in Gram Panchayats of U.P.

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Abstract: Efficient and effective handling of solid waste in gram panchayats of Uttar Pradesh starts with determining the character and quantity of the waste, for which we select two city from central region and west region (1. Lucknow, 2. Gorakhpur). In the above districts 2 Gram Panchayats of each district were surveyed. From the selected Gram Panchayat, the sample was as under: (1) Gram Panchayat with more than 10000 population 300 households were surveyed; (2) Gram Panchayat with 5000-10000 population 150 households were surveyed; (3) Gram Panchayat with 2000-5000 population 100 households were surveyed; (4) Gram Panchayat with less than 2000 population 50 households were surveyed. The selection of Gram Panchayats was done in consultation with the District authorities. And in order to get the data of waste generated and its type at the weekly markets, survey of one weekly market was done at each District. The waste generated in gram panchayats was categorized under 4 major heads (Bio-degradable waste, Recyclable waste, Hazardous waste, Inert waste). In the study we found that most of the waste in gram panchayats are Bio- degradable in nature (58.01%) and Inert waste (22.50%) is at second place and recyclable waste (16.52%) is at number 3 and every type waste can be managed but there is no proper management of solid waste at gram panchayat level. We also suggest some effective way to manage the solid waste at gram panchayat level in U.P.

Keywords: Gram Panchayats, Solid waste management, Characterization, Quantification, Healthy environment.

I. INTRODUCTION

Solid Waste Management (SWM) is an organized process of storage, collection, transportation, processing and disposal of solid refuse residuals in an engineered sanitary landfill. Solid Waste Management (SWM) includes all activities that seek to minimize the health, environment and aesthetic impacts of solid wastes.

It is an integrated process comprising several collection methods, varied transportation equipment, storage, recovery mechanisms for recyclable material, reduction of waste volume and quantity by methods such as composting, waste-to-power and disposal in a designated engineered sanitary landfill.

The selection of a suitable SWM process is driven by the source and quality of waste produced. Solid waste is generated from a number of sources which include households (kitchen and yards), commercial areas (shops, hotels, and restaurants), industries (raw material and packaging), institutions (schools, hospitals, and offices), construction and demolition sites, wild and domesticated animals (carcasses of dead animals, manure), parks (fallen branches, leaves from trees) and streets (sand, silt, clay, concrete, bricks, asphalt, residues from air deposition and dust).

To tackle the adverse impact of uncontrolled waste generation, its handling and disposal, the Government of India has made the "Solid Waste Management Rules, 2016".

And they apply to every urban local body, outgrowths in urban agglomerations, census towns as declared by the Registrar General and Census Commissioner of India, notified areas, notified industrial townships, areas under the control of Indian Railways, airports, airbases, Ports and harbours, defence establishments, special economic zones, State and Central government organisations, places of pilgrims, religious and historical importance as may be notified by respective State government from time to time and to every domestic, institutional, commercial and any other non-residential solid waste generator situated in the areas except industrial waste, hazardous waste, hazardous chemicals, bio medical wastes, e-waste, lead acid batteries and radio-active waste, that are covered under separate rules framed under the Environment (Protection) Act, 1986.

Scientific disposal of solid waste through segregation, collection, treatment and disposal in an environmentally sound manner minimises the adverse impact of waste on the environment. The Gram Panchayats/ Blocks/ District shall be responsible for development of infrastructure for collection, storage, segregation, transportation, processing and disposal of Solid Waste.

II. METHODOLOGY

A. Site Description

The study area covers 4 villages of Lucknow and 4 villages of Gorakhpur according to their population.

To Characterize & Quantify the waste we conducted a survey of Solid Waste in Gram Panchayats of Uttar Pradesh. For the above purpose 2 districts had been selected from each i.e. east and central region

- 1) Gorakhpur
- 2) Lucknow

Table 1: Details of Gram panchayats

S.NO.	LUCKNOW		GORAKHPUR		
	BLOCK	GRAM PANCHAYAT	BLOCK	GRAM PANCHAYAT	POPULATION CATEGORY
1	Bakshi ka talab	Digoi	Khorabar	Chhitouna	<2000
2	Chinhat	Papnamau	Muzaffarabad	Sansarpur	2000-5000
3	Chinhat	Ganeshpur Rahmanpur	Puwarka	Ugahu	5000-10000
4	Chinhat	Juggaur	Puwarka	Kailashpur	>10000

B. Sampling Procedure

In the above districts 4 Gram Panchayats of each district were surveyed. From the selected Gram Panchayat, the sample was as under:

- 1) Gram Panchayat with more than 10000 population 300 households were surveyed.
- 2) Gram Panchayat with 5000-10000 population 150 households were surveyed.
- 3) Gram Panchayat with 2000-5000 population 100 households were surveyed.
- 4) Gram Panchayat with less than 2000 population 50 households were surveyed.

The selection of Gram Panchayats was done in consultation with the District authorities. And in order to get the data of waste generated and its type at the weekly markets, survey of one weekly market was done at each District.

III. RESULT AND DISCUSSION

A. Nature Of Solid Waste Generated In Gram Panchayats

Preliminary investigation of the research in revealed that composition of solid waste range from food to electronic goods. The category of waste is depicted in the table given below:

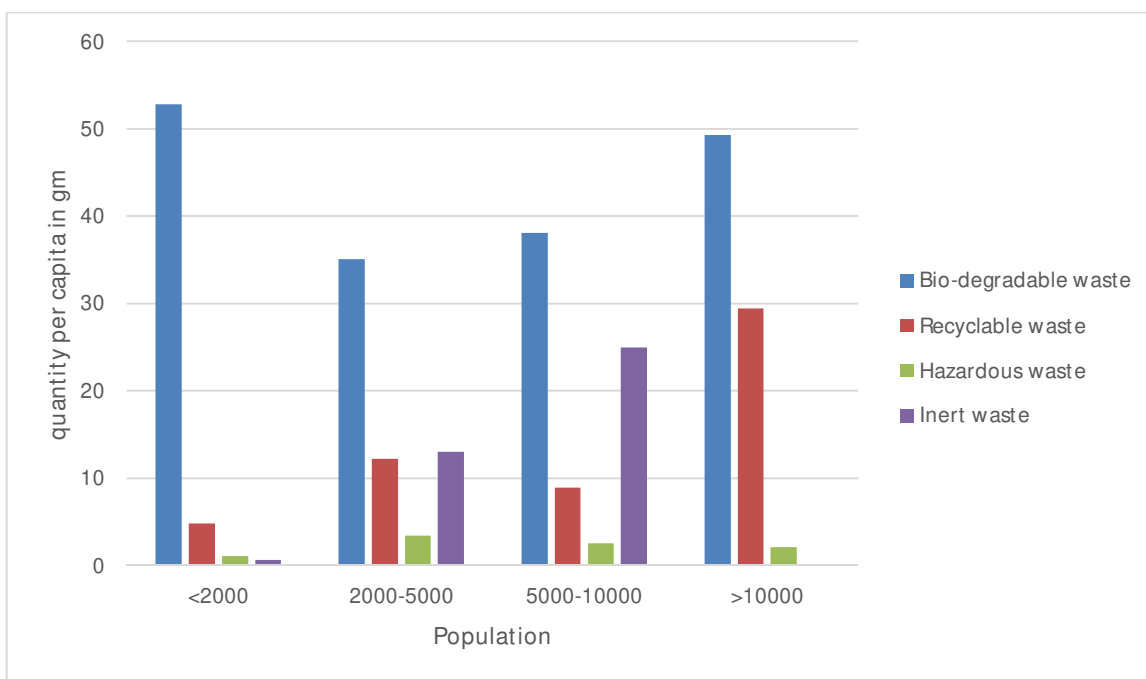
Table 2: Nature of solid waste generated in gram panchayats

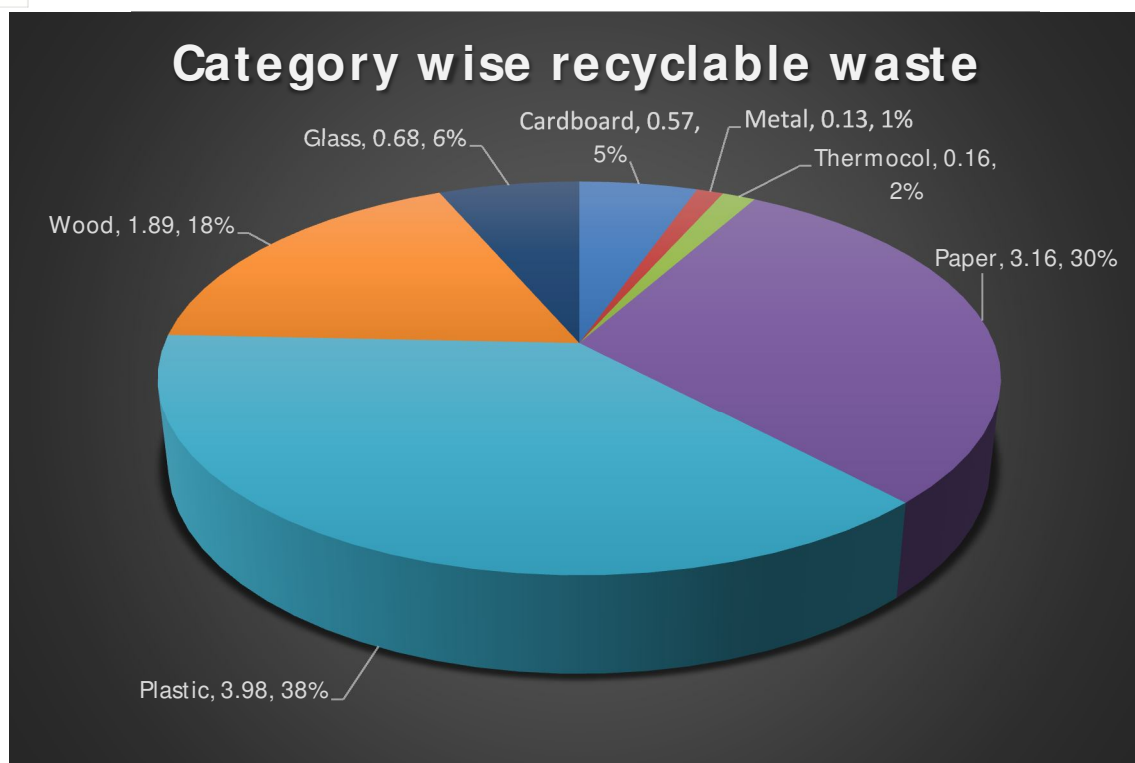
S.NO.	Waste Type	Sub-Category & Type
1	Bio-degradable Waste	Mostly green waste from the kitchen and animal waste
2	Recyclable Waste	Plastic, Wood, Thermocol, Glass, Tin, Metal etc.
3	Hazardous Waste	Diapers, Sanitary Napkins, Small batteries, unused medicines, syringes etc.
4	Inert Waste	Mostly Mud and Dust

B. Quantity of Solid Waste

1) Lucknow

	Block and Gram panchayat	Block-Bakshi ka talab Gram- Digo	Block-Chinhat Gram-Papnamau	Block-Chinhat Gram-Ganeshpur Rahmanpur	Block-Chinhat Gram-Juggaur	Total
	Population category and number of family	Less than 2000 (50 family)	2000-5000 (100 family)	5000-10000 (150 family)	>10000 (300 family)	
S.No.	Category of waste	Per capita per day in gms	Per capita per day in gms	Per capita per day in gms	Per capita per day in gms	Per capita per day in gms
1	Inert waste	0.68	13.06	24.97	11.73	14.24
2	Bio degradable waste	52.80	35.11	38.10	49.27	44.22
3	Hazardous waste	1.08	3.42	2.54	2.14	2.37
4	Recyclable waste	4.82	12.21	8.92	29.44	18.85
	Total	41.59	63.80	74.53	92.58	79.68
	Total family member	337	655	897	1700	





2) Gorakhpur

	Block and Gram panchayat	Block-Khorabar Gram-Chhitouna	Block-Muzaffarabad Gram-Sansarpur	Block-Puwarka Gram-Ugahu	Block-Puwarka Gram-Kailashpur	Total
	Population category and number of family	Less than 2000 (50 family)	2000-5000 (100 family)	5000-10000 (150 family)	>10000 (300 family)	
S.No.	Category of waste	Per capita per day in gms	Per capita per day in gms	Per capita per day in gms	Per capita per day in gms	Per capita per day in gms
1	Inert waste	23.08	42.90	23.08	32.22	31.15
2	Bio degradable waste	27.37	76.68	28.08	33.88	39.66
3	Hazardous waste	0.00	0.02	0.01	0.89	0.44
4	Recyclable waste	4.83	5.96	5.47	19.58	12.41
	Total	55.28	125.56	56.64	86.57	83.66
	Total family member	281	746	1069	2008	

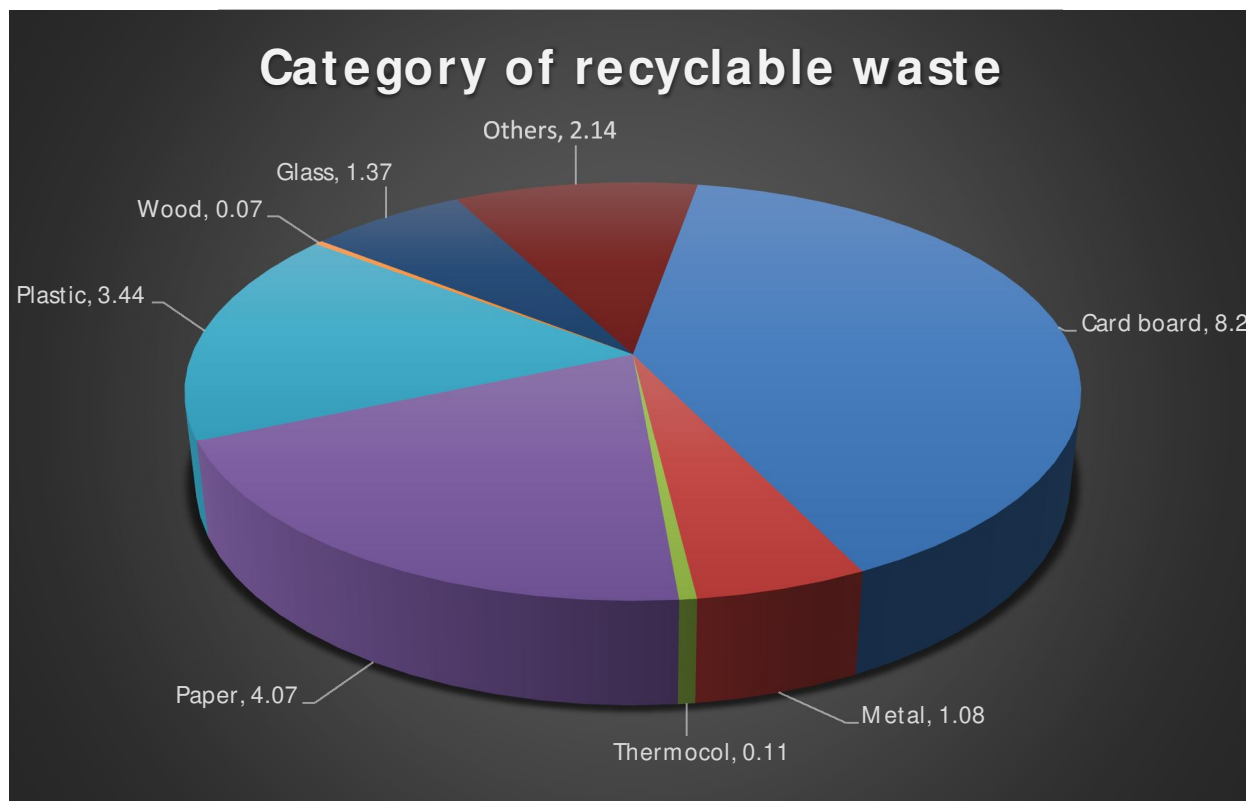
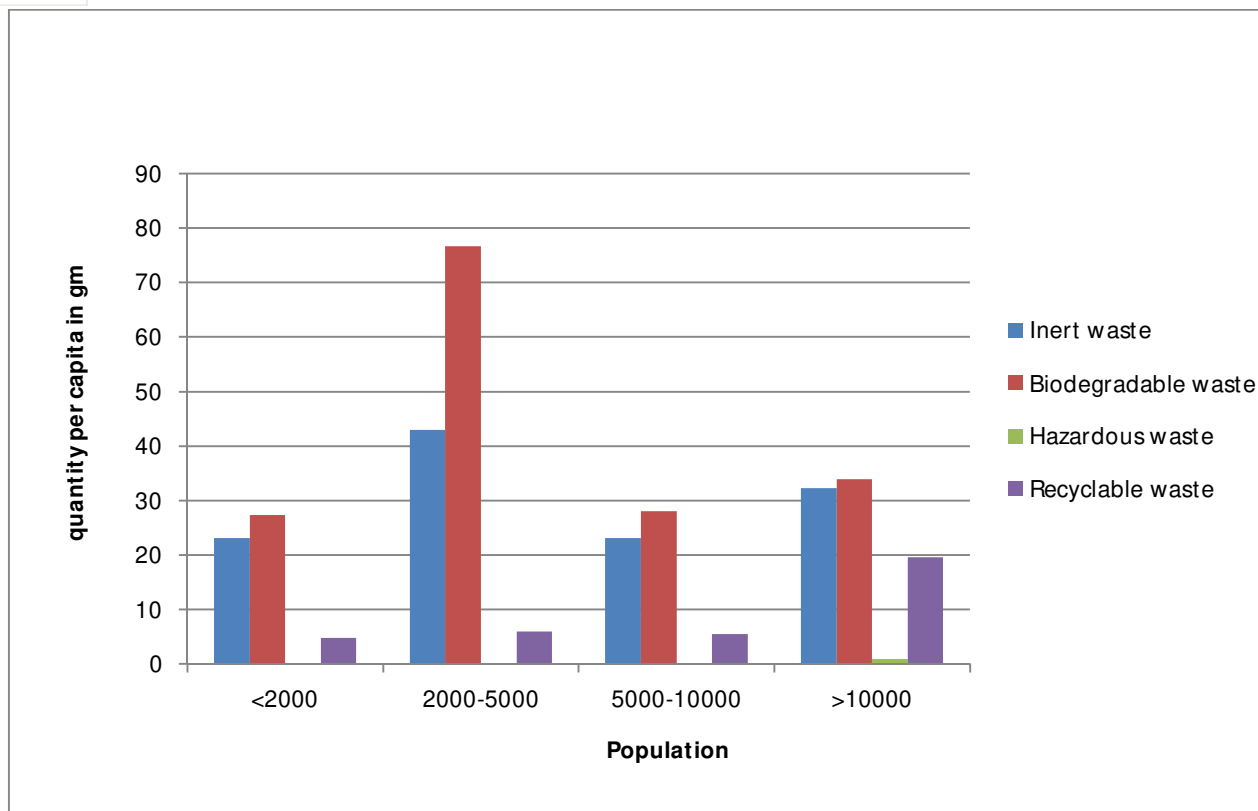


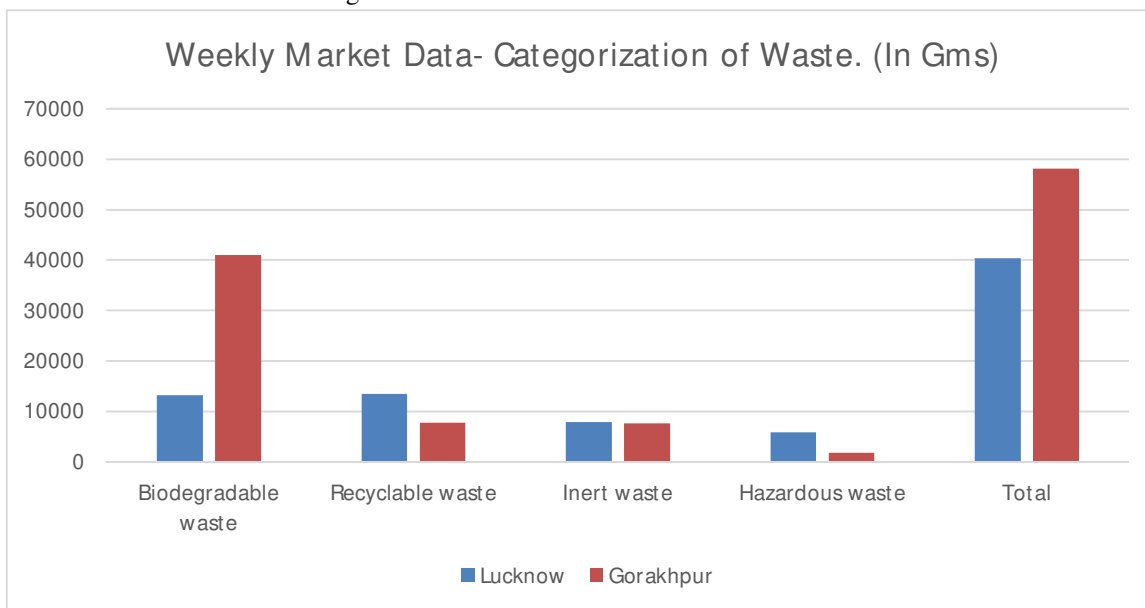
Table 3: Weekly Market Data- Number & Type of Shops/Stalls

S.No.	Nature or Type/category of Stall	Juggaur-Lucknow	Piprauli Bujurg-Gorakhpur
		Total No. of Stall	Total No. of Stall
1	Vegetables, Flowers and Fruits	8	95
2	Meat/Chikan/Fish Stalls	1	6
3	Food Stalls	5	21
4	Grains Stalls	2	14
5	Handlooms & clothes	4	11
6	Kitchen Utility Stalls	1	18
7	Farm Utility Stalls	4	0
8	Footwear Stall	1	5
9	Plastic Households/Plastic wares	2	8
10	Decorative items stalls	0	8
11	Cosmetics Stalls	4	6
12	Others-clay pot etc	6	8
	Total	38	200

Table 4: Weekly Market Data- Categorization of Waste. (In Gms)

	Lucknow	Gorakhpur
Biodegradable Waste	13200	41000
Recyclable waste	13500	7730
1) Paper	4893	3700
2) Plastic	3664	1600
3) Metal	0	145
4) Glass	2640	235
5) Thermacol	498	750
6) Cardboard	0	1300
7) Wood	0	0
8) Others	1805	0
Inert waste	7850	7600
Hazardous Waste	5843	1800

From the above table and Chart below we find Biodegradable Waste maximum followed by Recycleable and within that Plastic & Paper Waste. Some Hazardus Waste is also generated.



C. Strategy of Solid Waste Management in Gram Panchayats

- 1) Segregation of waste at household level/ establishment level- two bin system (organic and recyclable).
- 2) Encourage the households, if land available with them, to construct a small pit/earthen post composting for biodegradable waste and compost can be used by them.
- 3) Door to door collection- by private party or the Gram Panchayat;
- 4) Collection vehicles/ carts to have two bin systems.
- 5) At secondary collection point two bins to be kept.
- 6) Transportation to be in vehicles with Partition and cover, to the material recovery centre to be established by the Gram Panchayat.
- 7) Bio-degradable waste to be sent to vermi-composting unit/community composting pit/windrow composting - to be established at Gram Panchayat level and managed by local NGO's or RWAs or SHGs.
- 8) Local rag-pickers and kabariwalas to be roped-in for segregation and paid out of the sale of recyclables.
- 9) If no nearby Industry is available than RDF material to be sent to nearest big ULB/ Point designated by the District Authority to be further sent to Industry.
- 10) Balance inert waste to be sent to nearest Landfill site for which district authorities to make arrangements (Not more than 10%).

IV. CONCLUSION

The management of solid waste in the gram panchayat level still faces many problems. There is no any existing management system at the gram panchayats of Uttar Pradesh. The main component of solid waste at gram panchayat level is Bio-degradable waste which can be managed by composting at gram panchayat level and the biggest problem in villages is the management of plastic waste because it is very harm-full for the animals as well as for the environment so this is very important to manage the plastic waste and it is done by door to door collection system by private party or the gram panchayat and segregation at household level/ establishment level-two bin system (organic and recyclable). Improper management of solid waste in villages causes many severe disease like typhoid, cholera, amoebic dysentery etc. so proper management of solid waste at gram panchayat level is necessary.

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