iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** XI **Month of publication:** November 2022

DOI: https://doi.org/10.22214/ijraset.2022.47283

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue XI Nov 2022- Available at www.ijraset.com

Characterization and Quantification of Solid waste in Villages of Jhansi and Saharanpur

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Abstract: ***The first step in the efficient and effective management of solid waste in gramme panchayats in Uttar Pradesh is to identify the type and quantity of garbage. To do this, we choose two cities from the central area and the west region (1. Jhansi, 2. Saharanpur). Two Gram Panchayats from each of the aforementioned districts were surveyed. The sample came from the chosen Gram Panchayat and was as follows: Gram Panchayats with populations greater than 10,000 were surveyed in 300 households, those with populations between 5,000 and 10,000 were surveyed in 150 households, those with populations between 2000 and 5000 were surveyed in 100 households, and those with populations under 10,000 were surveyed in 50 households. The District authorities were consulted for the selection of Gram Panchayats. Additionally, a survey of one weekly market was conducted in each District in order to collect information on the amount and type of waste produced during the weekly markets. Four major heads were used to categorise the garbage produced in gramme panchayats (Bio-degradable waste, Recyclable waste, Hazardous waste, Inert waste). In the study, we discovered that biodegradable trash makes up the majority of waste in gramme panchayats (57%), followed by inert waste (22%) and recyclable waste (17%). While all waste types can be managed, there is insufficient solid waste management at the gramme panchayat level. Additionally, we make some recommendations for efficient gramme panchayat-level waste management in Uttar Pradesh.***
Keyword: 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.

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II. METHEDOLOGY

A. Site Description

The study area covers 4 villages of Jhansi and 4 villages of Saharanpur 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.N0.	JHANSI		SAHARANPUR		
	BLOCK	GRAM PANCHAYAT	BLOCK	GRAM PANCHAYAT	POPULATION CATEGORY
1	Bamaur	Benda	Muzaffarabad	Anwarpur Barauli	<2000
2	Babina	Khaira	Muzaffarabad	Bhatpur	2000-5000
3	Babina	Raksa	Puwarka	Ghana khandi	5000-10000
4	Babina	Simrawari	Ballia kheri	Shekhpura Kadeem	>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

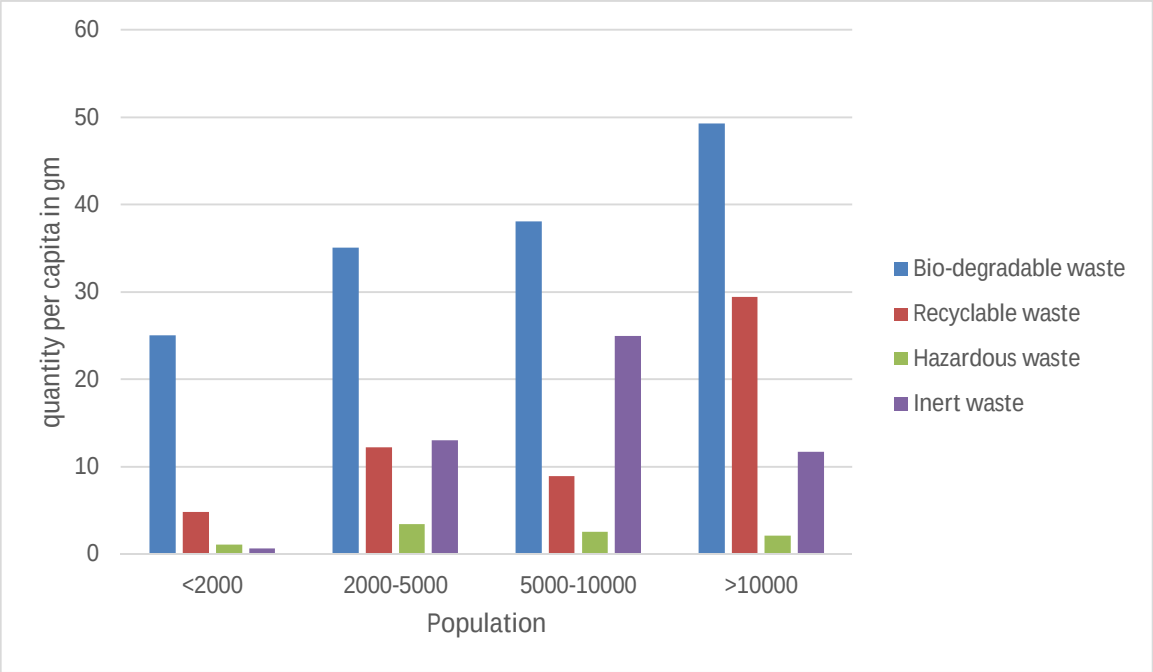
S.NO.	Waste Type	Sub-Category & Type
1	Bio-degradable Waste	Mostly green waste from the kitchen and animal waste
2	Recyclable Waste	Plastic, Wood, Thermocol, Glass, Tin, Metal etc.
3	Hazardous Waste	Diapers, Sanitary Napkins, Small batteries, unused medicines, syringes etc.
4	Inert Waste	Mostly Mud and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

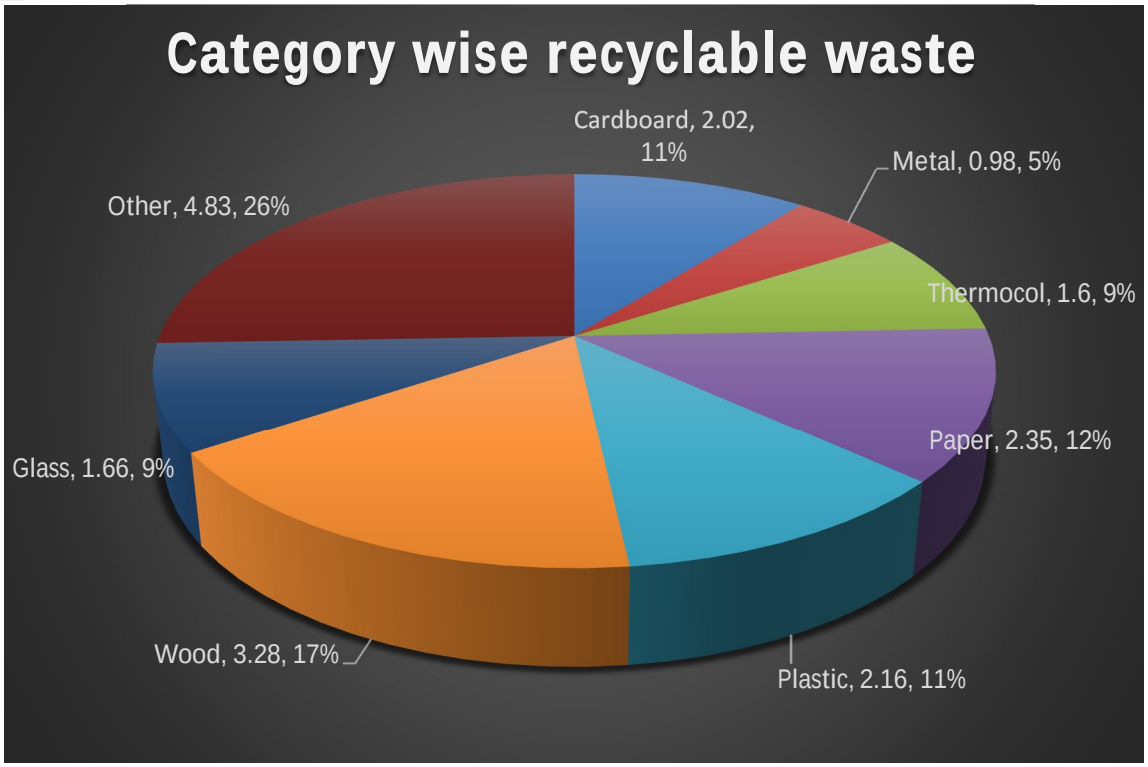
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B. Quantity of Solid Waste

1) Jhansi

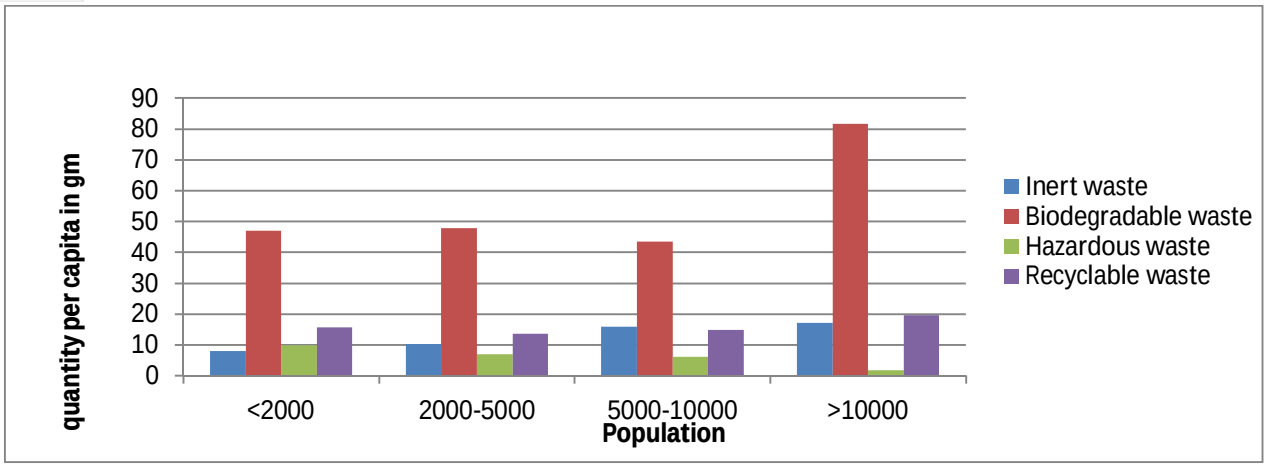
	Block and Gram panchay at	Block- Bamaur Gram- Benda	Block- Babina Gram- Khaira	Block- Babina Gram- Raksa	Block- Babina Gram- Simrawari	Total
	Population category and number of family	Less than 2000 (50 family	2000-5000 (100 family)	5000-10000 (150 family)	>10000 (300 family)	
S.No.	Category of waste	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	10.63	13.06	24.97	11.73	15.2
2	Bio degradable waste	25.05	35.11	38.10	49.27	41.7
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	329	655	897	1700	





2) Sharanpur

	Block and Gram panchayat	Block-Muzaffrabad Gram-Anwarpur Barauli	Block-Muzaffarabad Gram- Bhatpur	Block-Puwarka Gram- Ghana khandi	Block-Ballia kheri Gram-Shekhpura kadeem	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	8.13	10.35	15.94	17.09	15
2	Bio degradable waste	46.96	47.81	43.45	81.64	63.7
3	Hazardous waste	9.83	7.05	6.12	1.79	4.4
4	Recyclable waste	15.69	13.70	14.96	4.19	9.4
	Total	80.62	78.92	80.47	104.71	92.5
	Total family member	281	656	960	1936	



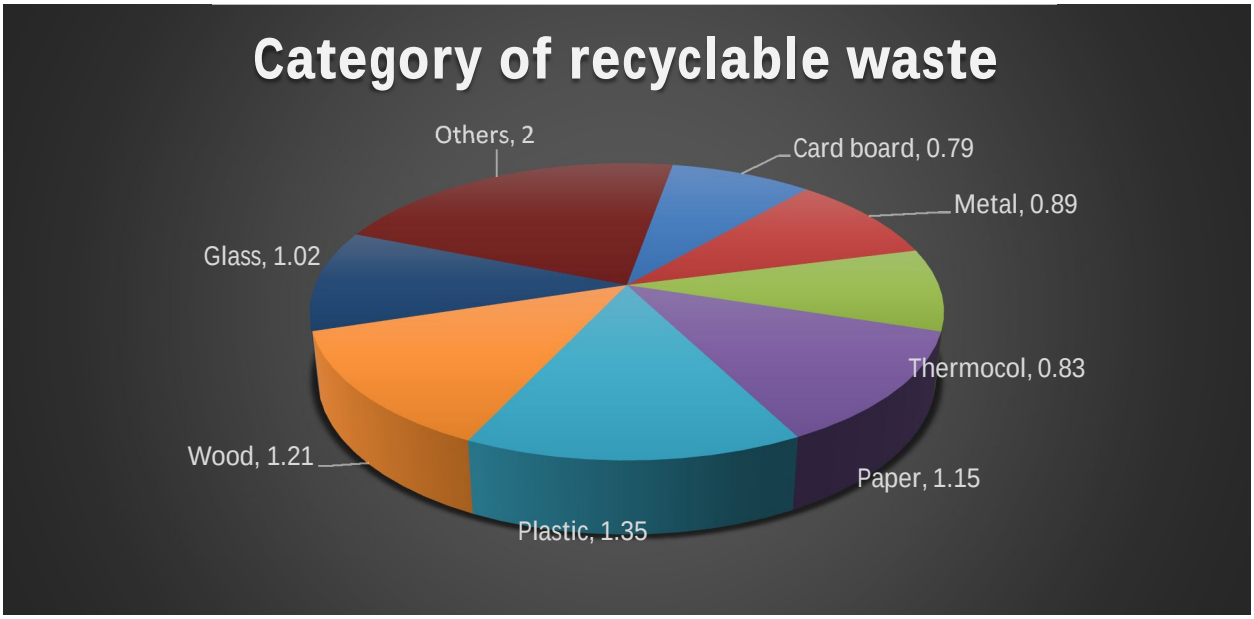


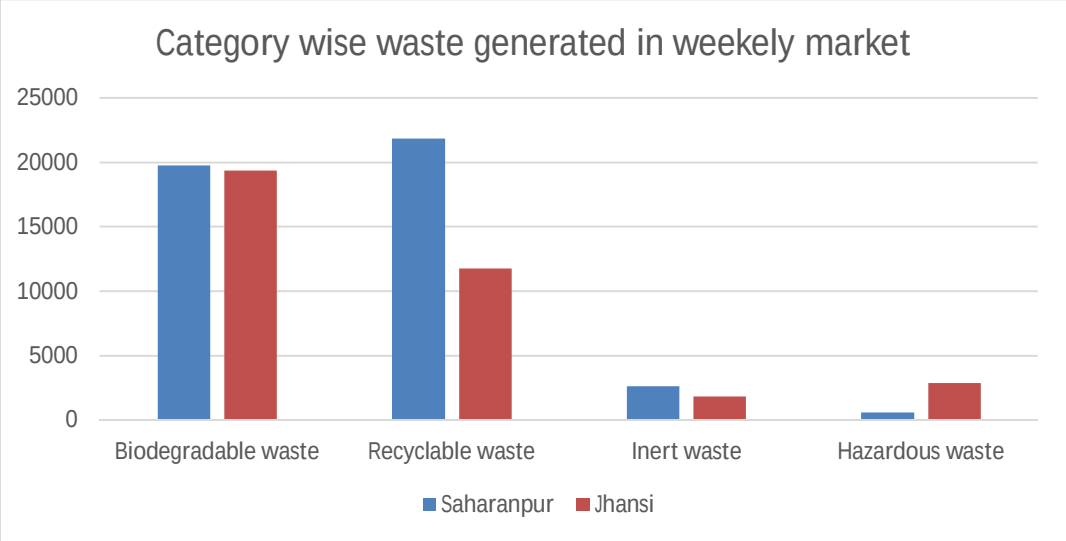
Table 3: Weekly Market Data- Number & Type of Shops/Stalls

		Sansarpur - Saharanpur	Chirgaon dehat - Jhansi
S.NO.	Nature or Type/category of Stall	Total No. of Stall	Total No. of Stall
1	Vegetables, Flowers and Fruits	52	23
2	Meat/Chikan/Fish Stalls	3	4
3	Food Stalls	4	5
4	Grains Stalls	12	3
5	Handlooms & clothes	13	3
6	Kitchen Utility Stalls	3	5
7	Farm Utility Stalls	6	1
8	Footwear Stall	9	7
9	Plastic Households/Plastic wares	1	5
10	Decorative items stalls	2	1
11	Cosmetics Stalls	3	2
12	Others-clay pot etc	4	8
	Total	112	67

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

	Saharanpur	Jhansi
Biodegradable Waste	19768	19368
Recyclable waste	21836	11749
• Paper	8684	2716
• Plastic	7419	5620
• Metal	135	0
• Glass	385	366
• Thermacol	0	438
• Cardboard	0	0
• Wood	0	0
• Others	5213	2609
Inert waste	2639	1830
Hazardous Waste	576	2871

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%).

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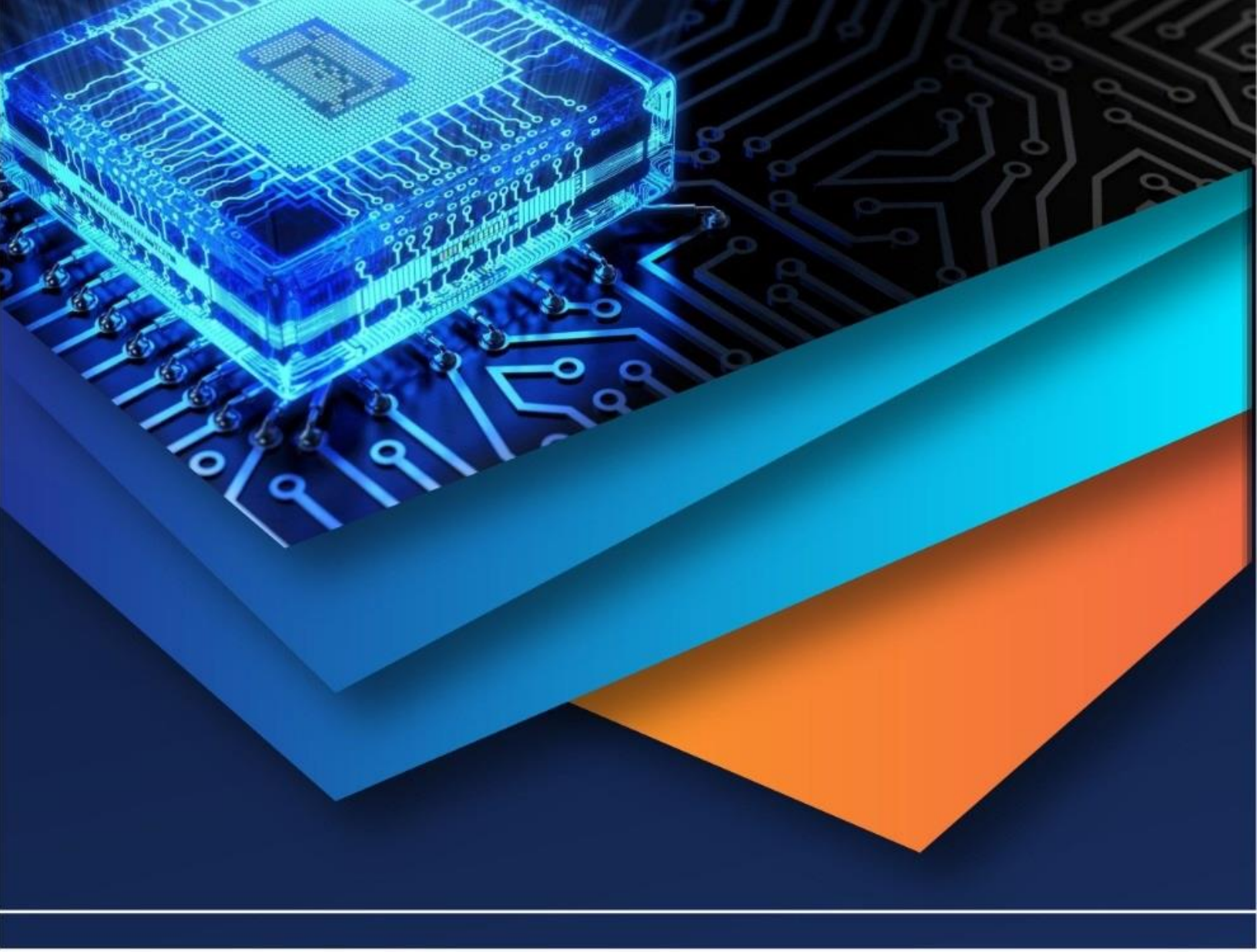
IV. CONCLUSION

There are still several issues with solid waste management at the gramme panchayat level. In the gramme panchayats of Uttar Paradesh, there is no management system in place. The primary source of solid waste at the gramme panchayat level is biodegradable waste, which can be managed by composting at the gramme panchayat level. The management of plastic waste, which is the biggest issue in villages because it is so harmful to both animals and the environment, is handled by a door-to-door collection system by a private party or the gramme panchayat, as well as segregation at the household level/establishment level (organic and recyclable). Typhoid, cholera, amoebic dysentery, and other serious diseases are brought on by the improper management of solid waste in villages, hence adequate management of solid waste at the gramme panchayat level is required.

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