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WHITE BLACK LEGAL is an open access, peer-reviewed and refereed journal provide dedicated to express views on topical legal issues, thereby generating a cross current of ideas on emerging matters. This platform shall also ignite the initiative and desire of young law students to contribute in the field of law. The erudite response of legal luminaries shall be solicited to enable readers to explore challenges that lie before law makers, lawyers and the society at large, in the event of the ever changing social, economic and technological scenario.

With this thought, we hereby present to you

# **SOLID WASTE MANAGEMENT IN INDIA: A THEORETICAL STUDY**

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## **ABSTRACT**

The growing issue of solid waste management in India's driven by rapid population growth, industrialization, and urbanization has significantly increase the volume and complexity of waste generated daily. This paper provides a theoretical study on solid waste management in India, its sources, types, and impacts on human health and the environment. It examines the constitutional and legislative frameworks, along with key judicial decisions, that have shaped environmental jurisprudence in India. The study emphasizes that solid waste management is not merely an administrative or technical issue but also a question of ethics, human rights, and sustainable development.

The paper argues that despite the existence of comprehensive environmental laws such as the Environment (Protection) Act, 1986, and specific waste management rules, implementation gaps persist due to inadequate infrastructure, lack public awareness, and weak institutional mechanisms. The study underscores that effective waste management requires community participation, technological innovation, and an integrated policy framework that prioritizes reduction, reuse, and recycling. Finally, it proposes practical policy recommendations, technology upgrading, and citizen involvement to ensure effective sustainable solid waste management in India.

**Keywords:** Solid Waste, Pollution, Waste Management, Legislation, Judicial Decisions.

## INTRODUCTION

India is one of the most populated country in the world and a major waste generation due to its population growth, industrialization, urbanization, high demand and consumption patterns. Waste is anything which is refuse or intends to discard, or handles or produces and is not wanted or required. But not all waste are wasted, some can be recycle and reused it again after proper treatment which is benefit for economic resource of others. Waste was associated with human society from prehistory till today and no doubt will continue for the future. Most wastes were disposed of with little or no control: to land, as open dumping; to air, by burning or evaporation of volatile compounds; or to water, by discharging solids and liquids to surface, groundwater or the ocean. There are two types of solid waste (1). Natural Solid Waste: Natural solid waste includes such as dead leaves, trees and animals; debris cause by flood, volcano eruption, earthquake, tsunami etc. (2). Man made solid waste.

### Solid Waste

Solid wastes, as defined in Agenda 21 of the United Nation Environment Programme, include all domestic refuse and non-hazardous wastes such as commercial and institutional wastes, street sweepings and construction debris. In some countries, the solid wastes management system also handles human wastes such as night-soil, ashes from incinerators, septic tank sludge and sludge from sewage treatment plants. If these wastes manifest hazardous characteristics they should be treated as hazardous wastes. Thus, Biomedical Waste and Hazardous Waste treated separate entity being infectious as well as hazards in nature.<sup>1</sup>

### Sources and Types of Solid Wastes

Solid Waste of any kinds which produced by human activities and include:<sup>2</sup>

- (i) Municipal solid wastes
- (ii) Industrial solid wastes
- (iii) Agricultural and dairy wastes
- (iv) Mining and quarrying wastes
- (v) Energy production wastes.

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<sup>1</sup> Agenda 21 of United Nation Environment Programme, “*Environmentally Sound Management of Solid Wastes & Sewage-Related Issues*” UN Department of Economic and Social Affairs, Division for Sustainable Development, available at: [https://www.un.org/esa/dsd/agenda21/res\\_agenda21\\_21.shtml](https://www.un.org/esa/dsd/agenda21/res_agenda21_21.shtml) (Last Modified July 25, 2023).

<sup>2</sup> Vasudevan Rajaram, Faisal Zia Siddiqui, Sanjeev Agrawal and Mohammad Emran Khan, *Solid and Liquid Waste Management – Waste to Wealth 2* (PHI Learning Private Limited, Delhi, 2022).

## IMPACT OF SOLID WASTE POLLUTION

Poor management of the collection and disposal of solid waste may lead to leachate pollution of surface water or underground water. This may cause significant problems if the waste contains toxic substances or if nearby water sources are used for water supplies.<sup>3</sup> The effects of solid waste on health may vary based on a number of factors, including the type of waste management practices, the traits and behaviors of the population exposed, the period of Interventions for exposure, prevention, and mitigation. The health consequences included mortality, neonatal outcomes, cancer, respiratory illnesses, gastroenteritis, vector-borne infections, cardiovascular disorders, and mental health issues.<sup>4</sup>

## SOLID WASTE MANAGEMENT

The main concept and aims of solid waste management is to protect public health, environment and minimize waste pollution through the systematic processes of waste generation, storage, collection, transport, processing and final disposal. Its primary goal is to control and minimize pollution, protection of public health, conservation of natural resources from over exploitation during materials productions, environmental preservation, and promotion of sustainable development. Solid waste management is the process which requires full cooperation and disciplines from the people, legal and authorities administration to work together to control environmental pollution and degradation.

Solid waste management in India faces a huge challenge with the ever increasing population and urbanization. Not only the waste has increased in quantity, but the characteristics of waste have also changed tremendously over a period, with the introduction of so many new gadgets and equipment. It is estimated that about 62 million tonnes of waste is generated annually in the country, out of which 5.6 million is plastic waste, 0.17 million is biomedical waste. In addition, hazardous waste generation is 7.90 million TPA and 15 lakh tonne is e-waste. The per capita waste generation in Indian cities range from 200 grams to 600 grams per day (2011). 43 million TPA is collected, 11.9 million is treated and 31 million is dumped in landfill

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<sup>3</sup> Watsan “Solid waste management”, Chapter 7, *European Commission* 105, 2005 available at: [https://ec.europa.eu/echo/files/evaluation/watsan2005/annex\\_files/WEDC/es/ES07CD.pdf](https://ec.europa.eu/echo/files/evaluation/watsan2005/annex_files/WEDC/es/ES07CD.pdf) (Last Modified July 25, 2023).

<sup>4</sup> Nazish Huma Khan, Nida Naz, Mohammad Nafees, Nida Gul and Tooba Saeed “Solid Waste Management” Researchgate 2023, available at: [\(PDF\) Solid Waste Management \(researchgate.net\)](#) (Last modified July 09, 2023).

sites.<sup>5</sup>

## COMPONENT OF SOLID WASTE MANAGEMENT

Solid waste management can be divided into 6 components:

- (i) Generation
- (ii) Storage
- (iii) Collection
- (iv) Transportation
- (v) Treatment
- (vi) Disposal.

## STUDY OF LITERATURE

1. In 2022, Shailesh Kumar Dewangan, Akshat Jaiswa and others “*Theoretical Study on Solid Waste Management*” give the definition of Solid waste as the unwanted or unusable solid material generated from human activities in residential, laboratory, hospital and industrial areas. It can be classified into three types. 1. Origin such as domestic, industrial, commercial, manufacturing or institutional, 2. Contents/Material such as organic material, glass, metal, plastic, paper etc. and 3. Hazard potential such as toxic, non-toxic, flammable, radioactive, infectious, etc.<sup>6</sup>
2. In 2012, Daniel Hoornweg and Perinaz Bhada-Tata ‘*What a Waste: A Global Review of Solid Waste Management, Urban development series*’ Current global MSW generation levels are approximately 1.3 billion tonnes per year, and are expected to increase to approximately 2.2 billion tonnes per year by 2025. This represents a significant increase in per capita waste generation rates, from 1.2 to 1.42 kg per person per day in the next fifteen years. However, global averages are broad estimates only as rates vary considerably by region, country, city, and even within cities. MSW generation rates are influenced by economic development, the degree of industrialization, public habits, and local climate. Generally, the higher the economic development and rate of urbanization,

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<sup>5</sup> Javadekar, “*Solid Waste Management Rules Revised After 16 Years; Rules Now Extend to Urban and Industrial Areas*” Press Information Bureau Government of India Ministry of Environment, Forest and Climate Change, 2015-16, available at: <https://pib.gov.in/newsite/printrelease.aspx?relid=138591> (Last Modified April 05, 2016).

<sup>6</sup> Shailesh Kumar Dewangan , Akshat Jaiswal , Ajeet jaiswal , Nishu Jaiswal , Mamta Chandra , Sourav Tirkey, “*Theoretical Study on Solid Waste Management*” 3 International Journal of Innovative Research in Engineering 1 (2022) available at: [https://www.researchgate.net/publication/366668763\\_Theoretical\\_Study\\_on\\_Solid\\_Waste\\_Management](https://www.researchgate.net/publication/366668763_Theoretical_Study_on_Solid_Waste_Management) (Last modified December 29, 2022).

- the greater the amount of solid waste produced. Income level and urbanization are highly correlated and as disposable incomes and living standards increase, consumption of goods and services correspondingly increases, as does the amount of waste generated. Urban residents produce about twice as much waste as their rural counterparts.<sup>7</sup>
3. In 2021 World Health Organization “Solid Waste”, in this paper the WHO describes the improper disposal can lead to adverse health outcomes through water, soil and air contamination. Hazardous waste or unsafe waste treatment such as open burning can directly harm waste workers or other people involved in waste burning and neighbouring communities. Vulnerable groups such as children are at increased risk of adverse health outcomes. Poor waste collection leads to environmental and marine pollution and can block water drains. Resulting flooding and other standing waters in waste items favour cholera and vector-borne diseases such as malaria and dengue.<sup>8</sup>
  4. In 2016 Javadekar, ‘Solid Waste Management Rules Revised After 16 Years; Rules Now Extend to Urban and Industrial Areas’ according to this paper the Scientific disposal of solid waste through segregation, collection and treatment and disposal should be in an environmentally sound manner minimizes the adverse impact on the environment. The local authorities are responsible for the development of infrastructure for collection, storage, segregation, transportation, processing and disposal of MSW.<sup>9</sup>

## **LAWS AND REGULATIONS GOVERNING SOLID WASTE MANAGEMENT IN INDIA**

### **INDIAN CONSTITUTION AND ENVIRONMENT**

The Indian constitutional provisions relating to environmental pollution protection stated clearly under Article 21 “Protection of Life and Personal Liberty: No person shall be deprived of his life or personal liberty except according to procedure established by law.” The expansive interpretation of ‘life’ in Article 21 has led to the salutary development of an environmental jurisprudence in India. According to this Article ‘a person has a right to the enjoyment of pollution free water and air to enjoy life fully’.<sup>10</sup> According to Article 48A the central and the

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<sup>7</sup> Daniel Hoornweg, & Perinaz Bhada-Tata, “What a Waste: A Global Review of Solid Waste Management, Urban development series”, 8 (Knowledge Papers no. 15, World Bank, Washington, DC 20433 USA, 2012).

<sup>8</sup> World Health Organization, “Solid Waste”, *Compendium of WHO and Other UN Guidance on Health and Environment*, World Health Organization JSTOR, 54 (2021) available at: <https://www.jstor.org/stable/resrep35857.10> (Last Modified Jan 1, 2021).

<sup>9</sup> Vasudevan Rajaram, Faisal Zia Siddiqui, Sanjeev Agrawal and Mohammad Emran Khan, “Solid and Liquid Waste Management – Waste to Wealth” 2 (PHI Learning Private Limited, Delhi, 2022).

<sup>10</sup> M.P. Jain, *The Indian Constitutional Law* 1173 (LexisNexis, Haryana, 7<sup>th</sup> edn., 2014).

state Government requires to take steps to protect and improve the environment and to safeguard the forests and wildlife of the Country.<sup>11</sup> Furthermore under Article 51A (g) it is also an important provision of the constitution which states the duties of every citizen of the country “to protect and improve the natural environment including forests, lakes, rivers and wild life, and to have compassion for living creatures.”<sup>12</sup> Article 243W of the Indian constitution provides a broad framework relating to the powers, authority and responsibilities of Municipalities, etc. in order to protect, maintenance of safe and healthy environment for people and other living ones.<sup>13</sup>

### **ENVIRONMENT (PROTECTION) ACT, 1986**

The Environment (Protection) Act, 1986 was enacted in response of Bhopal Gas Tragedy of 1984<sup>14</sup>, one of the world’s worst industrial disasters. It was also enacted under Article 253<sup>15</sup> of the Indian Constitution, following India’s participation in the United Nations Conference on the Human Environment (Stockholm, 1972). All legislations related to solid waste management falls under the umbrella of the Environment (Protection) Act, 1986. It provides the legal authority for the Ministry of Environment, Forest and Climate Change (MoEFCC) to notify specific rules for various types of waste.

### **THE HAZARDOUS WASTES (MANAGEMENT AND HANDLING) RULES, 1989**

Hazardous Waste Management Rules 1989 are notified to ensure safe handling , generation, processing, treatment, package, storage, transportation, use reprocessing, collection, conversion, and offering for sale, destruction and disposal of Hazardous Waste. These Rules came into effect in the year 1989 and have been amended later in the years 2000, 2003 and with final notification of the Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008 in supersession of former notification.<sup>16</sup>

### **Hazardous Wastes**

“Hazardous waste” according to Section 3 (14) of The Hazardous Wastes (Management and

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<sup>11</sup> Dr. J.N. Pandey, The Constitutional Law of India 445 (Central Law Agency, Allahabad, 50<sup>th</sup> Edn., 2013).

<sup>12</sup> Dr. J.N. Pandey, The Constitutional Law of India 455 (Central Law Agency, Allahabad, 50<sup>th</sup> Edn., 2013).

<sup>13</sup> The Constitution of India (Ninety-Eighth Amendment) Act, 2012

<sup>14</sup> Bhopal Gas Tragedy, *available at:* <https://www.iasgyan.in/daily-current-affairs/bhopal-gas-tragedy-29>, (last visited November 12, 2025)

<sup>15</sup> The Constitution of India, arts. 253

<sup>16</sup> The Hazardous Wastes (Management and Handling) Rules, 1989, *available at:* <https://faolex.fao.org/docs/pdf/ind40674.pdf> (Last modified May 23, 2003).

Handling) Rules, 1989, means any waste which by reason of any of its physical, chemical, reactive, toxic, flammable, explosive or corrosive characteristics causes danger or is likely to cause danger to health or environment, whether alone or when in contact with other wastes or substances, and shall include <sup>17</sup>-

- (a) Wastes listed in column (3) of Schedule-1;
- (b) Wastes having constituents listed in Schedule-2 if their concentration is equal to or more than the limit indicated in the said Schedule; and
- (c) wastes listed in Lists 'A' and 'B' of Schedule-3 (Part-A) applicable only in case(s) of import or export of hazardous wastes in accordance with rules 12, 13 and 14 if they possess any of the hazardous characteristics listed in Part-B of Schedule 3”.

### **Hazardous waste management**

The collection, reception, treatment, storage, transportation and disposal of Hazardous waste shall be followed separately in accordance with rules specified under The Hazardous Wastes (Management and Handling) Rules, 1989. According to Section (15) of the Act “hazardous wastes site” means a place for collection, reception, treatment, storage and disposal of hazardous wastes which has been duly approved by the competent authority.<sup>18</sup>

### **MUNICIPAL SOLID WASTE (MANAGEMENT & HANDLING) RULES, 2000**

The Ministry of Environment & Forests, Government of India notified Municipal Solid Wastes (Management & Handling) Rules, 2000 under Environment (Protection) Act, 1986 to regulate management and handling of the municipal solid wastes.<sup>19</sup>

The salient features of rules are:<sup>20</sup>

- i. Implementation of provisions of the MSW Rules.
- ii. Collection of waste by organizing Door-to-Door collection system or community bins
- iii. Segregation and storage waste by adopting three bin system
- iv. Transportation of waste in covered vehicles.
- v. Establishment of processing facilities

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<sup>17</sup> *Ibid*

<sup>18</sup> *Ibid*

<sup>19</sup> Municipal Solid Waste (Management And Handling) Rules 2000, available at:

<https://indiankanoon.org/doc/10681868/> (Last modified July 27, 2023).

<sup>20</sup> *Ibid*

vi. Construction of Sanitary landfill facilities.

The Municipal Solid Wastes (Management & Handling) Rules, 2000, were replaced by the Solid Waste Management Rules, 2016, which apply to both urban and rural areas

### **THE PLASTIC WASTE (MANAGEMENT AND HANDLING) RULES, 2011**

The Ministry of Environment and Forests notified The Plastic Waste (Management and Handling) Rules, 2011. The Plastic Waste (Management and Handling) Rules, 2011 replaces the earlier Recycled Plastics Manufacture and Usage Rules, 1999 (amended in 2003). These Rules have been brought out following detailed discussions and consultations with a wide spectrum of stakeholders including civil society, industry bodies, relevant Central Government Ministries and State Governments.<sup>21</sup>

#### **Plastic Waste**

Plastic means material which contains as an essential ingredient a high polymer and which at some stage in its processing into finished products can be shaped by flow. Plastic waste means any plastic product such as carry bags, pouches or 7 [multilayered plastic pouch or sachet etc.], which have been discarded after use or after their intended life is over.<sup>22</sup>

#### **Plastic waste management**

Waste management according to Section 3(p) of the Plastic Waste (Management and Handling) Rules means the scientific reduction, re-use, recovery, recycling, composting or disposal of plastic waste.<sup>23</sup>

### **E-WASTE (MANAGEMENT AND HANDLING) RULES, 2011**

#### **E-Waste**

E-Waste means waste electrical and electronic equipment, whole or in part or rejects from their manufacturing and repair process, which are intended to be discarded.<sup>24</sup>

E-waste management was enclosed under the Hazardous Waste (Management and Handling)

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<sup>21</sup> The Plastic Waste (Management and Handling) Rules, 2011, Press Information Bureau (PIB), Government of India, Ministry of Environment, Forest and Climate Change, *available at*: <https://pib.gov.in/newsite/PrintRelease.aspx?relid=69649> (Last modified Feb 7, 2011).

<sup>22</sup> The Plastic Waste (Management And Handling) Rules, 2011, *available at*: <https://parivesh.nic.in/writereaddata/ENV/HSM/note5.pdf> (Last modified Feb 4, 2011).

<sup>23</sup> *Ibid*

<sup>24</sup> Section 3 (1) k. E-waste (Management and Handling) Rules in 2011, *available at*: [https://www.meity.gov.in/writereaddata/files/1035e\\_eng.pdf](https://www.meity.gov.in/writereaddata/files/1035e_eng.pdf) (Last modified May 12, 2011).

rules until 2010. Due to huge concerns and the adverse impact of the E-waste in the surrounding environment and human health, India pressed the necessity of the strategic initiative to control the E-waste menace and its hazardous characteristic. The Ministry of Environment and Forests enforced the first E-waste (Management and Handling) Rules in 2011 under the Environmental Protection Act in order to regulate management and handling E-waste Pollution.<sup>25</sup>

## **JUDICIAL DECISION RELATED TO SOLID WASTE MANAGEMENT IN INDIA:**

1. Municipal Council, Ratlam vs. Vardhichand<sup>26</sup>
2. B.L Wadhera vs. Union of India.<sup>27</sup>
3. Almitra Patel and Anr..vs. Union of India and Ors..<sup>28</sup>

The Supreme Court relied on Municipal Council, Ratlam v. Vardhichand, (1980) 4 SCC 162 and B.L. Wadhera v. Union of India, (1996) 2 SCC 594 where it was held that clean environment is fundamental right of citizens under Article 21 and the local bodies as well as the State should ensure that public health is preserved by taking all possible actions and held that “...*handling of solid municipal waste is a perennial challenge and would require constant efforts and monitoring with a view to making the municipal authorities concerned accountable, taking note of dereliction, if any, issuing suitable directions consistent with the said Rules and direction incidental to the purpose underlying the Rules such as upgradation of technology wherever possible. All these matters can, in our opinion, be best left to be handled by the National Green Tribunal established under the National Green Tribunal Act, 2010.*”<sup>29</sup>

The Tribunal Stated that “Moreover, without fixing quantified liability necessary for restoration, mere passing of orders has not shown any tangible results in the last eight years (for solid waste management) and five years (for liquid waste management), even after expiry of statutory/laid down timelines. Continuing damage is required to be prevented in future and past damage is to be restored.”

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<sup>25</sup> Shashi Arya, Sunil Kuma, “E-waste in India at a glance: Current trends, regulations, challenges and management strategies” 271 *Journal of Cleaner Production, sciencedirect* 2 (2020).

<sup>26</sup> Municipal Council, Ratlam vs. Vardhichand (1980) 4 SCC 162

<sup>27</sup> B.L Wadhera vs. Union of India (1996) 2 SCC 594

<sup>28</sup> Almitra Patel and Anr.vs. Union of India and Ors (2000) 2 SCC 678

<sup>29</sup> Editor-4 , “NGT directs Maharashtra Government to pay compensation of ₹12,000 crore due to improper waste management” SCC Online 2022, available at: <https://www.sconline.com/blog/post/2022/09/16/ngt-directs-maharashtra-government-to-pay-compensation-of-rs-12000-crore-due-to-improper-waste-management/> (last visited September 16, 2022).

## RESULTS AND DISCUSSION

It is clear from the research paper study that protection of environment is to protecting our life free from pollution which is our basic needs and fundamental rights. Healthy environment means healthy life. Solid waste pollution control primary goals is to achieve sustainable environment free from waste pollution by minimize or reduce, reuse and recycle the solid waste.

Solid waste pollution is the primary concern of our life today. Mere passing the laws relating to solid waste management does not enough without full participation from all sectors in order to get the effectives outcomes.

The existing laws relating to Solid waste management, treatment, management, handling, disposal and other scientific technique should be implemented and enforce according to the changing needs of the society for better environment pollution control.

## CONCLUSION

Pollution is the main cause to human health and environment disaster. Solid waste is the refuse materials or goods, if not treated and manage properly will harm the environment for the present and may be worse for the future generation. It is the duty of each and every citizen to come up with different idea how to manage and reduce solid waste pollution which benefit for the human being and the environment as well. In order to ensure environmentally sound and sustainable ways of dealing with waste generation to disposal practices of solid waste, different legislations and laws in India have been passed to regulate management and handling various kinds of solid waste in accordance with the specified laws, rules and regulation should be well understood, follow and strictly implemented by all sectors for effective outcomes.

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1. Agenda 21 of United Nation Environment Programme, “*Environmentally Sound Management of Solid Wastes & Sewage-Related Issues*” UN Department of Economic and Social Affairs, Division for Sustainable Development, *available at:* [https://www.un.org/esa/dsd/agenda21/res\\_agenda21\\_21.shtml](https://www.un.org/esa/dsd/agenda21/res_agenda21_21.shtml) (Last Modified July 25, 2023).

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