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Improper Disposal Of Hazardous Waste And Its Impact On Human Health: In Special Reference To India

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ABSTRACT

India is a developing country which is moving ahead on the path of development with its diversity. One of the biggest challenges facing this rapidly growing Indian economy is the production of hazardous waste materials. Processing hazardous waste materials has become the biggest problem for all developed and developing countries. Because it not only affects environment but is also causing serious damage to the human health. Due to which natural The effect of continuous use of these substances is also clearly visible on human health. The objective of this study is to comprehend the impact of hazardous waste on human health and to deal with problems associated with it. The results revealed that hazardous waste, when incorrectly treated, processed and disposed of, has a significant impact on public health and the environment. The most severe consequences of insufficient waste management are air pollution, water supply depletion, and the spread of human diseases. Cities become untidy and dirty, have a negative impact on people's health, harm flora and fauna, and hinder the economy of countries. Some of the prevention such as hazardous waste handling, dilution, a tube-well structure using well-logging methods and other forms of geophysical monitoring designed specifically for the contaminated area, as well as the different treatment systems, could also be advised.

Keywords: *Hazardous Waste; Environment, Human Health, Sustainable Development*

1. INTRODUCTION

Man’s paradise is on earth; this living world is the beloved place of all.

It has the blessings of nature’s bounties. Live in a lovely spirit.

Atharva Veda (5.30.6)

Any waste which by reason of characteristics such as physical, chemical, biological, reactive, toxic, flammable, explosive or corrosive, causes danger or is likely to cause danger to health or the environment, whether alone or in contact with other wastes or substances.[1] Hazardous waste is a type of waste that poses dangers to life, health, and environmental systems unless properly stored, transported, treated, and mitigated. The impact of hazardous waste depends on various factors, primarily the type of waste (chemical, biological, or radioactive), its concentration, the duration of its presence in the environment, and the disposal method. Also, the proximity of the waste to human populations or ecosystems significantly affects its impacts. Over time, exposure to these harmful substances can lead to a wide range of health problems, from skin irritations and respiratory issues to more severe conditions like organ damage, cancer, or developmental disorders.

1.1 Classification of Hazardous Wastes

The Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 have been framed under the Environment (Protection) Act, 1986. These rules were framed to regulate the management, storage, treatment and disposal of hazardous and other wastes in India in an environmentally sound manner. According to these rules, hazardous wastes are broadly categorized based on their origin, composition, and potential risk. Here's how they're classified:

Schedule I, which lists specific industries and the types of waste they generate such as waste from petroleum refining, metal treatment, or chemical manufacturing.[2]

[1] Section 3(17) of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016
[2] Schedule I of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016

Another major classification is based on the **physical and chemical characteristics** of the waste, as defined in **Schedule II**[3]. Wastes are considered hazardous if they possess properties such as being explosive, flammable, toxic, corrosive, or eco-toxic. In addition, if the waste contains certain hazardous substances like mercury, arsenic, lead, etc. beyond permissible limits, it is also treated as hazardous.

Furthermore, **Schedule III** includes specific categories of wastes, especially those involved in import and export, which may not be generated locally but are still considered hazardous due to their potential impact.[4] These include used electronic waste, used oil, and discarded batteries, which need to be handled with care even if they are being transported across borders.

Here is a summary table of the classification:

S. No.	Basis of Classification	Details
1	By Process (Schedule I)	Wastes generated from specific industrial processes (e.g., oil refining, paint manufacturing)
2	By Hazardous Properties (Schedule II)	Wastes that are flammable, toxic, reactive, corrosive, explosive, or eco-toxic
3	By Hazardous Constituents (Schedule II)	Wastes containing harmful elements (like lead, mercury) beyond safe limits
4	By Transboundary Movement (Schedule III)	Certain imported/exported wastes like e-waste, used oil, or batteries

In addition to the above classification, **Schedule IV** of the Act allows the import of certain recyclable hazardous wastes (e.g., metal scrap, e-waste) only with prior informed consent (PIC) and regulatory approval[5]. In contrast, **Schedule V** allows the export of specified wastes (e.g., lead-acid batteries) under the Basel Convention safeguards[6]. **Schedule VI** prohibits the import of non-hazardous but environmentally hazardous wastes (e.g., plastic waste, tyres) to prevent dumping.[7]

1.2 Sources of Generation of Hazardous Wastes

Hazardous waste is generated from a wide range of industrial, agricultural, commercial and household activities.[8] About a third of the population lives in urban areas. By 2050, it is expected that about 50% of India's population will be living in urban areas, and waste generation will grow by 5% per year.[9] The rise in the generation of solid waste is mainly due to population growth, economic development, and changing lifestyles. Municipal solid wastes which are hazardous are often simply collected, transported, and dumped without treatment or processing.[10] Thus a substantial amount of waste remains unattended at collection centers, roadsides, and riverbanks, with many small scale and large scale industrial units disposing of their waste mainly in open spaces and adjacent to water sources, resulting in environmental pollution and risks to public health.[11]

1.3 Soil and Groundwater Contamination by Hazardous Wastes

Hazardous wastes, such as chemical, biological or radioactive substances can severely contaminate soil and groundwater if not properly managed. Soil and groundwater contamination by hazardous wastes stems from multiple human-induced factors that allow chemical, biological, and radioactive substances to infiltrate critical environmental systems. Improper disposal practices, such as unregulated dumping or using landfills without impermeable liners, enable toxins like heavy metals or

[3] Schedule II of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016
[4] Schedule III of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016
[5] Schedule IV of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016
[6] Schedule V of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016
[7] Schedule VI of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016
[8] Hasan, M. A., Mallick, J., Ahmed, M., & Saleem, M. (2020). Hazardous Wastes and its Impact on Human Health. *IOP Conference Series Materials Science and Engineering*, *804*(1), 012056. https://doi.org/10.1088/1757-899x/804/1/012056
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[10] Karthikeyan, L., Suresh, V. M., Krishnan, V., Tudor, T., & Varshini, V. (2018). The management of hazardous solid waste in India: an overview. *Environments*, *5*(9), 103. https://doi.org/10.3390/environments5090103
[11] Kumar, S.; Smith, S.R.; Fowler, G.; Velis, C.; Kumar, S.J.; Arya, S.; Rena; Kumar, R.; Cheeseman, C. Challenges and opportunities associated with waste management in India. R. Soc. Open Sci. 2017, 4, 160764.

volatile organic compounds to leach into soil and groundwater, often due to cost-cutting or lax regulatory enforcement.[12] Accidental spills and leaks from storage tanks, pipelines, or transportation mishaps, such as oil or solvent discharges, rapidly contaminate porous soils and aquifers, as seen in documented oil spill cases.[13] Weak regulatory enforcement and lack of awareness, particularly in developing regions, lead to improper waste handling by industries or communities unaware of safe practises.[14] These factors underscore the urgent need for robust waste management and regulatory measures to protect soil and groundwater resources.

2. EXISTING INDIAN LAWS AND ITS OVERVIEW

India's environmental policy have been greatly impacted by the Stockholm Conference in 1972. The Ministry of Environment and Forests (MoEF) and the National Committee on Environmental Planning and Coordination (NCEPC) were both founded by the government. Articles 48A and 51A(g) were added by the 42nd Constitutional Amendment (1976), which made environmental conservation a core citizen and state fundamental duty. The Bhopal gas tragedy (1984) further accelerated the need for stringent environmental laws.

Environmental impact assessments (EIAs), environmental courts, and the development of an environmental code were among the recommendations made by the Tiwari Committee in 1980. Environmental governance was also significantly shaped by judicial activism and economic changes in the 1990s.

2.1 Legislative and Regulatory Framework

- **Factories Act 1948 & amended 1987):** Covers hazardous processes, worker safety, and emergency protocols.
- **Environment (Protection) Act, 1986:** Central legislation giving the government authority to regulate hazardous substances.
- **Hazardous Waste Rules (1989, amended 2000, 2003, 2008, and 2016):** Define hazardous waste categories, handling procedures, and transboundary movement rules.
- **Public Liability Insurance Act, 1991:** Mandates insurance for hazardous operations to provide quick relief to victim.
- **National Environment Policy (2006) and Hazardous Waste Management Strategy (2012):** Emphasize minimization, safe disposal, and institutional strengthening.

India, under the Basel Convention, regulates import/export of hazardous waste. The 2016 rules clarify conditions under which transboundary movement is legal and prohibit certain waste imports to prevent illegal dumping.

1.2 Judicial and Institutional Mechanisms

The Law Commission (186th Report) recommended specialized environmental courts. The National Tribunal (NGT) was established in 2010 for expeditious resolution of environment disputers, based on strict and no-fault liability principles.

One of the most significant rulings was in the 2005 case of Research Foundation for Science, Technology, and Natural Resource Policy v. Union of India[15], in which the Supreme Court ordered the government to establish comprehensive guidelines for the handling and disposal of hazardous waste as well as to apply the Basel Convention standards. The Court directed routine inspections and audits of establishments handling hazardous chemicals, emphasising the necessity of adequate infrastructure, regulatory monitoring, and accountability systems.

Along with enforcing the law, the judiciary has promoted increased public understanding and community participation in environmental decision-making, which has strengthened the polluter pays[16] and sustainable development tenets. These interventions highlight the judiciary's vital role in the development of hazardous waste management in India as well as its function as a guardian of environmental justice. The Court issued comprehensive directions for maintaining the standards stipulated by the Pollution Control Board. The Supreme Court directed the Central Government to constitute an authority under Section 3(3) of the Environment (Protection) Act, 1986 to deal with the situation created by the tanneries and other polluting industries in the State of Tamil Nadu. The Court held that polluter pays principle must extend to paying damages for the environment degradation caused by the pollutants discharged by them. Such polluter is liable to pay the cost to the individual sufferers as well as the cost of reversing the damaged ecology.

[12] U.S. Environmental Protection Agency. (2023). *Landfill Management and Hazardous Waste*. https://www.epa.gov/landfills
[13] Fingas, M. (2016). *Oil Spill Science and Technology*. Elsevier.
[14] World Health Organization. (2021). *Hazardous Waste Management in Developing Countries*. https://www.who.int
[15] *Research Foundation for Science Technology and Natural Resource Policy v. Union of India*, (2005) 10 SCC 510
[16] *Vellore Citizens' Welfare Forum v. Union of India*, (1996) 5 SCC 647.

3. HAZARDOUS WASTE IMPACT ON HUMAN HEALTH

Exposure to elements of hazardous waste may result in severe consequences for an individual and community, inhibiting their growth and productivity in the long term while posing a very complex threat to their health simultaneously. Treating the waste carelessly does not only affect one area, it tends to impact the land as a whole as toxins are easily spread through water, eroding soil and poisoning it in the process. Even if just a small ravine or lake is impacted, it poses a high risk for groundwater and even water streams supplying to the area. The overall waste, waste that is on the heavier side such as lead, arsenic and even mercury, poses a tremendous threat to the bakery industry. Consuming contaminated foods by children can result in serious shifts in a behavioural manner. In the long run, this might even lead to cancer, placing them on the ropes with exposure to feeling sick for most of their life.

Hazardous wastes containing chemical, biological, and radioactive contaminants threaten human health by exposure routes such as inhalation, ingestion, and dermal absorption. Lack of regulation of such waste management processes like dumping and storage allows the release of harmful pollutants into the air, water, and land, having a direct impact on populations. Heavy metals such as lead and mercury from industrial wastes, for example, are retained in the body, leading to neurological impairments, child development delay, and kidney failure.[17]

Polluted water for drinking, usually a result of leaching of chemicals such as benzene or pesticides into the ground, is associated with cancers, reproductive disorders, and liver damage.[18]

These health effects are especially pronounced in sensitive populations, including children and pregnant women, who experience increased risk from even low-level exposures. Chronic disease has been linked to long-term exposure to hazardous waste facilities, highlighting the importance of strong waste management procedures to ensure public health. Airborne pollution from hazardous waste facilities or unregulated disposal methods is another source of health risks. Incinerating toxic waste, for instance, emits dioxins, furans, and other harmful air pollutants, which cause respiratory ailments, cardiovascular disease, and immune system impairment.[19]

These toxins can migrate over long distances, impacting populations distant from the source of contamination. Furthermore, asbestos fiber inhalation, which is often present in toxic waste streams, can cause asbestosis, lung cancer, and mesothelioma, all of which have high fatality rates.[20]

4. REGIONAL CASE STUDIES IN INDIA

In many parts of India, the negative effects of improper handling of hazardous waste on human health and the environment are glaringly apparent. Heavy industrialisation in Gujarat, especially in the Vapi industrial area, has seriously contaminated soil and groundwater with hazardous chemicals and heavy metals. According to studies, local water supplies have high amounts of lead and mercury, which can cause developmental difficulties, skin conditions, and respiratory problems in children[21]. Delhi and Uttar Pradesh, particularly Seelampur and Moradabad, have gained notoriety as unofficial centres for recycling e-waste. In this case, workers—often children—are exposed to hazardous materials including lead, cadmium, and brominated flame retardants through the uncontrolled breakdown of electronic debris, which can cause problems with their neurological, respiratory, and reproductive systems[22].

The tannery sector in Tamil Nadu has been a major source of chromium pollution, especially in areas like Ranipet and Vellore. The improper disposal of tannery effluents has contaminated the soil and water, increasing the risk of cancer and causing gastrointestinal issues and skin illnesses in the local populations[23]. The Bhopal gas tragedy of 1984, in which thousands of people died instantly and had long-term health problems as a result of a methyl isocyanate gas leak from the Union Carbide pesticide facility, is arguably the most horrific example. Untreated hazardous waste remains at the site decades later, contaminating the environment and harming the health of local populations with cancer, respiratory conditions, and birth deformities[24].

5. SOCIO-ECONOMIC AND ENVIRONMENTAL JUSTICE DIMENSIONS

The burden of hazardous waste mismanagement in India disproportionately affects vulnerable communities, including the urban poor, informal sector workers, and rural populations. These groups often live near industrial zones or waste dumping sites due to low land costs, lacking access to clean air, water, and sanitation. Informal workers, especially those engaged in

[17] World Health Organization. (2022). *Lead Poisoning and Health*. https://www.who.int/news-room/fact-sheets/detail/lead-poisoning-and-health
[18] U.S. Environmental Protection Agency. (2023). *Drinking Water Contaminants*. https://www.epa.gov/ground-water-and-drinking-water
[19] World Health Organization. (2021). *Dioxins and Their Effects on Human Health*. https://www.who.int/news-room/fact-sheets/detail/dioxins-and-their-effects-on-human-health
[20] U.S. Environmental Protection Agency. (2023). *Asbestos and Health Risks*. https://www.epa.gov/asbestos
[21] Virendra Mishra & S.D. Pandey, "Hazardous waste, impact on health and environment," *Environment International*, Vol. 31, 2005, pp. 419–425.
[22] Pooja P. Vardhan, "Environment Protection under Constitutional Framework of India," available at: www.pib.nic.in.
[23] Shantanu K. Dutta et al., "Environmental Management of Industrial Hazardous Wastes in India," *Journal of Environmental Science & Engineering*, Vol. 48, 2006, pp. 144–147.
[24] Danish Hasnain, "Managing Hazardous Wastes and Substances: Legislative Approach," *International Journal of Management and Social Sciences Research*, Vol. 3, 2014, pp. 34–42.

waste collection and recycling, are exposed daily to toxic chemicals without protective gear, leading to severe health conditions and reduced life expectancy[25]. Rural populations, dependent on groundwater for agriculture and drinking, suffer when hazardous leachates contaminate water sources, resulting in long-term health problems and livelihood loss[26].

The gendered impacts of toxic exposure are also significant. Women, particularly those working in unregulated recycling sectors or living near hazardous sites, face higher risks of reproductive disorders, miscarriage, and cancers. Additionally, children, with their developing immune and neurological systems, are highly susceptible to lead poisoning, respiratory issues, and developmental delays. Epidemiological studies in areas like Bhopal and Vapi have revealed increased rates of congenital anomalies and low birth weight among children exposed to industrial pollutants[27].

Moreover, India's hazardous waste policies often reflect patterns of environmental racism and neglect, where marginalized communities—frequently those of lower caste or tribal background—bear the brunt of environmental hazards with little legal recourse or institutional support. Regulatory failures and weak enforcement have allowed hazardous industries to operate in these areas with impunity. Scholars argue that this policy indifference stems from systemic social inequality and lack of political clout among these affected populations[28]. Addressing these injustices requires an integrated approach that combines environmental regulation with social equity and human rights.

6. CURRENT MITIGATION AND MANAGEMENT STRATEGIES FOR HAZARDOUS WASTE DISPOSAL IN INDIA

India has taken a multipronged strategy to tackling the escalating problem of hazardous waste by combining community involvement, legal frameworks, and technology initiatives. Technologies for treatment and disposal include bioremediation, incineration, and secured landfilling are important examples of these. High-toxicity wastes are burned under regulated settings to reduce emissions, while secured landfills are designed to stop leachate from leaking into groundwater. Although its application is currently restricted, bioremediation provides a more sustainable approach by employing microorganisms to degrade harmful pollutants found in soil and water[29].

Particularly in the wake of significant environmental catastrophes and the increase in the prevalence of illnesses linked to pollution, public health initiatives and awareness campaigns have accelerated. Campaigns to inform corporate organisations and the public on appropriate handling, segregation, and disposal methods have been started by the Ministry of Environment, Forests, and Climate Change (MoEFCC) in collaboration with state pollution control boards. The purpose of health camps, especially in industrial areas, is to screen and treat populations that have been exposed to harmful chemicals. To guarantee the integration of hazardous waste management and health surveillance, however, more extensive and systematic efforts are required[30].

7. CURRENT ISSUES FOR HAZARDOUS WASTE MANAGEMENT

Hazardous waste management in India is a critical environmental and public health concern, exacerbated by rapid industrialization, urbanization, and changing consumption patterns. The country faces multifaceted challenges in managing hazardous waste, including industrial, electronic, and biomedical waste. This analysis provides a detailed examination of the current issues, supported by recent data and insights, and is structured to reflect the complexity and urgency of the situation.

7.1 Inadequate Infrastructure for Treatment and Disposal

According to Statista's[31] Hazardous trash created in India report, India's production of hazardous waste has increased significantly, with over 12 million metric tonnes produced in the fiscal year 2022. The infrastructure for removal, storage, and treatment is still insufficient in spite of this. States like Gujarat, Maharashtra, and Andhra Pradesh are home to the majority of Treatment, Storage, and Disposal Facilities (TSDFs), which have a limited ability to manage the volume. A 2018 research, for example, emphasised the lack of high-temperature treatment technology, and new studies indicate that this deficiency continues to exist, resulting in inappropriate disposal in open areas or municipal landfills. According to CPCB research, this leads to pollution of soil and groundwater, with landfill leachates making the water unsuitable for human consumption.

[25] S. Narayan, S. Mazumder, & K. Bhattacharya, "Hazardous Waste Management in India Scenario," available at: www.srcosmos.gr (accessed Sept. 28, 2014).
[26] Divya Agarwal & Anil Kumar Gupta, "Hazardous Wastes Management: Analysis of Indian Scenario and Perspective Governance," *Visual Soft Research Journal*, Vol. 2(9), 2011, pp. 485–488.
[27] A.K. Saxena & Yogesh Gupta, "Environmentally Sound Management of Hazardous Wastes," *Encyclopedia of Life Support System*, www.eolss.net
[28] Bharat H. Desai & Balraj Sidhu, "On the Quest for Green Courts in India," *Journal of Court Innovation*, 2010, pp. 97–104.
[29] P.S. Jaswal & Nishtha Jaswal, *Environment Law*, 2009, pp. 407–410.
[30] Ministry of Environment, Forest and Climate Change, "Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016," www.moef.nic.in.
[31] Statista. (2024, February 5). Hazardous waste generation in India FY 2017-2022. https://www.statista.com/statistics/1448755/hazardous-waste-generated-india-timeline/

7.2 Poor Waste Segregation and Collection

Segregation at the source is necessary for effective hazardous waste management, yet enforcement and awareness are lacking, which leads to poor implementation. Treatment procedures are made more difficult by the frequent mixing of hazardous waste, such as biomedical and e-waste, with municipal solid garbage. According to India Solid garbage Management[32] data from 2021 shows that only 43 million tonnes of the 62 million tonnes of garbage created year are collected, and only 12 million tonnes are handled. As evidenced by Delhi's Supreme Court review in 2024, which noted that over 3,800 tonnes of untreated trash per day include toxic components, this mixing raises the hazards to the environment and human health.

7.3 Regulatory Gaps and Weak Enforcement

According to the CPCB's Hazardous Waste Management guidelines, India has laws such as the Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016, which are subject to revisions until 2024. However, because of a lack of resources and problems with coordination between the State Pollution Control Boards (SPCBs) and the Central Pollution Control Board (CPCB), enforcement is uneven. A lot of industries do not follow Standard Operating Procedures (SOPs) or seek authorisations, which results in uncontrolled transboundary movement and unlawful dumping. Gujarat's online tracking system is a good example, although its efficacy is limited by uneven implementation.

7.4 Dominance of the Informal Sector

The informal sector handles a significant portion of hazardous waste, particularly e-waste, with research suggesting approximately 95% managed informally, as per Business Today[33] - E-waste: A Growing Problem. This involves unsafe methods like open-air incineration and acid leaching, exposing workers to toxic substances like mercury and lead, causing health issues such as respiratory problems and cancers. Only 5% of e-waste is formally recycled, with informal processing leading to environmental pollution. Examples include Bengaluru, where informal e-waste recycling exposes workers to hazardous conditions, as noted in awareness programs by Earth5R.

7.5 Lack of Public Awareness and Community Participation

Low public awareness about hazardous waste dangers and proper disposal, especially in rural areas, contributes to open dumping. Social taboos and resistance to waste management practices hinder community participation, and initiatives like Earth5R's Delhi Community-led Waste Management Project perpetuate improper disposal habits.

7.6 Emerging Challenges with E-Waste and Biomedical Waste

As per Down to Earth report[34] - India's e-waste generation has increased by 73% in five years, reaching 1.751 million metric tons in 2023-24. Biomedical waste, estimated at 0.17 million tons annually, faces challenges due to inadequate treatment facilities and illegal imports. The need for enhanced facilities and enforcement under the E-Waste (Management) Rules, 2016 is highlighted.

8. CONCLUSION & SUGGESTIONS

In conclusion, the improper disposal of hazardous waste in India presents a significant and multifaceted threat to human health and the environment. The alarming prevalence of unscientific waste management practices, coupled with weak enforcement mechanisms and a lack of widespread awareness, exposes vulnerable populations to a cocktail of toxic chemicals through various pathways, leading to a range of acute and chronic health conditions. From respiratory illnesses and neurological disorders to increased cancer risks and reproductive problems, the consequences of this negligence are far-reaching and disproportionately affect marginalized communities and informal waste workers. The situation is further exacerbated by rapid industrialization, urbanization, and the ever-increasing volume of hazardous waste generated, demanding urgent and comprehensive action. To mitigate the detrimental impacts, a multi-pronged approach is crucial. This includes strengthening regulatory frameworks with stricter enforcement and accountability measures, promoting the adoption of cleaner production technologies and waste minimization strategies in industries, and investing in state-of-the-art hazardous waste treatment and disposal facilities. Furthermore, raising public awareness about the dangers of improper disposal and promoting responsible waste management practices at the individual and community levels are essential. Prioritizing occupational safety and health for informal waste workers through training, provision of protective gear, and access to healthcare is also paramount. Ultimately, a collaborative effort involving the government, industries, NGOs, and the public is necessary to ensure the safe and sustainable management of hazardous waste in India, safeguarding human health and preserving the environment for future generations. Only through a sustained commitment to these measures can India hope to break the cycle of pollution and protect its citizens from the devastating consequences of improper hazardous waste disposal.

[32] India Solid Waste Management. (2023, April 27). International Trade Administration | Trade.gov. https://www.trade.gov/market-intelligence/india-solid-waste-management
[33] Rao, R. (2021, May 13). E-waste: a growing problem. Business Today. https://www.businesstoday.in/zero-carbon-challenge/story/e-waste-a-growing-problem-295647-2021-05-12
[34] Kiran Pandey, & Kiran Pandey. (2024, December 17). India's e-waste surges by 73% in 5 years. Down to Earth. https://www.downtoearth.org.in/waste/indias-e-waste-surges-by-73-in-5-years

To combat improper hazardous waste disposal and its health impacts in India, robust measures are needed. Strengthen enforcement by establishing district-level regulatory agencies to monitor compliance, penalize non-compliant industries, and ensure State Pollution Control Boards' accountability. Launch media-driven awareness campaigns, legal camps, and seminars to educate citizens on safe disposal and health risks. Mandate training, safety equipment, and health check-ups for workers, especially in the informal sector. Enforce Extended Producer Responsibility and Deposit Refund Schemes to promote less toxic products and take-back systems. Integrate informal recyclers into formal systems with incentives and better working conditions. Curb illegal waste imports through strict enforcement and online tracking, aligning with Basel Convention standards. Enhance infrastructure with data banks and treatment facilities, supported by periodic waste assessments. Foster public-private partnerships and low-interest loans for cleaner technologies. Engage NGOs and media for awareness and accountability, and mandate standardized Environmental Impact Assessments with public input to assess risks of hazardous industries.