

Solid Waste and Human Health: A Legal Study under the Environment (Protection) Act, 1986 with Special Reference to Raipur District

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Abstract: *Solid waste management is now a major environmental and public health issue in India, especially in areas where poor segregation, collection, treatment and disposal lead to risks of contamination of the air, water and soil as well as exposure of humans. The present study looks at the effects of solid waste on human health from a legal point of view, with a specific focus on the Raipur District in Chhattisgarh. It uses a doctrinal-empirical approach to legal research, drawing on environmental laws and regulations, judicial rulings, reports from the government and regulatory bodies, and other relevant secondary sources. Particular emphasis is placed on the Environment (Protection) Act, 1986, the Solid Waste Management Rules, 2016, and the current Solid Waste Management Rules, 2026, which came into effect on 1 April 2026. The study also examines the roles of local authorities, pollution control agencies and waste producers in meeting their legal obligations. The analysis shows that although Raipur has established systems for the collection, transfer, processing and the remediation of legacy waste, there are still deficiencies in source segregation, compliance monitoring, institutional capacity, public involvement and effective enforcement. The study concludes that the main problem is not simply the existence of environmental legislation but rather its consistent and verifiable implementation at the local level. In order to reduce health risks and achieve proper environmental protection, it is necessary to strengthen regulatory supervision, the capacity of municipal authorities, protection for workers and community participation.*

Keywords: Solid Waste Management; Human Health; Environmental Law; Environment (Protection) Act, 1986; Raipur District

Introduction

Solid waste has now turned into a major environmental and public health issue due to rising urbanisation, population growth, changes in consumption patterns and the growth of commercial and industrial activities. Municipal solid waste consists of a wide variety of materials which are discarded by households, commercial businesses, institutions and other urban activities. If this type of waste is not correctly sorted, collected, transported, processed and disposed of in a scientific manner, it can act as a major source of environmental pollution. The World Health Organization (WHO) states that poorly managed solid waste can lead to the contamination of air, soil and water and may cause a variety of health risks for waste workers, the communities nearby and other vulnerable groups. Inadequate waste collection can also block drainage systems and result in stagnant water conditions that are conducive to vectors and vector-borne diseases (WHO, 2022; WHO, 2026). The connection between solid waste and human health therefore extends beyond the immediate problems caused by litter or unpleasant smells. Practices such as open dumping, uncontrolled decomposition and open burning of waste can give rise to biological, chemical and physical hazards. Contaminated surface water and groundwater can serve as routes for human exposure, while the smoke and other pollutants emitted through uncontrolled burning can have a negative effect on air quality. Waste workers and people who live or work near waste storage, treatment and disposal sites may have a considerably higher level of exposure because of their direct or prolonged contact with the waste. The WHO has specifically acknowledged that waste management practices, such as recycling, composting, incineration and landfilling, can have important effects on health and well-being, especially for those who work with waste and for the communities situated around waste facilities (WHO, 2021).

The importance of solid waste management from a public health point of view means that effective legal regulation is necessary. In India, environmental protection is backed by an extensive statutory and regulatory framework, the Environment (Protection) Act, 1986 being one of the main pieces of legislation. Hassan et al. (2025) This Act was passed with the aim of ensuring the protection and improvement of the environment and includes provisions which give the Central Government the authority to take action for the purpose of environmental protection, to regulate pollution of the environment and to prescribe safeguards relating to environmental pollutants and hazardous substances. Sections 3, 5, 6, 7 and 8, together with other sections, offer key legal tools for preventing and controlling environmental damage. The regulatory system for municipal solid waste has since been built up through rules made under the environmental protection framework. The Solid Waste Management Rules, 2016, laid down specific responsibilities regarding waste generation, segregation, collection, transportation, processing, treatment and disposal and thus changed the approach from simple waste disposal to one of integrated and environmentally appropriate waste management. Haider et al. (2025) The Ministry of Environment, Forest and Climate Change has also issued further amendments and, more recently, the Solid Waste Management Rules, 2026, showing that India's regulatory response to solid waste management is still evolving. The significance of this legal framework is especially apparent at the local level, where statutory requirements must be put into practice in terms of waste management. Ramos et al. (2026) Raipur, as a major urban area in Chhattisgarh, offers a suitable setting in which to look at the connection between environmental

law, municipal waste management and human health. Previous reports by the Central Pollution Control Board (CPCB) listed Raipur as one of the cities in Chhattisgarh that needed integrated solid waste management infrastructure and noted that the city had developed waste-processing and disposal facilities. The CPCB's reports have also indicated that Raipur is one of the urban local bodies included in the state's integrated solid waste management programmes.

In view of this, it is important to carry out a study of Raipur District not only to look at whether environmental legislation exists but also to evaluate the effectiveness of its implementation at the local level. The main question is whether the current legal framework is able to ensure environmentally sound waste management and thus reduce risks to human health. The present study therefore looks at the impact of solid waste on human health from a legal point of view, with a special focus on the Environment (Protection) Act, 1986, the relevant solid waste management regulations and their application in Raipur District. By linking environmental law with public health concerns and with the actual implementation at the local level, the study aims to identify gaps in both the regulatory and practical aspects and to propose measures for improving legal compliance, institutional accountability and sustainable solid waste management.

Objectives of the Study

The study is guided by the following objectives:

1. To look at the human-health risks that are recorded in relation to the inadequate management of solid waste.
2. Analyse the legal framework which governs solid waste management in India.
3. To investigate the role of the Environment (Protection) Act, 1986, in the regulation of solid waste management and in the protection of human health and the environment.
4. To evaluate how the applicable solid waste-management regulations are being implemented in the Raipur District of Chhattisgarh.
5. To identify the legal, institutional and administrative gaps in solid waste management and to suggest suitable measures for strengthening implementation and environmental governance.

Research Methodology

This study makes use of a doctrinal and descriptive-analytical approach to legal research, focusing on Raipur District in Chhattisgarh as a specific example in order to look at the connection between solid waste management, environmental regulation and human health. In the doctrinal part, the study looks at both primary and secondary legal sources, such as the Environment (Protection) Act, 1986, the relevant Solid Waste Management Rules, the Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981, the constitutional provisions, judicial rulings, government notifications and reports published by the appropriate environmental authorities. Special attention is paid to the statutory duties, regulatory obligations, institutional responsibilities and enforcement mechanisms connected with solid waste management.

The study also looks at the secondary information that has already been published about Raipur District, such as government and regulatory reports, municipal records when they are available, the proceedings of the National Green Tribunal, reports from the CPCB and from the state level on environmental matters, and relevant academic literature. This information is employed to outline the waste-management practices, the arrangements for collection and processing, the problems associated with legacy waste, the environmental concerns, and the extent to which the applicable legal requirements have been implemented in the area. Since no primary survey, interviews, or independently compiled epidemiological dataset is carried out, the study does not assert that it has measured the prevalence or incidence of any specific health conditions among the people of Raipur.

The material gathered is studied using legal, descriptive and analytical methods. The legal analysis looks at whether the current statutory and regulatory framework is adequate and is being properly applied, whereas the descriptive analysis gives a account of the waste management situation in Raipur. The analytical part involves comparing the practices and institutional arrangements identified with the relevant legal requirements in order to spot the gaps in implementation concerning enforcement, segregation, disposal, monitoring, institutional capacity, public participation and accountability. Based on this, the study produces recommendations for strengthening the implementation of environmental law and for improving the protection of human health and the environment in the Raipur District.

Legal Framework for Solid Waste Management in India

The legal framework for solid waste management in India is a combination of environmental legislation, subordinate rules, constitutional principles and institutional mechanisms. At the heart of it is the Environment (Protection) Act, 1986 (EPA), which was passed in order to ensure the protection and improvement of the environment and to prevent hazards to humans, to other living organisms and to property. This Act gives the Central Government wide powers to take action for the protection of environmental quality, to prescribe safeguards for the handling of environmental pollutants and to issue directions for the prevention or control of environmental pollution. Sections 3 and 5 are especially important in this situation, and Section 6 forms the statutory basis for making rules concerning environmental protection. The Act thus serves as an overarching piece of legislation under the terms of which a number of specialised environmental rules, including those relating to solid waste management, have been prepared. A specific regulatory framework was introduced by the Solid Waste Management Rules, 2016, which were issued under the EPA and replaced the Municipal Solid Waste (Management and Handling) Rules of 2000. The 2016 Rules took a more comprehensive approach by extending their responsibilities not only to municipal authorities but also to waste generators, government bodies, bulk waste generators and other concerned parties. It was required that waste generators should segregate their waste at the source and that indiscriminate dumping, burning or getting rid of waste in public areas and in water bodies must be prohibited. Particularly, Rule 15 imposed a wide range of operational duties on local authorities, such as preparing solid waste management plans, carrying out door-to-door collection of segregated waste, transporting it, processing it and disposing of it in a scientific manner, as well as requiring the incorporation of authorised waste pickers into the formal waste management system.

For a legal analysis, it is necessary to acknowledge the present regulatory stance. The Indian Government issued the Solid Waste Management Rules, 2016 on 27 January 2016, and they came into force on 1 April 2016. As a result, the 1989 Rules are now mainly of relevance since they form the earlier regulatory framework and can be used when looking at the development of India's solid-waste governance, while the 2016 Rules represent the current regulatory regime. The Water (Prevention and Control of Pollution) Act of 1974 includes another legal means of action since incorrect disposal of solid waste can lead to the contamination of rivers, drains, groundwater and other water resources via leachate and surface runoff. The purpose of the Act is to prevent and control water pollution and to maintain or restore the state of the water. It sets up the Central and State Pollution Control Boards and confers on them the roles of regulation and monitoring with regard to water pollution. The Air (Prevention and Control of Pollution) Act of 1981 is also applicable in cases where solid waste is openly burned or in any other way causes air pollution. This Act provides the institutional structure for the prevention, control and abatement of air pollution and assigns key functions to the Central and State Pollution Control Boards.

The constitutional basis for environmental protection thus reinforces this statutory framework. According to Article 21, the right to life and personal liberty is guaranteed, and Indian judicial interpretation has step by step regarded the right to life as including the right to live in a healthy and pollution-free environment. In the case of *Subhash Kumar v. State of Bihar* (1991) the Supreme Court held that the right to life provided for in Article 21 involves the right to enjoy water and air which are free from pollution. Moreover, Article 48A requires the State to protect and improve the environment, and Article 51A(g) imposes on citizens a fundamental duty to protect and improve the natural environment. Together, these provisions provide a constitutional basis for environmental protection and underline the public-health aspect of waste-management regulation. The extent to which this legal framework is effective will rely on the coordinated operation of the local authorities and the regulatory agencies. Urban local authorities play a key role in the actual delivery of solid waste services, covering such activities as collection, segregation, transportation, treatment and disposal. According to the 2016 framework, the State Pollution Control Boards were given the duties of enforcement and monitoring, whereas the Central Pollution Control Board (CPCB) was given a number of functions, such as coordinating with the State Pollution Control Boards, developing and reviewing standards and guidelines, monitoring the implementation and preparing consolidated reports. Therefore, India's system for dealing with solid waste works through a multi-level system of governance in which the Central Government is responsible for providing the legislative and regulatory framework, the pollution-control authorities carry out environmental supervision, and it is the local bodies who are mainly in charge of implementation. This way of organizing the institutions is especially important when evaluating the degree to which the statutory requirements are turned into effective protection of human health and the environment in the Raipur District.

Solid waste and human health

Poorly managed solid waste is a serious environmental and public health issue since waste can serve as a means by which pollutants, pathogens and other hazardous substances get into the

human environment. If waste is not collected, is dumped without control or is inadequately treated, this can lead to the contamination of air, water and soil, thus providing a number of ways for human exposure. The World Health Organization (WHO) considers contamination of the air, soil and water to be the main health consequences of improper waste disposal, and the United Nations Environment Programme (UNEP) states that ill-managed waste can cause air pollution as well as contamination of water and soil and of drinking-water sources (WHO, 2022; UNEP, 2022). Pollution from solid waste is especially significant in cases where waste is burned openly or where uncontrolled dumping sites produce smoke, dust and other emissions. When waste is openly burned it can give off particulate matter, carbon monoxide, nitrogen oxides and sulfur oxides, heavy metals, polycyclic aromatic hydrocarbons, dioxins and furans. There is a link between exposure to these pollutants and symptoms such as respiratory irritation, coughing, respiratory disease and other negative health effects. The World Health Organization stresses that it is necessary to reduce open waste burning if air quality and health are to be protected, since both short-term and long-term exposure to the pollutants released during the burning of waste can have harmful consequences (WHO, 2025). Another major route by which health risks arise is through the contamination of water and soil. If waste is dumped without proper containment, it can produce contaminated leachate and enable hazardous materials and microorganisms to seep into the surrounding soil, surface water, and groundwater. This type of contamination can impact the communities which rely on the polluted water and may lead to greater exposure to both infectious agents and toxic substances. The United Nations Environment Programme points out that uncontrolled open dumping can cause hazardous substances to be released, thereby contributing to pollution of the air, water, and soil, and that people who live near or work at these sites can be exposed by breathing in or swallowing the substances (UNEP, 2025).

The health effects of inadequate waste management also involve infectious and vector-borne diseases. When waste builds up it can block drains and produce stagnant water, which encourages the breeding of disease-carrying organisms. The World Health Organization states that poor waste collection and blocked drainage caused by the accumulation of waste can lead to conditions favourable to diseases such as cholera and vector-borne diseases including malaria and dengue. The United Nations Environment Programme also points out that unmanaged accumulation of waste and clogged drainage act as factors which promote the breeding of vectors and the spread of infectious diseases (WHO, 2022; UNEP, 2015). Hence, the health effects of waste do not stop at direct contact with discarded materials but can also affect the broader community via environmental and ecological routes. Waste workers and waste pickers make up a group that is especially vulnerable due to the frequent and direct way in which they come into contact with mixed waste. Their job may involve being exposed to biological agents, hazardous chemicals, sharp objects, contaminated materials, dust and other physical dangers. The International Labour Organization (ILO) acknowledges that employees engaged in waste management and recycling can encounter considerable occupational risks, such as exposure to toxic chemicals, biological agents and physical hazards, and that these vulnerabilities tend to increase in situations where occupational safety and health protections are insufficient (ILO, 2024). The risk is especially pertinent in the case of informal waste workers, as they may have little access to personal protective equipment, occupational healthcare and social protection.

One of the most worrying practices is open dumping and uncontrolled burning since these practices result in both environmental pollution and direct exposure to humans. Open dumpsites can give off hazardous materials and draw in insects, rodents and other disease-carrying organisms, while uncontrolled burning adds toxic pollutants to the surrounding air. The United Nations Environment Programme notes that the people who live near open dumpsites and those who work at them suffer greater risks due to toxic exposures and the spread of disease, which in turn underlines the importance of carrying out the collection, treatment and final disposal of waste in an environmentally sound manner (UNEP, 2025). From a legal point of view, the health risks in question show that solid waste management cannot be regarded merely as a matter of municipal sanitation. It is also the responsibility of the authorities in the field of public health and environmental protection to regulate it properly. Necessary elements of a thorough regulatory strategy include preventing uncontrolled disposal, ensuring segregation and applying scientific treatment, protecting the workers who handle the waste and controlling the emissions from waste-burning and waste-disposal facilities. With regard to the Raipur District, therefore, the health effects of solid waste offer a significant basis for assessing the implementation and effectiveness of the relevant environmental laws and waste-management regulations.

The management of solid waste in the Raipur district

Raipur District is a suitable example when looking at how India's solid waste-management framework is put into practice since the city has set up an integrated system which includes door-to-door collection, the use of transfer stations, material recovery and centralised processing, as well as still dealing with the environmental impact of previous dumping methods. The Raipur Municipal Corporation (RMC) is the main urban local authority in charge of municipal sanitation and solid waste management in the city. The district administration lists the Raipur Municipal Corporation as the appropriate municipal authority, and environmental regulation and oversight are carried out with the help of the Chhattisgarh Environment

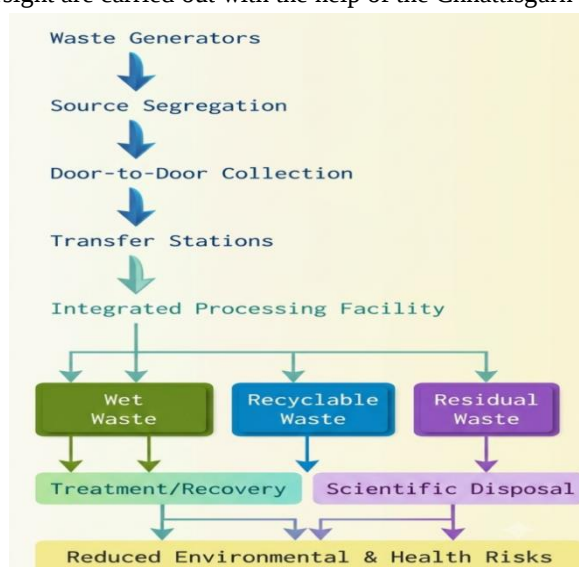


Figure 1: Schematic Diagram of the Integrated Solid Waste Management (ISWM)

The current waste-management arrangement has progressively moved away from direct disposal towards collection, transportation, segregation, recovery and processing. A recent Government of Chhattisgarh compliance report submitted before the National Green Tribunal records an Integrated Solid Waste Management (ISWM) facility at Raipur with a treatment capacity of 500 tonnes per day (TPD), of which approximately 276 TPD of dry waste was being received for segregation. The same report states that nine transfer stations have been established in Raipur to facilitate the movement of collected waste from households and commercial areas to the ISWM facility at Sakri. Independent research based on Raipur Municipal Corporation data similarly reports that the Sakri facility was established as a centralized waste-management facility with a planned capacity of 500 TPD and that collection vehicles transport waste through the network of transfer stations before processing. (Rathore et al., 2025).

Waste treatment and resource recovery have also become important components of the Raipur system. The municipal system incorporates material recovery and processing of recyclable and wet waste, while household-level wet-waste composting and soft-plastic recovery have been identified as components of the city's waste-management approach. A recent World Bank assessment of Indian cities reports that Raipur has strengthened monitoring of private-sector operations for dry- and wet-waste processing and door-to-door collection and transportation, while legacy waste is being processed and inert material is directed towards sanitary-landfill disposal. These developments indicate a gradual transition from an essentially disposal-oriented system towards an integrated solid waste management model based on recovery and treatment.

Table 1: Selected Solid Waste Management Indicators for Raipur

Indicator	Reported value/status	Source
Integrated waste-processing capacity	500 TPD	Government/NGT record
Dry waste received for segregation	276 TPD	Government/NGT record
Transfer stations	9	Government/NGT record
Legacy waste originally reported	450,000 tonnes	Government/NGT record
Legacy waste remediated by Dec. 2025	430,000 tonnes	Government/NGT record
Remaining legacy waste	20,000 tonnes	Government/NGT record

Despite this progress, legacy waste and incomplete source segregation remain significant concerns. The Sarena dumpsite represents the most important legacy-waste challenge in Raipur. A Government of Chhattisgarh compliance report placed before the National Green Tribunal recorded approximately 450,000 tonnes of legacy waste at Raipur, of which around 430,000 tonnes had been remediated by December 2025, leaving approximately 20,000 tonnes for completion, with a target date of 31 March 2026. The report also documents the utilisation of recovered materials, including processed material, plastics and inert fractions. This is

particularly relevant from a public-health perspective because unmanaged legacy waste may remain a source of dust, odour, leachate, fire and vector-related risks until it is completely remediated and the reclaimed site is appropriately secured.

Table 2: legal-compliance assessment

Legal/Regulatory Requirement	Responsible Authority	Evidence/Status in Raipur	Compliance Assessment	Identified Gap
Source segregation	RMC / waste generators	Reported implementation ; verification concerns documented	Partial	Inconsistent segregation and verification
Door-to-door collection	RMC	Collection system reported	Substantial	Need continuous monitoring
Waste transportation	RMC / operators	Transfer-station system available	Substantial	Operational monitoring required
Waste processing/recovery	RMC / facility operator	Integrated processing facility available	Substantial	Capacity/utilisation monitoring
Scientific disposal of rejects	RMC / regulatory authorities	Residual disposal arrangements	Requires monitoring	Compliance verification
Legacy-waste remediation	RMC / State authorities	Sarana remediation undertaken	Significant progress	Complete remediation and post-remediation monitoring
Regulatory monitoring	CECB/CPCB	Regulatory oversight and reporting	Partial	Independent verification
Public participation	RMC / waste generators	Awareness and segregation responsibilities	Needs strengthening	Behavioural compliance

The issue of source segregation and regulatory compliance requires particular attention. Although State authorities had reported very high levels of source segregation across Chhattisgarh, the National Green Tribunal, in its order dated 4 April 2024, expressed doubts regarding the reliability of the reported figures and directed an independent committee to verify the claims through ground-level assessment. The subsequent Joint Committee likewise concluded that it could not agree with the claim of 100% source segregation based on random site inspections. This finding is significant for the Raipur context because effective source segregation is fundamental to the successful operation of recycling, composting, material recovery and scientific disposal systems. Thus, the existence of collection and processing

infrastructure does not by itself establish full compliance with the applicable legal requirements.

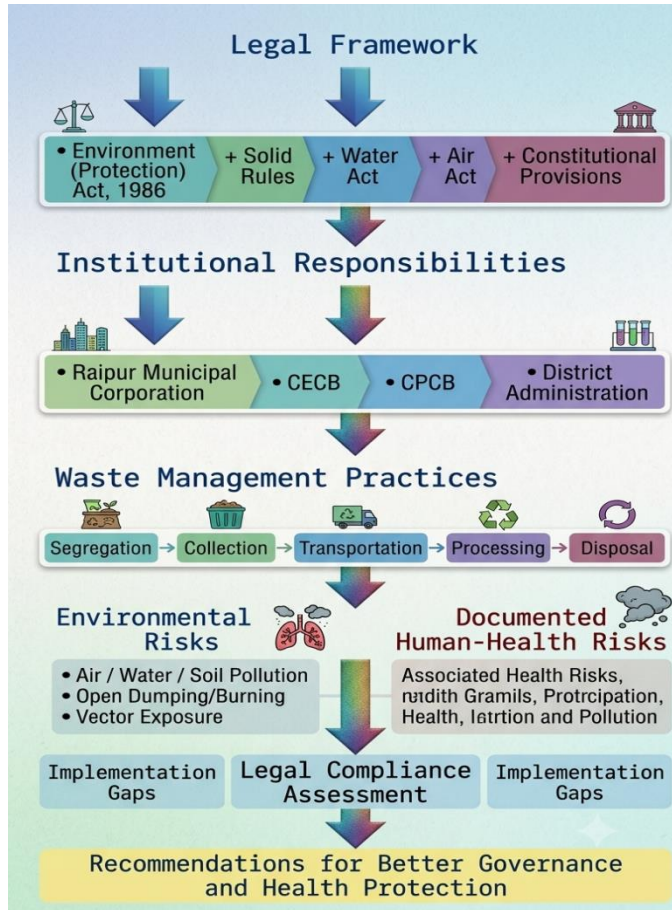


Figure 2: Integrated waste management governance and risk assessment framework for Raipur city

Figure 2 shows the regulatory environment, the roles of the various institutions, and the procedural flows in Raipur's system for the management of solid waste. It outlines the hierarchy starting with the legal frameworks (for example, the Environment (Protection) Act, 1986) and progressing to the practical practices of waste management (from segregation to disposal), and finally includes an evaluation of the environmental and human-health risks together with specific recommendations for improving governance and health outcomes by tackling the gaps in implementation.

In this system the municipal and regulatory authorities have separate and complementary responsibilities. The Raipur Municipal Corporation is in charge of all municipal activities, such as the collection, transportation, sanitation services and the coordination of processing and disposal operations. The Chhattisgarh Environment Conservation Board carries out regulatory and environmental monitoring within the state, whereas the CPCB carries out its statutory and

technical duties under India's environmental legislation and is responsible for coordinating wider pollution control and waste management oversight. The fact that the National Green Tribunal is still conducting proceedings on the issue of compliance with solid waste management requirements in Chhattisgarh shows the role that judicial and quasi-judicial supervision plays when there are deficiencies in the implementation or reporting of the rules. From the point of view of legal compliance, Raipur thus has a mixed record. On the one hand, the city has put in place a considerable amount of collection, transfer, recovery and processing infrastructure and has achieved measurable progress in remedying the Sarona legacy dumpsite; on the other hand, regulatory inspections have raised concerns about source segregation, the verification of reported compliance and the effective management of residues and rejects. Furthermore, since the Solid Waste Management Rules, 2026 came into effect on 1 April 2026, current compliance should now be assessed mainly in light of the new regulatory framework, even though the Solid Waste Management Rules, 2016 remain relevant when looking at the historical development of the city's waste management system. In general, the experience of Raipur shows that the effectiveness of environmental law depends not only on the existence of statutory standards but also on reliable data, continuous monitoring, adequate treatment infrastructure, effective municipal administration and enforcement at the local level.

Legal and Implementation Gaps

There are still gaps in both the law and how it is put into practice. Some rules may not cover all situations, and sometimes people do not follow them. This can lead to confusion or make it hard to solve problems. Policymakers need to look closely at these issues and fix them to make sure the system works well. Even though India has established a comprehensive set of statutory and regulatory measures for solid waste management, there could still be a gap between the legal requirements and their actual implementation at the local level. This point is especially relevant in the case of Raipur and Chhattisgarh, since judicial and regulatory actions have raised concerns about the reliability of the reported level of compliance and the effectiveness of the implementation. In its order of 4 April 2024 on adherence to the Solid Waste Management Rules in Chhattisgarh, the National Green Tribunal specifically cast doubt on the claim that 100% source segregation had been achieved in urban areas and ordered further verification. The Tribunal also pointed out that there had been no adequate explanation regarding the operation of the SLRM units, the processing and use of the products, the management of the residues and rejects, and the status of the legacy waste in Raipur and Rajnandgaon.

A major shortcoming in practice relates to enforcement and ongoing monitoring. The success of environmental legislation does not rest simply on the presence of legal duties but also on regular inspections, trustworthy reporting, environmental monitoring and taking corrective measures when violations take place. According to the CPCB's framework, State Pollution Control Boards and Pollution Control Committees are assigned the tasks of monitoring and reporting, and are required to compile this information and submit it to the Central Government. Yet previous CPCB reports have themselves pointed out that the level of reporting and implementation varies from one region to another, showing that the capacity for institutional monitoring and the verification of compliance still present significant difficulties. The involvement of the National Green Tribunal in Chhattisgarh also shows how important it is to

have independent verification when the reported compliance does not match the actual conditions on the ground.

A second major deficiency involves inadequate segregation and the improper disposal of waste. Effective recycling, composting, material recovery and scientific disposal all depend on source segregation. If biodegradable, recyclable and other types of waste are left mixed together, then the efficiency and economic feasibility of the subsequent treatment processes decrease and the amount of residual waste that has to be disposed of rises. The concerns raised by the National Green Tribunal about the reliability of the segregation figures reported in Chhattisgarh are therefore important from both an environmental and a legal point of view. The problem also applies to legacy waste and to inappropriate disposal methods; past assessments by the CPCB have shown that open dumping is still widespread and that the processing and disposal infrastructure in various parts of India remains inadequate, thus highlighting the wider difficulty faced by local authorities. Another limitation concerns the institutional and infrastructural capabilities. In order to achieve effective solid waste management it is necessary to have adequate collection systems, transfer facilities, material-recovery infrastructure, processing units, scientifically designed disposal facilities, trained staff and reliable financial resources. The legal framework divides up the responsibilities between the Central and State governments, the Pollution Control Boards, the district administration and the local bodies; as a result, weaknesses at any one of these levels can have an effect on the overall level of compliance. The 2016 regulatory framework clearly allocated different functions to the Central ministries, the State authorities, the district administration, the CPCB, the SPCBs and the local bodies, showing that solid waste management is by its nature a shared responsibility among a number of agencies. The notification of the Solid Waste Management Rules, 2026, which became effective on 1 April 2026, has further broadened and updated the regulatory framework and covers both urban and rural local bodies as well as a wider range of waste generators and establishments. The shift to this new framework therefore demands that the institutions be ready and that the local implementation mechanisms be updated.

Another important aspect of the implementation gap is public involvement and environmental awareness. The practice of sorting waste at the source, the responsible getting rid of it and adherence to local waste-management rules all to a large extent depend on the actions of households, businesses and institutions. Nowadays the legal framework is placing more responsibility on the people who generate waste rather than viewing waste management as something which should be the sole concern of municipal authorities. Yet it is unlikely that legal duties will reach their desired results if the public are not aware, if there are no convenient systems for sorting waste or if there are no effective ways of taking part and lodging complaints. The problem is thus both regulatory and behavioural in nature: local authorities have to set up an efficient service infrastructure while citizens and other waste producers must follow the rules regarding sorting and disposal. Above all, it is essential that there should be accountability for failure to comply with the requirements in order for the legal framework to be effective. Effective environmental governance depends on clearly established duties, clearly identifiable responsible bodies, accurate reporting and meaningful repercussions in the case of ongoing breaches. The way in which the National Green Tribunal exercises judicial oversight shows what a role environmental adjudication can play where the requirements set out in legislation

are not properly implemented. Since the Rules for Solid Waste Management 2026 have taken the place of the Rules for Solid Waste Management 2016 with effect from 1 April 2026, due attention must be paid to this transition. Accountability in Raipur should therefore be examined not only in relation to whether the waste management infrastructure is in place, but also as to whether the responsible authorities and waste producers carry out their statutory obligations, whether the compliance data can be independently verified, and whether violations result in prompt corrective or enforcement action.

Suggestions and Recommendations

The analysis shows that in order to improve solid waste management in Raipur it is necessary to place greater importance on implementation, monitoring and institutional accountability than on simply expanding the present legal framework. Enforcement mechanisms should be strengthened by means of regular inspections, transparent reporting on compliance and taking prompt action when there are violations of the relevant environmental and waste-management rules. The duties of municipal authorities, pollution-control agencies, waste producers and private operators should be clearly kept under review by means of measurable performance indicators.

Second, more attention should be paid to the segregation of sources, the systematic collection, transport and scientific treatment of waste. In order to achieve source segregation, adequate collection facilities and separate transport arrangements should be provided so that the streams of recyclable, biodegradable and residual waste remain distinct. The processing facilities should be regularly monitored to make sure that the available treatment capacity is being properly used and that rejects and inert materials are got rid of in an environmentally safe way. There should also be particular attention paid to the full remediation and monitoring of sites containing legacy waste.

Thirdly, regular environmental and public health monitoring should be an integral component of municipal waste management. Air quality, groundwater, surface water, soil quality, odours, emissions associated with landfills and other relevant environmental indicators should be periodically evaluated in the areas surrounding waste treatment and disposal sites. Moreover, health surveillance should be taken into account for communities that live near major waste facilities and for workers who have occupational exposure.

Sanitation workers, waste collectors and informal waste workers need to receive greater attention from institutions. Personal protective equipment that is suitable, occupational safety training, vaccination, access to healthcare, hygienic working conditions and social-security arrangements should all be provided. Formal recognition and the integration of eligible informal waste workers into the municipal waste-management system can also help to improve occupational protection and the recovery of recyclable materials.

Public participation and environmental awareness can be enhanced by carrying out continuous awareness campaigns which focus on source segregation, the responsible disposal of waste, the reduction of the amount of waste produced and the duties of citizens under the relevant

regulations. Municipal authorities should set up accessible channels through which residents can give complaints and provide feedback so that they can report cases of illegal dumping, open burning and other practices which are not in compliance.

Above all, the capacity of local governments should be enhanced by ensuring they have sufficient financial resources, technical expertise, trained staff, reliable data management systems and effective coordination between agencies. In order to put into effect the Solid Waste Management Rules of 2026, local authorities and regulatory bodies must adjust their administrative and operational systems to conform with the existing regulatory framework. If a coordinated approach is taken—which involves the municipal corporation, the State Pollution Control Board, the district administration, the waste management operators and the various community stakeholders—then accountability and long-term sustainability can be improved.

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legal citation note

1. (Government of India, 1986) — Environment (Protection) Act, 1986
2. (Government of India, 1974) — Water (Prevention and Control of Pollution) Act, 1974
3. (Government of India, 1981) — Air (Prevention and Control of Pollution) Act, 1981
4. (Government of India, 2016) — Solid Waste Management Rules, 2016
5. (Government of India, 2026) — Solid Waste Management Rules, 2026
6. (World Health Organization [WHO], 2022) — first citation; subsequently (WHO, 2022)
7. (Central Pollution Control Board [CPCB], 2016) — first citation; subsequently (CPCB, 2016)
8. Subhash Kumar v. State of Bihar (1991) — for the judicial recognition of the Article 21 environmental-right principle.