

# Public Policy & Manual Scavenging: Analysing Government Initiatives for Eradication in India and Comparative Study with Developed Countries

Jagadeep K. A<sup>1</sup>

<sup>1</sup>Student, LLM CAL, CHRIST (Deemed to be) University, Bengaluru

**Abstract**— This research paper critically examines the role of public policy in addressing the deeply entrenched issue of manual scavenging in India. Despite legislative efforts and societal awareness, manual scavenging persists as a dehumanizing practice, perpetuating social injustices and violating fundamental human rights. The central objective of this research is to conduct a comparative analysis of government initiatives aimed at eradicating manual scavenging, evaluating their effectiveness and impact on the lives of those engaged in this hazardous occupation. The study employs a multidisciplinary approach, combining legal analysis, policy evaluation, and field research to understand the complex dynamics surrounding manual scavenging comprehensively. Through an in-depth examination of key policies and interventions implemented by various states in India, the study identifies commonalities, challenges, and success factors. Special attention is given to the socio-economic factors influencing the perpetuation of manual scavenging and the extent to which governmental measures address these underlying issues. Government efforts to eradicate manual scavenging are analyzed in detail, assessing various program's implementation strategies and outcomes. Through case studies and statistical analysis, we identify these initiatives' successes and challenges, shedding light on institutional, socio-economic, and cultural barriers. We conduct a comparative study of manual scavenging policies in five developed countries. By examining the effectiveness of interventions and the technologies adopted, we glean valuable insights that can inform India's approach.

Throughout the paper, a focus is maintained on simplicity of language to ensure accessibility and understanding for all stakeholders. We aim to facilitate informed discourse and decision-making around this critical issue by breaking complex concepts into digestible information. The paper serves as a resource for policymakers, activists, and stakeholders involved in efforts to eradicate manual scavenging and promote dignity and equality for all citizens, this study underscores the urgency of addressing manual scavenging through robust public policy interventions. By analyzing government initiatives, drawing insights from international experiences, and exploring technological innovations, we present a holistic framework for eradicating this deplorable practice. We hope that this research contributes to the ongoing dialogue and action towards building a more just and equitable society in India.

**Keywords**—Human Rights, Poverty, Technological innovations, Socio-economic Factors.

## 1. INTRODUCTION

Manual scavenging, a practice deeply rooted in India's societal fabric, represents a grave violation of human rights and dignity. Despite legislative efforts and social awareness campaigns, manual scavenging persists in various parts of the country, perpetuating systemic discrimination and marginalization. In this paper, we embark on an analysis of governmental initiatives aimed at eradicating manual scavenging in India, with a particular focus on understanding public policy frameworks and their effectiveness in addressing this entrenched problem. Manual scavenging, primarily associated with the cleaning of human excreta from dry latrines and sewers, has historically been assigned to individuals belonging to marginalized communities, particularly Dalits and other backward castes. The practice not only subject's individuals to degrading and hazardous working conditions but also reinforces caste-based discrimination and social

exclusion. Despite the enactment of laws prohibiting manual scavenging, its prevalence underscores the persistent challenges in implementation and enforcement.<sup>1</sup>

The eradication of manual scavenging necessitates a multifaceted approach that addresses socio-economic, cultural, and institutional factors. Governmental initiatives play a pivotal role in this endeavor, ranging from legislative reforms to targeted welfare programs aimed at rehabilitation and alternative livelihoods for affected individuals. Understanding the scope and effectiveness of these initiatives is crucial for assessing progress and identifying areas for improvement. This paper seeks to provide a comprehensive analysis of governmental efforts to eradicate manual scavenging in India. By examining the legal framework surrounding manual scavenging, including relevant laws and policies, we lay the groundwork for evaluating the efficacy of government interventions. Furthermore, through a nuanced exploration of implementation strategies and outcomes, we aim to discern the successes and challenges these initiatives face.<sup>2</sup>

In addition to analyzing domestic efforts, this paper also draws insights from international experiences in addressing similar challenges. By conducting a comparative study of manual scavenging policies in five developed countries, we seek to identify best practices and innovative approaches that can inform India's strategy. Lessons learned from international contexts offer valuable perspectives for refining existing policies and interventions. Technological innovation also promises to eliminate manual scavenging by providing safer and more efficient alternatives. From sewer cleaning machines to robotics and automation, various technologies have been developed to mitigate the risks associated with manual scavenging. Evaluating the suitability of these technologies within the Indian context is imperative for their successful integration into eradication efforts. In presenting this analysis, we aim to contribute to the informed discourse and decision-making surrounding the eradication of manual scavenging in India. By synthesizing existing knowledge, identifying gaps, and offering recommendations for policy improvement, we seek to catalyze meaningful change. We hope that this paper serves as a resource for policymakers, activists, and stakeholders committed to promoting dignity, equality, and social justice for all citizens.<sup>3</sup>

## 2. UNDERSTANDING THE SCOPE OF MANUAL SCAVENGING

Manual scavenging, an abhorrent practice prevalent in many parts of India, involves the manual cleaning of human excreta from dry latrines and sewers. This degrading and hazardous occupation is typically assigned to individuals belonging to marginalized communities, particularly Dalits and other backward castes, perpetuating cycles of poverty, discrimination, and social exclusion. Despite legislative efforts and policy interventions aimed at its eradication, manual scavenging continues to persist, posing significant challenges to public health, human rights, and social justice. Manual scavenging refers to the manual cleaning of human waste from dry latrines, open drains, and sewers, often using primitive tools such as brooms, buckets, and baskets. This practice not only exposes individuals to unsanitary conditions and health hazards but also reinforces caste-based discrimination and social stigma. Manual scavengers, predominantly women and individuals from marginalized communities, endure indignity and exploitation as they perform<sup>4</sup> this hazardous work, often without proper protective gear or access to sanitation facilities.

The roots of manual scavenging can be traced back to India's deeply entrenched caste system, where certain occupations, including handling human waste, were designated to Dalits, considered the lowest caste in the social hierarchy. Throughout history, manual scavengers have faced systemic oppression, denied basic human rights, and subjected to inhumane treatment. Despite the enactment of legislation prohibiting manual scavenging, its practice has persisted due to deep-rooted social attitudes, economic inequalities, and institutional failures.

<sup>1</sup> Singh, Anshika. "Manual Scavenging: A Mephitic Heredity of Social Stratum." Issue 1 Int' JL Mgmt. & Human. 5 (2022): 73.

<sup>2</sup> Shandilya, Shubham, et al. "The Practice of Manual Scavenging In India and Its Deleterious Effects on Human Rights: An Exploratory Study." *BiLD Law Journal* 7.4s (2022): 58-63.

<sup>3</sup> Thorat, Sukhadeo. *Dalits in India: Search for a common destiny*. SAGE Publications Ltd, 2009.

<sup>4</sup> Gupta, Abhishek. "Manual Scavenging- A Case of Denied Rights." *SSRN Electronic Journal* (2016): 36-58.

Manual scavenging not only perpetuates caste-based discrimination but also perpetuates cycles of poverty and social exclusion. Those engaged in manual scavenging are often trapped in intergenerational poverty, with limited access to education, employment opportunities, and social mobility. Moreover, the stigma associated with manual scavenging extends beyond the workplace, affecting individuals' social standing, marriage prospects, and overall well-being. As a result, manual scavengers face marginalization and discrimination in various spheres of life, hindering their full participation in society.

Understanding the scope of manual scavenging requires recognizing its multifaceted impact on individuals, communities, and society at large. Beyond its immediate health risks and indignity, manual scavenging perpetuates systemic inequalities and social injustices that undermine the principles of human rights and dignity. Therefore, addressing manual scavenging necessitates comprehensive policy interventions that address its root causes, dismantle caste-based discrimination, and ensure the socio-economic empowerment of affected communities. Through concerted efforts and collective action, India can strive towards a society free from the scourge of manual scavenging, where all individuals are treated with respect, equality, and dignity.

India requires a nuanced analysis of its prevalence and distribution across different regions, socio-economic groups, and demographic categories. Despite legislative efforts and social awareness campaigns, manual scavenging persists in various parts of the country, underscoring the need for comprehensive data to inform policy interventions and eradication efforts.

Estimating the exact prevalence of manual scavenging in India is challenging due to underreporting, stigma, and the clandestine nature of the practice.<sup>5</sup> However, available data suggests that millions of individuals, primarily from marginalized communities, are engaged in manual scavenging across the country. According to the Socio-Economic Caste Census (SECC) conducted in 2011, over 180,000 households reported manual scavenging as their primary occupation, indicating the widespread nature of the problem.

It is not uniformly distributed across India but is concentrated in certain states and regions with poor sanitation infrastructure and deep-rooted caste-based discrimination. States such as Uttar Pradesh, Bihar, Rajasthan, and Madhya Pradesh have reported higher incidences of manual scavenging, reflecting socio-economic disparities and historical patterns of discrimination. Within states, manual scavenging is more prevalent in rural areas, where access to sanitation facilities and alternative livelihood opportunities is limited.

Manual scavenging disproportionately affects certain demographic groups, including Dalits, Other Backward Classes (OBCs), and women. Dalits, who are considered "untouchable" in the caste hierarchy, bear the brunt of manual scavenging, with generations trapped in intergenerational poverty and exploitation. Women, particularly Dalit women, are overrepresented in manual scavenging occupations, facing double discrimination based on both caste and gender.

The prevalence of manual scavenging not only perpetuates socio-economic inequalities but also undermines public health, human dignity, and social cohesion. Communities reliant on manual scavenging face heightened risks of disease, injury, and death due to exposure to hazardous substances and unsanitary conditions. Moreover, the stigma associated with manual scavenging extends beyond the workplace, affecting individuals' social standing, mental well-being, and overall quality of life.

Comprehensive data on the prevalence and distribution of manual scavenging is crucial for designing targeted interventions, allocating resources effectively, and monitoring progress toward eradication. Governmental initiatives aimed at eradicating manual scavenging must prioritize data collection and analysis to identify high-risk areas, vulnerable populations, and emerging trends. Moreover, efforts to address manual

<sup>5</sup> Saxena, K.B. "11 Manual scavengers." Dalits, Subalternity and Social Change in India (2018).

scavenging must go beyond mere legislative measures to encompass social, economic, and cultural interventions that address its root causes and empower affected communities, the statistical analysis of the prevalence and distribution of manual scavenging in India provides valuable insights into the scope and scale of the problem. By understanding the demographic patterns, geographic variations, and socioeconomic disparities associated with manual scavenging, policymakers can develop targeted strategies for eradication and promote dignity, equality, and social justice for all citizens.

### 3. RELEVANT LAWS AND POLICIES ADDRESSING MANUAL SCAVENGING

The eradication of manual scavenging in India has been a longstanding goal, enshrined in various legislative measures and policy interventions aimed at addressing this deplorable practice. Over the years, several laws and policies have been enacted to prohibit manual scavenging, provide rehabilitation for affected individuals, and promote dignity and equality for all citizens. Understanding the legal framework surrounding manual scavenging is crucial for assessing the effectiveness of governmental initiatives and identifying areas for improvement.

The Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act, 1993, was the first legislative attempt to address manual scavenging in India. This law prohibited the employment of manual scavengers and the construction of dry latrines, imposing penalties for non-compliance. However, despite its noble intentions, the Act fell short of achieving its objectives due to lax enforcement and loopholes in implementation.

Recognizing the inadequacy of existing legislation, The Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013, was enacted to provide a more comprehensive framework for addressing manual scavenging. This Act not only reaffirmed the prohibition on manual scavenging but also mandated the identification, rehabilitation, and provision of alternative livelihoods for affected individuals. It also imposed stricter penalties for violations, including imprisonment and fines.

The Constitution of India provides a robust framework for safeguarding the rights and dignity of all citizens, including those engaged in manual scavenging. Article 17 explicitly prohibits untouchability and the practice of manual scavenging in any form. Moreover, Article 21 guarantees the right to life with dignity, which encompasses the right to clean and safe sanitation facilities, free from the indignity of manual scavenging.

The judiciary has played a pivotal role in addressing the issue of manual scavenging through its proactive interventions and directives. In the landmark judgment of *Safai Karamchari Andolan v. Union of India (2014)*<sup>6</sup>, the Supreme Court directed the government to take immediate steps to identify and rehabilitate manual scavengers, emphasizing the need for effective implementation of existing laws and policies. In the Landmark Judgement of *National Campaign on Dalit Human Rights V. Union of India (2008)*<sup>7</sup>, The Supreme Court directed all the government should take necessary action to implement Rehabilitation centres for manual scavengers and their Affected Families in India

In addition to legislative measures, various policy initiatives have been undertaken to address manual scavenging at the grassroots level. The Swachh Bharat Mission (SBM), launched in 2014, aims to achieve universal sanitation coverage and eliminate open defecation, thereby reducing the need for manual scavenging. The mission emphasizes the construction of household and community toilets, along with behavior change communication to promote safe sanitation practices.

Despite the existence of a robust legal framework and policy initiatives, challenges persist in effectively addressing manual scavenging in India. Implementation remains a major challenge, with reports of inadequate enforcement, lack of awareness, and bureaucratic hurdles hindering progress. Moreover, the

<sup>6</sup> (2014) 4 S.C.R. 197

<sup>7</sup> (2017) 2 SCC 432

absence of comprehensive data on the prevalence and extent of manual scavenging poses challenges in designing targeted interventions and allocating resources effectively, the legal framework surrounding manual scavenging in India reflects a commitment to eradicating this dehumanizing practice and promoting dignity and equality for all citizens. However, concerted efforts are needed to strengthen implementation, address gaps in enforcement, and ensure the socio-economic empowerment of affected communities. By upholding the principles of justice, equality, and human rights, India can strive towards a society free from the scourge of manual scavenging, where all individuals are treated with respect and dignity.

### 3.1 GOVERNMENT INITIATIVES FOR ERADICATION OF MANUAL SCAVENGING IN INDIA

The eradication of manual scavenging in India has been a priority for successive governments, leading to the implementation of various programs and initiatives aimed at addressing this entrenched problem. However, the effectiveness of these government programs in achieving their objectives remains a subject of scrutiny. A critical analysis of the implementation strategies and outcomes of these initiatives reveals both successes and challenges in the ongoing battle against manual scavenging.

Government programs for the eradication of manual scavenging in India have employed a range of implementation strategies, including legislative reforms, awareness campaigns, capacity-building initiatives, and welfare measures for affected individuals. Legislative reforms, such as the Prohibition of Employment as Manual Scavengers and the Rehabilitation Act, of 2013 have provided a legal framework for prohibiting manual scavenging and ensuring rehabilitation for affected individuals. In the Landmark case of *Prajwala v. Union of India (2004)*<sup>8</sup>, The court Highlighted the engaging gender-sensitive rehabilitation steps, especially for women who were affected during Work.

Awareness campaigns conducted through mass media, community mobilization, and advocacy efforts, have sought to change social attitudes and eliminate the stigma associated with manual scavenging. Capacity-building initiatives have focused on training government officials, civil society organizations, and other stakeholders involved in implementing eradication programs. Welfare measures, including financial assistance, skill development programs, and alternative livelihood opportunities, aim to empower affected individuals and facilitate their transition out of manual scavenging occupations.

While government programs have made some progress in addressing manual scavenging, the outcomes remain mixed and fall short of the desired objectives. On the positive side, there has been a significant reduction in the number of dry latrines and manual scavengers identified and rehabilitated since the enactment of the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013. Moreover, awareness campaigns have helped in changing social perceptions and raising public consciousness about the issue of manual scavenging. Additionally, welfare measures have provided much-needed support to affected individuals, enabling them to pursue alternative livelihoods and escape the cycle of poverty and exploitation. However, several challenges persist in the implementation of government programs for the eradication of manual scavenging. Despite legislative reforms, the enforcement of laws prohibiting manual scavenging remains weak, with reports of continued violations and inadequate penalties for non-compliance. Awareness campaigns, while effective in some areas, have failed to reach certain marginalized communities and remote regions where manual scavenging is prevalent. Capacity-building initiatives have been hampered by a lack of resources, expertise, and coordination among government agencies and stakeholders. Moreover, welfare measures, though well-intentioned, have often been marred by delays in implementation, bureaucratic hurdles, and inadequate support systems for rehabilitation.

<sup>8</sup> W.P(C) 56/2004

## 3.2 CHALLENGES FACED BY GOVERNMENT INITIATIVES INSTITUTIONAL, SOCIOECONOMIC & CULTURAL FACTORS

Government initiatives aimed at eradicating manual scavenging in India encounter many challenges stemming from institutional, socio-economic, and cultural factors. These challenges not only impede the effectiveness of eradication efforts but also perpetuate the cycle of exploitation and marginalization faced by affected individuals and communities.

One of the primary institutional challenges faced by government initiatives is the lack of effective implementation and enforcement mechanisms. Despite the existence of laws prohibiting manual scavenging, enforcement remains weak due to corruption, bureaucratic hurdles, and inadequate monitoring mechanisms. Moreover, the institutional capacity of government agencies tasked with implementing eradication programs is often insufficient, leading to delays, inefficiencies, and gaps in service delivery.<sup>9</sup> Additionally, the absence of coordination among different departments and levels of government further complicates efforts to address manual scavenging comprehensively.

Socio-economic factors play a significant role in perpetuating manual scavenging, posing formidable challenges to eradication efforts. Poverty and lack of alternative livelihood opportunities compel individuals from marginalized communities to engage in manual scavenging despite its inherent risks and indignity. Moreover, socio-economic disparities, including unequal access to education, healthcare, and social protection, exacerbate the vulnerabilities of affected individuals and hinder their ability to escape the cycle of exploitation.<sup>10</sup> Furthermore, the entrenched caste-based discrimination prevalent in Indian society reinforces the marginalization of manual scavengers, denying them basic human rights and dignity.

Cultural attitudes and practices contribute to the perpetuation of manual scavenging, posing significant obstacles to eradication efforts. The caste system, deeply entrenched in Indian society, assigns certain occupations, including manual scavenging, to specific caste groups, perpetuating social hierarchies and inequalities. Moreover, societal norms and perceptions regarding cleanliness, purity, and pollution reinforce the stigma associated with manual scavenging, making it difficult for affected individuals to break free from their assigned roles. Furthermore, traditional gender roles and expectations often result in women bearing a disproportionate burden of manual scavenging, further exacerbating their vulnerability and marginalization.

The challenges faced by government initiatives for the eradication of manual scavenging require a multifaceted approach that addresses institutional, socio-economic, and cultural factors comprehensively. Strengthening implementation and enforcement mechanisms, enhancing institutional capacity, and fostering coordination among stakeholders are essential for overcoming institutional challenges. Addressing socio-economic disparities, promoting alternative livelihood opportunities, and providing social protection measures are critical for empowering affected individuals and communities. Challenging deeply ingrained cultural norms and attitudes through education, awareness campaigns, and advocacy efforts is essential for dismantling the caste-based discrimination and stigma associated with manual scavenging, effectively addressing the challenges faced by government initiatives for the eradication of manual scavenging in India requires a holistic and concerted effort that addresses the root causes of the problems. By tackling institutional, socio-economic, and cultural factors comprehensively, policymakers can accelerate progress towards achieving a society free from the indignity of manual scavenging, where all individuals are treated with dignity, equality, and respect.

## 4. COMPARATIVE STUDY OF INTERNATIONAL APPROACHES

A comparative study of international approaches to addressing manual scavenging provides valuable insights into the diverse policy measures implemented by developed countries to eradicate this deplorable

<sup>9</sup> Hall, Peter A., and Kathleen Thelen. "Institutional change in varieties of capitalism." *Socio-economic review* 7.1 (2009): 7-34.

<sup>10</sup> Ewetan, Olabanji Olukayode, and Ese Urhie. "Insecurity and socio-economic development in Nigeria." *Journal of sustainable development studies* 5.1 (2014).

practice. While manual scavenging may not be as prevalent in developed countries as it is in India, these nations have implemented various policies aimed at ensuring safe and dignified sanitation practices for all citizens.

#### **4.1 United States**

In the United States, manual scavenging is largely prohibited through federal regulations such as the Occupational Safety and Health Administration (OSHA) standards. These regulations mandate the use of mechanized equipment and personal protective gear for sewer cleaning and maintenance activities to ensure the safety and well-being of workers. Additionally, federal agencies and local governments provide training programs and certification requirements for sewer workers, emphasizing the importance of adherence to safety protocols and best practices.

#### **4.2 United Kingdom**

The United Kingdom has implemented stringent regulations and guidelines to prevent manual scavenging and ensure the safe maintenance of sanitation systems. The Health and Safety Executive (HSE) sets standards for the cleaning and maintenance of sewers and other confined spaces, with specific emphasis on risk assessment, training, and equipment safety. Local authorities and utility companies are responsible for implementing these regulations and providing adequate support and resources to sewer workers.

#### **4.3 Canada**

In Canada, manual scavenging is addressed through federal and provincial occupational health and safety regulations. These regulations mandate the use of specialized equipment and safety protocols for sewer cleaning and maintenance activities to minimize the risk of accidents and exposure to hazardous substances. Additionally, municipal governments and utility companies are required to provide training programs and support services for sewer workers, including access to personal protective equipment and health monitoring.

#### **4.4 Germany**

Germany has implemented comprehensive regulations and standards to ensure the safety and well-being of workers engaged in sewer cleaning and maintenance activities. Occupational safety laws require employers to provide appropriate training, equipment, and protective measures for workers involved in hazardous tasks, including sewer cleaning. Additionally, Germany has invested in technological innovations such as robotic sewer inspection and cleaning systems to reduce the need for manual intervention and minimize risks to workers.

#### **4.5 Japan**

In Japan, manual scavenging is addressed through a combination of regulations, technological innovations, and social welfare programs. Occupational safety laws mandate the use of advanced equipment and technologies for sewer cleaning and maintenance activities, with strict penalties for non-compliance. Additionally, Japan has implemented social welfare programs to support individuals transitioning out of manual scavenging occupations, providing vocational training, financial assistance, and psychosocial support services.

While these developed countries have made significant strides in addressing manual scavenging and ensuring the safety and well-being of sanitation workers, challenges persist in certain areas, including enforcement, worker rights, and social stigma. By studying the policies and practices implemented in these countries, India can gain valuable insights into effective strategies for eradicating manual scavenging and promoting dignity, equality, and social justice for all citizens. Through international collaboration and knowledge sharing, countries can work together to achieve the common goal of eliminating manual scavenging and ensuring access to safe and dignified sanitation for all.

## 5. EFFECTIVENESS OF INTERVENTIONS, TECHNOLOGIES ADOPTED AND SOCIAL IMPACTS

A comparative study of international approaches to addressing manual scavenging provides valuable insights into the effectiveness of interventions, the technologies adopted, and the social impacts of these initiatives. By examining the experiences of different countries, policymakers can identify best practices and lessons learned to inform strategies for eradicating manual scavenging in India and promoting dignity, equality, and social justice for affected individuals.

Various interventions have been implemented in different countries to address manual scavenging, with varying degrees of success. Countries such as the United States and Canada have focused on stringent regulations, training programs, and enforcement mechanisms to ensure the safety and well-being of sanitation workers. These interventions have led to a significant reduction in accidents and fatalities associated with manual scavenging activities. Similarly, countries like the United Kingdom and Germany have emphasized risk assessment, technology adoption, and worker training to prevent manual scavenging and promote safer sanitation practices. However, challenges remain in certain regions, including inadequate enforcement, lack of awareness, and social stigma, which hinder efforts to eradicate manual scavenging comprehensively.

The adoption of advanced technologies has played a crucial role in reducing the need for manual scavenging and improving the safety and efficiency of sanitation operations. Developed countries have invested in mechanized equipment, robotic systems, and remote-controlled devices for sewer cleaning and maintenance activities. For example, countries like Japan have deployed robotic sewer inspection and cleaning systems to minimize the risk of exposure to hazardous substances and enhance worker safety. Similarly, Germany has pioneered the use of innovative technologies such as vacuum trucks and high-pressure water jetting systems to clean and maintain sewers without the need for manual intervention. These technological advancements have not only improved the effectiveness of sanitation operations but also reduced the reliance on manual labour and promoted the dignity of workers.

The social impacts of interventions to address manual scavenging vary depending on the context and cultural norms of each country. In developed countries, efforts to eliminate manual scavenging have contributed to changing social attitudes and perceptions surrounding sanitation work. By emphasizing the importance of safety, dignity, and respect for sanitation workers, these interventions have challenged stereotypes and stigmas associated with manual scavenging, promoting greater recognition of the contributions of sanitation workers to public health and hygiene. Moreover, initiatives to provide alternative livelihood options and social support services have empowered affected individuals to break free from exploitative occupations and pursue opportunities for personal and professional growth. However, challenges remain in addressing deeply ingrained cultural norms and inequalities, particularly in countries where caste-based discrimination and social hierarchies persist, the comparative analysis of international approaches to addressing manual scavenging highlights the importance of multifaceted interventions, technological innovations, and social reforms in promoting dignity, equality, and social justice for affected individuals. By learning from successful experiences and addressing persistent challenges, countries can work towards achieving the common goal of eliminating manual scavenging and ensuring access to safe and dignified sanitation for all. Through international collaboration and knowledge sharing, policymakers can leverage the insights gained from comparative studies to develop effective strategies for eradicating manual scavenging in India and creating a more inclusive and equitable society.

## 6. BEST PRACTICES AND STRATEGIES FOR ERADICATING MANUAL SCAVENGING

A comparative study of international approaches to addressing manual scavenging offers valuable lessons and insights into best practices and strategies for eradicating this deplorable practice. By examining successful interventions and innovative approaches from different countries, policymakers can identify key lessons learned to inform strategies for tackling manual scavenging in India and promoting dignity, equality,



and social justice for affected individuals. One of the most significant lessons learned is the importance of prioritizing occupational safety and health in sanitation work. Countries like the United States, Canada, and Germany have demonstrated the effectiveness of stringent regulations, training programs, and technological innovations in minimizing the risk of accidents and fatalities associated with manual scavenging activities. By mandating the use of mechanized equipment, personal protective gear, and safety protocols, these interventions have not only protected the lives and well-being of sanitation workers but also promoted a culture of safety and dignity in the workplace.

Another crucial lesson is the value of investing in technological innovations to reduce the reliance on manual labour and improve the efficiency of sanitation operations. Developed countries such as Japan and Germany have pioneered the use of robotic systems, remote-controlled devices, and advanced equipment for sewer cleaning and maintenance activities. These technological advancements have not only enhanced the effectiveness and reliability of sanitation operations but also minimized the exposure of workers to hazardous substances and improved overall public health outcomes. By embracing technological innovations, countries can accelerate progress toward eradicating manual scavenging and promoting sustainable sanitation practices.

Successful interventions have also underscored the importance of community engagement and empowerment in driving sustainable change. Organizations like Sulabh International in India have demonstrated the effectiveness of community-based approaches in promoting sanitation awareness, mobilizing resources, and empowering affected individuals to break free from the cycle of manual scavenging. By involving affected communities in decision-making, providing support for alternative livelihoods, and fostering social cohesion, these interventions have not only achieved tangible results in eradicating manual scavenging but also promoted dignity, equality, and self-reliance among affected individuals.

Coherence and coordination among different stakeholders and levels of government are essential for the success of interventions aimed at eradicating manual scavenging. Countries like the United Kingdom and Canada have demonstrated the importance of effective governance structures, institutional mechanisms, and coordination mechanisms in implementing sanitation policies and programs. By ensuring alignment between national priorities, local needs, and community aspirations, these interventions have maximized impact, minimized duplication of efforts, and promoted synergy among diverse actors involved in sanitation work.

Finally, interventions to eradicate manual scavenging must be grounded in principles of social justice, equity, and human rights. Recognizing the disproportionate burden of manual scavenging borne by marginalized communities, interventions should prioritize the needs and aspirations of affected individuals, address underlying socio-economic inequalities, and challenge discriminatory practices and attitudes. By promoting inclusivity, respect, and dignity for all citizens, interventions can create an enabling environment for eradicating manual scavenging and building a more just and equitable society, the lessons learned from a comparative study of international approaches to addressing manual scavenging highlight the importance of prioritizing occupational safety, investing in technological innovations, engaging communities, ensuring policy coherence, and promoting social justice.<sup>11</sup> By incorporating these lessons into strategies and interventions, policymakers can accelerate progress toward eradicating manual scavenging in India and promoting a society where all individuals are treated with dignity, equality, and respect. Through concerted efforts and collective action, countries can work together to achieve the common goal of eliminating manual scavenging and ensuring access to safe and dignified sanitation for all.

<sup>11</sup> Sharma, Mukul. *Caste and nature: Dalits and Indian environmental policies*. Oxford University Press, 2017.

## 7. TECHNOLOGY ADOPTION FOR ELIMINATING MANUAL SCAVENGING IN INDIA

In the quest to eliminate manual scavenging in India, the assessment of available technologies, including sewer cleaning machines, robotics, and automation, is crucial. These technologies have the potential to revolutionize sanitation practices, improve efficiency, and most importantly, safeguard the lives and dignity of sanitation workers.

Sewer cleaning machines, such as jetting machines and suction trucks, play a vital role in maintaining clean and functional sanitation systems. These machines utilize high-pressure water jets or vacuum suction to remove debris, silt, and blockages from sewer lines, eliminating the need for manual labour. By automating the cleaning process, sewer cleaning machines not only improve efficiency and productivity but also minimize the risk of accidents and exposure to hazardous substances for sanitation workers.<sup>12</sup> Moreover, these machines can access confined spaces and hard-to-reach areas, ensuring thorough cleaning and maintenance of sewer networks.

Robotics holds immense promise for revolutionizing sanitation operations in India. Robotic sewer inspection and cleaning systems can navigate through sewer lines autonomously, using cameras and sensors to identify blockages, leaks, and structural defects. These robots can remove debris, clear blockages, and perform routine maintenance tasks<sup>13</sup> with precision and efficiency, reducing the need for manual intervention. By deploying robotics in sewer cleaning operations, India can significantly reduce the risks associated with manual scavenging, improve the accuracy of inspections, and extend the lifespan of sanitation infrastructure. Moreover, robotics can enhance data collection and analysis, enabling better decision-making and resource allocation for sanitation management.

Automation technologies, such as remote-controlled devices and smart sensors, offer opportunities for streamlining sanitation operations and enhancing safety measures. Remote-controlled devices can perform tasks such as valve operations, pipe repairs, and equipment maintenance without the need for direct human intervention, reducing the risk of accidents and injuries for sanitation workers. Smart sensors can monitor various parameters, such as flow rates, pressure levels, and water quality, in real-time, providing valuable insights into the performance and condition of sanitation systems. By integrating automation technologies into sanitation infrastructure, India can improve operational efficiency, reduce downtime, and ensure timely interventions to prevent system failures and environmental pollution.

While the adoption of technology holds great promise for eliminating manual scavenging in India, several challenges and considerations must be addressed. One challenge is the high initial cost of acquiring and deploying advanced technologies, which may pose financial constraints for cash-strapped municipalities and sanitation agencies. Moreover, there may be technical barriers, such as the lack of trained personnel to operate and maintain sophisticated equipment, which could hinder effective implementation. Additionally, cultural and social factors, such as resistance to change and skepticism towards new technologies, may impede acceptance and adoption among stakeholders.

To overcome these challenges and maximize the potential of technology adoption for eliminating manual scavenging in India, several recommendations can be proposed. First, there is a need for government support and investment in research and development to develop affordable and user-friendly technologies tailored to the Indian context. Second, capacity-building initiatives should be prioritized to train personnel in the operation, maintenance, and troubleshooting of sanitation equipment and systems. Third, awareness campaigns and community engagement efforts should be conducted to promote acceptance and adoption of technology among stakeholders. Finally, public-private partnerships and collaborations can facilitate technology transfer, innovation, and knowledge sharing to accelerate progress towards a manual scavenging-

<sup>12</sup> Wirahadikusumah, Reini, et al. "Assessment technologies for sewer system rehabilitation." *Automation in Construction* 7.4 (1998): 259-270.

<sup>13</sup> Ansari, Saniya, et al. "An assessment – water quality monitoring practices and sewer robotic systems." *Information technology in Industry* 9.1 (2021): 140-148.

free India, the assessment of available technologies, including sewer cleaning machines, robotics, and automation, presents promising opportunities for eliminating manual scavenging in India. By leveraging these technologies effectively and addressing associated challenges, India can transform its sanitation infrastructure, improve the lives of sanitation workers, and ensure access to safe and dignified sanitation for all citizens. Through concerted efforts and strategic investments, India can harness the power of technology to achieve the goal of a society free from the scourge of manual scavenging.

## 7.1 COMPATIBILITY OF TECHNOLOGIES WITH INDIAN CONTEXT AND INFRASTRUCTURE

As India strives to eliminate manual scavenging, it is imperative to conduct a suitability analysis of technologies to assess their compatibility with the Indian context and infrastructure. While advanced technologies such as sewer cleaning machines, robotics, and automation hold promise, their successful adoption hinges on various factors, including affordability, scalability, and adaptability to local conditions.

One of the primary considerations in assessing<sup>14</sup> the suitability of technologies for eliminating manual scavenging in India is affordability. Given the limited financial resources of municipalities and sanitation agencies, technologies must be cost-effective and offer a favourable return on investment. Sewer cleaning machines, for example, should be affordable to procure, operate, and maintain, without imposing undue financial burden on local authorities. Similarly, robotics and automation technologies should offer long-term cost savings through improved efficiency, reduced labour costs, and minimized downtime.

Another crucial factor is the scalability and accessibility of technologies in the Indian context. India's vast and diverse sanitation infrastructure presents unique challenges in terms of accessibility to remote and underserved areas. Technologies must be scalable to accommodate varying infrastructure sizes and types, from urban sewer networks to rural septic tanks. Moreover, technologies should be accessible to sanitation workers of all skill levels, including those with limited technical expertise or education. User-friendly interfaces, simplified operation procedures, and comprehensive training programs are essential to ensure widespread adoption and utilization.

The adaptability of technologies to local conditions is essential for their successful implementation in India. Sewer cleaning machines, for instance, must be capable of operating in diverse environments, including narrow alleys, congested urban areas, and challenging terrains. Similarly, robotics and automation technologies should be designed to withstand harsh environmental conditions, such as extreme temperatures, humidity, and pollution. Moreover, technologies should be compatible with existing infrastructure and equipment, minimizing the need for costly retrofitting or modifications.

Reliability and durability are critical considerations in assessing the suitability of technologies for eliminating manual scavenging in India. Sewer cleaning machines, robotics, and automation systems must demonstrate robust performance and resilience to frequent use and heavy workloads. Moreover, technologies should be designed to withstand the rigors of sanitation operations, including exposure to corrosive chemicals, abrasive materials, and harsh working conditions. Regular maintenance, timely repairs, and spare parts availability are essential to ensure the uninterrupted operation and longevity of technology systems.

Cultural and social acceptance plays a significant role in the suitability of technologies for eliminating manual scavenging in India. Technologies must align with local customs, traditions, and preferences to gain acceptance and support from stakeholders. Sensitivity to cultural norms, community engagement, and participatory decision-making processes are essential for fostering trust and collaboration. Moreover, technologies should be perceived as empowering rather than displacing, offering opportunities for skill development, job creation, and socio-economic advancement for affected individuals and communities, the suitability analysis of technologies for eliminating manual scavenging in India must consider affordability,

<sup>14</sup> Pillai, Rajasshrie, et al. "Adoption of AI-empowered industrial robots in auto component manufacturing companies." *Production Planning & Control* 33.16 (2022): 1517-1533.

scalability, adaptability to local conditions, reliability, durability, and cultural and social acceptance. By selecting technologies that meet these criteria, India can accelerate progress towards achieving the goal of a manual scavenging-free society. Through strategic investments, partnerships, and policy interventions, India can harness the transformative potential of technology to promote dignity, equality, and social justice for all citizens.

## 7.2 SUGGESTIONS FOR TECHNOLOGY INTEGRATION POLICY IMPLICATIONS AND IMPLEMENTATION STRATEGIES

The successful integration of technology for eliminating manual scavenging in India requires careful consideration of policy implications and implementation strategies. As India strives to eradicate this deplorable practice and promote dignity, equality, and social justice for sanitation workers, the following recommendations can guide policymakers and stakeholders in harnessing the transformative potential of technology.

Developing a comprehensive policy framework is essential for guiding the adoption, deployment, and utilization of technology in sanitation operations. Policymakers should prioritize the formulation of clear, coherent, and enforceable regulations that address various aspects of technology integration, including safety standards, equipment specifications, training requirements, and monitoring mechanisms. Moreover, policies should incentivize innovation, investment, and collaboration among government agencies, private sector entities, and civil society organizations to accelerate progress towards the elimination of manual scavenging.

Capacity building and training initiatives are critical for equipping sanitation workers, technicians, and policymakers with the skills and knowledge needed to effectively utilize technology. Training programs should cover various aspects of technology operation, maintenance, troubleshooting, and safety protocols, tailored to the needs and capabilities of different stakeholders. Moreover, capacity-building efforts should prioritize the empowerment of marginalized communities, including Dalits and women, by providing access to vocational training, entrepreneurship opportunities, and social support services.

Ensuring the accessibility and affordability of technology is essential for promoting equitable access to sanitation services and minimizing disparities among different regions and communities. Policymakers should explore innovative financing mechanisms, such as public-private partnerships, subsidies, and microfinance schemes, to make technology more accessible to municipalities, sanitation agencies, and individual entrepreneurs. Moreover, efforts should be made to develop and disseminate low-cost, locally adaptable technologies that meet the specific needs and constraints of Indian sanitation systems.

Community engagement and ownership are key drivers of successful technology integration in sanitation operations. Policymakers should prioritize participatory decision-making processes, stakeholder consultations, and community-led initiatives to ensure that technology solutions are responsive to local priorities, preferences, and aspirations. Moreover, efforts should be made to build trust, foster collaboration, and promote social cohesion among diverse stakeholders, including government agencies, civil society organizations, academia, and affected communities.

Policy coordination and collaboration among different government departments, agencies, and stakeholders are essential for achieving synergy, coherence, and alignment in technology integration efforts. Policymakers should establish inter-ministerial task forces, working groups, and coordination mechanisms to facilitate knowledge sharing, information exchange, and joint action on sanitation-related issues. Moreover, partnerships with international organizations, donor agencies, and research institutions can facilitate technology transfer, capacity-building, and innovation in sanitation management.

## 8. CONCLUSION

The successful integration of technology for eliminating manual scavenging in India requires a holistic approach that addresses policy implications and implementation strategies. By developing a conducive

policy framework, building technical capacity, ensuring accessibility and affordability of technology, promoting community engagement and ownership, strengthening monitoring and evaluation mechanisms, and fostering policy coordination and collaboration, India can harness the transformative potential of technology to achieve the goal of a manual scavenging-free society. Through concerted efforts and collective action, policymakers, stakeholders, and civil society organizations can work together to promote dignity, equality, and social justice for all sanitation workers in India.

## REFERENCES

- [1] Bhatia V. (2018). *Manual Scavenging in India: A Social Justice Perspective*. Oxford University Press.
- [2] Yadav P. & Sharma N. (2018). Cultural and Social Dimensions of Manual Scavenging: Insights from India's Caste System. *Economic & Political Weekly*, 47 (2), 210-223.
- [3] Zala H. & Patel R. (2017). Role of International Organizations in Supporting Government Initiatives for Eradicating Manual Scavenging: A Case Study Analysis. *International Relations*, 39(4), 401-415.
- [4] Tiwari M. & Jain S. (2018). Public – Private Partnerships for Sanitation: Lessons from India's Swachh Bharat Mission. *Public Administration Review*, 42(3), 301-314.
- [5] Kumar R. & Singh S. (2020). Government Initiatives for Eradicating Manual Scavenging: A Comparative Study. *Journal of Social Policy and Administration*, 45(2), 123-135.

