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A Social Entrepreneurial Approach to Tackling Environmental Issues in India (with Special Reference to Garbage Disposal)

Karunarathne Rasika R.A.^{1*} and Praveena D.²

¹Research Scholar, Department of Post Graduate Studies and Research in Sociology, Mangalore University, Mangalagangothri, Konaje, India. E-mail: rasike2010@gmail.com

²Department of Postgraduate Studies and Research in Political Science, Mangalore University, Mangalagangothri, Konaje, India. E-mail: praveend7788@gmail.com

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Abstract

India faces a severe waste management issue, producing an estimated 1.3 billion tons of waste annually, about one-third of the world's total. Despite government efforts to improve waste management, the situation remains critical. This study investigates a social entrepreneurial framework aimed at addressing environmental challenges in India, focusing on garbage management. The methodology includes a review of selected cases, municipal waste statistics, environmental impact assessments, and policy frameworks. By analyzing the historical and current state of garbage management, the research identifies key challenges, success stories, and areas needing improvement. India's waste problem is primarily due to inadequate waste collection infrastructure and a lack of effective sorting and recycling systems, leading to valuable materials ending up in landfills. Rapid urbanization exacerbates the challenge. Social entrepreneurs are addressing this issue through circular economy models, community-led recycling programs, technology-driven solutions, and educational campaigns. These initiatives enhance waste management, empower communities, and promote accountability.

Keywords: *Social entrepreneurship, Environmental issues, Garbage disposal, Intervention*

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1. Introduction

On a daily basis, a substantial volume of waste is generated globally, predominantly attributable to escalating urbanization and heightened rates of consumption. World Bank statistics reveal an annual accumulation of

* Corresponding author: Karunarathne Rasika R.A., Research Scholar, Department of Post Graduate Studies and Research in Sociology, Mangalore University, Mangalagangothri, Konaje, India. E-mail: rasike2010@gmail.com

trash amounting to 4.5 trillion pounds. Traditional landfill strategies, commonly employed to address waste disposal challenges, persistently engender complications rather than yielding viable solutions when addressing the pervasive global waste predicament (Team, 2022).

India, renowned for its rich cultural tapestry and rapid economic growth, finds itself at a critical juncture amidst escalating environmental challenges. Chief among these concerns is the issue of waste disposal, a manifestation of the escalating volume of waste generated by a burgeoning population and intensifying urbanization. To confront these challenges, the imperative is to explore innovative and sustainable alternatives, and within this context, social entrepreneurship has emerged as a transformative force propelling change in the realm of environmental sustainability. Indisputably, one of India's most critical environmental challenges is air pollution. According to the 2021 World Air Quality Report, India is home to 63 of the 100 most polluted cities, with New Delhi earning the unfortunate distinction of having the world's poorest air quality. The report highlights a concerning statistic, revealing that Particulate Matter (PM) 2.5 concentrations—minute particles in the air measuring 2.5 micrometers or smaller—exceed the 2021 WHO air quality guideline level by more than tenfold in 48% of the country's cities. Major contributors to air pollution in India include vehicular emissions, industrial waste, smoke from cooking, activities in the construction sector, crop burning, and power generation. The nation's heavy reliance on coal, oil, and gas, driven by widespread electrification, positions it as the third-largest global polluter, releasing over 2.65 billion metric tons of carbon into the atmosphere annually (Igini, 2022).

The environmental landscape in India, particularly in the realm of waste management, has reached a critical juncture. The accelerated urbanization and industrialization within the nation have led to an unprecedented surge in the production of waste. Statistical data reveals that India generates over 150,000 metric tons of municipal solid waste daily, positioning it as one of the foremost contributors to the global accumulation of waste (Ground Report, 2023). This mounting waste crisis not only poses immediate threats to public health and environmental integrity but also mandates a fundamental reevaluation of prevailing waste management paradigms.

At the core of this environmental conundrum lies the potential of social entrepreneurship—an agile and innovative force harnessing business principles for societal and environmental welfare. This study seeks to scrutinize and analyze the intricate role played by social entrepreneurs in addressing India's predicaments concerning waste disposal, with a specific focus on understanding the strategies employed, the impacts realized, and the challenges encountered by these social entrepreneurs in navigating the country's waste management landscape.

The imperative to identify sustainable and socially inclusive solutions to India's waste disposal challenges propels the urgency of this research. Social entrepreneurship, distinguished by its inherent commitment to harmonizing economic objectives with social and environmental impact, holds promise for driving substantial change. By concentrating on the intersection of social entrepreneurship and waste management, this study aspires to offer nuanced insights that can inform policymakers, practitioners, and academics alike. Through a meticulous examination of successful case studies, innovative models, and collaborative initiatives, the research aims to unveil the potential of social entrepreneurial approaches in steering India towards a more sustainable and socially responsible future.

It becomes increasingly imperative to acknowledge the interwoven nature of environmental challenges and societal well-being. The roles played by social entrepreneurs in waste disposal extend beyond mere waste management to encompass community engagement, the empowerment of vulnerable communities, and the influence of legislative frameworks. By comprehending the nuanced dynamics and impact of social entrepreneurial initiatives, the research aims to unlock the potential for scalable and replicable models contributing not only to waste reduction but also to holistic environmental stewardship.

In the subsequent chapters, this research will systematically investigate various facets of social entrepreneurial initiatives in waste disposal in India. Through meticulous case analyses, policy evaluations, and an exploration of technology-driven solutions, the study endeavors to furnish a comprehensive understanding of how social entrepreneurship can emerge as a potent force in mitigating environmental challenges, with a distinctive focus on waste disposal in the Indian context.

2. Objectives

2.1. The Main Objective

This study comprehensively explores a social entrepreneurial framework dedicated to mitigating environmental challenges in India. Therefore, this study seeks to investigate the social entrepreneurial approach towards addressing environmental challenges in India, specifically emphasizing garbage disposal.

2.2. Specific Objectives

- Exploring the current state of garbage disposal in India involves a comprehensive assessment of existing practices, challenges.
- Identification of key environmental issues and challenges related to garbage disposal is imperative for devising targeted solutions.
- Stakeholder engagement in garbage disposal encompasses a diverse array of actors, including government bodies, local communities, waste management companies, and non-governmental organizations.
- Analyzing a business model to address the garbage disposal problem in India involves a systematic evaluation of potential strategies and frameworks.

3. Methodology

This study's methodology relies on the use of secondary data, emphasizing a complete and methodical approach to gathering and analyzing existing material relevant to the chosen research topic. To begin, a thorough assessment of academic literature, research articles, and reports has been done in order to lay a solid theoretical foundation. Following that, the emphasis has moved to finding and selecting acceptable secondary data sources, such as databases, scholarly publications, and archive materials, in accordance with the research objectives. To verify the reliability and relevance of the selected secondary data, methods have been used here. To obtain significant insights and draw conclusions, qualitative methodology has been applied to analyze the collected data. This methodology attempts to give useful insights to the study issue by using existing data while minimizing the requirement for primary data collection, hence optimizing resources and time efficiency.

4. Literature Review

4.1. What is a Social Entrepreneur

Social entrepreneurship is one of the most noteworthy recent innovations in global civil society. While many of the activities and approaches associated with this term are not novel in and of themselves – for example, the use of business models by social enterprises to generate income to support social programs – the evolution of a discrete organizational field for such action represents an important structural change in the institutions of social action (Nicholls and Collavo, 2012). Emerging from the cooperative movement in nineteenth-century Europe, social entrepreneurship saw a surge in popularity during the 1980s and 1990s, coinciding with the development of social innovation and social business schools of thought and practice. Nevertheless, the principles of social entrepreneurship have long influenced the actions of philanthropists, a legacy that continues with the emergence of contemporary figures such as venture philanthropists.

In the 1980s, Edward Skloot and a group of innovators laid the groundwork for the social enterprise school of thought. This perspective asserts that businesses can employ earned-income strategies to advance social impact objectives. Over the ensuing decades, the social enterprise school has notably highlighted the importance of earned-income initiatives within non-profit organizations. Skloot, known for his influential publications such as “The Nonprofit Entrepreneur: Creating Ventures to Earn Income,” is also the founder of New Ventures. This consulting organization specializes in aiding non-profits to diversify their revenue streams and ensure long-term financial sustainability (United Nations, 2020). Muhammad Yunus and the Grameen Bank have played a significant role in shaping the landscape of social entrepreneurship. In the 1980s, Yunus drew global

attention to the crucial need for financial services and products aimed at alleviating poverty by establishing the Grameen Bank in Bangladesh. The bank not only offers microcredit and microfinance support to entrepreneurs with limited financial resources but also fosters community engagement and development by encouraging its members to actively participate in the political and social aspects of their localities and nations. In 2011, Yunus, along with three colleagues, co-founded Yunus Social Business, a venture fund that operates as both a for-profit and non-profit entity. This initiative aims to transform philanthropic contributions into investments in sustainable, long-term social enterprises.

When an individual or group of individuals establishes a business to address a social, cultural, or environmental concern, this is referred to as social entrepreneurship. These firms exist to positively impact society by tackling a specific issue. Understanding what a social entrepreneurship business model looks like and the various shapes it can take might help you prepare to start or join one. In this post, we address the question 'What is social entrepreneurship?', discuss the various types that exist with examples of each, and provide advice on how to get started ([Indeed, 2023](#)).

Social entrepreneurs are classified according to their roles in society. A community social entrepreneur focuses on the needs of a particular geographical area, usually the community in which they live. This type of social entrepreneur is less concerned with the precise nature of their endeavour; their primary goal is to improve their community. This type of social entrepreneur frequently cultivates strong relationships in their community, leveraging those relationships to influence how resources move within their community. Community members, local organizations, and the community social entrepreneur work together to make sure the needs of the community are satisfied and partnerships that make sense are developed. Non-profit social entrepreneurs are the most prevalent sort of social entrepreneur, with an overarching objective that benefits someone but not necessarily their immediate community. With the advent of remote or online social entrepreneurship, it is now possible to establish businesses with larger mission-driven goals. Non-profit social businesses are typically run in a manner comparable to a business. The key distinction is that the non-profit enterprise's net profits are frequently returned to the entity for further development into programs. Instead of looking for investors to make money, a non-profit social entrepreneur seeks to spend as much money as possible on its objective. As a non-profit social enterprise matures, it frequently evolves into a transformative social entrepreneur. The mission of local non-profits can expand as they grow. A transformative social entrepreneur seeks to scale a single initiative to benefit multiple places. Consider Goodwill's enormous reach; what began as a tiny non-profit social organization evolved into a much richer, broader entity with many more laws and regulations. Borders and geography aren't always barriers to social entrepreneurship. People may attempt to solve larger social ideas such as poverty, sadness, or a lack of living conditions at times. Typically, the social entrepreneur will attempt to tackle a problem in a given region. However, these deep-seated difficulties are frequently not regional. Many answers discovered in one field may be applicable in another. These types of organizations have the most influence. Consider the scope of the Bill and Melinda Gates Foundation. Their efforts to find vaccines for many diseases affecting people all over the world are prime examples of global social enterprises.

4.2. Garbage Problem in India

In the form of its rising garbage problem, India faces a mounting and diverse challenge. Rapid urbanization, population growth, and shifting consumer patterns have all contributed to massive trash output across the country. Inadequate waste management infrastructure, a lack of public knowledge, and a lack of effective legislation worsen the problem. As a result, India is dealing with the environmental, social, and health effects of incorrect trash disposal, which necessitates immediate attention and comprehensive solutions to this serious issue.

India is facing a serious waste management crisis, characterized by a glaring discrepancy between the large volume of trash produced and the limited capability for its efficient disposal. Only 43 million tons of the amazing amount of waste produced are collected, leaving a significant chunk unprocessed or destined for landfills. Recycling rates continue to be unsatisfactory, compounding environmental issues, and the management of hazardous and biological waste adds further challenges. Immediate action is required to improve garbage collection, promote effective segregation, and build strong treatment standards across the

country, tackling the many difficulties that now define India's waste landscape (Next IAS, 2023). The escalating challenges of waste disposal in urban areas are exacerbated by the rapid pace of urbanization and population growth. This global issue is particularly pronounced in developing countries, where household garbage emerges as a significant concern. The relentless pursuit of consumption, influenced by psychological factors, intensifies the problem, and India serves as a quintessential example of this phenomenon. As per capita income and urban culture advance, so does per capita consumption, leading to an exponential rise in waste generation. Solid waste, encompassing household, industrial, and biomedical waste, compounds the issue. Within household waste, a diverse array exists, ranging from biodegradable components like fruit peels and paper to non-biodegradable items such as plastics and metals. Furthermore, hazardous materials like used menstruation products, diapers, and medical waste pose additional challenges in the management of solid waste in India's evolving urban landscape (Goyal and Dharwal, 2022).

4.3. Social Entrepreneurship in India

India, ranked as the seventh-largest country globally by land area and home to 17.5% of the world's population, is the second most populous nation, surpassed only by China. Distinguished as the world's youngest country in terms of demography, nearly two-thirds of its population is under the age of 35. Positioned as the third-largest economy by GDP, trailing China and the United States, India experienced a 7.5% GDP growth in 2015-16, with expectations of an 8% annual rate in 2016-17 (MoSPI, 2016). Classified as a middle-income nation, India recorded a per capita income of \$1,405 (£954) in 2015-16, accompanied by a 6.2% real growth rate.

The economic landscape is diverse, with agriculture contributing over 18% to GDP and employing 49% of the labour force. The service sector plays a dominant role, constituting more than 52% of GDP and employing 31% of the workforce. India has emerged as a significant exporter of information technology, business process outsourcing, and software services (MoSPI, 2016). The industrial sector, contributing 29.7% to GDP and employing 20% of the workforce, further adds to the economic complexity. Despite being the world's second-fastest-growing economy, India faces substantial challenges, housing over 40% of the global poor, with nearly 30% living below the poverty line. The country grapples with persistent socioeconomic issues, including illiteracy, starvation, and inadequate healthcare, ranking 130th out of 188 nations on the Human Development Index (UNDP, 2015). Poverty and unemployment remain significant political and economic concerns, compounded by infrastructural bottlenecks, onerous laws and regulations restricting business, insufficient law enforcement, and high dependence (British Council, 2016).

When it considered the application of social entrepreneurs in India which can be come across through the following programs are conducted by different organizations. Zero Miles is in the process of establishing multi-utility drinking water centres in Maharashtra, fostering community development. Aadhan transforms discarded shipping containers into classrooms and various structures. Leveraging social enterprise access to online and urban markets holds vast potential for traditional Indian crafts and craftsmanship. Ziveli, a social venture, introduces Manipur's kauna craft to a global audience. Divya Rawat utilizes mushroom cultivation to curb migration and create employment opportunities in Uttarakhand, contributing to the revival of numerous 'ghost settlements' in the state. In a society where women often embark on lengthy treks to secure drinking water for their families, the Water Maker's innovative approach to generating water from thin air is truly remarkable. As expressed by one grateful recipient, it is nothing short of "khuda ka paani" (water from the divine) (Sushashini et al., 2021).

4.4. The Swachh Bharat Mission

The Swachh Bharat Mission is considered be as an important policy level intervention mitigate garbage problem in India. The Swachh Bharat Mission, launched in 2014, emerged as a transformative initiative with a primary goal of achieving an Open Defecation Free (ODF) India by October 2019. The mission succeeded in constructing over 10 crore toilets, catapulting sanitation coverage from 39% in 2014 to a commendable 100% in 2019. The subsequent SBM-G Phase-II, approved in February 2020, marks a strategic shift towards sustainability and comprehensive waste management. This phase aims to elevate villages from ODF to ODF Plus by 2024-25, introducing a nuanced classification into Aspiring, Rising, and Model stages for villages. The progress report as of October 2023 indicates a noteworthy 78% of villages declaring themselves ODF Plus,

showcasing substantial advancements. The Department of Drinking Water and Sanitation (DDWS) has played a pivotal role, in implementing innovative campaigns to sustain momentum and cultivate a vision of a cleaner, greener, and healthier nation. Crucially, the success of the Swachh Bharat Mission hinges on active community participation, underlining the significance of grassroots involvement in ensuring the continued success of the campaign and the enduring impact on economic, environmental, and health fronts, particularly for women (Swachh Bharat Mission, 2023).

4.5. Analysis of Prior Studies

A study on solid waste management scenario in India and illegal dump detection using deep learning: An AI approach towards the Sustainable Waste Management in 2022 done by Sana Shahab Mohd Anjum. The study is organized into four sections. The initial section defines municipal solid waste and the solid waste management system. The second section conducts a descriptive statistical analysis of waste generation patterns in India, revealing that the average waste generation in 2021 reached 160,038.9 tons per day, with 95% of this waste successfully collected and transported to disposal sites. Per capita waste generation rates ranged from 0.490 to 0.626 g per day in 2018. Over the past decade and a half, Delhi and Bangalore exhibited the highest percentage growth in total waste generation among major cities, with growth rates of 2075% and 1750%, respectively. Urbanization emerges as a significant factor influencing waste generation rates. The third section outlines major challenges in current solid waste management services, including the absence of citizen web portals, lack of real-time monitoring for bins and collection vehicles, and prevalent illegal dumping. The study proposes a technological solution, a multipath convolutional neural network (mp-CNN), in the fourth section, designed for detecting and localizing waste dumps on streets and roadsides. A dataset was created for model training and testing due to the absence of publicly available benchmark datasets for this objective. The weakly supervised learning approach was applied, resulting in impressive model performance metrics of 97.82% precision, 98.86% recall, 98.34% F1 score, 98.33% accuracy, and 98.63% AUROC for binary waste classification. While quantitative waste localization results are constrained by dataset scarcity, a survey comparing model-generated masks with actual waste regions achieved an average score of 3.884 out of 5. Analysis of performance metrics, precision-recall curves, receiver characteristic operator curves, and mask comparisons demonstrate the mp-CNN's efficacy in waste detection, classification, and localization. The study concludes by suggesting two conceptual architectures for the future practical application of the mp-CNN model in developing countries.

Sunil Kumar, Stephen R. Smith, Geoff Fowler, Costas Velis, S. Jyoti Kumar, Shashi Arya, Rena, Rakesh Kumar, and Christopher Cheeseman conducted a comprehensive examination of the challenges and opportunities associated with waste management in India in 2017. This study discusses what are the significant environmental issues stemming from escalating waste generation and deficiencies in waste collection, transport, treatment, and disposal. The existing waste management systems are ill-equipped to handle the escalating volumes of waste resulting from the expanding urban population, thereby adversely affecting both the environment and public health. Although the challenges and barriers are formidable, the paper highlights the considerable opportunities available. A primary objective outlined in the paper is the imperative shift away from reliance on environmentally unprotected waste dumps towards waste management systems that promote the retention of valuable resources within the economy. The pivotal role of waste segregation at the source and the utilization of specialized waste processing facilities for separating recyclable materials are emphasized. The paper stresses the necessity for engineered landfill sites or investments in waste-to-energy facilities for the disposal of residual waste post-extraction of material resources. A notable opportunity lies in energy generation from landfills through methane extraction or thermal treatment. However, a significant impediment is the shortage of qualified engineers and environmental professionals experienced in delivering enhanced waste management systems in India.

The exploration of the status and challenges surrounding municipal solid waste management (MSWM) in India in 2016, as undertaken by Rajkumar Joshi and Sirajuddin Ahmed, stems from the dire conditions and obstacles facing urban MSWM in the country. This review shows that the process of urbanization exacerbates the generation of municipal solid waste (MSW), and the inadequate handling of MSW not only degrades the urban environment but also poses significant health risks. This paper endeavours to assess key parameters of MSWM, offering a comprehensive review of MSW generation, its characterization, collection, and treatment

practices prevalent in India. Additionally, it presents the current MSWM status in various Indian states and important cities. The paper addresses the essential conditions for optimizing benefits through potential public-private partnerships, discusses associated challenges, and sheds light on the often-overlooked role of rag-pickers. The study concludes that, especially in developing countries like India, the imperative lies in establishing decentralized solid waste processing units in metropolitan cities and towns and fostering the growth of a formal recycling industry sector.

Uddin and Akther (2019) "Contributions of Social Entrepreneurs: A Study from the Perspective of the Society, Culture, and Environment of Bangladesh," *Management Dynamics* has emphasized the significant effects of social entrepreneurship (SE) on society, culture, and the environment, aiming to redefine the corporate landscape and ensure sustained development. The investigation delves into the socioeconomic landscape of Bangladesh, identifying areas where social entrepreneurs could make pivotal contributions to long-term progress. A five-point Likert scale questionnaire, comprising thirteen factors related to the impact of SE on culture, society, and the environment, was developed. Data collection involved interviews with both novice and seasoned businesses. The study's findings underscore the crucial roles played by social entrepreneurs in fostering a country's socioeconomic growth through their entrepreneurial endeavours. It argues that certain essential criteria must be met for the advancement of social entrepreneurship to effectively contribute to a nation's socioeconomic development.

5. Discussion

This section is based on the selected waste management programs in India to examine the background of the social entrepreneur and its application. Therefore, this study mainly focuses on identified programs related to social entrepreneurs in garbage management. Herewith, this analysis envisages developing a model for garbage disposal in the purview of a social entrepreneurial context.

Sanshodhan, a non-profit organization founded by a group of young professionals in Hyderabad, has introduced an innovative E-Waste Management initiative through its Internet of things (IoT)-based platform, the Sanshodhan E-waste Exchange. This platform establishes a sustainable ecosystem for e-waste by facilitating direct transfers from corporations and societies to government-authorized recyclers in Hyderabad. The organization is driven by a dual purpose: environmental stewardship and supporting the government in establishing robust data and monitoring mechanisms for effective waste management. By leveraging technology, Sanshodhan not only streamlines the e-waste disposal process but also contributes to the larger goal of responsible and regulated waste management practices in the region. The success of this initiative demonstrates the potential for technology-driven solutions in addressing pressing environmental concerns while fostering collaboration between private entities and government agencies.

Conserve India, founded by Anita and Shalabh Ahuja, stands out as a socially and environmentally conscious organization with its unique approach to upcycling plastics into fashion accessories. The creation of Handmade Recycled Plastic (HRP) from discarded polythene bags, rubber from old truck tires, and pieces of denim and saris exemplifies innovative recycling practices. Notably, this initiative not only contributes to the cleanliness of Delhi's streets but also addresses socio-economic challenges by providing jobs for some of the city's poorest residents. The income generated from the sale of upcycled products is channeled into social welfare projects, creating a sustainable cycle of positive impact.

The environmentally friendly production process, which avoids harmful chemicals and dyes while ensuring energy efficiency, not only aligns with eco-conscious principles but also reduces costs, providing Conserve India with a greater capital pool for investment in other impactful projects. The dual focus on environmental sustainability and social responsibility is a commendable strategy, demonstrating that profitability and positive social change can coexist.

Moreover, the initiative's impact on the lives of waste pickers is substantial. The provision of better wages, three times higher than alternative opportunities, enhances the economic well-being of these workers. Additionally, Conserve India goes beyond job creation by offering training opportunities, and enabling skill development for more specialized employment either within the organization or elsewhere. The organization's commitment extends to empowering waste pickers to start their businesses through provided loans, promoting financial independence.

Furthermore, Conserve India's holistic approach includes the establishment of a school and health clinic within the waste pickers' slum, financed by the organization's profits. This exemplifies a comprehensive understanding of the interconnected challenges faced by the community and an effort to address them at multiple levels.

In conclusion, Conserve India's upcycling initiative not only exemplifies sustainable environmental practices but also serves as a model for socially responsible entrepreneurship. The organization's impact on waste pickers' lives, economic empowerment, and community development reflects a successful integration of business innovation and social welfare, showcasing a blueprint for sustainable and inclusive growth.

Praveen Chauhan's social enterprise, "MATR," addressing the floral waste predicament at the Mahabodhi Temple in Bodh Gaya, is a commendable initiative with dual objectives of recycling floral waste and promoting khadi internationally. The temple, generating substantial floral waste, faced an environmental challenge that went unaddressed until MATR's intervention. By converting discarded flowers into natural dyes and collaborating with the sustainable clothing brand "Because of Nature," MATR not only addresses waste management but also harnesses people's sentimental connection to the temple's offerings to boost khadi sales.

The collaboration with "Because of Nature" in the "Happy Hands Project" exemplifies a strategic partnership that transforms waste into valuable products. Engaging 50 local women in the process, MATR not only provides employment opportunities but also empowers women through skill development in the manufacture of floral dyes. The meticulous process, from segregating flowers by colour to manually grinding and boiling them, showcases the dedication to producing high-quality khadi garments with a multitude of shades.

The Memorandum of Understanding (MoU) between MATR, "Because of Nature," and the Bodhgaya Temple Management Committee (BTMC) underlines a structured approach to sustainable development. The revenue-sharing model, allocating 90% of profits to MATR, "Because of Nature," and the women involved, and contributing 10% to the Bodhgaya Temple, creates a fair and sustainable economic ecosystem. The plan to expand the initiative to other temples in and around Bodh Gaya demonstrates a scalable and replicable model that could be applied to pilgrimage sites across the country.

Furthermore, the enterprise's intention to weave and spin its fabric from 2019 onwards adds another layer of self-sufficiency and sustainability to the project. By doing so, MATR aims to create a closed-loop system, reducing dependence on external retailers and further enhancing the economic resilience of the initiative.

In summary, MATR's "Happy Hands Project" not only effectively tackles the floral waste issue at the Mahabodhi Temple but also provides a replicable model for waste management and community empowerment. The socio-economic impact, commitment to sustainability, and potential for scalability make this initiative a notable example of how creative, environmentally conscious solutions can generate positive outcomes for both communities and the environment.

Chanu Associates, a Manipur-based social enterprise, stands out as an environmentally conscious initiative with its diverse range of eco-friendly products, including pens with embedded seeds, pencils, and various types of bags. The enterprise, launched in June 2017 with a modest investment of Rs. 20,000, has demonstrated a commitment to sustainability and innovation in its product offerings.

The eco-friendly pen, made from compressed paper and containing seeds, is a notable innovation that addresses the issue of plastic pollution. This product not only provides a greener alternative to traditional plastic ballpoint pens but also encourages environmental responsibility by allowing users to plant the used pens to grow saplings. The emphasis on biodegradability and the potential for tree growth adds a unique ecological dimension to the enterprise's offerings, contributing positively to environmental conservation.

The enterprise's current production volume of 200-300 units per month, with a monthly profit of Rs. 50,000, reflects a viable and economically sustainable business model. The State Government of Manipur's support through a loan under the Startup Conclave 2018 to upgrade machinery indicates recognition and encouragement of the enterprise's potential for growth. The targeted expansion to produce 3000-5000 units per day signifies an ambitious but achievable goal that aligns with the enterprise's commitment to scaling up its impact.

Furthermore, the role of Chanu Associates in local job creation adds a socio-economic dimension to its impact. By generating employment opportunities for the local community, the enterprise not only contributes to economic development but also fosters a sense of community engagement and empowerment.

However, while the case highlights the positive aspects of Chanu Associates, it would benefit from more detailed information on the specific environmental and social impacts of the enterprise, such as the number of jobs created, the environmental footprint of its operations, and the overall contribution to sustainable development in the region. Additionally, considerations regarding the supply chain, sourcing of materials, and engagement with local communities could provide a more comprehensive understanding of the enterprise's practices.

In conclusion, Chanu Associates exemplifies a socially and environmentally responsible business model, utilizing innovative and eco-friendly products to address plastic pollution while contributing to local economic development. The enterprise's success and potential for growth, coupled with government support, position it as a promising venture with the capacity to make a meaningful impact on both environmental and social fronts.

Zerund Bricks Manufacturing Pvt. Ltd., founded by engineers Rupam Choudhury, David Pratim Gogoi, and Mousum Talukdar, emerges as a promising solution to Guwahati's pressing plastic waste crisis. With the city generating a staggering 37,000 kg of plastic waste daily, the establishment of this enterprise signifies a proactive response to the environmental challenge. The use of multilayered, non-recyclable plastic waste in manufacturing concrete bricks addresses the urgent need for sustainable waste management.

The centralized unit initiated with an initial capital expenditure of Rs. 50 lakhs, not only serves as a significant contributor to waste reduction but also acts as an efficient dry waste recycling centre. The production of Zerund bricks, made from cement, fly ash, organic chemicals, and plastic waste, offers a compelling alternative to traditional clay bricks, available at a competitive 15-20% lower cost. The strategic collaboration with Urban Local Bodies (ULBs) for the supply of plastic waste and the National Thermal Power Corporation (NTPC) for free fly ash further exemplifies a comprehensive approach to resource utilization and industry collaboration.

The innovative characteristics of Zerund bricks, such as reduced water absorption, lower drying shrinkage, and enhanced structural integrity due to the plastic component, position them as a viable and eco-friendly building material. The bricks' larger size contributes to a 40% reduction in the total dead load of structures compared to clay bricks, leading to significant cost savings in construction. Additionally, the larger size reduces the number of mortar joints, thereby minimizing cement consumption and further bolstering the bricks' sustainability credentials.

While Zerund Bricks Manufacturing Pvt. Ltd. presents an innovative and economically viable solution to plastic waste management, a more detailed analysis of the long-term environmental impact and scalability of the enterprise would enhance the comprehensiveness of the case study. Considerations such as the energy efficiency of the manufacturing process, the potential for wider adoption in the construction industry, and the enterprise's role in creating awareness about sustainable building practices would provide valuable insights.

In conclusion, Zerund Bricks Manufacturing Pvt. Ltd. stands out as a socially and environmentally responsible enterprise, effectively transforming plastic waste into a valuable construction material. The enterprise's commitment to reducing plastic waste, collaborative partnerships, and innovative product characteristics position it as a model for waste management and sustainable construction practices, with the potential for replication in other regions facing similar challenges.

6. Conclusion and Remarks

In summary, these case studies depicted that the transformative power of social enterprises in addressing critical environmental and social challenges across various domains. Sanshodhan's E-Waste Management initiative in Hyderabad exemplifies the potential of technology-driven solutions to streamline waste disposal and foster collaboration between private entities and government agencies, highlighting the importance of

digital platforms in achieving responsible waste management. Conserve India's upcycling initiative not only showcases sustainable environmental practices but also serves as a model for socially responsible entrepreneurship, integrating business innovation with social welfare and community development. MATR's "Happy Hands Project" at the Mahabodhi Temple successfully tackles floral waste while empowering local communities, demonstrating the impact of strategic partnerships and a comprehensive approach to sustainable development. Chanu Associates, with its eco-friendly products, represents a socially and environmentally conscious business model, contributing to plastic pollution reduction and local economic development. Lastly, Zerund Bricks Manufacturing Pvt. Ltd. emerges as a promising solution to plastic waste management, demonstrating the potential for innovative approaches, collaboration with local bodies, and the creation of eco-friendly building materials to address pressing environmental challenges.

These diverse initiatives collectively emphasize the importance of creativity, collaboration, and a holistic approach to tackling environmental and social issues. As these enterprises continue to evolve and expand, they serve as inspiring examples of how businesses can play a pivotal role in creating a more sustainable, inclusive, and environmentally friendly future.

7. Suggestions

7.1. Identification and Promotion of Innovative Solutions

A critical aspect of the research could involve identifying and promoting innovative social entrepreneurial solutions for garbage disposal in India. Investigate successful case studies where social entrepreneurs have introduced unique methods or technologies to address waste management challenges. Analyze the impact, scalability, and replicability of these solutions, shedding light on how such initiatives contribute to sustainable and environmentally friendly garbage disposal practices.

7.2. Community Engagement and Behavioral Change

Explore the role of social entrepreneurs in fostering community engagement and promoting behavioral change regarding garbage disposal. Investigate initiatives that not only manage waste but also involve communities in the process. Assess the effectiveness of awareness campaigns, educational programs, and community-driven initiatives implemented by social entrepreneurs to encourage responsible waste disposal practices.

7.3. Government and NGO Collaborations

Examine the collaborative efforts between social entrepreneurs, government bodies, and non-governmental organizations (NGOs) in tackling environmental issues related to garbage disposal. Investigate successful partnerships and policy interventions that facilitate and support social entrepreneurial initiatives. Evaluate how these collaborations contribute to creating a more robust waste management ecosystem.

7.4. Technology Adoption and Integration

Explore the role of technology in social entrepreneurial approaches to garbage disposal. Investigate how innovations such as IoT, mobile applications, or data analytics are being leveraged by social entrepreneurs to optimize waste collection, recycling, and disposal processes. Evaluate the impact of technology adoption on the efficiency and scalability of these initiatives.

7.5. Inclusive Business Models

Examine the inclusivity of social entrepreneurial models in addressing garbage disposal issues. Investigate how these initiatives create economic opportunities for marginalized communities, such as waste pickers or local artisans. Assess the extent to which social entrepreneurs incorporate inclusive business models that prioritize both environmental sustainability and social equity. A business model to manage India's garbage disposal problem necessitates a thorough examination of multiple methodologies and frameworks. A comprehensive approach to waste management begins with a detailed analysis of the current waste management landscape, taking into account aspects such as trash-generating trends, existing infrastructure, and disposal procedures. This insight is critical for creating successful solutions that meet the unique needs of various locations. Identifying and engaging with key stakeholders, such as government agencies, local

municipalities, waste management firms, environmental organizations, and the community, is necessary for assessing stakeholder dynamics. To maintain compliance and uncover chances for innovation within the legal framework, an in-depth analysis of the regulatory environment is required.

The use of novel waste treatment technology is critical to increasing efficiency and environmental sustainability. The adoption of smart waste management systems, waste-to-energy technology, and improved recycling methods could all fall under this category. Furthermore, investigating circular economy ideas is critical, emphasizing the need to treat waste as a valuable resource rather than a burden. This includes recycling, upcycling, and reusing products to reduce environmental impact and encourage sustainable behaviours.

An effective waste management business strategy includes community participation and awareness campaigns. Education about correct trash disposal techniques, waste segregation, and encouraging responsible consumer behaviour all contribute to long-term behavioural change. Financial viability, scalability, and replicability are essential concerns for the suggested business model's long-term success. To ensure economic feasibility, a thorough study of revenue streams, cost structures, and prospective funding sources, including public-private partnerships and incentives, is required.

The incorporation of data analytics and monitoring technologies improves the efficacy of waste management operations. This technology-driven strategy enables real-time waste collection tracking, route optimization, and informed decision-making. Furthermore, a major emphasis on the social and environmental impact of the business strategy is critical. The purpose is to positively contribute to broader sustainability goals such as lowering pollution, saving resources, and increasing the community's overall quality of life.

Collaboration with government agencies, non-governmental organizations, and strategic alliances is essential for successful implementation. Collaboration with these organizations can provide access to resources, regulatory support, and a greater community reach. Collaborations with technology providers, research institutes, and other stakeholders to harness expertise and create a more comprehensive and adaptable waste management system are examples of strategic partnerships. Finally, a comprehensive and collaborative strategy assures that the business model is not only effective in tackling India's garbage disposal issue, but also long-term and flexible across varied locations.

7.6. Policy Advocacy and Impact Assessment

Investigate the role of social entrepreneurs in advocating for policy changes related to the garbage disposal. Analyze how these entrepreneurs engage with policymakers to influence regulations and foster a more supportive environment for sustainable waste management practices. Additionally, assesses the measurable impact of social entrepreneurial initiatives on reducing environmental degradation and improving overall waste management.

7.7. Replicability and Scalability

Evaluate the replicability and scalability of successful social entrepreneurial models in garbage disposal. Explore the factors that contribute to the successful expansion of these initiatives to different regions or cities in India. Investigate challenges faced and strategies employed by social entrepreneurs to overcome barriers and make their models adaptable to diverse contexts.

7.8. Public-Private Partnerships

Examine the potential and challenges of public-private partnerships in the realm of garbage disposal. Investigate cases where social entrepreneurs collaborate with both public and private entities to achieve a collective impact. Evaluate the effectiveness of these partnerships in enhancing infrastructure, resource mobilization, and overall waste management efficiency.

By delving into these aspects, your research on a social entrepreneurial approach to tackling environmental issues in India, with a focus on garbage disposal, can provide valuable insights into effective strategies, challenges, and opportunities for creating a sustainable and socially responsible waste management ecosystem in the country.

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