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Is India Ready to Adopt Sweden's Waste Management System

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Abstract

The authors of this paper were inspired by the announcement of the India-Sweden partnership in the virtual joint summit 2021. Sweden has received worldwide recognition for its Waste Management System (WMS), and the successful implementation of public-private partnership is the essence of its success. The study carefully analyses the Indian Waste Management System (WMS). The authors aim is to know whether a public-private partnership for waste management will be effective in a country like India, which is 7 times larger than Sweden.

It is observed that policy drivers & citizen engagement play a crucial role in the successful execution of a system. This paper also studies the willingness of the residents of India to work in harmony with the government in reforming the WMS. The authors have conducted a primary survey to know the opinions and beliefs of the respondents on the privatisation of WMS, organizational holdings, and the role of government. The authors have highlighted recommendations, potential opportunities and obstacles based on the results of the survey and secondary research.

Key Words: Waste Management System, India, Sweden, Privatization, India-Sweden partnership.

1.0 Introduction

Each human activity results in the production of certain useful products as well as certain unwanted products. These unwanted products are discarded, and then termed as ‘waste’. In simpler words, ‘waste’ is any material that is not useful anymore and does not hold any economic value. A need for a proper waste management system arises whenever the generated waste exceeds the controllable limit. However, if you manage waste properly, it can provide space for creativity. This management of waste is a long process and includes the collection, transport, processing, recycling, and monitoring of waste materials. Digging into the history of waste management in India, it becomes evident that the techniques used previously were successful enough to recycle and manage household waste.

Waste management in India falls under the supervision of the Union Ministry of Environment, Forests, and Climate Change (MoEF&CC). There are 8 types of waste, each of which has its own management rules. In 2016, the ministry released the Solid Waste Management (SWM) rules, which replaced the Municipal Solid Waste Rules, 2000, which had been in place for 16 years. (*Civilsdaily, 2017)* This national policy is important because it acknowledged and incorporated the informal sector, i.e. waste pickers, for the very first time.
Sweden started its recycling revolution in the mid-20th century. The implementation took place over time, intending to form a cohesive national recycling policy. By converting waste into energy, Sweden has reduced its carbon dioxide emissions by 2.2 million tonnes a year. Between 1990-2006, carbon dioxide emissions went down by 34%, and greenhouse gas emissions fell by 76% by 2020, compared to 1990. *(Chan Kim & Mauborgne, 2018)*

Swedish municipal waste management companies are trusted with a public service mission to organize and collect waste from households for a reasonable fee and offer competitive waste management services. To fulfil their goals, they developed processing activities that transform waste into potential products. *(Corvellec et al., 2011, p. 514)* These waste management companies act as pillars for the Sweden waste management system. Marketing of the processed material also plays a crucial role, for the material to be sold and have an economic value.

India stresses sustainable living and harmony in the development of smart cities, e-mobility, etc. So, maintaining waste without hindering development continues to be India's primary concern. The focus of this paper is the India-Sweden partnership regarding waste management, along with the readiness of the Indian society to adopt the Swedish waste management system.

2.0 The Indian waste management system

Ancient India was successful in managing waste with proper disposal and did so without polluting the environment. There is no doubt that increasing population and urbanization are some of the major reasons for the unmanageable amount of waste. Development projects such as Digital India, Smart Cities, etc. have made proper management of waste very important for a sustainable and eco-friendly environment.

Very few researchers have explored waste management in detail. India, therefore, has no time-series data or panel data on solid or liquid waste, making it difficult to examine the economy of waste management. Therefore, it has become problematic for private entities to enter the market without prior assessment of prospects. The relationship between the cost and benefits of waste management policies has become perplexing to understand. (Singh Bisht & Priya Ranjan, 2017)

2.1 Methods of waste disposal and management in India

a. Landfill

In 2019, Madhya Pradesh had the highest number of landfills in India. Maharashtra, Karnataka and Rajasthan also have an abundance of landfills. 91.4% of waste goes to landfills in India. (Statista, 2021)

b. Composting

In the year 2019, Kerala was having the highest number of composting plants that are 700. Other than Kerala states like Tamil Nadu, Chhattisgarh and Maharashtra were identified with abundant composting plants. 2.2% of total waste gets composted in India (Statista, 2021)

c. Dumping

According to the report of the planning commission in 2014, 80% of the waste generated in India is disposed of in the dumping yard, without any segregation, leading to many diseases. The waste flows to the river surfaces and railway tracks in rainy seasons, leading to viruses. (Singh, 2020)

d. Recycling

In India, segregation and recycling are handled by informal sector workers, starting from the rag pickers who segregate plastic, to the dealers who finally sell the plastic to various industries for final processing. Around 60% of the plastic waste gets recycled in India according to many estimates. (Staff, 2019)

e. Incineration

Incineration involves the combustion of waste, converting it into carbon dioxide, water, steam, ash, etc. Nevertheless, all wastes are not combustible. Yet, incineration can reduce the waste volume by 80-90%. (Waste Incineration - an Overview | ScienceDirect Topics, 2013)

2.2 Waste characterization

Waste characterization is a process that helps to differentiate among different types of waste to decide their treatment methods. It is a manual process carried out in waste management plants. Every 1 tonne of garbage is divided into 4 categories, which are further subdivided into smaller groups.

Today, high-income groups use more packaged products, resulting in higher volumes of plastics, paper, glass, metals, and textiles. Changes in the composition of waste may have a significant impact on waste management practices. (Kumar et al., 2017, p. 160764) The 8 types of waste include municipal waste, plastic waste, E-waste, Biomedical waste, Construction and Demolition (C&D) Waste, Hazardous Waste, Battery waste, and radioactive waste. Biodegradable Waste accounts for 70-50 per cent of waste generated in the cities. Non- Biodegradable waste lies between 40-20 per cent, while Inert waste has a percentage band of 20-25 per cent. (csestore, 2019)

2.3 Waste generation and population

India is experiencing rapid urbanization, due to its physical, climatic, geographical, ecological, social, cultural, and linguistic diversity. The growing population in India is a major contributor to the unmanageable waste situation in the country. (Kumar et al., 2017, p. 160764) Each day out of 100 per cent, only 80 per cent of solid waste gets collected, of which only 30 per cent gets treated.

The waste produced in urban areas of India is approximately 170 000 tonnes per day, equivalent to about 62 million tonnes per year, and this is expected to increase by 5% per year owing to increases in population and changing lifestyles. (Kumar et al., 2017, p. 160764)

3.0 Swedish Model of waste management

In Sweden, municipalities and their companies work in cooperation with private companies for waste management. They are in a public-private relationship and constantly working on new legislation and contracts and assess them for maximum efficiency. The responsibility for proper execution lies with the municipality. Sweden is leading the world in sustainable waste management.

In Sweden, private businesses profit from sorting, reusing, or recycling waste, or by converting it into electricity and heat. The competition in this area has increased to such an extent that some users import waste from other countries to increase their profit margins. (Bolton,PHD & Rousta,PHD, 2019)

3.1 Policy drivers of the Swedish model

1. **Extended Producer Responsibility (EPR)-** The responsibility of the product to be environmental-friendly lies with the producer. It is a governmental policy and a Swedish law that aims at better waste management and collection. (Smart City Sweden, 2020)

    a. Waste packaging and newspapers were the first product groups to be covered under EPR, to create incentives while reducing the impact on the environment, and to relieve the municipalities of the costs involved in the collection and treatment of the waste. (Smart City Sweden, 2020)
    b. A separate collection of glass was introduced to improve the health and safety of waste collectors, who were at risk of harming themselves through pieces of glass through the bag. Special bins for glass were implemented and placed outside shops and parking lots. (Smart City Sweden, 2020)
    c. A separate collection of electronic waste and organized manual disassembling was implemented. The recycling industry began to gain interest in the economic value of electronic waste and started industrial-scale recycling, while the municipalities sent the electrical waste to them. (Smart City Sweden, 2020)

2. **Deposit system**

It is a scheme in which the consumer pays a small amount as a deposit and gets a refund upon return. In Sweden, PET-Bottles & aluminium can come under this scheme. More than 80% of this material gets recycled. The recycled aluminium saves 95% energy involved to make it from scratch. For example, the beer importers and distributors recirculate materials, which means that those industries have consistent access to recycled material and use it for drinks containers. For retailers, the scheme works as a customer traffic builder contributing to a reduced volume of waste. (Zero Waste Scotland, 2019)

3. Taxes on landfilling and incineration

The Swedish landfill tax was first introduced in 2000 to decrease the economic attractiveness of landfilling and encouraging more environmentally acceptable treatment methods, such as material recycling or energy recovery. An economic incentive is given to other treatment options like incineration, composting, etc., which showed positive changes. (Miliute-Plepiene & Plepys, 2009)

4. Consensus seeking

Cooperation between industry and authorities in terms of negotiation to introduce environmental and other regulations is an important characteristic of Swedish policymaking. A consensus between the two can provide more realistic solutions at a lower cost for all users involved. (Miliute-Plepiene & Plepys, 2009)

The Government of Sweden has adopted a national strategy for a circular economy. A Circular Economy, also known as Waste Hierarchy, is based on the idea that reduced environmental impact and new business opportunities can be achieved through more efficient and more short-lived material cycles.

4.0 Implications of the India-Sweden partnership

India aims to deepen its relationship with Sweden in innovation, technology, investments, and research. Sectors such as smart-cities, waste management, circular economy, etc. are areas where there lies the most potential for success.

What happens after the partnership? Looking at the Swedish system of waste management, there is a high probability that waste management will be privatized in India.

5.0 Privatisation of waste management in India

Rapid urbanization needs advanced models, systems, and techniques to tackle the problems like urban solid waste management. Local governments and municipalities are suffering from low funding for urban waste management, which is where privatization could help. Managers of the private sector will have better control over their working population compared to bureaucratic services. Also, due to fewer restrictions, the private sector can provide more effective and cost-efficient services. (Ohri & Singh, 2009, pp. 1–3).

Having a strong need for privatization of waste management, the risks of privatization also should be considered. Private sector handling may lack in giving transparency to the people, commercial failure which might affect the other public services. (Agarwal et al., 2015, p. 120)

5.1 Factors that influence the privatization of waste management in India

a. Infrastructure

In the present scenario, the local government is assigned the responsibility of providing adequate infrastructure for waste management. But, in a privatized system, a particular agency will be assigned with the task of providing the infrastructure, while also managing the progress and the cost-effectiveness. However, the contractor can have some other motives as well. (Rogoff et al., 2015)

b. Uncertainty

Uncertainty involves the behaviour of the contactor, market developments, and asymmetric information. (Rosana, 2013)

c. Contextual issues

In the context of developing countries, any kind of new policy implementation needs strategic planning. Likewise, privatization waste management also needs strategic planning. Another aspect or factor to be addressed are contextual issues like finance, economies of scale, cost recovery, efficiency aspect of the system, etc. (Cointreau-Levine, 1994, pp. 1–3)

d. Ability to respond

The government usually responds lately to any kind of changes. For instance, if capital investment is needed for any kind of adoption of new technology then the private sector can provide it with private capital. But in government cases, it should be from the public capital which needs proper budgeting, planning, and other political processes. Through privatization, this political process can be avoided. (Rogoff et al., 2015)

5.2 Pros and Cons of public-private partnership on waste management in India

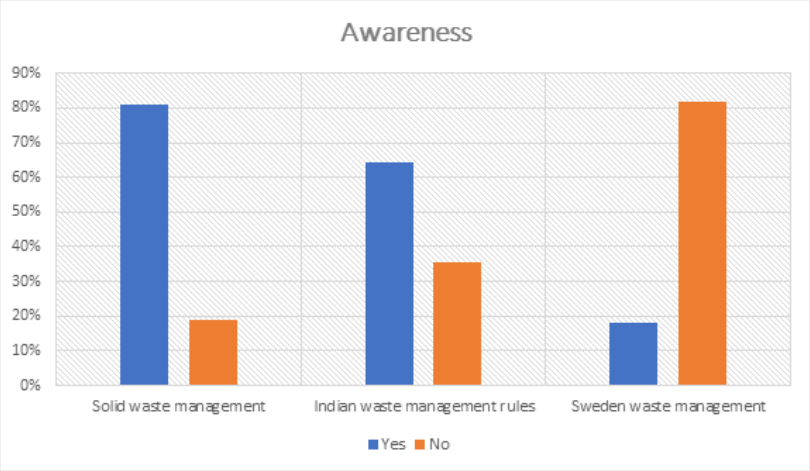
Pros	Cons
1) Local companies will strive to secure a contract from the government to upgrade their work culture. Companies will maintain efficiency and results to secure long-term contracts. 2) Through privatization, the country will have the opportunities to enhance its income inflow. Streamlining the waste management through privatization adds to the economies of scale for the system. (Rogoff et al., 2015). 3) Privatization can be used as a tool to reduce the debt burden. In the 1980s many cities funded the solid waste management system to adopt new technologies which reduced the waste that was going to landfills. But this had led to the enormous level of debt payments. This situation can be eased by involving the private sector in solid waste management. (Segal & Moore, 2000, p. 15) 4) Regular financing is required in the field of public sector projects such as solid waste management to meet the updating demands of the infrastructure and other technologies. The public sector failed to meet this demand because of its incapability to finance regularly. Private entities can finance any kind of project through their capital investments. (Martin, 2001, pp. 1–3)	1) India struggles in having structured infrastructure to adopt the Sweden model of waste management. There are many reasons for this such as large population, policy implementation, corruption, lack of awareness among the people, etc. 2) Companies might appoint low-cost labour. Labourers employed under privatized waste management systems should be entitled to the minimum wages and prescriptions about assigned jobs should be provided to prevent labour exploitation (Ohri & Singh, 2009, pp. 1–3). 3) Profit entities may follow some unethical practices to reach their profit objectives. This lack of transparency might lead to conflicts among the company and the general public. 4) Many researchers have found that competition created among private entities diminishes as they get into the favour of political parties. Political parties merge with entities to take competitive advantages. (Anderson, 2011)

5) Participation of the private sector in waste management plays an important role in the regulation of the natural environment. Involvement of the private sector in treatment and disposal projects like waste management can lead to the adoption of advanced techniques in landfilling, recycling, and waste to energy models through their capital investments. (*Municipal Solid Waste (MSW) PPPs | Public-Private Partnership*, 2021)	5) Foreign private companies are inclined towards profit. They work in such a way that it fetches profit for their parent country. This may hamper the interest of the host country, which is India in our context.

6.0 Is the majority ready to adopt the privatized system of waste management?

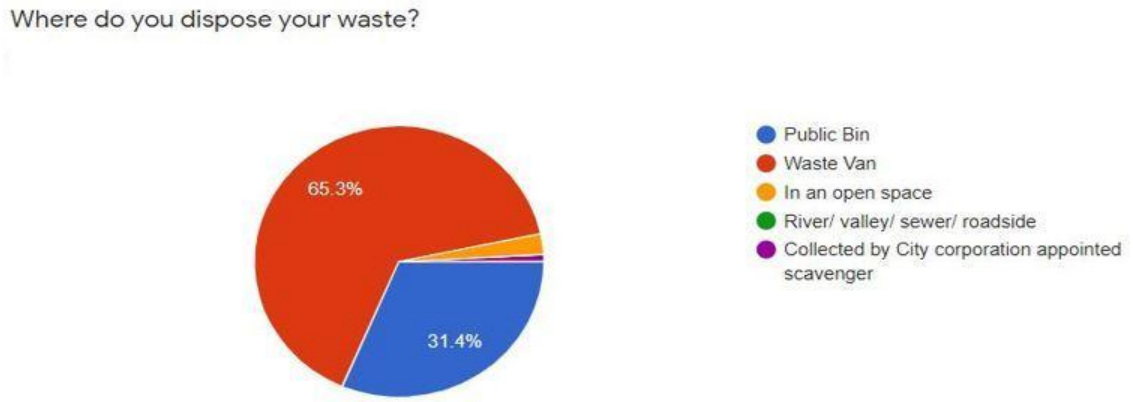
A short survey on waste management was conducted to find out if the residents of India were comfortable in adopting Sweden's system of waste management. A total of **121** participants took part in the survey. The respondents were taken from various cities of India, some of them being Jammu, Bihar, Goa, Mumbai, Mangalore, Delhi, Vasco to get more accurate results. Most of our respondents were from the age group of 18-25. Below are the results which were generated.

a. Awareness



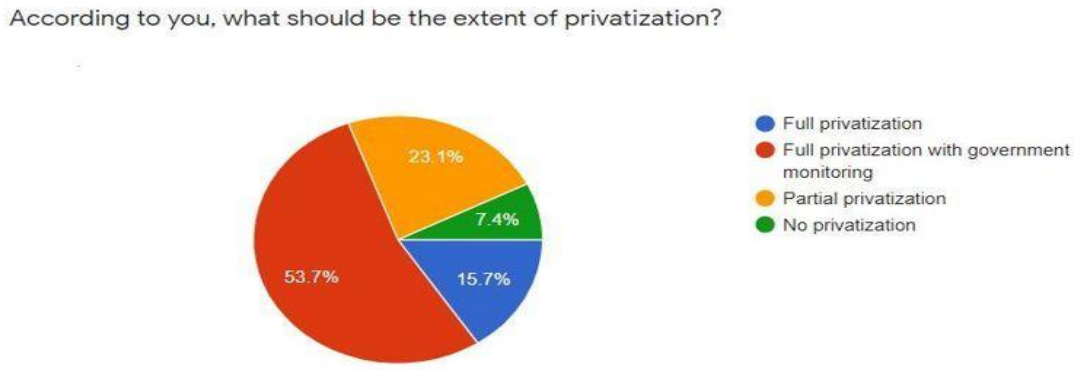
81%, **64.5%** and **18.2%** of the respondents were aware of Solid waste management, Indian waste management, and Swedish waste management respectively. When asked, **88%** of the respondents wanted regular updates on the prevalent waste management system in their cities.

b. Waste disposal



65.3% of the participants make use of a waste van, which could be due to the success of the Swachh Bharat Abhiyan. **31.4%** of the respondents dispose of the waste in public bins **0.8%** and **2.5%** of the respondents make use of a scavenger and an open space respectively. **39.7%** of people use plastic bags as a mode of disposal, **46.3%** of them directly empty their bin, and the remaining **7.4%** use a more environmentally-friendly option such as the use of paper-bags etc.

c. **Privatization**



As the above pie-chart shows, **92.6%** of the participants preferred some form of privatisation of waste management. When asked if they would trust privatisation with a local Indian company or a foreign company, **61.2%** of respondents wanted local companies but with uncertainty, highlighting the lack of belief of the general public in their home organizations. Some respondents were sceptical of the political agendas of Indian companies, while others doubted their management. **90.2%** of the respondents agreed that if implemented properly, privatisation of waste management will be fruitful for India. **65.3%** of them wanted the government's participation, to make sure that the implementations reach rural areas as well.

7.0 Recommendations

These recommendations have been compiled after taking into account both primary and secondary research.

a. Indian companies need to enhance their skills and management techniques to build trust among the people. This will benefit their revolutionary journey.
b. Before the implementation, familiarising people with the Sweden management system can be done through adequate marketing techniques. This includes reaching out to the people through media channels, newspapers etc. to inform them about the system.
c. Government should have an upper hand even after privatization. It should maintain strict legislation to avoid any slacks and to ensure a wider reach. If the government has a monitoring mechanism, people will trust the system more.
d. All rag-pickers should be provided minimum wage. This will prevent the exploitation of labour due to low wage rates, delayed payments etc.
e. Sweden's policy of producer responsibility should be adopted to make a coherent impact.
f. The private entity should give regular updates to increase transparency.

8.0 Conclusion

India does not have a proper regulatory system for waste management, unlike Sweden, structuring waste management systems is the biggest hurdle in India. Hence, this paper studies the waste management systems and policies of both countries to understand the present situation accurately.

The potential India-Sweden partnership hints towards privatisation of waste management in India. However, before introducing Sweden's waste management system in India, several aspects need to be analysed, such as the already existing infrastructure to accommodate the new model, deficiencies in transparency, the population level, etc. On the other hand, this paper also discusses the benefits of adopting the new system, such as a boost to the economy and fulfilled capital requirements. Residents of India are the final beneficiaries of this new system, making their beliefs and opinions crucial to our research. Most of the respondents preferred some form of privatisation of waste management. Therefore, if India rectifies some of its weak points, then privatisation with collaboration would be extremely fruitful.

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