Indian Pollution Control Association (IPCA)


# NEWS LETTER

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## Solid Waste Management: Challenges and Issues in India

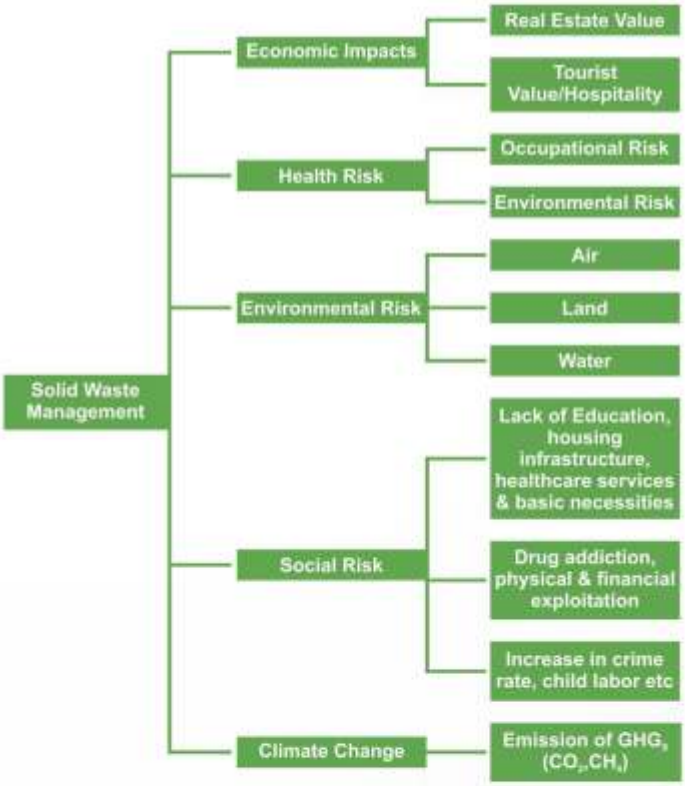
### Introduction

Solid Waste Management (SWM) has emerged as a critical problem for developing countries such as India. There has been a progressive per capita waste increase in waste generation by 1.3% per annum, the yearly increase in waste generation is around 5% annually. The government is under constant pressure to efficiently handle the ever growing amounts of solid waste and make cost effective changes. Added to constrained budget allotments in the solid waste sector, poor administrative management practices have been a focus of increasing concern in most of the developing countries (ERM, 2004).

Rapid resource use and improper waste disposal has further worsened the situation and has affected the life of the present and future generations. SWM in most cities of developing countries is highly unsatisfactory. SWM has been identified as one of the serious, complex and challenging problem in developing countries a strategic way of addressing environmental and social concerns (Furedy 1997).

Improper SWM has resulted in many kinds of issues and challenges in India. There are many risks associated with poor solid waste management in India . These risks are

I. Economic Risks
ii. Health Risks
iii. Environmental Risks
iv. Social Risks
v. Climate Change Risk




### Economic Impact:

The current solid waste management practices especially collecting, processing and disposing are considered to be inefficient in the developing countries. The typical problems are low collection coverage and irregular collection services, crude open dumping and burning, breeding of flies and the handling and control of informal waste picking or scavenging

Waste Management influencing the GDP!

Waste management is one major area in urban environment which has a major impact on urban livelihoods and people's health with disastrous consequences as exemplified by the rise of Malaria which is responsible for the loss of about 1% Gross Domestic Product (GDP) in Africa.
(Source : Obirih-opareh, 2002)

*"The greatest threat to our planet is the belief that someone else will save it."*

activities (Bartone, 1995). The economy of the country is directly affected by the inefficient handling of the solid waste. There are many associated sectors influenced by the state of solid waste management in a country. It results in increase in transportation cost, health cost, decline in crop production etc.

India's per capita Solid Waste generation rates keep pace with the economic growth rate and the growth rate of the urban population of the country. In India the municipal expenditure on core services per capita expenditure on solid waste & sewerage averaged to only 21.5% of the total budget allocated (Goel, 2008). ULBs in India spend only 5-25% of their total budget on SWM. Inefficient waste management can further increase this cost in a country.
Increase in Municipal Solid Waste gives significant impacts in terms of land required for disposing the waste if solid waste is not properly handled.

Area of Land Occupied/Required for unsanitary disposal of MSW generated in India:

| Years | Area Of Land Occupied/Required For MSW Disposal (Sq.Km) | City Equivalents |
|---|---|---|
| 1947 - 2001 | 240 | 50% Of Mumbai |
| 1947 - 2011 | 380 | 90% Of Chennai |
| 1947 - 2021 | 590 | Hyderabad |
| 2009 - 2047 | 1400 | Hyderabad + Mumbai + Chennai |

(Source: TERI; 1998, 'SOLID WASTE MANAGEMENT IN INDIA: OPTIONS AND OPPORTUNITIES')

Some of the sectors being directly affected by state of SWM in are hospitality and real estate industry

**Tourist /Hospitality industry**

The uncontrolled and un-scientific dumping of MSW has brought about a rising number of incidents of hazards to human health; contamination of both surface and ground water which is in turn posses a serious human health risk. The indiscriminate dumping of MSW in water bodies sources and low lying areas without consideration of its effect on the environment is a common practice in many cities of the developing countries (Medina, 2010; Zurbrugg, 2003; Da Zhu et al., 2008).

State of solid waste management in tourist places
Kolkatta and Delhi city

Improper waste management can cause environmental degradation and loss of aesthetic appeal, through litter on beaches and streets, and illegal dumping and burning of garbage. Other potential negative impacts of tourism include: loss of

*"Every ton of mixed paper recycled can save the energy equivalent of 185 gallons of gasoline."*

agriculture land, clearing of mangroves, damage to coral reefs, resource conflicts over land and water use, higher land prices, overcrowding, and conflict with local communities (Tribe et al. 2000; Manuaba 1995).

According to Economic Survey India's tourism growth which was 10.2% in terms of Foreign Tourist Arrival (FTA) and 9.7% in terms of Foreign Exchange Earnings(FEE) in 2014 decelerated to 4.5% in terms of FTAs and fell by 2.8% in terms of FEEs in 2015. There has been considerable decline in high spending tourists originating from European countries like France, Germany and UK.

Due to improper waste management the beaches of Goa which were once frequently visited by the foreign tourist has gradually started losing its charm as a foreign tourist destination. These lacunas in waste management practices coupled with the poor state of sanitation can influence the tourism & hospitability industry of any developing country like India which contributes 6.23 percent to the National Gross Domestic Product and 8.78 percent of the total employment in the country.

The Indian tourism and hospitality industry has materialized as one of the key drivers of growth among the services sectors in India. In 2013 this industry catered to 2.3 per cent to the country's GDP. Increase of waste and inefficient waste management has resulted in decline in tourism in many places.

**Foreign Direct Investment**

To achieve an enduring high trajectory of economic growth, a country needs bigger inflows of foreign investments. The Foreign Direct Investment is also very much influenced by the state of waste management and sanitation in a country as in the case of Singapore a cleanliness drive from 1977 to 1987 to attracted more FDI transformed Singapore from Developing to Developed country. The same can be applicative for developing countries like India.

**Real state value**

One of the important economic impacts created by the solid waste is the impact on residential property values. Residential property values are affected by factors like good road network, infrastructure facilities (water, electricity, drainage, etc) accessibility (in terms of traffic flow) and demand, location and distance. Apart from this, residential property values are affected by the generation and management of solid waste (Ogedengbe et al 2006). The social impacts created by MSW include the unpleasant odour when garbage is left uncollected and the unpleasant odour due to landfill site, the dirty surroundings, breeding of mosquito, worms, insects &flies due to the landfill site, uncollected garbage and the release of smoke and poisonous gases giving rise to health safety problems. All these factors affect the ambience and surrounding of a particular area hence affecting the property value.

**Revenue generation from recycling industry**

India's higher economic growth has resulted in increased consumption of the natural

*"The only thing you can not recycle is wasted time."*

resources and increased generation of waste that contributes to ecological degradation, which is estimated at around 5% of India's Gross Domestic Product (Planning commission).

Some of the key areas of waste generation are liquid waste, industrial waste including hazardous wastes, municipal wastes and e-waste. Currently in India 62million tons of waste is generated annually, out of which 5.6million tons is plastic waste, 0.17 million tons is biomedical waste, 7.9 million tons is hazardous waste and 15 lakhs ton in e-waste. 43 million tons per annum is collected, 11.9 million is treated and 31 million is dumped in landfill sites, which means that only about 75-80% of the municipal waste gets collected and only 22-28% of this waste is processed and treated. "Waste generation will increase from 62 million tons to 165 million tons in 2030".

The opportunity and market potential for waste management & recycling in India is very high but can only be achieved through an organized recycling industry driven by proper policy guidance of management of solid waste from the Government.

Recycling of materials is and has been a prevalent and constant activity in India but has been largely confined to the unorganized sector without significant external support to improve and mainstream recycling.

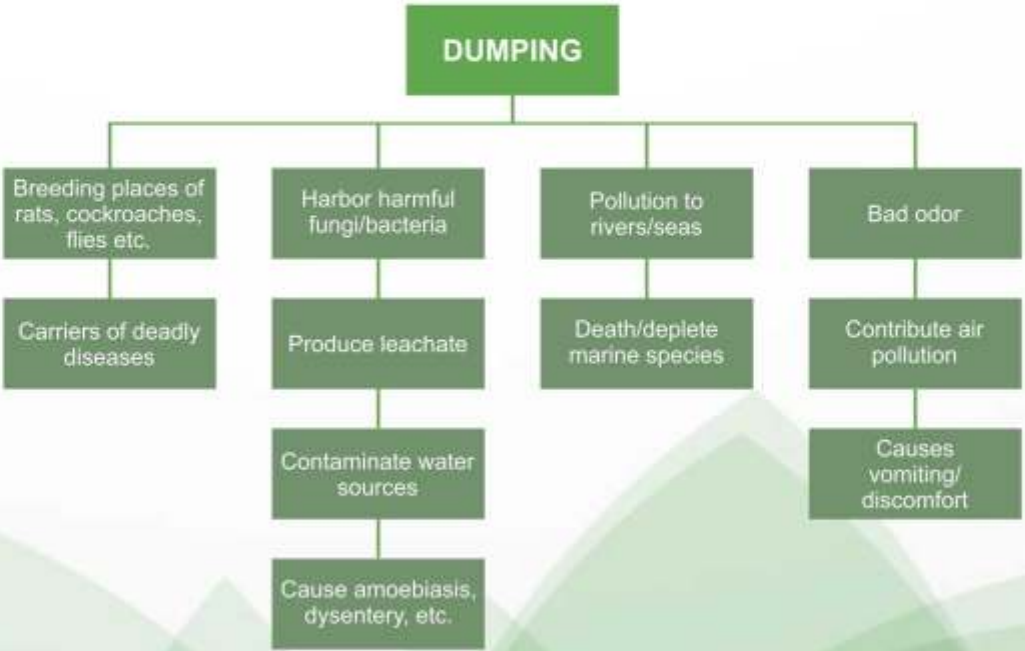
**Impact of Solid Waste on Health, Animals and Aquatics life:**

There are potential risks to environment and health from improper handling of solid wastes.

The health risks due to poor solid waste management can be both direct as well as indirect.

The health risks from waste are caused by many factors, which include the nature of waste, its components, nature of decomposed waste, handling of waste, processing and disposal of waste.

*"We can help educate our families and communities about the importance of recycling for our environment, and how each of us can make a difference for a better world by recycling."*
*--Robert Alan Silverstein*



*Did You Know ?*

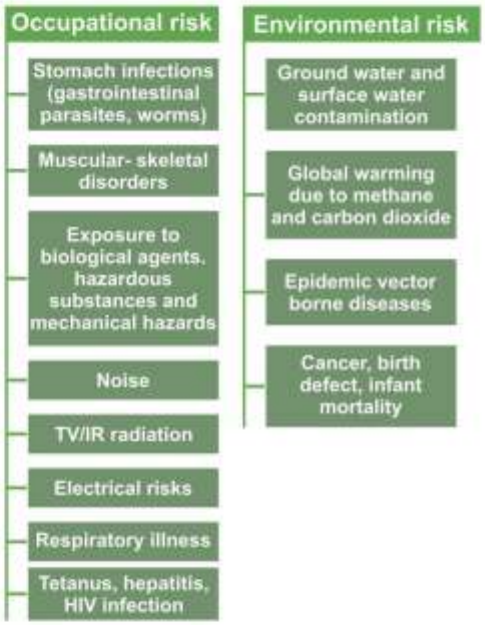
*· The Intergovernmental Panel on Climate Change (IPCC) estimates that land filling of solid waste is responsible for 2 per cent of global GHGs emissions, and is the third leading source of anthropogenic methane emissions (after fossil fuels and livestock).*

*· Copenhagen recycles most of the waste it generates and lets only 3 per cent go to the landfill.*

## Impact of Heath

**Direct risks/**
**Occupational Risk:**
The waste collectors who are directly in contact with the waste-domestic, industrial, hospital are prone to direct risks.

**Indirect risks/**
**Environmental Risk:**
For the general public/residents, the main risks to health are indirect and arise from the breeding of disease vectors, primarily flies and rats.

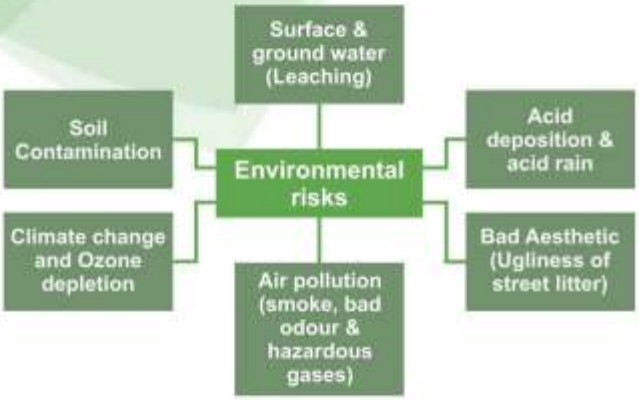



**a) Occupational hazard:** Workers and waste pickers handling solid waste throughout the world are exposed to occupational health and accident risks related to the content of the materials they are handling, emissions from those materials, and the equipment being used. Waste pickers work informally at open dumps, typically living adjacent to the dumpsite in poor housing conditions, with minimal basic infrastructure for clean water and sanitation; and a significant portion of their number are children under 16 years old. Waste sorting and recycling activities are typically conducted manually in micro and small-scale enterprises, with minimal washing and baling equipment and virtually no dust control or worker protection.
Children engaged in rag picking have a faster rate of breathing than adults which may make them more vulnerable to airborne hazards (such as gases given off by burning waste materials). Children have thinner layers of skin than adults which may make them more vulnerable to chemical absorption and burns. Furthermore, the softness of children's bones may mean any skeletal problems resulting from carrying heavy loads are greater than they would be for adults. Studies have revealed that children starting this work at an early age, have a greater potential number of years in the occupation which may put them at an increased level of risk of low level chronic exposure.

Epidemiological studies have shown that a high percentage of workers who handle refuse, and of individuals who live near or on disposal sites, are infected with gastrointestinal parasites, worms and related organisms.

**b) Environmental Risks:** Residents living and working in the vicinity of solid waste processing and disposal facilities also are exposed to environmental health and accident risks. The most obvious environmental damage caused by municipal solid wastes is aesthetic, the ugliness of street litter and degradation of the urban environment and beauty of the city. More serious, however, and often unrecognised, is the transfer of pollution to water,

ground water. Air pollution can be caused from the inefficient burning of wastes, either in open air, or in plants that lack effective treatment facilities from the gaseous effluents.




### Open burning of MSW

Open burning of MSW on streets and at landfills, along with landfill fires emit 22,000 tons of pollutants into the lower atmosphere of Mumbai city, every year. The pollutants identified in Mumbai due to uncontrolled burning of wastes are carbon monoxide (CO), carcinogenic hydro carbons (HC) (includes dioxins and furans), particulate matter (PM), nitrogen oxides (NOx) and sulfur dioxide ($SO_2$).

## Social Impact

SWM is dealt with by informal sector including the underprivileged rag pickers who lead a miserable life with no basic infrastructure, health care, education facilities. The children of this section of the society are deprived of proper basic education and other necessities of life. Due to lack of proper guidance and education these children are exposed to bad habits like drug addiction, stealing, fighting etc. These children have social stigma and are deprived of all basic necessities. They are also vulnerable to physical and financial exploitation. Child labour is rampant in these areas.

Besides the health risks posed by the occupation may be greater for children than for adults. In comparison to adults, children lack judgement, experience and knowledge. They may therefore be at greater risk of occupational hazards and injuries. For instance, children may pick hazardous materials which adults would know to avoid which may be more severe for a child.

Children are more susceptible than adults to the detrimental effects of this work on personality development. Children are less aware of the stigma attached to the work than adults. Furthermore, the lack of choice associated with this work means that the children forgo other opportunities such as formal education.

## Climate change

The disposal and treatment of waste can produce emissions of several Green House Gases (GHGs), which contribute to global climate change. The most significant GHG gas produced from waste is methane. It is released during the breakdown of organic matter in landfills. Other forms of waste disposal also produce GHGs but these are mainly in the form of carbon dioxide (a less powerful GHG). Even the recycling of waste produces some emissions (although these are offset by the reduction in fossil fuels that would be required to obtain new raw materials). Waste prevention and recycling help address global climate change by decreasing the amount of GHG emissions and saving energy (Environmental Protection Agency).

Waste management has at least five types of impacts on climate change, attributed to:
(1) Methane emissions from landfill;
(2) Reduction of the use and emissions due to recycling and reduction of industrial waste of energy;
(3) Energy recovery from waste;
(4) Carbon sequestration in forests due to decreased demand for virgin paper; and
(5) Energy used in the transport of waste over long distances.

IPCC has reported that waste sector is accountable for approximate 5% of the global green house budget with total emission of approximated 1,300 Mt $CO_2$ in the year 2005.

Emissions of methane from the landfilling of biodegradable wastes (mainly paper, food and garden wastes – the latter known collectively as putrescible waste).Emissions of fossil-derived carbon dioxide from the combustion of plastics and some textiles in incinerators, emissions of nitrous oxide during incineration of wastes, emissions of fossil-derived carbon dioxide from the collection, transportation and processing of wastes, from the fuel used in these operations.

Source-segregation of various waste components from MSW, followed by recycling or composting or anaerobic digestion of putrescibles offers the lowest net flux of greenhouse gases under assumed baseline conditions.

MSW dumped in landfills also generates GHGs like Methane, which has 21 times more global warming potential than carbon dioxide. Improper SWM contributes to 6% of India's methane emissions and is the third largest emitter of methane in India. This is much higher than the global average of 3% methane emissions from solid waste. It currently produces 16 million tons of $CO_2$ equivalents per year and this number is expected to rise to 20 million tons of $CO_2$ equivalents by 2020.

## Possible Solutions for Solid Waste

The best way to minimize hazards due to solid waste is to treat waste as wealth and recycle as much as possible. This has been done since Vedic times but now forgotten. We do have some sustainable solutions that can leads to meet our current needs and future generations as well.

## Design and implementation of Integrated waste Management plan:

Integrated Solid Waste Management (ISWM) system based on 5R's (Refuse, Reduce, Reuse, Recycle and Recovery) principle. The integrated waste management plan includes

1. Waste segregation
2. Waste collection
3. Waste handling
4. Waste transport
5. Waste processing: Composting and Recycling
6. Disposal of Compost Rejects and Debris: Landfilling


## IPCA Contribution

IPCA is working on the 5R's principle with the vision of sustainable development of India in a manner that protects environment. With this vision we are endeavouring to integrate and mainstream natural resources and environment management concerns into development activities like education of underprivileged, livelihood security of poor and solid waste management by harmonizing the traditional wisdom with suitable policy measures. Our constant efforts towards environmental risk minimization are:

- We organise workshops and seminars to aware people and children about the problems arising due to solid waste that exists around us and educate and train them regarding the management of their waste in a hygienic and scientific manner.
- We run primary education and health care program for the children of "Rag-pickers".
- We have door-to-door collection system for the domestic waste which is further segregated, reused, recycled and then minimum rejects are disposed off on the landfills

## In This Issue

· The CPCB report also reveals that only 68% of the MSW generated in the country is collected of which, 28% is treated by the municipal authorities. Thus, merely 19% of the total waste generated is currently treated.

· The Government of India had notified the Solid Waste Management Rules, 2016, thereby making it mandatory for all urban local bodies in the country to engage in collection, segregation, secondary storage in covered bins, transportation in covered vehicles, processing through composting or waste-to-energy technologies and disposal of rejects in engineered/sanitary landfills.

### *Conclusion*

*The need of the hour is scientific, sustainable and environment friendly management of waste.*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IPCA
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3-5, DDA Shopping Complex, Hargobind Enclave, Vikas Marg Extn., Delhi-110092
Tel.: 011 - 42207478
e-mail: Info@ipcaworld.co.in | web: Http://www.ipcaworld.co.in