



## Garbage Free Environment Using Waste Management Initiatives With Special Reference to the State of Kerala

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**ABSTRACT** The area of contact and interaction between the abiotic and biotic factors of the nature is the most important factors for any organism to exist. These aspects contribute to form a natural biosphere, and organisms are dependent on it. It is most unfortunate that man by his failure to live in harmony with nature has brought humanity to the brink of this global environmental catastrophe. It is ironical that the natural environment which is to be nourished is being spoilt. This study aims in drawing global issues out to light and tries to throw awareness among the general public in finding ways to go green for protecting the mother earth. Even though it took thousands of years to form into a natural landscape with greens and heavenly fresh air it now takes just a moment for man to pollute the earth. In case of hazardous industries it is submitted that the primary responsibility for safety of the lives and property of the persons should be imposed on the state, because it is the state which permits the industries to function by granting license and environmental clearance. For the sake of survival on earth man is now concerned about environment

**KEYWORDS** Waste management, hazardous waste, Waste management initiatives, Environmental catastrophes.

**INTRODUCTION**

Waste is an unavoidable by-product of most human activity. Economic development and rising living standards have led to increases in the quantity and complexity of generated waste. Solid waste is a mixture of organic and inorganic waste generated by domestic or commercial activities. In case of pollution there cannot be effective remedial and corrective measures to redeem the polluted environment into a pure pollution free economy, but still effective strategies can be taken to combat and precautions can be taken to be on the safer side with a clean green sight. The problems affecting the environment are diverse and approaches to find solutions are connected with the modern or classical methods of bio technology and management. Bio technology and management cuts the facet of environment giving importance to protect her from being polluted. The onslaught on the environment came through increased population pressure leading on to over exploitation of the land, air, water resources which results in destruction of the natural bio wealth and bio diversity. The need of the hour is environment and only environment. Awareness for all the human beings has become a major talk because people must know their individual responsibilities in protecting the nature. Education can play a major role in helping to deal with the solid waste management crisis. Waste management is the collection, transport, processing, recycling or disposal, and monitoring of waste materials. However poor solid waste management is a threat to public health. Management of residential and institutional waste is considered to be the responsibility of local government authorities and it the duty of the public to avoid dumping waste which causes the nature to fade. Municipal Solid Waste is generated from households, offices, hotels, shops, schools and other institutions. The major components are food waste, paper, plastic, rags, metal and glass, although demolition and construction debris is often included in collected waste, as are small quantities of hazardous waste, such as electric light bulbs, batteries, automotive parts and discarded medicines and chemicals. There are degradable and non-degradable wastes. Degradable wastes are mainly organic substances. There are hazardous and non-hazardous wastes. As far Municipal waste is concerned, a major chunk of it emanates from households, hotels, schools, institutions, marriage parties, slaughter houses etc. Further, there are E- wastes as

well.

**OBJECTIVES OF THE STUDY**

- To analyse in detail the strategies followed for Clean Kerala Mission and its highlights.
- To categorize waste according to the source of production and nature of waste.
- To study the health hazards and environmental catastrophes caused by improper waste discharge.
- To suggest better waste management strategies with special emphasis on "waste to wealth concept".

**NEED FOR THE STUDY**

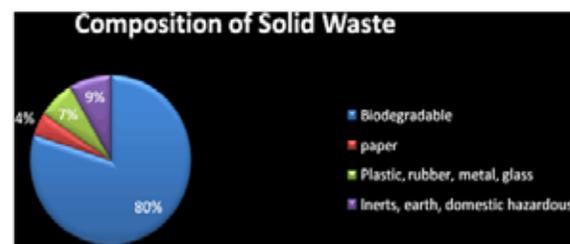
Kerala regionally referred to as Keralam, is a state in the south-west region of India on the Malabar Coast. The state is famous for its cultural heritage and natural resources that forms the backbone of the state's annual income. Despite of several initiatives such as Clean Kerala Mission taken by the state government nothing much has changed as far as Solid Waste Management is concerned. It may also be viewed as these plans are not sufficient to address the issue of Waste Management in Kerala. While media and the general debates and experiments on Waste Management continue, Kerala still stinks from village to village and from city to City. Its rivers, tiny water canals and all other natural beauty, foundation of its growing tourism industry are getting affected as lack of waste management system in the State causing havoc to normal public life.

**CURRENT SCENARIO OF HEALTH HAZARDS CAUSED BY WASTE IN KERALA**

- Resorting to dumping the waste generated is also a serious matter since such insanitary methods of disposal of solid wastes would cause a serious health concerns.
- Part of the waste generated remains unattended and grows in the heaps at poorly maintained collection centres.
- The choice of a disposal site also is more a matter of what is available than what is suitable.
- In several places locals are up in arm against prevalent practice of dumping and landfill
- Contractors who transport garbage to dump in the interior village dumping sites or near forests or water bodies often

face severe resistance from locals and environmental activists

Following tables present a picture of sources and types of solid wastes generated in Municipal localities in a developing country as well as in Kerala:



Household Waste	49%
Hostels, Marriage halls, Institutions	17%
Shops & Markets	16%
Street sweepings	9%
Construction	6%
Slaughter house, Hospitals	3%

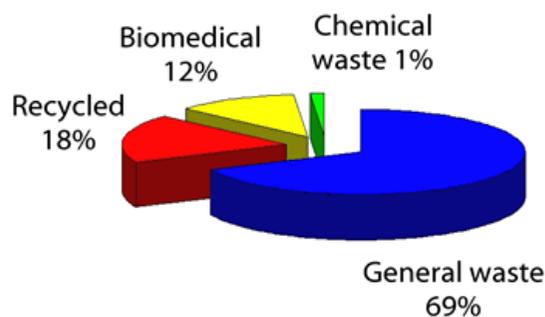
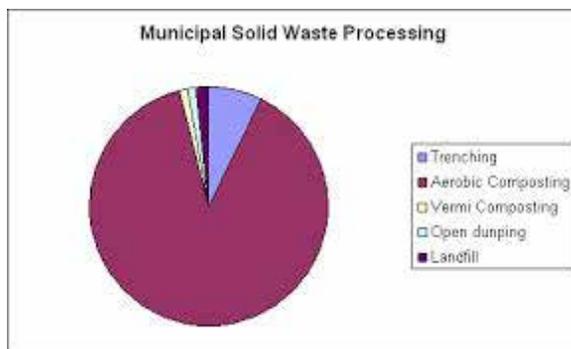
Source	Typical waste generators	Types of solid wastes
Residential	Single and multifamily dwellings	Food wastes, paper, cardboard, plastics, textiles, leather, yard wastes, wood, glass, metals, ashes, special wastes (e.g. bulky items, consumer electronics, white goods, batteries, oil, tires), and household hazardous wastes
Industrial	Light and heavy manufacturing, fabrication, construction sites, power and chemical plants	Housekeeping wastes, packaging, food wastes, construction and demolition materials, hazardous wastes, ashes, special wastes
Commercial	Stores, hotels, restaurants, markets, office buildings, etc.	Paper, cardboard, plastics, wood, food wastes, glass, metals, special wastes, hazardous wastes
Institutional	Schools, hospitals, prisons, government centres	Paper, cardboard, plastics, wood, food wastes, glass, metals, special wastes, hazardous wastes
Construction and demolition	New construction sites, road repair, renovation sites, demolition of buildings	Wood, steel, concrete, dirt, etc
Municipal services	Street cleaning, landscaping, parks, beaches, other recreational areas, water and wastewater treatment plants	Street sweepings, landscape and tree trimmings, general wastes from parks, beaches, and other recreational area, sludge

Process	Waste Types
Heavy and light manufacturing, refineries, chemical plants, power plants, mineral extraction and processing	Industrial process wastes, scrap materials, offspecification products, slag, tailings
Crops, orchards, vineyards, dairies, feedlots, farms	Spoiled food wastes, agricultural wastes, hazardous wastes (e.g. pesticides)

With respect to Kerala, barring few exceptional cases such as Calicut or Thiruvananthapuram corporations and in certain municipal areas, there is a lack of proper Waste Management system in place.

**WASTE MANAGEMENT IN KERALA**

There has been significant importance given to implement the Municipal Solid Waste (Management & Handling) Rule, 2000 which envisages segregated storage of waste at source, collection from source, protected transportation to the treatment facility, establishment environmentally safe treatment system and its operation and maintenance and safe disposal of inert rejects. These studies indicated that 70-80% of the total waste generated is biodegradable in nature and these putrescible waste needs to be managed within 24 hours. 13% of the waste is generated by the five City Corporations, 23% by the 53 Municipalities and the rest by the 999 Gram Panchayats. It is clear that general waste contributes a higher percentage among the other waste materials.



Local Governments	Population 2001	Per capita waste generation (g/day)	Waste generation per day (tonne)	
			2001	2006
5 City Corporations	2456618	400	983	1091
53 Municipalities	5810307	300	1743	1935
999 Grama Panchayats	23574449	200	4715	5312
Total			7441	8338

Jawaharlal Nehru National Urban Renewal Mission (JNNURM), Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT) and Kerala Sustainable Urban Devel-

opment Project (KSUDP) and own fund mobilized by the Local Governments. Efforts are also taken to establish solid waste treatment systems in hotspots of 226 urbanized Grama Panchayats by making use of the funds under Total Sanitation Campaign for the purpose of solid and liquid waste management. Accordingly, six regional ELF are proposed for the 14 districts and a feasibility of establishing one regional engineered landfill facility has been initiated during the current year.

No	Item	Individual ELF for each UBS	Regional ELF
1	Land requirement (Ha)	2316	957
2	Cost of land (Rs. per Ha)	0.40 Crore	0.18 Crore
3	Savings on land cost (Rs)	754 Crore	
4	O&M cost per ton (Rs)	555	388
5	Savings per annum on O&M (Rs)	13 Crore	

### Solid Waste Management: Issues & Challenges

Solid waste management is fast becoming a nightmare for citizens and local authorities in cities across India. Homes, commercial establishments, hospitals, industries and construction sites are estimated to generate a total of 10,000 MT of waste per day in the country. Even as the warning alarm regarding proper management of waste has been sounded across India, the problem seems to be particularly exacerbated in Kerala. Unofficial estimates indicate that Kerala generates 6000 ton of waste every day. However, local issues and sentiments have prevented even the collection of solid waste. The end result is that the stunning Kerala landscape has been converted into a stinking, garbage strewn one.

### Private Participation in Waste Management: need of the Hour

Private sector participation in waste management is the need of the hour since experiments in waste management are not affordable as any failure at any level can be risky. Private sector participation is one of the best choices open to boost the performance of public services like solid waste management. It has following advantages:

- Very less risk of commercial failure and halting of this essential service provision unlike in initiatives managed by co-operatives or community organizations
- Efficiency: Higher level of efficiency and accountability
- Access to technology and expertise
- Focus on customer satisfaction
- Low cost of service because of competition.
- Access to finances for new investments

For the private sector it is an opportunity to take part in a responsible economic activity. By being part of waste management business, private sector is fulfilling its social responsibility, in addition to be part of a sustainable business venture. It is also to be noted that waste management industry is being viewed as an ever green sector. Boom or downturns in the economy, this sector will always have business to do. In ad-

dition, with the right technology, investment and professional management practices, a new avenue for employment generation would also be opened up.

### What Kerala produces

Local governments	Population (in 2001)	Per capita waste generation (g/day)	Waste generation per day (tonne)	
			in %	2006
5 city corporations	2,456,618	400	13	1,091
53 municipalities	5,810,307	300	23	1,935
999 gram panchayats	2,3574,449	200	64	5,312
<b>Total</b>				<b>8,338</b>

### Waste Processing: Technology and potential

According to Planning Commission, there is a potential of 2,700 MW of power generation from urban and industrial waste in the country. As far as Kerala is concerned there is tremendous potential for waste to fertilizer processing projects in conjunction with Municipal Solid Waste management. It is to be noted that a case of collecting and processing biodegradable wastes from chicken shops, meat shops and slaughter houses itself would make a difference since today the prevalent practice is that of throwing these wastes in to rivers or other close by water bodies and sometimes in unused old wells, resulting in ground water contamination. Production of bio fuels from municipal wastes can prove to be a better alternative to the hydrocarbon based petrochemicals. The eventual utilization of biomass as a valuable feed stock for bioethanol production can prove to be a better green strategy to cope up with the increasing fuel needs of the state. An alternative to this waste management strategy is the use of the solid municipal waste as a substrate or compost bed for the commercial scale production of biofertilizers like nitrogen fixers, phosphate solubilizers or plant growth promoting biofertilizers. The method to tackle the problems associated with plastics and plastic based products sounds to be complex in a state like Kerala that welcomes tourists from every part of the world all the year round. A sustainable method is the promotion of use of biodegradable plastic based goods. Proper planning and action for reuse, recycle and compost solid waste can bring potential benefits to humans and society.



### CONCLUSION

Waste management practices in the state of Kerala have to be modified based on the recent advancements in the fields of science and technology. Biotechnology and Management principles has to go hands in hands to find proper remedy to solve any of the concern that is capable of disturbing the state's natural heritage. Scientific and Modernized waste management practises, waste to wealth strategies, proper execution of projects, creating public awareness and commercialization of ecofriendly products has to be done to sustain the states honorary title- Gods own Country.

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