

Waste Management: Developed and Developing Countries

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Abstract: Waste has become a challenge before society as it is being continuously neglected in the field of environment which is getting harmful for the health of living beings as well as the environment in a way that it ends up in surface water contamination, soil pollution because many chemicals like cyanides, mercury etc are highly toxic and exposure can lead to disease or death. Effective waste management strategies are required that involves a synchronised system of controlling the production and disposal of wastes. Most of the waste management techniques like landfills, incineration, sanitary landfills provide a variety of environmental benefits but have negative impacts too like emission of large amount of green house gases. Hence, the major goals involve the reduction of consumption in industrialized cities, increasing the collection and analysis of solid waste data and effectively managing the increasing amount of municipal solid waste. Although, the main objective of the waste management projects are to improve the waste services effectively and to reduce the health hazards caused by inadequate waste collection and disposal systems. This present study is based on the comparison of municipal solid waste management techniques in India and some of the European countries (Germany and Netherlands). The improvisation of laws and involvement of local authorities along with awareness amongst people play a major role in waste management in developed countries. This study also depicts the requirement of advanced techniques and proper laws in developing countries i.e. India and learning of avoidance methods for minimisation of waste along with its utilisation instead of dumping.

Keywords: Environment, waste production, waste minimisation, laws on waste management, health

1. Introduction

Waste has become a challenge before society as it is being continuously neglected in the field of environment which is getting harmful for the health of living beings as well as the environment in a way that it ends up in surface water contamination, soil pollution because many chemicals like cyanides, mercury etc are highly toxic and exposure can lead to disease or death. Waste includes all forms but solid waste is becoming a major health and environment concern in most of the developing countries. Environmental effects like dirty sites and foul odour are becoming a common site in rural and urban areas of developing countries. Epidemiological effects such as transmission of diseases, clogging of sewers, and emission of harmful gases are also creating a major impact on the human health (1, 2). Strategies like incineration, land filling, dumping of wastes are also affecting the air and soil by release of polluting chemicals and accumulation of various heavy metals in the soil. Effective waste management strategies are required that involves a synchronised system of controlling the production and disposal of wastes.

Most of the developed countries are using advanced management techniques like Germany (Enhanced Resolution, Mobile sorting) that are proving to be very helpful in eluding the waste as well as creating a better probability of recycling and reuse. Use of such techniques has allowed increasing the level of recycling to 62% by 2010, and land filling was almost reduced to zero by that time (3). Although, adequate laws are required to run a country waste free as Germany put a ban on land filling MSW by defining requirements to the organic content. Direct land filled (maximum 5% carbon content) or maximum 18% if the waste has been pre-treated. The first initiative was taken in 1993 that followed up in 2001 and 2002 and was fully implemented in 2005 (4). This initiative has made a boon in the development of Mechanical biological treatment plants (MBTs) that redirects the

biodegradable material to fermentation and composting plants for the production of biogas (5).

Likewise, Netherlands works on the principle of 'Lansnik's ladder' (proposed in 1994) that follows the avoidance as well as recovery of valuable components from the waste (6). Under this, more than 35 waste categories were banned by 1995 and landfill tax was introduced that increased the recycling rate from 45% to 50% in the period of 2001 to 2009, eleven years ahead of the deadline. Thermal waste incineration has been followed in Netherlands since 1919 due to its dependency in accommodating variations in composition and calorific value of MSW (7, 8). By 2012, Netherlands established 12 incineration plants that helped 50,000 households in Amsterdam to attain 25% heat requirements from waste incineration (9).

However, developing countries like India have been using aerobic composting (organic compost as fertilizers), anaerobic composting (biogas as fuel or electricity) or refuse derived fuel (secondary fuel for solid fuel industry) to manage their municipal solid waste (10,11). The most common technique considered as composting had nearly 70 plants established in India by 2012, most of them located in Maharashtra. Out of 57 cities that generate municipal solid waste more than 200 TPD, 38 cities have composting plants managing around 4361 TPD of waste (12). 6 refuse derived fuel plants along with sanitary landfills in eight cities have helped a lot to manage the municipal solid waste efficiently. Waste-to-Energy combustion is also being used for breakdown of solid waste thermally and production of electricity or other form of energy. The waste produced in India contains nearly 60% organic content and 10% paper, making the waste 70% renewable as bio-fuel energy. The waste-to-energy combustion decreases the volume of waste by 90%, thus increasing the life of landfills from 20 to 200 years, approximately (13).

India has been facing struggles in the field of data and awareness related to waste, lack of consultants and trained

professionals along with improper finances. Inadequate knowledge of calorific values, composition and quantity of waste is creating an impact on waste management industries. However, progressive steps are being considered in the field of waste management and the government is realising the impact of waste on human health and environment. Introduction of 'landfill project' in Shimla (14) and mega awareness programs are being organised in cities like Aurangabad and Mumbai (15, 16).

European countries are managing the solid waste with the best approach and laws by reducing the solid waste and recovering energy from wastes. The waste composition in India is different from European countries due to climatic and cultural variations leading to a completely different approach to manage the waste i.e. composting. Although, providing better finances, data, and trained consultants will help developing countries like India to create a waste-free nation.

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