

# Chapter 8

## Integrated Waste Management

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### ABSTRACT

*Handling of solid waste has been a serious problem for countries all over the world. Increase in population, change in life standard and life style, industrialization and production of new products contribute to the increase in the amount of solid wastes and consequently the problems generated by them. Developed countries, being aware of the significance of the problems, established regulatory programs, while economically developing countries continued to handle the solid wastes in a very primitive way, such as dumping them into “open dumps.” In these countries recycling activities are mostly carried on by scavengers in a very primitive way. For the protection of the environment and sustainable development, economically developing countries should establish solid waste management policies, plan recycling programs and publish related regulations and by-laws, and strictly control the application of them. This is explored in this chapter.*

### INTRODUCTION

Waste management is a one of the most important issue that the authorities are facing. It also has global dimension because of its interface with the global economy (ISWA, 2012a). As a result of human activities, waste is generated and disposed as useless. The history of the generation of wastes is parallel to the creation of the world. During the old times, at the primitive tribes, villages, towns and the areas that urbanization was not very popular, management of solid waste was not a problem. As the population of the world increased and people started to prefer to live at the urban areas, this caused changes in the habits and

life style of citizens, coupled with the increase of the types of the new products at the markets, both the amount and the composition of the generated municipal solid waste have been increased and changed tremendously. Solid wastes are generated at the starting with the process of the mining of materials and thereafter generated at every step in the process as raw materials are converted to goods for consumption. The best way to reduce the amount of solid waste that must be disposed off, is to limit the consumption of the virgin raw materials and to increase the rate of recovery and reuse of the waste materials.

By the technological and scientific developments, new types of wastes such as hazardous

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and infected wastes which need special handling and treatment have been introduced. As a result of rapid industrialization at the 18th century a new type of waste-hazardous waste- and by the improvements in the medical science infected waste have been generated. Consequently it has become a burden for the responsible authorities to handle and manage them properly. Although new types (categories) of wastes have been introduced in the waste scene, municipal solid waste (MSW) is still the main /basic waste stream of wastes at all countries around the world (ISWA & Abrelpe, 2012). The establishment of a national regulatory control program with appropriate legislation, regulations, ordinances and licenses is the most important step in the protection of human health and the environment. In the countries where regulatory programs are established, clear improvement in waste management practices has occurred while in those countries without any regulatory programs many instances of environmental damage and public health problems have been cited.

When we look at the development of the management of solid waste, we can observe that the trend has been changing. Due to globalization, many popular consumer products are being sent worldwide. Thus, there are linkages between the globalization and waste management. Both waste management practices and globalization affect each other (ISWA 2012a). Also the amount and the type of the solid waste changes from country

to country, from city to city, even from the district to district in the same city as well as with the season. Therefore the solid waste data in the literature cannot be used for the decision of the type of the solid was handling. Data in the region should be collected. Although the components are generally same, the percentage of the components of the solid waste generated at the developed and economically developing countries is different. The percentage of food remains is very high at economically developing countries while the recyclable wastes such as paper and paper products, plastics, metals and glasses are very low. The opposite is true at the developed countries (Table 1).

There are different applications for the final removal of solid wastes. Although the best way to reduce the amount of solid waste that must be disposed of, is to limit the consumption of the virgin raw materials and to increase the rate of recovery and reuse of the waste materials. Generally waste has been burned, reused or dumped according to the economic, cultural, social and political developments of organized people in their own particular situations since the very ancient times.

Countries which have scarcity for the available land area incinerate their wastes while countries with large land areas use landfills for the final disposal of their wastes. No matter which alternative is used, “integrated solid waste management” which involves five steps should be applied for the appropriate waste handling.

*Table 1. The percentage distribution of municipal solid waste composition in different countries (ISTAÇ, 2011)*

Type of Wastes	France	Italy	Japan	South Africa	Turkey	UK	USA
Food Remains (%)	25.0	20.0	20.0.0	31.0	45.0	23.4	29.0
Paper and Cardboard (%)	30.0	28.0	37.0	33.0	15.5	33.9	35.6
Glass (%)	12.0	11.0	16.0	12.0	3.8	14.4	8.4
Plastics (%)	6.0	8.0	17.0	7.0	9.5	4.2	7.3
Metals (%)	5.0	3.0	6.0	7.0	2.2	7.1	8.9
Textile (%)	4.0	1.0	3.8	-	5.6	4.1	2.0
Ash (%)	-	2.0	0.2	1.0	15.0	-	0.1
Other (%)	18.0	27.0	-	9.0	3.4	12.9	8.7

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