

## 1.4. ELEMENTS OF INTEGRATED SOLID WASTE MANAGEMENT

Integrated Solid Waste Management (ISWM) represents a contemporary and systematic approach to solid waste management. The U.S. Environmental Protection Agency (EPA) defines ISWM as a complete waste reduction, collection, composting, recycling, and disposal system. An efficient ISWM system considers how to reduce, reuse, recycle, and manage waste to protect human health and the natural environment. It involves evaluating local conditions and needs. Then choosing, mixing and applying the most suitable solid waste management activities according to the condition.

### *The Importance of ISWM as a Waste Management Approach*

With rapid population expansion and constant economic development, waste generation both in residential as well as commercial/industrial areas continues to grow rapidly, putting pressure on society's ability to process and dispose of this material. Also, inappropriately managed solid waste streams can pose a significant risk to health and environmental concerns. Improper waste handling in conjunction with uncontrolled waste dumping can cause a broad range of problems, including polluting water, attracting rodents and insects, as well as increasing floods due to blockage in drains.

As well, it may bring about safety hazards from explosions and fires. Improper solid waste management can also increase greenhouse gas (GHG) emissions, thus contributing to climate change. Having a comprehensive waste management system for efficient waste collection, transportation, and systematic waste disposal—together with activities to reduce waste generation and increase waste recycling—can significantly reduce all these problems. While nothing new, an ISWM approach provides the opportunity to create a suitable combination of existing waste management practices to manage waste most efficiently.

### *The 'Stakeholders'*

A stakeholder is a person or an organisation that has a stake, an interest in—in this case—waste management. The municipality, with its general responsibility for urban cleanliness and the citizens or households who use the system, are (almost) always stakeholders in waste management. But other stakeholders differ in each city, so they need to be identified in the local context and often also grouped according to their interests. Their influence - the extent to which stakeholders are able to persuade or coerce

others into making certain decisions or following certain courses of action- and importance - the extent to which the problems, needs and interests of a particular stakeholder are a priority in a project or plan- varies. Stakeholders by definition have different roles and interests in relation to waste management; the challenge of the ISWM process is to get them to agree to co-operate for a common purpose, that of improving the waste system. In addition, the stakeholders in a particular city or region share a common social and geographic context and may be bound together by other systems in addition to solid waste.

### ***Functional Elements of Integrated Solid Waste Management***

The four components or functional elements of ISWM include source reduction, recycling and composting, waste transportation and landfilling. These waste management activities can be undertaken either in interactively or hierarchically. Following are brief discussion of each of these functional elements of ISWM:

**Source Reduction**, also known as waste prevention, aims at reducing unnecessary waste generation. Source reduction strategies may include a variety of approaches, such as:

- products that are designed for recycling, durable, sustainable goods and, where possible, in concentrated form.
- reusable products, including reusable packaging, as reuse and increasingly becomes an important component of the circular economy.
- refurbishing of goods to prolong product life, another important element of the circular economy model.
- redesign of goods and utilize less or no packaging.
- reduction of food spoilage and waste through better attention to food processing and storage
- avoidance of goods that don't last long and can't be reused or recycled, such as Halloween decorations.
- Waste source reduction helps us to lessen waste handling, transportation, and disposal costs and eventually reduces methane generation.

**Recycling and Composting** are crucial phases in the entire ISWM process. Recycling includes the accumulation, sorting and recovering of recyclable and reusable materials, as well as the reprocessing of recyclables to produce new products. Composting, a component of organics recycling, involves the accumulation of organic waste and converting it into soil additives. Both recycling and composting wastes have a number of economic benefits such as they create job opportunities in addition to diverting material from the waste stream to generate cost-effective sources of material for further use. Both recycling and composting also significantly contribute to the reduction of greenhouse gas emissions.

**Waste Transportation** is another waste management activity that must be integrated systematically with other waste management activities to ensure smooth and efficient waste management. Typically, this includes the collection of waste from curbside and businesses, as well as from transfer stations where waste may be concentrated and reloaded onto other vehicles for delivery to the landfill.

**Waste Disposal**, in particular through the use of landfills and combustion, are the activities undertaken to manage waste materials that are not recycled. The most common way of managing these wastes is through landfills, which must be properly designed, well-constructed and systematically managed.

***The 'aspects':***

The ISWM concept distinguishes six aspects, or lenses, through which the existing waste system can be assessed and with which a new or expanded system can be planned. The ISWM aspects give a municipal manager a set of tools to perceive, study and balance priorities and create measures to give the desired results.

The six aspects of ISWM are described below:

1. Financial-economic aspects pertain to budgeting and cost accounting within the waste management system and in relation to the local, regional, national and international economy. Some specific issues are: privatisation; cost recovery and cost reduction; the impact of environmental services on economic activities; the commodities marketplace

and how the recycling infrastructures connect to it; efficiency of municipal solid waste management systems; macroeconomic dimensions of resource use and conservation; and income generation.

2. Environmental aspects focus on the effects of waste management on land, water and air; on the need for conservation of nonrenewable resources; pollution control and public health concerns.

3. Political/legal aspects address the boundary conditions in which the waste management system exists: setting goals and priorities; determination of roles and jurisdiction; the existing or planned legal and regulatory framework; and the basic decision-making processes.

4. Institutional aspects relate to the political and social structures which control and implement waste management: the distribution of functions and responsibilities; the organizational structures, procedures and methods implicated; the available institutional capacities; and the actors such as the private sector who could become involved. Planning is often considered the principal activity in relation with institutional and organizational aspects.

5. Socio-cultural aspects include the influence of culture on waste generation and management in the household and in businesses and institutions; the community and its involvement in waste management; the relations between groups and communities, between people of various age, sex, ethnicity and the social conditions of waste workers.



**Figure: 1.4.1. Integrated solid waste management**

[Source: Waste Portal]