



# Solid Waste Management: A Local Challenge With Global Impacts



## SOLID WASTE MANAGEMENT AND CLIMATE CHANGE

BASURA, GARBAGE, GOMI, ORDURES, AFVAL, SPAZZATURA—

whatever people call it, solid waste is a problem that must be properly managed. While it is generally understood that proper waste management helps protect human health and the environment and preserve natural resources, many do not realize that solid waste also impacts climate change. The manufacture, distribution,

and use of products—as well as the disposal of the resulting waste—all result in emissions of atmospheric gases called “greenhouse gases” that affect the Earth’s climate. When organic waste decomposes in landfills and uncontrolled dumps, it produces methane, one of the

major greenhouse gases contributing to climate change. Waste generation

increases with population expansion and industrialization. Countries in

Asia, Latin America, and Africa account for nearly 40 percent of annual

methane emissions from landfills, which is equal to 37 million met-

ric tons of carbon dioxide equivalent (MTCO<sub>2</sub>e) or the amount of

air emissions from more than 102 million automobiles. You can

reduce greenhouse gas emissions, however, through proper

solid waste management (for a more detailed explanation of

the relationship between climate change and solid waste,

see the *What is Integrated Solid Waste Management?* fact

sheet).

Solid waste should be managed through a number of activities—waste prevention, recycling, composting, controlled burning, or landfilling. Using a combination

of these activities together in a way that best protects your community and the local environment is referred

to as integrated solid waste management (ISWM). An

ISWM program can help reduce greenhouse gas emissions and slow the effects of climate change. This folder

and its accompanying fact sheets are designed for govern-

ment officials, nongovernmental organizations, and others involved in planning and communicating the benefits of

ISWM programs. The fact sheets will introduce you to important issues you will need to address in planning a successful

ISWM program. These fact sheets also assist you in planning an

ISWM program by providing guidelines for recycling and composting,

waste collection and transport, and waste disposal (landfilling and

combustion).

For further information on ISWM in the United States and worldwide, please visit the U.S. Environmental Protection Agency’s (EPA’s) Climate Change and Waste Web site at <[www.epa.gov/globalwarming/actions/waste/tools.html](http://www.epa.gov/globalwarming/actions/waste/tools.html)> or write to: EPA’s Office of Solid Waste (5306W), Ariel Rios Building, 1200 Pennsylvania Avenue, N.W., Washington, DC 20460, U.S.A.





## U.S. ENVIRONMENTAL PROTECTION AGENCY

[www.epa.gov](http://www.epa.gov)

In the United States, the Environmental Protection Agency (EPA) is the national agency that works to protect human health and the natural environment. EPA establishes and enforces national environmental protection standards, conducts research on environmental problems, and assists other organizations in protecting the environment through grants, technical assistance, and other programs.

EPA's **Office of Solid Waste** ([www.epa.gov/osw](http://www.epa.gov/osw)) promotes and supports residential, commercial, and governmental efforts to reduce waste, prevents future waste disposal problems by establishing effective standards, and cleans up areas where wastes may have spilled, leaked, or been improperly disposed of. In addition, OSW's Climate and Waste Program works to prevent climate change by informing the public of and studying the link between solid waste and greenhouse gas emissions. To support efforts to reduce greenhouse gases globally, the Climate and Waste Program provides outreach and technical assistance to other countries.

EPA's **Office of International Activities** ([www.epa.gov/oia](http://www.epa.gov/oia)) manages the Agency's involvement in international policies and programs that cut across EPA's offices and regions. More generally, OIA also provides leadership and coordination at EPA and acts as the focal point on a variety of international environmental matters.

The following descriptions introduce and define the main activities classified under ISWM.

**WASTE PREVENTION** Waste prevention—often called source reduction—means reducing waste by not producing it. Examples of waste prevention would include purchasing durable, long-lasting goods and seeking products and packaging that are as free of toxic substances as possible. It can be as simple as switching from disposable to reusable products, or as complex as redesigning a product to use fewer raw materials or to last longer. Because waste prevention actually avoids waste generation, it is the preferred waste management activity. Overall, waste prevention conserves resources, protects the environment, and prevents the formation of greenhouse gases.

**RECYCLING** Recycling makes use of materials that otherwise would become waste by turning them into valuable resources. Recycling helps reduce greenhouse gas emissions, in part, by diverting waste from landfills. In some countries, a great deal of recycling occurs before the waste reaches the landfill. Scrap dealers buy directly from households and businesses, wastepickers or scavengers collect materials from waste bins, and waste collectors separate materials that can be sold as they load their trucks. Governments can build on these practices by providing support to organize and improve recycling efforts.

**COMPOSTING** Another form of recycling is composting—the controlled aerobic biological decomposition of organic matter, such as food scraps and plant matter, into humus, a soil-like material. Compost acts as a natural fertilizer by providing nutrients to the soil, increasing beneficial soil organisms, and suppressing certain plant diseases, thereby reducing the need for chemical fertilizers and pesticides in landscaping and agricultural activities. Organic materials often comprise a large portion of the solid waste stream, particularly in communities that rely heavily on tourism. Composting can be particularly helpful to communities managing their waste and thus reducing greenhouse gas emissions.

**COMBUSTION** Combustion is the controlled burning of waste in a designated facility to reduce its volume and, in some cases, to generate electricity. Combustion is an ISWM option for wastes that cannot be recycled or composted, and is sometimes selected by communities where landfill space is limited. While the combustion process can generate toxic air emissions, these can be controlled by installing control equipment such as acid gas scrubbers and fabric filters in combustors. Combustion of solid waste can help reduce amount of waste going to landfills. It also can reduce reliance on coal, one of the fossil fuels that produces greenhouse gases when burned.

**LANDFILLING** Uncontrolled dumping of waste can contaminate groundwater and soil, attract disease-carrying rats and insects, and even cause fires. Properly designed, constructed, and managed landfills provide a safe alternative to uncontrolled dumping. For example, to protect groundwater from the liquid that collects in landfills (leachate), a properly designed landfill has an earthen or synthetic liner. As waste decomposes, it emits methane, a greenhouse gas that can also cause fires. To prevent fires, a properly designed landfill should have a way to vent, burn, or collect methane. Landfill operators can also recover this methane—thereby reducing emissions—and generate electricity from the captured gas.