



INTEGRATED RESOURCE RECOVERY CENTRES

What is an Integrated Resource Recovery Centre?

Integrated Resource Recovery Centres (IRRCs) recover valuable resources from waste. Through their simple, non-mechanical technology, IRRCs can be built and operated at low costs.

IRRCs directly benefit the urban poor, providing waste pickers with better, more stable incomes and safer working conditions. By limiting the amount of waste going to dumpsites the IRRCs also help the environment.

IRRCs can be initiated and operated by municipalities, private-sector enterprises and civil society organizations, or a combination of all three through different partnership models.

The capacity to process waste can vary from 2 to 20 tons per day. IRRCs can be established within neighbourhoods, in several areas in one city or in the outskirts of the city.

ORGANIC AND INORGANIC WASTE

The main focus of the IRRCs is on organic waste, coming mainly from kitchens, restaurants, wholesale markets of fruits, vegetables, fish and meats, and cuttings from parks and lawns. Inorganic waste, mainly paper, packaging materials made of plastic, glass, tin, aluminium, iron etc., and appliances, is also collected, stored and sold.

How is an IRRC different?

The IRRC model incorporates successful strategies to address both quality of compost and demand for the produced products.

IRRCs use simple technology: Because IRRCs use limited mechanical technology, they are easy to operate and maintain. Local organizations can quickly become familiar with the technology and adapt it to the local context. Using technology that requires little energy keeps operation costs low and equipment breakdowns are minimal. Simpler technology is also more labour intensive, therefore it creates more job opportunities for the poor.

IRRCs produce high-quality compost: Key features of an IRRC are the close involvement of the surrounding communities and the small scale of the facilities. Households are trained on how to separate organic and inorganic waste. With carefully sorted organic waste, IRRCs use the aerated box method to produce good quality compost.

IRRCs are businesses: To ensure profitability, an IRRC must formulate a business plan before starting any work. The business plan must ensure that the products cater to the demands of the local agricultural sector and that sources of revenue, including carbon credits, and running costs are identified and estimated as accurately as possible.

How does an IRRC work?

Three major activities can be carried out by the IRRC: collection of segregated waste, processing of waste and selling of resources produced from the waste.

Income streams can include:

- Collection fees from serviced households
- Sale of compost
- Sale of recyclables to junk dealers
- Income from carbon financing

Collection of waste: An IRRC needs a regular input of waste to operate efficiently and profitably. Most centres provide daily door-to-door collection service from neighbourhoods and charge a monthly waste collection fee. Others receive waste collected by the local authorities or private companies. Households are trained to separate their waste into organic and inorganic fractions; thus, the collected waste is pre-sorted. An IRRC may also collect used cooking oil from households, restaurants, hotels and other potential sources and process it in a bio-diesel plant.

Processing: Waste is sorted a second time at the centre. A major portion of the incoming waste is organic and about 70 to 80 per cent can be composted. The recyclable material is stored and in some cases processed. Rejects comprising about 5 to 10 per cent are sent to the landfill.

Selling: Compost is sold in bulk to farmers, fertilizer companies and to local authorities who use it for parks and green spaces in the town. The IRRIC is encouraged to focus on bulk buyers and buyers with their own distribution networks to reduce costs of transportation and packaging. Recyclables are also sold in bulk.

What are some of the systems IRRICs use to recover resources from waste?

Compost enrichment: Through compost enrichment the IRRIC can produce different types of fertilizer for specific soil and crops by varying quantities of nitrogen, phosphorus, and potassium and other nutrients that are added to the compost. Unlike chemical fertilizer, organic fertilizer returns organic matter to the soil, thereby replenishing it and reducing the amount of fertilizer needed, reducing costs and pollution from excess chemicals in the soil.

Biogas plant: Fish and animal waste cannot be used for compost; however, they can be made into biogas using a digester installed within the premises. The produced biogas can be used for cooking and generating electricity.

Recyclable management: Inorganic waste, including plastics and metals, is sorted, cleaned, compacted and stored before it is sold to bulk buyers of these various materials.

Used cooking oil recycling unit: In an IRRIC, used cooking oil can be converted into biodiesel. Biodiesel is a clean-burning

fuel that can run in an unmodified diesel engine. This is an environmentally friendly alternative to higher emission petroleum diesel and can be sold or used in the vehicles operated by the IRRIC. This process addresses the problem of used cooking oil being disposed of into the drainage systems of many developing cities.

WATER SYSTEMS

Leachate management system

A significant amount of wastewater is generated during composting and the cleaning of the facility. Instead of discharging the wastewater into drains, it can be collected in a small covered storage tank below ground level. This stored wastewater can then be reused for new compost piles to maintain the moisture balance and enhance the decomposition process by mixing this wastewater with fresh water from pipes or rainwater tanks. Using this wastewater saves ground water resources.

Rainwater harvesting system

To maximize rainwater harvesting, the roofs of IRRICs are connected to rainwater collection tanks. Use of rainwater reduces the need to use ground water and saves electricity that is otherwise needed to pump water from the ground.

Flowchart of segregated waste collected from communities based on collection (inputs), processing and marketing (outputs)

