

FUKUOKA (JAPAN)

General information

Area:	340 km ²
Population:	1.3 million
National GDP per capita:	USD 26,755
Total income:	JPY 722,803 million (USD 5.8 billion)

Solid waste generation

Total generation:	772,916 ton/year (total) (2117 ton/day) 326,544 ton/year (domestic) (894 ton/day)
Waste generation per capita:	0.69kg/person · day (domestic), 1.6 kg/person · day
Waste sources:	42% household, 46% commercial, 2.5% industrial, 1% other, 7.8% accepted from outside city limits
Waste composition:	90% combustible, 7.2% non-combustible and bulky, 2.5% glass/PET bottles (domestic waste)

Solid waste management

Collection rate:	100%
Recycling:	84.5 ton/day, carried out by Fukuoka City
Incineration:	1,777 ton/day
Final treatment:	432 ton/day
Expenditure:	JPN 30,692 million (USD 248 million), a rate of 4% in the general account.

Major challenges and strategies:

With the shift to a society of mass production, mass consumption and mass waste, Fukuoka is conducting a range of measures to reduce waste volume and promote recycling, including rewards to children's groups, subsidizing systems for purchasing compost, provision of unused furniture and other items, simple wrapping, and collection of empty cans and other items by city offices, in addition to other public activities. To reduce business waste and promote recycling, corporations with buildings larger than 3,000m² are required to prepare a waste reduction report and appoint a promotion manager.

The acquisition of final disposal sites for landfills is a major issue for Fukuoka. In the Final Disposal Plan, Fukuoka has outlined the following goals:

- (1) Reduction of waste content and weight, and minimization of final disposal amount by introducing intermediate processing of waste
- (2) Strict monitoring and management of waste
- (3) Restrict the disposal of reusable and recyclable refuse by placing charges on reusable items, i.e. televisions, washing machines, air conditioners
- (4) Appropriate management of landfill sites and sewerage treatment facilities

A particular type of semi-aerobic landfill, known as the "**Fukuoka Method**", was developed as a joint project of Fukuoka City and Fukuoka University. This method was first tested in the construction of Shin-Kamata Landfill in 1975. This method has now been adopted through Japan, as recommended by the Ministry of Health and Welfare in guidelines for final waste disposal. This is a semi-aerobic landfill, where leachate is collected in leachate collection ponds through properly sized perforated pipes embedded in graded boulders. As the outlet of the main leachate collection pipe is always open to air, fresh air is drawn into the layers introducing an aerobic condition around the pipes. Since leachate is removed as quickly as it is formed, the internal waste layers have lower water content.

Advantages of the Fukuoka Method include:

- (1) Utilisation of the self-purifying capacity inherent in nature to stabilize waste materials. As a landfill method, it requires only commonly used machinery and equipment. Fresh air causes microorganisms to flourish inside the waste layers, thus hastening the decomposition process and reducing the emission of methane. This helps to address global warming issues.
- (2) The quality of leachate improves significantly and rapidly, helping to reduce costs for secondary

treatment. Moreover, the technology is cost-effective and simple to construct and operate. There is flexibility for selection of materials and pipes. Enhanced stabilization makes it possible to return the landfill sites for other uses in short period.

- (3) The overall effectiveness depends on the continuous monitoring of various performance parameters. This induces a better understanding of what it takes to achieve a given environmental standard in final waste management, thereby laying a sound foundation for future upgrading and improvement.

Technology has been successfully transferred to Malaysia (Seberang Perai) at Ampang Jajar landfill site in 1996, followed by Guangzhou City (China) in 1997, and Tehran Municipality (Iran) in 1998 and various training programs inside and outside Japan have also been conducted. With the help of donors and experts, this method could be applicable to other cities in the Kitakyushu Initiative Network.