

Kyonggi Province (Korea) Efforts to Recycle Food Waste

Many districts and cities in Kyonggi make efforts to collect and recycle food waste .Suwon City began collecting of food waste from housing complexes in July 1999. Yeosu District has been using worms for composting since 1995.

Province Profile

Kyonggi Province is a large-scale local government (10,189km²) with a population of nine million residents, where a variety of environments coexist such as urban as well as rural areas, forests, and streams, coastal areas and mountainous inland areas.

Background

Kyonggi Province is a region surrounding Seoul Metropolitan Government where one-fifth of Korean population is concentrated, and where extreme urbanization and industrialization have been occurred. The administration has relied on landfill for waste disposal in the past, but landfill sites has become difficult to be secured since the beginning of 1990. For this reason, the Province has switched from landfill to incineration as its basis for waste disposal policy and each city and district has built incineration facilities.

Many of these municipalities suffered friction with local residents as a result, and environmental considerations increased at the same time. Therefore, emphasis has recently been placed on community participation in waste management, recycling, and waste policy.

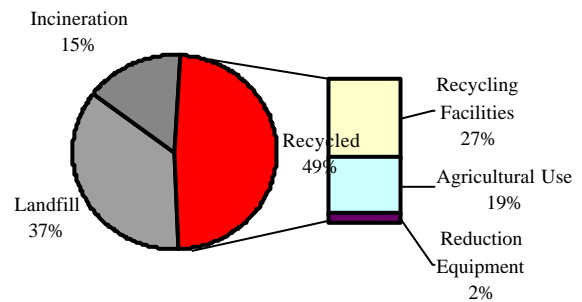
“Green Kyonggi 21” established in September of 1999, is the Local Agenda 21 for Kyonggi Province and waste management was included within the eight main fields of current efforts. The following were decided on for immediate action: 1) Participation of residents in waste management planning, 2) Campaign for reducing the waste of wrapping materials, and 3) Food waste recycling.

In South Korea, food waste, which produces great amounts of effluent, is generated in large volumes, and the problem is specified not only as a waste problem but also as groundwater pollution and dioxin problems. Due to the strong efforts of the administration, recycling of food waste is promoted by public sector through the collection and separation of food waste from households and transformation of the waste into organic fertilizer and feed.

“War Against Food Waste”

In Kyonggi Province, efforts toward solving the food waste problem were motivated by necessity, and in October 1996, the Provincial Governor issued a declaration of “War Against Food Waste.” Disposal of organic garbage at landfill sites near the capital will be banned. Furthermore, direct landfilling of food wastes will be banned under the Waste Management Law beginning in 2005. At the same time, the system for collecting food waste has been greatly improved and the recycle rate of it has been exponentially increased.

Recycling of Food Waste in Kyonggi Province



Food waste is generated at the rate of 2,033 tons per day in Kyonggi, accounting for one-fourth of all household wastes (8,087 tons). Of which, 990 tons (49%) are being recycled. Of the remainder, 731 tons goes to landfills and 312 tons is incinerated.

There are 50 recycling facilities, including 35 private facilities. The facilities produce feed and

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organic fertilizer. Currently, plans to attract foreign investment for food waste recycling business are progressing. The Province is also making efforts to create a collection system, conferring with Seoul Metropolitan Government and Incheon Metropolitan City on the maximum volume of organic garbage that can be brought in.

Volume of Food Waste Generated and Recycled in Kyonggi Province, Seoul, and Incheon
(Units: tons/day)

Region	Total Volume	Recycled	Incinerated	Landfilled
Seoul	2,644	900	489	1,567
Incheon	593	162		431
Kyonggi Province	2,033	990	312	731
Total	5,270	2,052	489	2,729

Food Waste Collection in Suwon City

Suwon is the seat of Kyonggi Province and has a population of around 910,000. The city generates 227 tons of food waste per day, 11% of the total volume of Kyonggi Province. Suwon began efforts in July 1999 to collect and recycle food waste from housing complexes.

Targeting the 269 apartments with over 50 units for a total of 129,000 households, food waste is placed in the specialized boxes and is collected by special trucks everyday to be composted at city-managed facilities. There is a fee for collection of 530 – 670 won⁶ per month per household according to the size of the household.

Through this system, the 25,000 tons of food waste annually generated in apartments is composted and about 825 million won is cut off as landfill and incineration costs. Currently, the city is operating the composting facilities year-round, but since its capacity is almost overwhelmed by the volume of food waste, plans call for additional facilities. The compost is being sold to compost retailers for 12,000 won per ton.

Yeoju District: Composting with Worms

Yeoju District has been using worms for food waste recycling since 1995. This region demands high quality compost to produce agricultural products such as the regional specialty “Yeoju Rice” and water quality preservation policies have also been sought in this regard.

In 1995, a model worm farm to compost food waste was set up in a 100m² with vinyl house and now has been expanded into 13 steel frame vinyl houses covering 33,000m². In 1998, the food waste collection was expanded to cover the entire district.

When food waste is delivered to the facilities, the waste is fermented for about 15 days, after dewatering and desalination. Then wood shavings and rice bran are mixed with the waste and the mixture is transferred to the wood farm and spread over the worms. There is actually no odor at this stage. In this facility, worms digest the waste to produce compost. This composting process takes about 6 months.



The facility sells worms as fishing bait and sells the compost to golf courses and gardeners.

The project outline

Investment	1,679 million won (Province:1,390, District:289)
Capacity	50 tons per day
Area (District Owned)	3,300 m ²
Main Facilities	worm farm (8,580 m ² , 13 buildings), fermentation building (760

⁶ 1,000won USD 0.8

	m ² , composter), compost building (330 m ²), Operations building (fabricated) (660 m ²), Management building (100 m ²), compost automatic wrapping equipment, recycle warehouse (330 m ²)
Main Equipment	wood chipper, wood crusher, dehydrator, conveyer belt, skid loader, compost scatterer, fork lift, cleaning car, tanker

Effectiveness

- Effective way of disposal of food waste → prevention of secondary pollutions
- Reduction of garbage and recycling resources → increase of longevity of landfill sites and reduce costs
- Decrease of effluent from landfill sites → minimizing pollutions
- Maximization of the efficiency of incineration
- An increase of Non-Tax income to the District through management of profitable public business (worm and compost sales)
- Improving residents awareness towards basic environmental-friendly facilities

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Generation and dispose of food waste

As of January 1, 2000 (ton/day)

	Normal Garbage			Food Waste			Disposal Method				percentage of recycled (%)
	Total	from households	from business offices	Total	from households	from business offices	Total	land-fill	incineration	recycling	
Kyonggi Province	8,087	6,784	1,303	2,033	1,760	274	2,033.1	730.9	311.8	990.4	49%
Suwon City	787	676	111	227	189	38	227.0	82.0	26.0	119.0	52%
Yeoju District	86	78	7	25	25	0	25.4	-	-	25.4	100%

Collection of food waste

	Number of households (A)	Number of households where food waste is collected (B)						(%) (B/A)	
		(B)	Use of special bags			Use of special box			
			sub-total	households	business	sub-total	households		business
Kyonggi Province	2,880,421	2,370,255	1,639,387	1,582,177	57,210	730,868	719,836	11,032	82.3%
Suwon City	304,217	134,233	895		895	133,338	132,963	375	44.1%
Yeoju District	32,666	32,666	-			32,666	28,949	3,717	100.0%

(Source: Statistics of Kyonggi Province)

Process of Food Waste Recycling

Collection from households and restaurants

Production of collection boxes ('95~'98)

8 l : 1,090boxes (5,250won / box)

16 l : 12,360boxes (Round : 3,550won/box ,
Square : 4,550won/box)

75 l : 40boxes (14,300won/box)

120 l : 1,865boxes (30,500won/box)



Collecting boxes (120 l)

Delivered by special trucks



Trucks and Personnel
trucks :8 special trucks
4 regular trucks
personnel:33

Dewatering



Mixing and Stiring



Fermentation (about 15days)



Production of wood chips and wood shavings

Wood chipper: 1

Wood crusher: 1

Sorting worms by size



Worm breeding (8,600m³)



Sales of worms

Fishing bait; Pharmaceutical and cosmetic materials

Compost storage

- Golf Course
- Environmental Conservation Project
- Gardeners

Automatic packaging



Production of compost



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