

CASE STUDY

Use of taxes and bans to divert organic waste from landfills



TOOL TYPE:
TAX INCENTIVES



CASES OF THE NETHERLANDS AND SOUTH KOREA

Introduction:

Beginning in 1995, the Netherlands introduced a landfill tax in an effort to improve Municipal Solid Waste (MSW) management in the country. The tax was intended to provide an economic incentive for companies and individuals to reduce the amount of waste they generate and to encourage them to divert it from the landfill. Together with other waste policies, it has achieved remarkable results. While in 1992 there were over 80 operational landfills, this number dropped to only 19 landfills in 2018. **The Netherlands is diverting 99% of waste that was originally landfilled**, becoming a world leader in this indicator.



In parallel, South Korea has also made impressive progress, especially around increasing the recovery of its organic waste, which represents 40% of total MSW. This happened as a result of the introduction of a **landfill ban** for organic waste in 2005 and several other accompanying policies. South Korea is a country the size of Portugal, but with a population of nearly 51 million, meaning that there is minimal room for landfills. In the 1980s, waste management in South Korea was underperforming in several ways (inadequate final disposal, low recycling rates, etc.), while today it stands as an example for other countries. This matches South Korea's



economic trajectory – the country has been able to maintain strong economic growth for several decades. Back in 1980s, it was classified as a lower income country (at the

same level as Botswana and Bolivia) and today it is one of the countries at the top of GDP per capita levels (similar to the United Kingdom and France).

Quick facts of the Netherlands and South Korea

Población en 2022 (millones de habitantes)	Netherlands 	South Korea 
Population in 2022 (million inhabitants)	17.1	51.3
GDP per capita PPP* in 1980 (USD)	11.708	2.169
GDP per capita PPP* in 2020 (USD)	56.038	44.766
MSW generation per capita in 2019 (kg/yr)	544	413
Percentage of MSW to landfill in 2019 (%)	1,4%	12,7%

*Purchasing power parity

Sources: International Monetary Fund, World Bank, OECD

Objectives

The landfill tax developed by the Netherlands aimed at several key objectives. On the one hand, by increasing the price of final disposal it promoted recycling and composting in households and reduced the amount of waste going to landfill. On the other, it aimed at protecting the environment by reducing the size, quantity, and impact of final disposal sites and decreasing their associated greenhouse gas emissions.

Similarly, the objective of the landfill ban on organic waste in South Korea was to substantially reduce the amount of organic waste generated and sent to final disposal. This was part of an effort to reduce the number of landfills the country had to build, since per capita waste generated was increasing

dramatically as a consequence of the steep rise in incomes. Importantly, the ban also aimed at valorizing the organic waste diverted from landfills, recovering the energy and/or nutrients present in the organic fraction, either as animal feed or as compost to enrich agricultural soils.



Implementation of the Netherlands' Landfill Tax

Back in 1980 and 1985, the Netherlands approved two directives that established strict requirements for sanitary landfills, and in 1996 the country ordered the **closure of all landfills that did not comply** with these. This was the first step in moving away from landfilling. In 1994 and 1995, the government passed an additional waste policy package, including the start of **mandatory separate collection of organic waste, a landfill tax, and a ban on landfilling for 35 waste streams**. These included all combustible and biodegradable waste (the ban has since expanded to include 60 waste categories as of 2018).

The tax has not been free of controversies.

In 2002, the government introduced a steep increase in the tax level and a similar sharp increase in 2010 made the landfill tax in the Netherlands the highest in Europe, which led to a repeal of the policy in 2012 due to corporate pressure.

However, shortly after, in 2015, the government reintroduced the tax at a lower level so as to stay on track to achieve its waste reduction targets under the European Union Directive.

The landfill tax in the Netherlands was originally aimed at bridging the gap between the higher costs of incineration and recycling and the relatively lower cost of landfilling. The landfill tax consisted of two different tax rate levels that were based on the density of

waste. The higher rate was applied to waste that could be combusted or recycled. The rates were much lower for waste that could not be combusted or recycled. If the waste collected was lighter than 100 kg/m³, it was classified as combustible waste, therefore receiving the higher tax rate. As the EU Waste Directive aims at moving away both from landfilling and incineration, the tax currently stands at 33.15 EUR/ton and applies to both of those processes.

The **landfill tax is used to fund waste management and environmental protection initiatives**. The

revenue generated from the tax is collected by the government and used to finance the design of more sustainable landfill sites as well as the construction of new recycling and waste valorization facilities.

A relevant piece of the process was the 'National Waste Stakeholders Council', which was operational during the 1990s. All actors of the waste management system (national, local/regional responsible authorities and waste management agencies) were members of this council. All possible legislative measures were first discussed and approved by the council before being discussed in the Dutch parliament. This resulted in a constructive dialogue and support for implementation and compliance of the legislation by all stakeholders, upon implementation.





Implementation of Korea's Landfill Organics Ban

The Korean economic boom of the past few decades brought with it a substantial increase in MSW generation. In the span of just two decades, the rate of MSW being generated per day had increased 600% from around 12,000 tons in 1970 to 84,000 tons in 1990. As the amount of waste generated increased rapidly, several problems regarding waste disposal surfaced in Korea. Securing land for final disposal facilities became increasingly difficult with residents becoming more and more susceptible to NIMBYism ('not-in-my-backyard'), resisting against the establishment of new landfill sites in or around their villages or requiring high compensation for accepting them.

South Korea first launched a Waste Management Law in 1986, which provided a framework stating that waste management was not just about containment, but about reducing waste in general. With this approach in place, the government was well positioned to enact supporting legislation (such as a pay-as-you-throw -PAYT- scheme for several different waste streams), and to fund projects that promoted waste reduction and valorization.

In 2005 the country approved a landfill ban of organic waste, a policy that could not have been successful in the absence of complementary measures to allow for

the separate management of the organic fraction. In 2013, the country introduced a **mandate for source separation of organics** within the broader PAYT scheme. This was carried out by the obligation for citizens to only dispose of their organic waste in special biodegradable bags, which have a low cost (about USD 6 a month for an average family of four) as a way to foster home composting as well as raising revenues to cover the cost to run the system (sale of the bags cover 60% of total costs).

New technology was also introduced to increase efficiency and ease of organics disposal, including in high rise buildings where residents can avoid the use of the special bag and directly dispose of the organic waste at specific collection points with the use of an RFID (radio frequency identification) card. Within four years, from 2013 to 2017, 4,000 of these organic waste collection points have been installed in apartment complexes and approximately 2,000 in non-apartment residential neighborhoods.



FIGURE 1:

Hi-tech organic waste collection points that use RFID cards

Source: Cho, K., 2021



Money Card:
Used for Pay-By-Weight



Pohang Pay-By-Weight
Collection Bin:
Using the Money Card



Pohang Pay-By-Weight
Collection Bin

South Korea has invested heavily in developing the necessary infrastructure to recover waste. Not only did the government fund the installation of large-scale commercial plants, but also the research and development of recycling, incineration, and intermediate treatment from the beginning of the 1990s until the mid-2000s. Organic waste is treated in plants where the moisture is extracted and anaerobically digested to obtain biogas. The remaining solids are dried with heat and turned into animal feed or composted to be used as agricultural fertilizer.

There are **strict penalties for noncompliance with the source separation mandate** of up to 1,000,000 Korean won (about USD 785). A reward system for reporting unlawful activities was introduced in 2000. Any citizen who reports unlawful activity is paid up to 80% of the fine charged to the violator.





Results

The landfill tax and the organics ban has helped the Netherlands to reach one of the lowest landfilling rates in the world. It currently sends only 1.4% of total MSW generated to landfill, down from 50.4% in 1991. However, it must be noted that 41% of that waste is still going to waste-to-energy facilities, resulting from the original focus of the tax on closing the gap between incineration and landfilling.

The landfill ban on organic waste has helped South Korea to move from a 2% organics valorization rate in 1995 to nearly 100%

in 2022. It is among the most impressive journeys in the treatment of organic waste any country has made. Kim Jong-min, from the Ministry of Environment states that *“before implementing the policy, food waste obviously created a foul odor and spawned a great amount of leachate in landfills”*. That is, beyond creating new inputs to the economy in the form of energy, animal feed and compost, the valorization of organic waste has also helped to reduce the odors and environmental impacts of landfills.

Lessons learned

The experiences of both South Korea and the Netherlands provide relevant lessons for countries seeking to leverage policy to transition from landfilling to more circular approaches of waste valorization that reduce methane emissions while adding value to the economy. Given the complexity of the waste management system (the role played by citizens, municipalities and waste operators), an organics ban or a landfill tax need to be part of a broader waste policy package. The Netherlands adopted both policy tools, including other complementary ones, such as the separate collection mandates. Similarly, in South Korea, the development of the necessary treatment facilities led by the government and the

complementary policies upstream of the landfill (separate collection mandates for waste generators), helped comply with the ban. The central government needs to play a major role in developing the mandates and regulations, as well as in providing funding for the new infrastructure. In the case of a tax, the revenue from the tax can be used to finance new infrastructure. This has led some countries to put a tax in place to start to build the necessary alternative treatment infrastructure before the ban comes into effect.

In the Dutch case, it is interesting to note the evolution of the landfill tax scheme. It went from a focus on diverting waste from landfills, regardless of whether it went to incineration plants, to a focus on a circular



economy, where incineration is no longer preferred. **As the vision changes, the same tax tool can be adapted to incentivize specific changes.**

The ban of organics from landfills in South Korea sent clear **signals to private actors.** Many businesses such as organic waste plants were created after 2005, when the landfilling of food waste was banned.

Finally, the National Waste Stakeholders Council established in the Netherlands as the regulation was being deployed, facilitated its acceptance and implementation. **Multi-stakeholder governance schemes** are a key element to make progress in the complex system that is waste management.

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