

WASTE WISE
CITIES



UN HABITAT
FOR A BETTER URBAN FUTURE

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LANDFILLS & DUMPSITES

*DUMPSITES & LANDFILLS AROUND
THE WORLD*

ISSUES AROUND DUMPSITES & LANDFILLS

INNOVATIONS

FUNDING FOR DUMPSITES & LANDFILLS

WUF 10

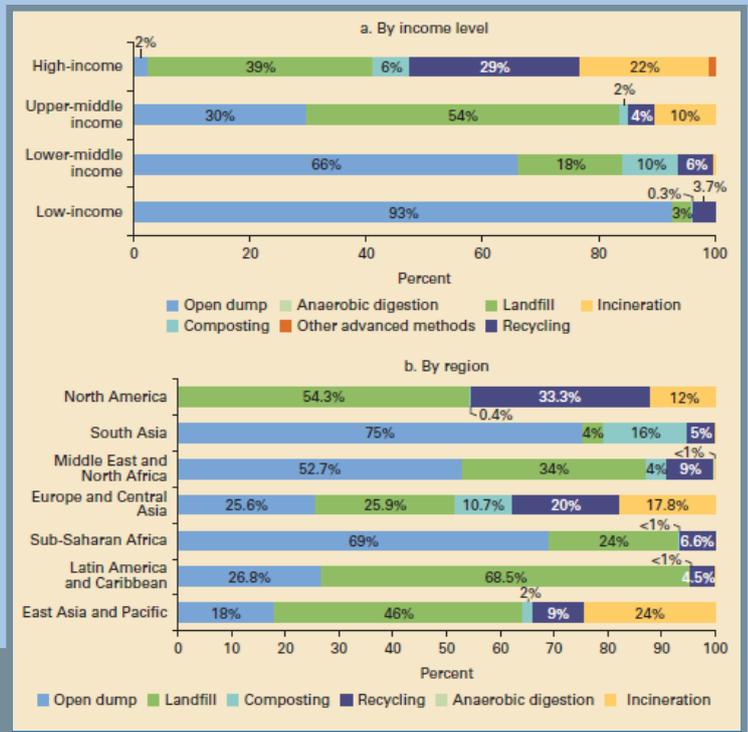
UPDATES AND OUTLOOK

DUMPSITES & LANDFILLS AROUND THE WORLD

WASTE DISPOSED IN DUMPSITES & LANDFILLS

The last step of the waste hierarchy is realized in many countries of the world either through open dumping or sanitary landfilling. This is the cheapest method of waste disposal, especially when a strong regulatory framework is missing. Overall waste disposal and treatment practices vary significantly by income level and region (see figure 1). Open dumping is mostly prevalent in lower-income countries, where investments in building sanitary landfills or upgrading existing dumps are lacking. About 93 percent of waste is burned or dumped on the sides of roads, open land, or waterways in low-income countries, whereas only 2 percent of waste is openly dumped in high-income countries. However, the amount of waste landfilled is still high even in upper-middle and high-income countries. More than two-thirds of global waste generated are openly dumped in South Asia and Sub-Saharan Africa.

Kaza, Silpa, Lisa Yao, Perinaz Bhada-Tata, and Frank Van Woerden. 2018. What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050. Urban Development Series. Washington, DC: World Bank. Doi:10.1596/978-1-4648-1329-0. License: Creative Commons Attribution CC BY 3.0 IGO



DUMPSITES AND LANDFILLS IN THE WORLD

On the [Waste Atlas](#) 93 dumpsites around the world are registered so far. In 2014, Waste Atlas published a report on the world's 50 biggest and riskiest dumpsites which included the following findings: all these dumpsites are located less than 10 km away from or even within hugely populated urban areas; more than 52,500 informal recyclers are making their living there; the surrounding environment is polluted by open burning and leachate from the dumpsites; 44 out of the 50 dumpsites are frequently affecting natural resources as lakes, rivers and forests, being within a 10 km distance; hazardous and e-waste are disposed in all of the 50 studied dumpsites. Highlighting the significant impacts on human health and the environments, five representative cases are reported in more detail. [Read more](#)



Source: Dumpsites in the world, Waste Atlas

ISSUES AROUND DUMPSITES & LANDFILLS

LANDSLIDE AT KOSHE DUMPSITE, ETHIOPIA



Open dumpsites have a significant potential to kill people. In 2017, the Koshe landfill on the outskirts of Addis Ababa, the capital city of Ethiopia, experienced [a catastrophic landslide](#). Over 100 people died due to this incident. The landfill had been receiving waste from the capital city for over 50 years. After the incident, UN-Habitat carried out a rehabilitation project at the Koshe Dumpsite jointly with the Japan International Cooperation Agency (JICA). Part of the project was also capacity development on landfill management for different technological options

TICKING GARBAGE BOMBS IN GHAZIPUR AND BHALSWA LANDFILLS, INDIA

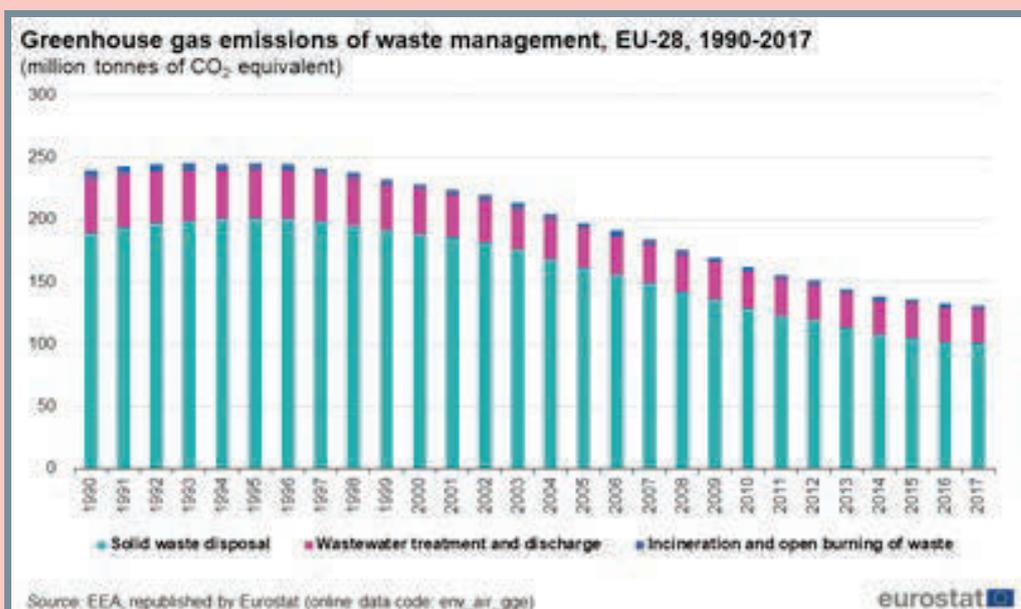
Upgrading an open dump to a sanitary landfill in one step is difficult, why often intermediate steps are taken, referred to as controlled landfill or engineered dumpsite. However, limited controlled landfills sometimes have problems due to the lack of appropriate maintenance of the site. In 2016, Ghazipur and Bhalswa landfills in India were found [spewing toxic gases](#) by the minute. The landfills have been used much beyond their capacity since the 1980s, generating copious amounts of combustible methane. [To tackle this challenge](#), Delhi wants to stop dumping untreated waste through increased use of incinerators, composting and biogas plants.



Source: Bhalswa dumpyard, hindustantimes

LANDFILLS/DUMPSITES & CLIMATE CHANGE

Methane is the solid waste sector's largest contributor to greenhouse gas emissions, leading to global warming and climate change. Methane gas is released when organic waste decomposes in an oxygen-limited/free environment (e.g. dumpsite), while pollutants and particulate matter arise through inefficient transportation and burning. Data from 2010 shows that municipal solid waste management and wastewater contribute about 3 percent to current global anthropogenic greenhouse gas emissions, about half of which is methane from landfills. One forecast suggested that without mitigation, this could double by 2020 and quadruple by 2050. In the European Union, the amount of waste landfilled between 1995 and 2017 fell by 60 percent. This resulted in reduced greenhouse gas emissions from waste by 42 percent, according to estimates by the European Environmental Agency (also see graph). The reduction in landfilling was possible because the amount of waste being recycled or composted has tripled and the amount of waste being incinerated has doubled. [Read more](#)

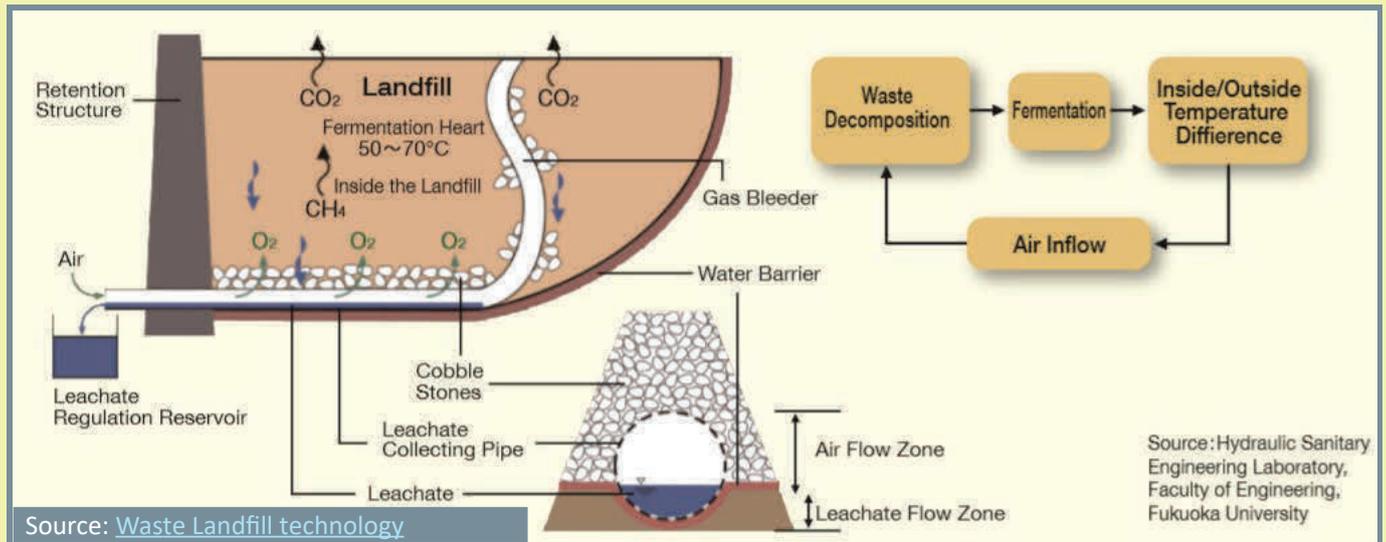


INNOVATIONS

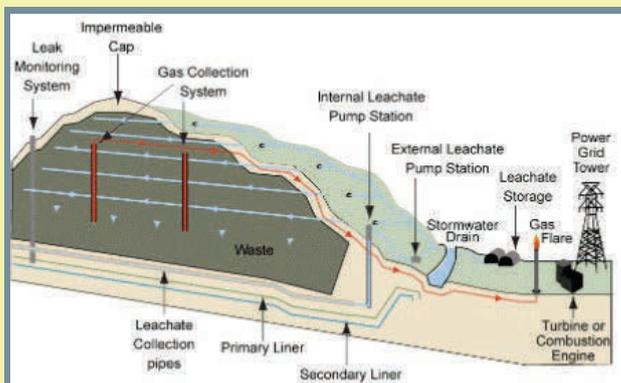
FUKUOKA METHOD, MANAGING LANDFILLS IN A COST-EFFECTIVE AND ENVIRONMENTAL-FRIENDLY WAY

The so called 'Fukuoka method' is a landfill technology to improve landfill sites with "semi-aerobic structure". This method was jointly developed by the Fukuoka City Environmental Agency and Fukuoka University, Japan. Their landfill technology has been accredited as a new method for the Clean Development Mechanism (CDM) which is defined by the United Nations Framework Convention on Climate Change (UNFCCC). Also, this method is a very simple technique at a low cost.

This waste landfill technology uses leachate collection and gas venting systems to continuously remove leachate and gas from the heap of waste. When the ambient air naturally flows into the waste mass through the pipes, it improves the process of waste decomposition and increases the quality of leachate by enhancing the micro-organisms' activities in the waste. Therefore, applying the Fukuoka method leads to much faster decomposition compared to a conventional system, reducing the time and overall cost of managing the landfill during operation. Read more on UN-Habitat's work on dumpsite with the Fukuoka method in [Ethiopia](#) and [Kenya](#)



MANAGING WASTE WITH THE LANDFILL BIOREACTOR TECHNOLOGY



The concept of a bio-reactor landfill is to rapidly transform and degrade organic waste under anaerobic conditions, generating biogas. The increase in waste degradation and stabilization is accomplished through the addition of a liquid to enhance microbial processes. In detail, leachate is removed from the bottom layer, piped to liquid storage tanks, and re-circulated into the landfill in a controlled manner. Decomposition and biological stabilization of the waste in a bioreactor landfill can occur in a much shorter time than in a traditional "dry tomb" landfill. This can potentially provide a decrease in long-term environmental risks, as well as landfill operating and post-closure costs. Furthermore, research has

shown that municipal solid waste can be made less hazardous by enhancing and controlling the moisture within the landfill under aerobic and/or anaerobic conditions. Additionally, leachate quality in a bioreactor rapidly improves, which leads to reduced leachate disposal costs. The landfill volume will also significantly decrease due to the settling of waste, with the recovered space offering landfill operators the full operating life of the landfill.

The main disadvantage of landfill bioreactors is the need for careful management to avoid leakage of landfill gas and possible risks of explosion. The presence of methane could create explosive atmospheres inside the reactor if the gas collection system is not properly built, operated and maintained.

UN-Habitat, in collaboration with the Politecnico di Milano, the Technical University of Kenya and LDK, a waste management engineering consulting, has conducted the social, environmental and financial feasibility study for the bio-reactor landfill in Ngong town, Kajiado County with from the support of Italian Government.

THE REHABILITATION OF THE SAIDA DUMPSITE, NOW A PUBLIC GARDEN FOR SAIDA'S RESIDENTS

Saida dumpsite is located in the southern part of the city of Saida, Lebanon, at the seafront and receives 300 tons of waste daily from 15 municipalities. It was established as a landfill for rubble and demolition waste, but all kinds of waste have been dumped there. "Landfill Mining" was applied to rehabilitate the Saida landfill, a technique where the dumpsite's waste is treated on site. The process shall ensure that material is recovered to the maximum extent possible and recyclables waste is treated within the vicinity of the dump. At Saida landfill, excavation of waste was done to produce secondary construction material and to reclaim land. The site was assessed for volumes and characteristics of waste, degasification was carried out before excavation of the waste. The waste than was segregated and treated on-site, half of the original volume was transferred to an on-site sanitary landfill for final disposal with proper liners, leachate collection system, capping and rainwater management in place. [Read more](#)



HOW 'LESS THAN 5 PERCENT WASTE' IS LANDILLED BY LJUBLJANA

In 2012 the city of Ljubljana, capital of Slovenia, announced plans to build a municipal solid waste incinerator. By then the city was already recycling 45 percent of its waste, but the available landfill space was quickly filling up. However, in 2013 separate collection rates rose to over 50 percent, and to 60 percent by 2014. At this point, two dilemmas arose: What are the limits for successful separate collection? And what should Ljubljana do with residual waste if not burn it?

The city adopted a zero-waste strategy and decided to build a Material Recovery and Biological Treatment plant that upgrades traditional MBT (Mechanical-Biological Treatment). It aims to extract additional materials from residual waste, while complying with obligations on pre-treatment of the same as stipulated by the EU Landfill Directive, while at the same time not having to rely on thermal treatment. Ljubljana's Regional Waste Management Centre (RCERO Ljubljana) started operation in 2016. The prime target of the project is to avoid landfilling at the existing landfill site and to recover as much reusable and recyclable material from mixed waste as possible, as well as to obtain biogas from organic waste fractions to produce heat and electricity. The residuals from the waste treatment are either utilized as solid refused fuel for thermal use or as the inert non-calorific part for landfilling. Nowadays, less than 5 percent of the quantity of waste, received by RCERO Ljubljana, is landfilled.

Ljubljana recently joined Waste Wise cities Campaign as a Member City committed on the journey to be WasteWise. Read more about Ljubljana's zero waste strategy in the attached PDF.



WASTE WISE CITIES CAMPAIGN @ THE 10TH WORLD URBAN FORUM

The Tenth Session of the World Urban Forum (WUF 10), the world's premier conference on cities, took place from February 8 - 13 in Abu Dhabi. It attracted over 13,000 participants from 168 countries. Waste Wise Cities Campaign was present in several of the more than 500 events.



The week started off with an **Urban Cinema Event**, showcasing the short video on the World Wide Fund For Nature's (WWF) **"Plastic Smart Cities Initiative"**, featuring the linkages between cities and marine litter, as well as UN-Habitat's **"Sound of Waste"** – an audio-visual piece of art capturing the life stories of waste pickers. The next days a **networking event** and **press conference** on the **Global Commitment for Waste Wise Cities Campaign** followed, highlighting the possible collaboration areas between UN-Habitat and partners, including the United Nations Educational, Scientific and Cultural Organization (UNESCO), the Ministry of the Environment Japan and WWF. Cities such as Bogota (Colombia), Bonn, Dortmund (Germany), Cape Coast (Ghana) and Abuja (Nigeria) expressed their interest in the Campaign and wanted to take on the Waste Wise Cities Challenge.

An agreement was signed between WWF and UN-Habitat, to tackle the global challenge of waste management in cities, as well as plastic pollution together. The agreement opens the way for collaboration between Waste Wise Cities Campaign and WWF's Plastic Smart Cities Initiative.



Another networking event on closing the loop for Waste Wise Cities co-organized by the Swiss Federal Institute of Aquatic Science and Technology (Eawag), the German Corporation for International Cooperation (GIZ) and UN-Habitat discussed how measuring waste and plastic leakage from cities can catalyse actions to improve urban waste management. Case studies of applying different tools and developing actions based on data assessment were showcased. The City of Dakar and the City of Yopal joined the Campaign during the session and expressed their commitment to the Challenge. To sum it up, during the busy week Waste Wise Cities Campaign strengthened its ties with partners from all around the world to tackle global waste and marine litter challenges together.

UPDATES AND OUTLOOK

We welcome all the new Members!

Although most Member Cities are still from Africa, the other world regions are catching up. So far cities from the Arab States, Asia and the Pacific, Europe, as well as Latin America and the Caribbean have joined the Campaign. Which city from North America will be the first to sign up?



UN-Habitat was featured as **Partner of the Month** with its Waste Wise Cities Campaign on the **South-South Galaxy**. The Galaxy was initiated by the United Nations Office for South-South Cooperation (UNOSSC) last year and is all about knowledge sharing and partnership brokering (introduced in the 2nd issue of the Waste Wise Cities Campaign Newsletter).

Waste Wise Cities Campaign was part of a holistic **needs-assessment for the Koidu–New Sembehun City of Sierra Leone** under UNOSSC's Cities Project. During a whole week, experts from four UN agencies, one municipal government and one private company assessed the city's status in mining, agriculture, road infrastructures and waste management. The foundation for new partnerships was established, and Koidu–New Sembehun City joined the Waste Wise Cities Campaign. Welcome!

Last year, the Application for the **Waste Wise Cities Challenge** was launched – UN-Habitat encourages cities all over the world to become Changemaker Cities and transform their waste management system. Cities can also apply as Supporter Cities and assist Changemaker Cities in the process. Due to the high level of interest in the Challenge at WUF 10, the deadline for applications has been extended to March 15. Afterwards, Changemaker and Supporter Cities will be selected, and the Challenge begins

Waste Wise Cities Challenge



We want to draw your attention to the following funding opportunity: the **Dubai International Best Practice Award** for Sustainable Development. The winners of this award walk away with USD 200,000. If you want to hand in your innovative waste management project, **Category 4: Addressing Climate Change and Reducing Pollution**, is the place to do it. Deadline: **30 April 2020**. Register and apply now [here](#)

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