


# International Solid Waste Association's "closing dumpsites" initiative: status of progress

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Following the publication of the International Solid Waste Association (ISWA)'s "World Atlas: The 50 Biggest Dumpsites" as identified by D-Waste in 2014 (D-Waste, 2014), the ISWA's work on closing dumpsites began with its first report, "Wasted Health: The Tragic Case of Dumpsites," (International Solid Waste Association, 2015a). This report, released in Antwerp, Belgium, at the 2015 World Congress, informs the public about how dumpsites and untreated wastes are linked to illness and premature deaths. A complementary report on the "Global Waste Management Outlook: Summary for Decision-Makers" focuses on how developing countries can improve their systems, including the closure of uncontrolled open dumps (International Solid Waste Association, 2015b).

A follow-up report, "A Roadmap for Closing Waste Dumpsites: The World's Most Polluted Places" was released at the 2016 World Congress in Novi Sad, Serbia, along with announcement of an initiative to close dumpsites (International Solid Waste Association, 2016). The roadmap provides guidelines for local governments and authorities on proven procedures and processes to close dumpsites, and to develop and operate alternative reliable waste management systems (WMSs). The report shows that all the elements for closing a dumpsite (e.g., technical, financial, governance, and social) are proven and available. The report also points out that for any situation a practical roadmap can be developed that leads to improved waste management practices with much lower environmental and health impacts compared to business as usual open dumping.

Since then, the ISWA has garnered international attention and had a presence in high level fora on the needs for fixing the dumpsite crisis, particularly in developing countries. In July 2018, ISWA's Working Group on Landfill (WGL) developed a Task Force on Closing Dumpsites (TFCD) and presented its dump closure initiative as one of its flagship projects for the future at the United Nations (UN) Conference on Housing and Sustainable Urban Development – Habitat III, held in Quito (Ecuador) in October 2016. More details about the Task Force and its findings are presented at: <http://closingdumpsites.iswa.org/>. Later the ISWA released a petition on Avaaz (a non-governmental organization with the mission to improve global living conditions), collecting over 2,500 signatures from 97 countries. This supported inclusion of closing dumpsites on the agenda of the World Health Organization (WHO) Special Session of the Executive Board in November 2017, with the ISWA advocating that the WHO expand their support of global efforts to close open dumps, long identified as significant threats to public health.

## Some published facts and figures

Currently, the ISWA has determined that uncontrolled dumpsites hold 40% of the world's waste and that the world's 50 biggest dumpsites (identified through a voluntarily survey conducted by D-Waste in 2014) directly affect the daily lives of 64 million people, equivalent to the population of France. The ISWA reports (2014, 2015a, 2015b, 2016) showcase how eliminating dumpsites is an urgent issue, affecting local, regional, and even global health and the environment. Important findings indicate that 38 out of the 50 biggest dumpsites directly impact marine and coastal areas and can become sources of disease outbreaks and the release of wastes (particularly durable plastics) to waterways and the oceans.

Studies suggest that non-engineered dumps and uncontrolled landfills are the third largest source of global anthropogenic methane, a greenhouse gas about 25 times more potent than carbon dioxide (CO<sub>2</sub>), accelerating climate change. It is estimated that open dumps emit the equivalent of more than 20 million metric tonnes of CO<sub>2</sub> per year. Without any action, it is projected that existing open dumps will account for 10% of global greenhouse gas emissions by 2025. If open dumps instead were replaced by engineered landfills with state-of-the-art landfill gas collection and destruction systems, it would be like removing five million cars from the planet.

In the 2016 Roadmap Report, the ISWA team directly linked the targets of closing dumps with 15 of the 17 UN Sustainable Development Goals (SDGs) that have been adopted by 193 nations world-wide; so, closure of dumps per ISWA guidelines would substantially contribute towards attaining the UN's SDGs (International Solid Waste Association, 2016).

In addition, dumps located near water sources pose a tremendous threat to water bodies used as potable water sources and for marine ecosystems supporting fishing and aquaculture. Therefore, closure of dumps near or linked by topography to water bodies must be a top priority and an essential task.

## Catastrophic dump failures

Catastrophic and virtually instantaneous structural failures at non-engineered landfills are typically more vivid and newsworthy, another important shortcoming of dumps in addition to their relatively slowly emerging and less obvious negative environmental and public health impacts. Over the past several decades, many homes have been lost and hundreds of people have been buried and killed by dump landslides around the globe, particularly in Asia, Africa, and South America.

From December 2015 to June 2016, in a period of only seven months, the ISWA has recorded more than 750 deaths globally that were directly related to poor waste management and operations at the dumps. And several incidents had important health impacts. There is no doubt that dumps are a global health and environmental emergency. The ISWA, as the world's leader in promoting best waste management practices and networking with thousands of waste experts, has the mandate to lead the way.

The ISWA has made positive strides in promoting dump closures through its communications and technical assistance. But dump closures (and upgrades) are only slowly occurring. Tragically, an estimated 113 individuals died in the landfill collapse in Addis Ababa, Ethiopia, in March 2017. And in the following month, the Meethotamulla Garbage Dump in Sri Lanka collapsed, resulting in over 30 deaths with dozens missing and over 140 houses buried and destroyed. More recently, heavy rains may have triggered the partial collapse of the Hulene landfill site on the outskirts of Maputo, Mozambique's capital, burying and killing at least 17 people. And in September 2017, the Ghazipur landfill site, one of the world's 50 largest dumps located in East Delhi, India, collapsed, causing the deaths of two motorists and injuring six. It was fortuitous that no other motorists were killed since the road adjacent to the dumpsite is usually jammed with traffic. There likely are other dump slope failures, big or small, that were not widely reported. These tragedies could have been prevented if dumps were operated and managed properly in accordance with operation and safety standards such as those practiced in developed countries and advocated by the ISWA.

Many factors alone or in combination can lead to the structural failure of a dump, such as: (1) poor compaction of waste; (2) allowing the slopes of waste piles to become too steep; (3) placement of overly saturated waste with immediate or gradual reduced material shear strength; (4) the unplanned deposit of large volumes of "soft" wastes such as sludge from wastewater treatment plants or placement of highly organic and moisture-laden wastes close to the waste slope; (5) poor operating practices resulting in pockets of perched water from surface infiltration or ponding on relatively impervious soil cover layer within the waste mass; and (6) sustained heavy precipitation that runs onto and/or off of wastes deposited at a dump (an increasingly significant trigger of dump slides as climate change appears to spawn more extreme storms). In our opinion, at least 80% of these factors are preventable, manageable, and/or avoidable; thus, catastrophic waste slope failures and associated deaths are mostly preventable.

## TFCD

Due to the ever-growing amount of waste generated globally and the subsequent rise in uncontrolled dumping of waste in developing countries, it is imperative that we act quickly to create a practical approach that can be scaled up and shared more widely to mitigate the adverse impacts of improper handling of waste management. Recognizing the importance and broad scope of closing dumps, especially with their vulnerability to climate change,

contributions to marine litter, and links to environmental and public health risks, the ISWA announced the closing dumpsite initiative as one of its two flagship projects. The ISWA's WGL was charged to establish a TFCD aimed to work in conjunction with the other flagship project – the Task Force on Marine Litter. Collaboration amongst the other nine working groups' members will bring a diversity of ideas to the challenge of closing dumps and improving waste management as a whole.

The TFCD initiative's aim is to: (1) serve as the basis for fundraising and contacts with international stakeholders; (2) promote best practices of solid waste management (SWM) in developing countries; (3) present costs and benefits related to transitioning from dumps to engineered sanitary landfills; and (4) encourage more municipalities that currently rely on open dumps for disposal of their waste to participate in this initiative.

The TFCD began in July 2018 with a two-phased approach. The first phase is to conduct and present a scoping study of three successful case studies on closed dumps serving as a roadmap, and the second phase is to select a candidate dumpsite at which to conduct a feasibility study involving assessment of conditions, identification of dump closing alternatives and associated costs, and evaluation of the alternatives. Recommendations will include the presentation of a replicable model for use by other jurisdictions that also are considering closing their own dumps. The second phase will evolve over a three-year period.

To be considered as the candidate dumpsite under the second phase, the TFCD team requires that local government or authorities request the ISWA's assistance and demonstrate community support for a program to close and/or upgrade the local dump. The TFCD will engage the ISWA landfill experts with support and participation of locals in every step of the feasibility study. The study team will assist the owner or local authority to apply for funds from international sources to implement the study's recommendations. Through this TFCD effort, the team aims to create a replicable approach that can be applied to the closure of dumpsites in countries throughout the developing world.

## Status of progress

The ISWA's TFCD initiative and fundraising campaign seeks to:

- increase the ISWA's global visibility as the leading player in promoting public health and protecting the environment through SWM improvements;
- brand the ISWA as a positive contributor to SDGs;
- communicate its Scientific and Technical Committee mission and activities to a wider range of audiences, partners, and stakeholders; and
- establish new partnerships and networks in the developing world.

The TFCD has made steady progress on the closing dumps initiative since July 2018. In the first phase of the scoping studies, three successful closure case studies sites are presented:

- (1) Estrutural dumpsite, Brasília, Brazil;
- (2) Rautenweg landfill site, Vienna, Austria; and
- (3) Hiriya landfill site, Tel-Aviv, Israel.

Reports on these successful dump closure projects will soon be posted at the ISWA TFCD website ([www.closingdumpsites.iswa.org](http://www.closingdumpsites.iswa.org)). From these three sites, the Estrutural dumpsite in Brazil was the first success story supported by the ISWA's global campaign. The story of this site and the lessons learned about the social, political, and financial aspects were presented by Brazil's government officials at the 2018 World Congress in Kuala Lumpur, Malaysia. This case study aims to showcase a successful dump closure and focuses on climate benefits due to moving away from uncontrolled dumping of waste towards an integrated WMS. The results deliver a strong message: the forecasted reduction of landfill gas emissions shows a climate benefit of 60% by 2050 due to closing of the Estrutural dumpsite in January 2018, not accounting for future improvements of the waste management in Brasília. The Estrutural experience shows that closing a dumpsite can be realized in a relatively short period of time. Also, this example demonstrates the feasibility of steering a change of habits and working conditions involving the informal sector (scavengers) and integrating that group into the formal WMS.

The Estrutural dump closure case study shows what dramatic results are possible if there is political will and stakeholders' involvement in the process. If the biggest dumpsite in Brazil can be closed successfully, other dumps around the world can too.

The second phase of TFCD is currently underway. At this writing, the ISWA is looking to select a new candidate dump study site by May 2019. There will be an interim report on this new dumpsite with data collection and analysis, including gas emissions calculations using and adapting the UN Climate and Clean Air Coalition (CCAC) Solid Waste Emissions Estimation Tool for estimation of the total carbon emission reductions stemming from site closure. A final report of the investigation will be presented to its local municipal government or authority with a preliminary plan on closing the dumpsite (for example, the total cost, landfill closure efforts with gas capture and use, leachate treatment, equipment needed, calculation on total carbon emissions averted, etc.). The TFCD will produce this report for international dissemination. In addition, a replicable model is to be produced for use in applying for further international funding for further dump closure efforts at other locations.

The interim report will be released at the 2019 World Congress in Bilbao, Spain, and the final report and the replicable model is scheduled for release at the 2020 World Congress in Rotterdam, Netherlands.

## Funding opportunities

So far, the TFCD has received funding of US\$100,000 from the UN CCAC to support creation of the above-mentioned interim and final reports to be produced at a selected site (yet to be determined), including creating a cost-benefit analysis for closing the selected dump. The final report would consider alternative WMSs based on site-specific needs as well as a strategy for the development of the

dump's replacement, for example, appropriate facets of an integrated WMS with a sanitary landfill for residuals.

Potential additional internal and external funding is expected from ISWA National Members and interested donors. To this end, a website has been created to facilitate large and small donations by anyone seeking to support the ISWA's mission to close open dumps ([www.gofundme.org/closing-dumpsites](http://www.gofundme.org/closing-dumpsites)). The ISWA will also sponsor capacity building workshops and trainings at the selected site to provide local authorities and decision-makers with tangible short-term actions that can be taken. These workshops and trainings are meant to be coupled with site visits by ISWA experts. In addition, the TFCD will create a strategy for informing the public of the urgency of closing dumps and presenting the project deliverables to all involved at the selected site.

The TFCD is looking for additional funding and donors, and aims to raise a total of 245.000 € from external funding to realize the baseline objectives of the first closure feasibility study project. Depending on the project's success, the suggestions and analyses will be used for separate project proposals for development aid associated with dump closure.

## Help desk

The TFCD plans to set up a help desk at its website ([www.closingdumpsites.iswa.org](http://www.closingdumpsites.iswa.org)) to centralize queries and present frequently asked questions regarding dumpsite closures, and to facilitate contacts between ISWA experts and individuals seeking help. With time, this will serve as a comprehensive knowledge bank for any inquiries regarding the subject of closing dumps.

*Waste Management & Research* (WM&R) has published many papers addressing open dump issues, including Blight (2008), Cardarelli and Di Filippo (2004), Mehta et al. (2018), and Sharma and Chandel (2017). Researchers are encouraged to continue conducting and reporting on related research in WM&R, in support of the ISWA's closing open dumps initiative.

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