



## City Knowledge Exchange Series

This series, developed by the USAID-funded Building Healthy Cities (BHC) project, highlights city-led efforts to improve urban health in three BHC partner cities: Indore, India; Makassar, Indonesia; and Da Nang, Vietnam. While no USAID funds were used to complete these particular efforts, BHC is sharing these successes with other project cities and investors to explore how to scale up these initiatives.

# TURNING WASTE INTO WONDER

How Indore transformed a dumping ground into a beautiful garden

In recent years across India, waste collection efficiency has increased, but the efficiency of waste disposal has remained low. As a result, municipal solid waste has been dumped at disposal sites and scattered across cities and towns without planning. In Indore Indore, India, the Municipal Corporation (IMC) faced a similar challenge at the dumping ground at Devguradia, a 100 acre landfill within the city limits, which took in waste for over 50 years. The overload of municipal solid waste led to frequent fires at the dumping ground that affected air quality and were difficult to control due to hidden methane pockets. The dumping ground also posed serious health hazards for those living nearby; children living near landfills are more likely to have reduced lung function, while women experience an increased rate of certain cancers.<sup>1,2</sup> In 2016, the Mayor and the Commissioner of IMC began a bioremediation initiative at Devguradia. Bioremediation generally involves using natural organisms or processes to eliminate environmental pollutants in order to clean up a polluted site.









The Devguradia site before bioremediation. Source: Shankar Mourya (Hindustan Times)

In Indore, IMC contracted with E-Tech Projects Private Limited, Bikaner for the bioremediation process. IMC deployed over 200 workers, 10 rotary screens, 15 horizontal screens, and more than 50 excavators. Progress was monitored daily by a team lead by the IMC Commissioner.

The bioremediation treatment process began by dividing the site into blocks and assessing the top layer of waste, which was then stabilized through herbal/biological sanitizers. Next, waste was raked to remove plastic, rubber, textiles, rags, and other materials. The waste was then further sorted through rotary or horizontal screens, and the recovered earth was spread over the site. Stones, bricks, and ceramics that were removed were sent for use as construction landfill. Recyclables such as plastic, glass, and metal were bundled to be sold or disposed of properly, while leftover waste was sent to a landfill. The soil recovered was used to refill the ground where a granary is being developed.<sup>3</sup>

As of December 2018, approximately 1.5 million metric tons of land had been recovered through bioremediation. To ensure that waste dumping does not return, Indore has separated the processing of dry and wet waste across the city.



The Devguradia site after bioremediation. Source: Indore Municipal Corporation

#### **History**

Following a visit to the dumping ground in 2016, the IMC Commissioner personally took on this challenging project. He met with experts, the additional commissioner, and others to learn about bioremediation. Additionally, an annual survey of cities and towns (Swachh Survekshan) is conducted across India to assess cleanliness, sanitation, and hygiene. In 2017, the survey findings highlighted legacy waste as a concern. Legacy waste includes waste that remains for many years, sometimes in dedicated places like landfills, or on barren land.<sup>4</sup> These survey findings spurred the Mayor of Indore and the IMC Commissioner to continue to prioritize bioremediation.

#### Funding

This activity was approved by the Mayor, and IMC used their own funds to remediate the waste. No outside funding was utilized. Since the dumping ground was restored, IMC has maintained the resulting garden with their own resources. In total, from 2016-2018, the bioremediation process cost IMC just under Rs 10 crore, or about US\$13 million.<sup>5</sup>



#### **Public Response and Benefit**

One hundred acres of land, worth Rs 400 crore (US\$52 million), was restored through this effort, and discussions are underway to decide how to repurpose these newfound natural resources.<sup>5</sup> An additional 20 cities have started similar programs on the heels of this success.<sup>3</sup> Citizens of Indore have responded very positively to the restoration of the former dumping ground. "Most importantly, we have been able to control the smell that came out from this place. The smell at this place was unbearable two months ago," said Bharat Singh Chouhan, a sanitation inspector, to the Times of India in 2017.<sup>6</sup>

Other public benefits of this work included:3

- Eliminating dump-related air pollution and the foul smell.
- Reducing diseases related to dump hazards, such as skin rashes among children due to contaminated groundwater.
- Eradicating dump fires and chemical leaching.
- Decreasing methane and other emissions, soil pollution, and ground water contamination.
- Increasing value of nearby real estate.
- Developing green spaces and planting 60,000 saplings.

Indore is not done yet – IMC is planning to continue to add trees and features to Devguradia to turn it into an urban forest by the end of 2020.<sup>7</sup>

#### JSI RESEARCH & TRAINING INSTITUTE, INC.

2733 Crystal Drive 4th Floor Arlington, VA 22202 USA Phone: 703-528-7474 Fax: 703-528-7480 Web: <u>www.jsi.com</u>

This report is made possible by the generous support of the American people through USAID. The contents are the responsibility of BHC and do not necessarily reflect the views of USAID or the United States Government.

### BUILDING HEALTHY CITIES

<sup>&</sup>lt;sup>1</sup> Yu et al. 2018. "Effects of Ambient Air Pollution from Municipal Solid Waste Landfill on Children's Non-Specific Immunity and Respiratory Health." *Environmental Pollution* 236 (May): 382–90. <u>https://doi.org/10.1016/j.envpol.2017.12.094</u>. <sup>2</sup> Vrijheid, Martine. 2000. "Health Effects of Residence near Hazardous Waste Landfill Sites: A Review of Epidemiologic

Literature." Environmental Health Perspectives 108 (suppl 1): 101-12. https://doi.org/10.1289/ehp.00108s1101.

<sup>&</sup>lt;sup>3</sup>"Bioremediation/Bio Mining of Legacy Waste: Deoguradia." n.d. Accessed June 29, 2020.

https://smartnet.niua.org/csc/assets/pdf/waste/CS4.pdf.

<sup>&</sup>lt;sup>4</sup>"Legacy Waste." 2020. Drishti IAS. <u>https://www.drishtiias.com/daily-updates/daily-news-analysis/legacy-waste</u>. <sup>5</sup> "Indore Does Away with Waste of 15 Lakh MT on Its Landfill and This Is How the Empty Space Is Being Used." 2019. NDTV-Dettol Banega Swasth Swachh India. <u>https://swachhindia.ndtv.com/indore-does-away-with-waste-15-lakh-mt-on-landfill-</u> <u>this-is-how-empty-space-used-30367/</u>.

<sup>&</sup>lt;sup>6</sup> Kishore, Shubham. 2017. "Residents near Trenching Ground Finally Get Fresh Air to Breathe." *The Times of India*, January 18, 2017. <u>https://timesofindia.indiatimes.com/city/indore/residents-near-trenching-ground-finally-get-fresh-air-to-breathe/articleshow/56640354.cms</u>.

<sup>&</sup>lt;sup>7</sup> "Indore Trenching Ground: Masterstroke for Survekshan 2020." 2019. *Indore Talk*. <u>https://indoretalk.com/indore-</u> trenching-ground-reclaim-100-acre-land-developing-city-forest/.

Building Healthy Cities (BHC) is a five-year cooperative agreement funded by the United States Agency for International Development (USAID) under Agreement No. AID-OAA-A-17-00028, beginning September 30, 2017. BHC is implemented by JSI Research & Training Institute, Inc. (JSI) with partners International Organization for Migration, Thrive Networks Global, and Urban Institute, and with support from Engaging Inquiry, LLC.