

Air Pollution in Delhi

Implementing a Daily Waste Collection Service That Sorts, Repurposes and Redistributes Waste in Delhi to Reduce Waste Burning and Air Pollution

TKS

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Executive Summary

PROBLEM

Delhi burns 149,068 tons of waste generated annually, contributing to 29% of PM2.5 emissions which cause 54,000 annual deaths.

To dispose of their waste, people burn it, which releases hazardous particulate matter. Open waste burning accounts for up to **25% of CO2** emissions, which are 65% responsible for the Earth's increase in temperature. Waste incineration also contributes to **29% of PM2.5** emissions. This particulate matter has been determined to cause 24% of mortalities due to **lung cancer** and 40% of **stroke**-related deaths.

SOLUTION

A daily waste collection service that sorts, repurposes, and redistributes waste to reduce waste burning.

Our recommendation establishes a **daily waste collection** system in which waste is collected from households and corporations, redirecting it from overflowing landfills. This waste is then sent to locally-collaborating facilities, recycled, and sold as raw material through partnered organizations. The profit would be distributed to the waste collectors and recycling facilities. Through a WhatsApp service, our plan would gradually introduce **education-based tactics** to spread awareness to reduce waste burning, while focusing on making an impact.

IMPACT

Air pollution reduced by up to 30%, and 5,050 unskilled jobs created in Delhi by 2024.

Waste burning will be significantly reduced, decreasing levels of **PM2.5** in the air by 20 to 30% in Delhi. Our recommendation also leads to:

- A circular economy with **5,050** new waste-collector positions
- Lowered incident rates of cardiopulmonary and neurological diseases as well as mortality
- Increased awareness through an educational **WhatsApp** service
- Reduced effects of water shortage and **agricultural burning** through redirected waste from water-polluting landfills

INDIA

Behind The Problem

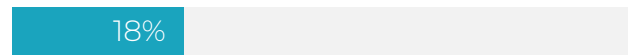
Waste Burning in India

60,225,000 tons of waste is generated in India annually, and up to **24%** of that can be burned, depending on the city.

Waste is mostly burned due to inadequate waste collection services and **overcrowded landfills**.

Although up to 90% of India's waste can be repurposed, lack of education on how to sort the waste contributes to **77% ending up in landfills**.

Deaths in India caused by air pollution



Population who live in areas where air quality is below WHO standards



DELHI, INDIA

Behind The Problem

149,068 tons of waste are burned every year in Delhi, contributing to the release of **8,378 pounds** of particulate matter, which can be a main factor of up to 40% of cardiopulmonary and neurological mortalities.

Not only does waste burning directly affect air quality levels, but the lack of waste management also contributes to water shortage and agricultural burning.

3 Main Overflowing Landfills



Water Pollution & Shortage



Government Law of Planting Crops Only During Monsoon Season



Agricultural Burning (**40%** Contribution to Air Pollution in Delhi)



¹Dhruv is a middle-aged, low income citizen, living with his wife and three children in New Delhi.

Much like most of the population in Delhi, he does not fully understand the severity of the health effects that hazardous air quality can lead to, as he is habituated to the pollution.

UNDERSTANDING THE CLIENT

Meet Dhruv Das

Dhruv has resorted to burning his trash due to **inadequate access to a waste service**. He is aware of the effect it has on the city's air quality, but feels like he has no other choice but to eliminate his waste by burning it.

Dhruv works a full time job to provide for his wife and children. His priority is providing and caring for his retired parents. He does not have the time or money to take part in sustainable activities, like **sorting his waste** into the proper categories.

“ *I always knew burning my waste would harm the environment, but I never understood how how severely it affects me and my family...* ”

DHRUV'S ANNUAL INCOME
COMPARED TO DELHI CITIZENS 204,200 RS²

CHANCE OF DEVELOPING A
SICKNESS AFTER BURNING WASTE 80%

¹All information is based off of multiple sources. Dhruv is fictional.

²Approximately 2,674 USD.

5 PHASE PLAN

Solution Overview

Phase 1

Pilot project in New Delhi

Waste collected door-to-door is sorted, repurposed and redistributed



Phase 2

Expansion to Delhi

Same system is introduced in Delhi on a larger scale

Phase 3

Introduction of education services

Digital newsletter and incentivizing service through WhatsApp

Phase 4 & 5

Launch in other regions

Waste-burning regions in India and elsewhere in the world are targeted

Phase 1



EXPANSION TO DELHI

Phase 2

Following the project in New Delhi, the system would be adapted to operate in Delhi.

We would use data from the pilot project to modify the service in order to suit the city of Delhi.

This second part of the project would focus on the creation of **new jobs**, as well as planning for the education service on Whatsapp and **spreading awareness** alongside Earth5R.

Phase 2 would start **September 1st, 2022**, using the first two months to hire waste collectors, and the next ten months to develop the system.



Employees & Waste Collection

An additional **9,000** employees, collecting waste from **620** households daily



Waste Management Facilities

In Phase 2, **three** more waste management facilities will be added to the system across Delhi



Education Service

Preparation for Phase 3 will begin, including finalizing content and beginning advertisement with **Earth5R¹**



Compost Management

Both recyclable and compostable materials will be added to this process, diverting **80% of all waste** from landfills

¹Earth5R would be responsible for any advertising costs

Phase 3

Easy to Read Facts

Simple language will be used to ensure everyone understands the problem and feels motivated to act



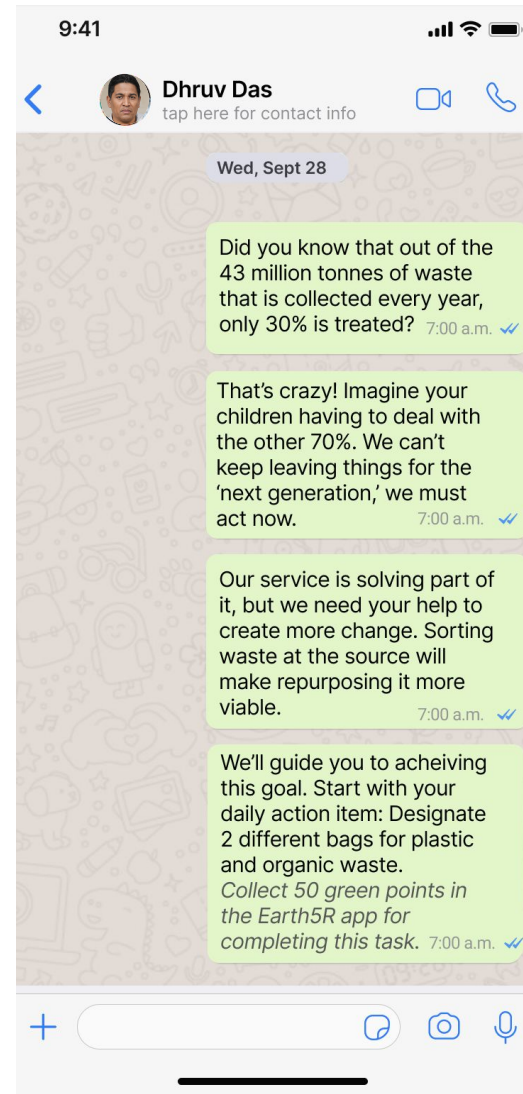
Variety of Languages

The newsletter will be offered in both English and Hindi, in order to reach most of the Delhi population



Incentive to Subscribe

The service will inform people of the impacts each individual could make by taking part in sustainable activities



Daily Action Items

Every day a rewardable action item will be provided to guide users toward a common goal



Sent to Your Device

Since daily messages will be sent right to the user's WhatsApp, absorbing information will be quick



Earth5R Partnership

[Earth5R](#) will use their services and new app to spread awareness and increase volunteer-based action.



EXPANSION TO INDIA

Phase 4



April, 2024

Mumbai, Maharashtra

2,744,755 Tons/Year

Mumbai is the largest waste producing city globally, burning **329,370** tons annually. Landfill sites account for 10% of total burning, while the remaining 2% is burned by households.



April, 2025

Agra, Uttar Pradesh

371,205 Tons/Year

Agra burns **24%** of its waste produced annually, contributing to **700 premature deaths** in the area, as well as significant discoloration of the Taj Mahal, a popular tourist destination.

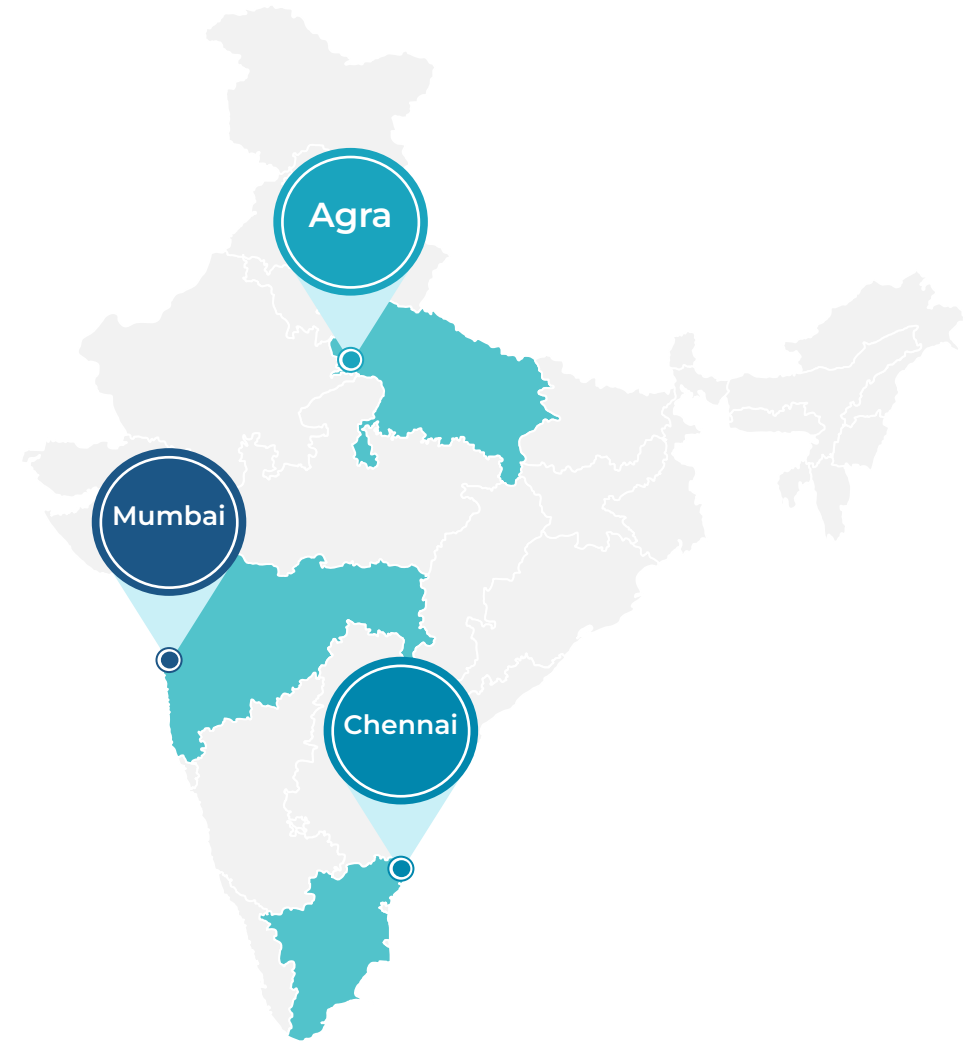


April, 2026

Chennai, Tamil Nadu

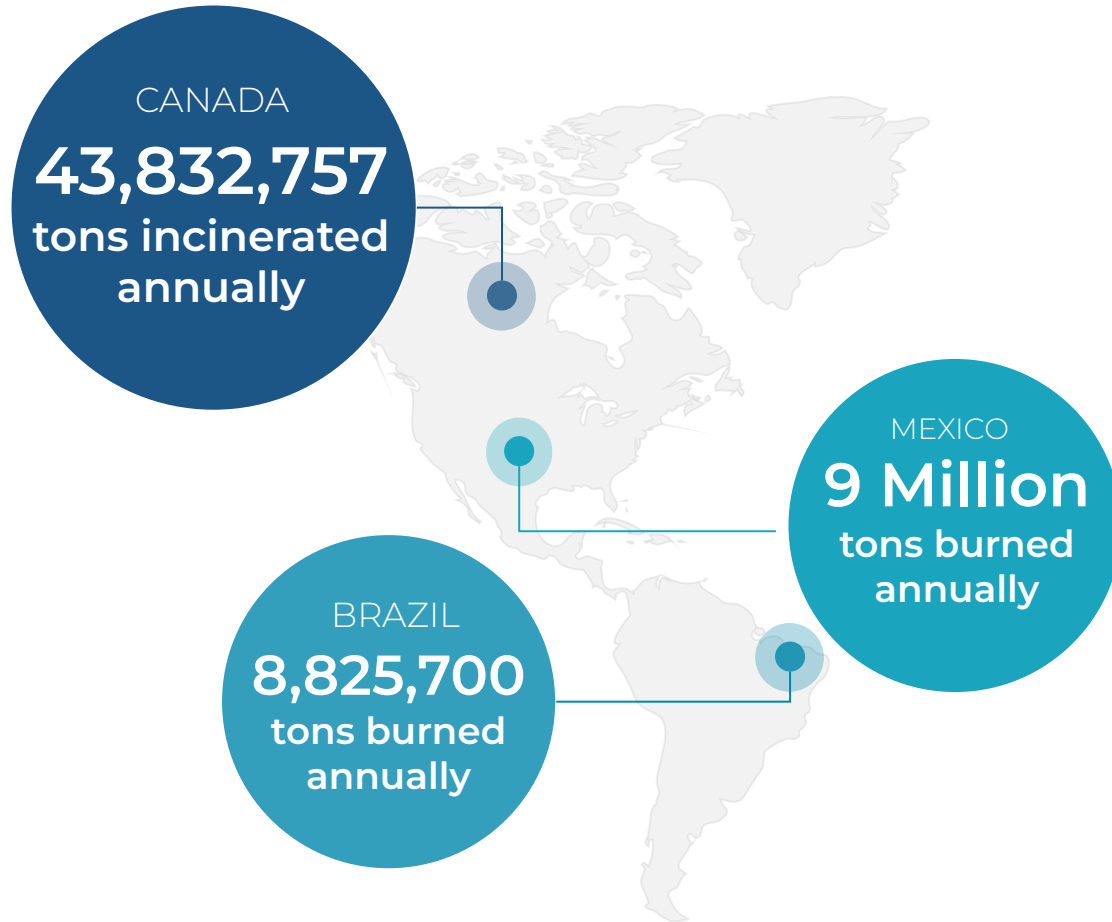
2,017,230 Tons/Year

The informal waste service industry includes more than **2,000 waste collectors** who pick and sell trash as a living. Our system offers potential to provide more jobs with better pay.



EXPANSION WORLDWIDE

Phase 5



● Canada ● Rural Brazil ● Mexico



A Global Problem

2 billion people don't have access to waste collection services, resulting in an estimated **2.2 billion tons** of plastic that will be open burned by **2040**.



Mexico 2027

In some parts of Mexico City, a few street cleaners collect and sort solid waste for recycling. Adapting our service will create a more **efficient system**.



Rural Brazil 2029

There is a significant lack of waste management services in rural areas of Brazil, leading to **62% of waste being burned** or buried. Our service can be introduced in these areas with links to larger cities.



Canada 2031

Canada is the largest waste producer and incinerates **3%** of its waste. Incineration has harmful effects on **human health and agriculture**, making the adaptation of our system safer and more effective.

Implementation Timeline



Meet Anita Agarwal



Employee System

In Delhi, there would be **9,100** total waste collector employees. Each employee would collect waste from **620 households**, most of which are grouped together in around 10,000 slums within a specific community. The waste would be collected on a **daily basis** and employees would arrange for their own transportation to collect waste.



Employee Income

Each employee would start by being paid **₹300 000¹ annually**, which is the salary of an average waste collector in India. As employees gain experience, they may enter a senior position in which they will be paid up to **₹400 000² annually**. This salary would provide employees with an increased source of income.



Employee Demographic

The employee demographic would mainly be middle-aged to older individuals with limited education. This includes the estimated **1.7 million** people living below the poverty line in Delhi. By targeting this specific demographic, we would be able to improve the standard of life for more than 9,000 people living in poverty.



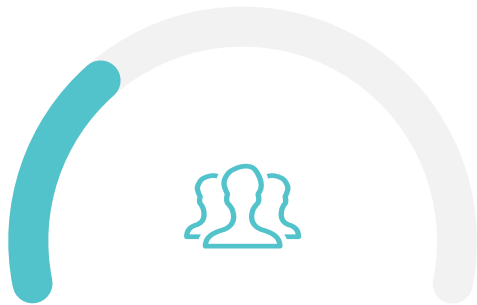
Anita is a middle-aged, low-income resident in New Delhi. She works as a maid, but usually does not make enough to make ends meet for her family. She has limited education, and is part of the population that lives below the poverty line in Delhi. This position as a waste-collector would provide her with the opportunity for an unskilled job, and an increased source of income.

¹ Approximately 3,900 USD

² Approximately 5,200 USD

DELHI, INDIA

Impact & KPIs



30%

Improved Air Quality

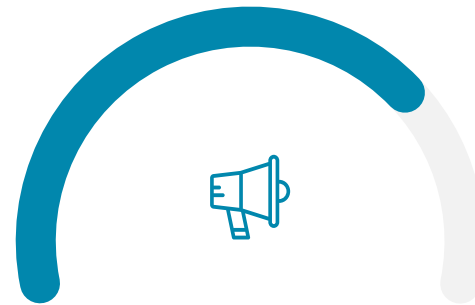
Waste burning will be substantially reduced, lowering levels of PM2.5 emissions by **20 to 30%**. This will also lead to a significant decrease in cardiopulmonary and neurological morbidities as well as mortality.



7%

Unskilled Job Opportunities

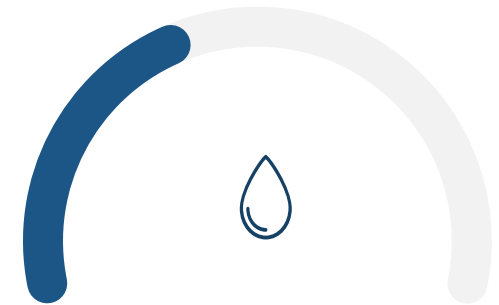
5,050 new waste collector positions will be generated. This will create a **circular economy**, and provide people below the poverty line with an increased source of income, while expanding the number of jobs in Delhi by 7%.



64%

Increased Awareness

Up to 64% of India can be reached through WhatsApp and will be **better educated** on the effects of hazardous air quality. They will be motivated to take action by participating in the **accessible collection service** to avoid waste burning.



40%

Less Agricultural Burning

By redirecting waste from water-polluting landfills, the effects of water shortage will be reduced. This will also lower levels of **agricultural burning** by up to 40%, which is due to government policies that were caused by water shortage in India.

From The Experts



Rishabh Raj

**Environmental Engineer
In Sustainability**

"Whenever there is a system available, people do it [sort waste]."

"There is a large amount of revenue opportunities."

"It [our system] has the potential to **reduce 80 to 90%** of the waste."



Sunil Dahiya

**Analyst, Centre for Research on
Energy and Clean Air (CREA)**

"That's a really nice idea, and I think **that's doable in Delhi**. And obviously Delhi has started to do segregation and all those things, but if it's more organized—more regulated—I think that will definitely help. "



Nick Nesbitt


**Business Development Manager
at StormFisher**

"Your ideas are fantastic, and I think you are on the right track with wanting to create businesses around waste. That's what will really get people involved."


**I think that would be
amazing."**

Next Steps & People To Contact


Here is all of the information you may need to move forward with this project, as well as playbooks explaining the details of our waste management system.

 Where can I find some more information on the process of repurposing waste, and the financial implications of it?


[Repurposing Waste](#)

 How did you calculate the number of employees and cost?

[Complete Calculations](#)

 Where can I find details about Earth5R and the partnership in Phase 3?

[Earth5R Partnership](#)

 What sources did you use for research and data?

[Data Resources](#)



Saurabh Gupta

Earth5R
Founder



Andrew Almack

Plastics For Change
CEO



Administration

Recycle India Foundation
Office Admin



We have reached out to the contacts above and they are open to partnering with the UN to help implement this recommendation.

THANK YOU UNITED NATIONS

Personal Note



Aarya Jagdale



Angelyn Joseph



Ishaal Ali



Kshirin Anandkumar



We would like to thank the UN for giving us the opportunity to work on this proposal to spread awareness about air pollution and drive real change. We are deeply inspired by the work the UN is doing to solve important problems around the world! We are truly grateful for this amazing learning experience, and it has enabled us all to grow so much in the process. We hope our recommendation provides value to solve this problem. If you have any questions, feel free to reach out and we would love to answer them!