THE GLOBAL STOCKTAKE
CLIMATE DATATHON

PROMPT OWNER

Climate TRACE

PROMPT TOPIC

Filling gaps in global landfill datasets

PROMPT DATASET

https://docs.google.com/spreadsheets/d/1RyiZbxDNlLmXRIN_JWI1PZRsLEztc1R0DssMzPytXns/edit#gid=354041464

TOPIC BACKGROUND

Landfill and solid waste management emissions are one of the largest contributors of emissions globally, accounting for around 11% of global methane emissions. They also remain hard to measure and accurately estimate, given the challenges of the sector – such as incomplete lists of landfills/dumpsites, outdated or lack of information on their volume or annual waste growth rate.

Climate TRACE has aggregated available global landfill data (location, volume, capacity, etc) from multiple sources, but the dataset remains incomplete in some respects:

1. The metadata for the known landfills, which is crucial to estimating emissions, are incomplete, outdated or use average values;
2. It is not a complete list of all landfills/dumpsites in the world;

MAIN PROMPT QUESTION/CHALLENGE

Can current global landfill datasets be improved on by incorporating information from other sources such as government websites, municipal websites, non-English websites, or even newspapers?

SUPPLEMENTARY QUESTIONS

1. Could any of the blanket assumptions that tend to be taken for multiplicative factors, such as degradable organic carbon, organic waste subcomposition, be improved on to capture more variance within a given region?
2. Are there other sources of landfill or related data that can be incorporated into this dataset to improve global understanding of methane emissions from landfills?

OPPORTUNITIES AND CHALLENGES WITH THE CURRENT DATA:

Given the data available, a mix of land area, waste in place, and annual capacity for incoming waste, most of which are 1-10 years old, any insightful approaches to capture the unknowns of landfill evolution would be invaluable to advancing the sector. Particularly, any method more sophisticated than backward and forward filling waste in place and capacity based on average annual waste generation growth rates aggregated roughly by world region.

The ideal output from submissions would be the following, in order of priority:

1. Updated metadata for the known landfills in the dataset, specifically, the waste in place and annual capacity for as many locations as possible [columns M, N or O in the dataset].
2. New landfills added to the list with as complete metadata as possible (larger landfills the priority).
3. Improving the currently used IPCC values to country or subnational values to country-specific or subnational-specific values [Columns P to W in the dataset].

Please document all data sources. If any of the submitted data are used by us, full attribution will be given to the authors in the methodology documentation.

APPENDIX: SEE ATTACHED

Appendix - Data tables and variables

Field	Definition
name	Name of the landfill
source	Source of the data
country	Country
location	Latitude and longitude in WKT format
category	Sanitary landfill, dumpsite, other
known_area (ha)	Facility areas as published by the data sources
known_status	Active, under construction, unknown, or inactive at time of waste in place year
year_opened	Known year opened/started accepting waste
year_closed	Known year closed
known_waste_in_place_year	Year where known waste in place and capacity values were published
known_waste_in_place (t)	Total waste, at the time of waste in place year
known_annual_capacity (t/yr)	Annual incoming waste, at time of waste in place year
updated_waste_in_place_year	Year for updated information where available
updated_waste_in_place (t)	Updated total waste in place
updated_annual_capacity (t/yr)	Updated annual incoming waste
pct_CH4	Percent of landfill gas that is CH4, only known for many EPA sites, otherwise assumed to be 50% by IPCC standards
MCF	Methane correction factor, see IPCC documentation attached for more info. MCF = 1 for sanitary landfills, MCF = 0.6 for dumpsites/unknown status where HDI > 0.8, MCF = 0.4 for remaining sites where HDI < 0.8.
fraction_paper_textiles	Fraction of waste estimated to be paper and textiles (A), uses World Bank “What a Waste 2.0” reported regional average for fraction.
fraction_organics	Fraction of waste estimated to be food and non-food organics (B), uses World Bank “What a Waste 2.0” reported regional average for fraction.
fraction_wood_straw	Fraction of waste estimated to be wood and straw (C), uses World Bank “What a Waste 2.0” reported regional average for fraction.

DOC	Degradable organic carbon, calculated using fractions of waste types. DOC = 0.4*A + 0.32*B + 0.3*D.
DOCf	Fraction of degradable carbon that is eventually dissimilated, used 0.55 as midpoint of IPCC best practice range of 0.5-0.6
LFG_frac_collected	For EPA, uses "LFG Generated" and "LFG Collected" to get fractional difference; for GPW sites and Waste Atlas dumpsites, assumed 0; for Waste Atlas sanitary landfills, use IPCC default value of 0.2
LFG Generated (mmscfd)	Landfill gas generated (million standard cubic feet per day) published in EPA LMOP dataset
LFG Collected (mmscfd)	Landfill gas collected (million standard cubic feet per day) published in EPA LMOP dataset

Relevant documents/sources:

- Original 2006 IPCC guidelines: https://www.ipcc.ch/site/assets/uploads/2018/03/5_Waste-1.pdf
- 2019 updates to IPCC guidelines: https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/5_Volume5/19R_V5_3_Ch03_SWDS.pdf
- World Bank "What a Waste 2.0" (go to "Read Publication"): https://datatopics.worldbank.org/what-a-waste/
- Waste Atlas site: http://www.atlas.d-waste.com/
- EPA LMOP site: https://www.epa.gov/lmop/landfill-technical-data
- Global Plastic Watch: https://globalplasticwatch.org/