Mauritius

A SIDS Solid Waste Management Paradigm

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Agenda

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3. *Stakeholder Mapping*
4. *Country Context Issues and Challenges*
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6. *Landfill overview / process / challenges*
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Waste Management & Recycling Regulations

- ***Parent Ministry:*** *Ministry of Environment, Solid Waste Management & Climate Change*
- *The Solid Waste Management Division under Ministry responsible for SWM at national level.*
- *Depending on projects, other Ministries such as Finance, Local Govt, PMO ..would be roped in*
- *Waste Management & Resources Recovery Act 2023*
  - ❑ ***Act Provision:*** *Provides regulatory framework to ensure the safe and sound management of solid and hazardous wastes and a sustainable waste management system through the adoption of a circular economy approach focusing on waste reduction, reuse, material recovery and recycling*
  - ❑ ***Focus Areas****: commercial waste; waste prevention and awareness programmes to inform the public of the impact of waste on health and the environment; interference with the ecological systems; hazardous waste; household waste; industrial waste, including waste arising from agricultural activities, and the supply of electricity to the public; solid waste; recycling activity; transboundary movement of hazardous waste.*
  - ❑ ***Powers****: Licensing, registration and enforcement; prohibition notice; offences and penalties; extended producer responsibility; prevention of pollution; Ministerial power to issue Regulations and the matters provided therein; amendment of the Local Government Act, the Environment Protection Act, and the Dangerous Chemicals Control Act.*

Planning Framework

- Strong legal and planning framework promoting the circular economy approach and aiming to achieve the UN Development Goal 12 target of "By 2030, significantly reduce waste generation through prevention, reduction, recycling and reuse"

- As per EU Multi-annual Indicative Programme, objective is to divert 70% of waste from landfill by 2030, including through composting plants, sorting units, biogas plants and waste-to-energy plants, and by using anaerobic digestion.

- A Solid Waste Management Strategy and Action Plan focusing on resource recovery and recycling, developed with the support of AFD.

- Legal and regulatory framework for SW includes several texts specific to plastic waste a.o:
  - Environmental Protection Act 2002, as amended in 2008.
  - Local Government Act 2011, as amended in 2018.
  - The Environmental Protection (Plastic Bags Ban) Regulations (2020).
  - The Environmental Protection (Control of Single-Use Plastic Products) Regulations (2020).

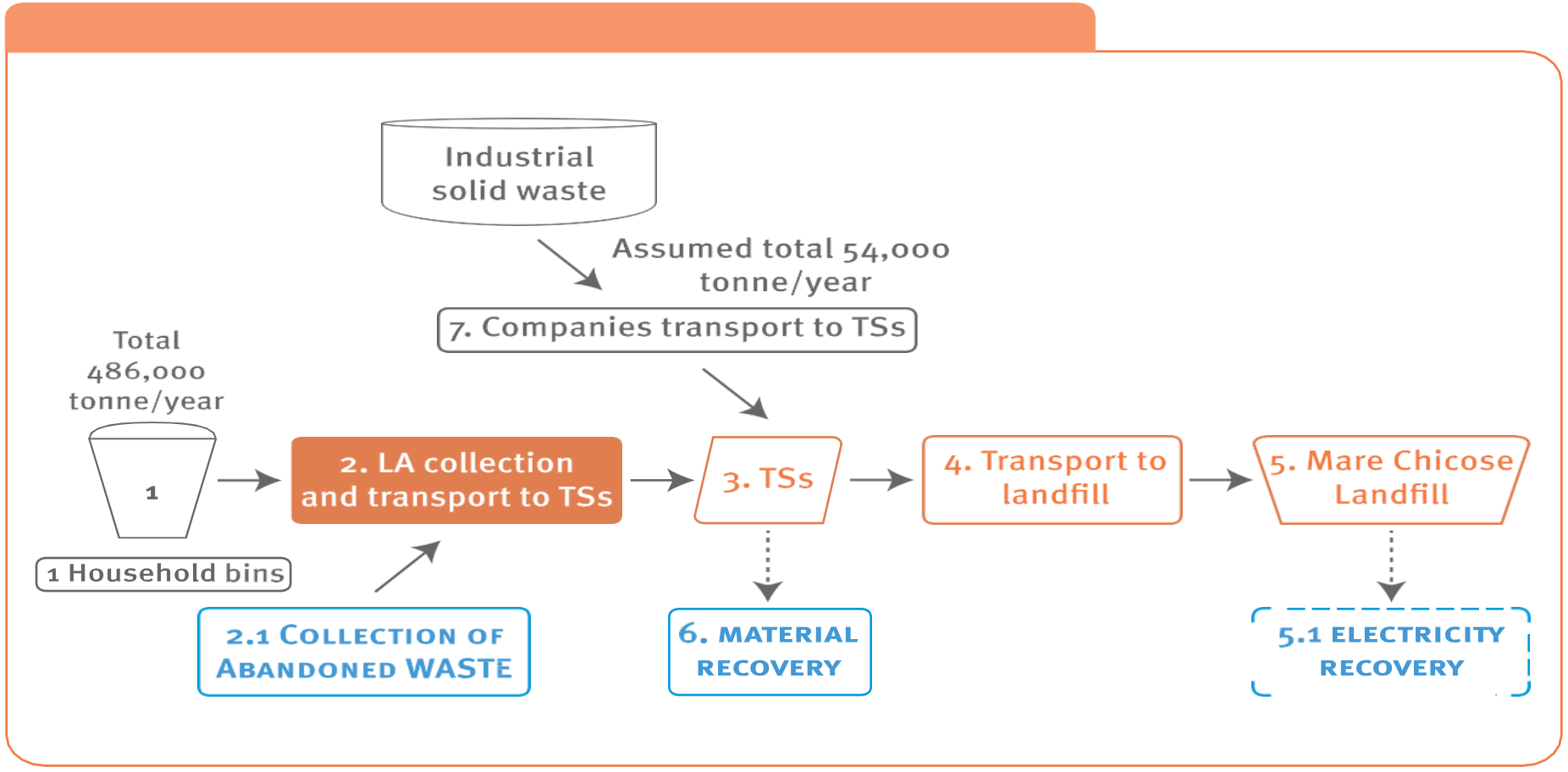
Stakeholders Mapping

- *Government of Mauritius and parent Ministry*
- *UNIDO (United Nations Industrial Development Organisation)*
- *UNEP (United Nations Environment Program)*
- *UNDP (United Nations Development Program)*
- *AFD (Agence Francaise de Development)*
- *EU (European Union)*
- *PAGE (Partnership for Action on Green Economy)*
- *Business Mauritius and private sector companies*
- *General Public / Consumers (NGO, Activism etc.)*

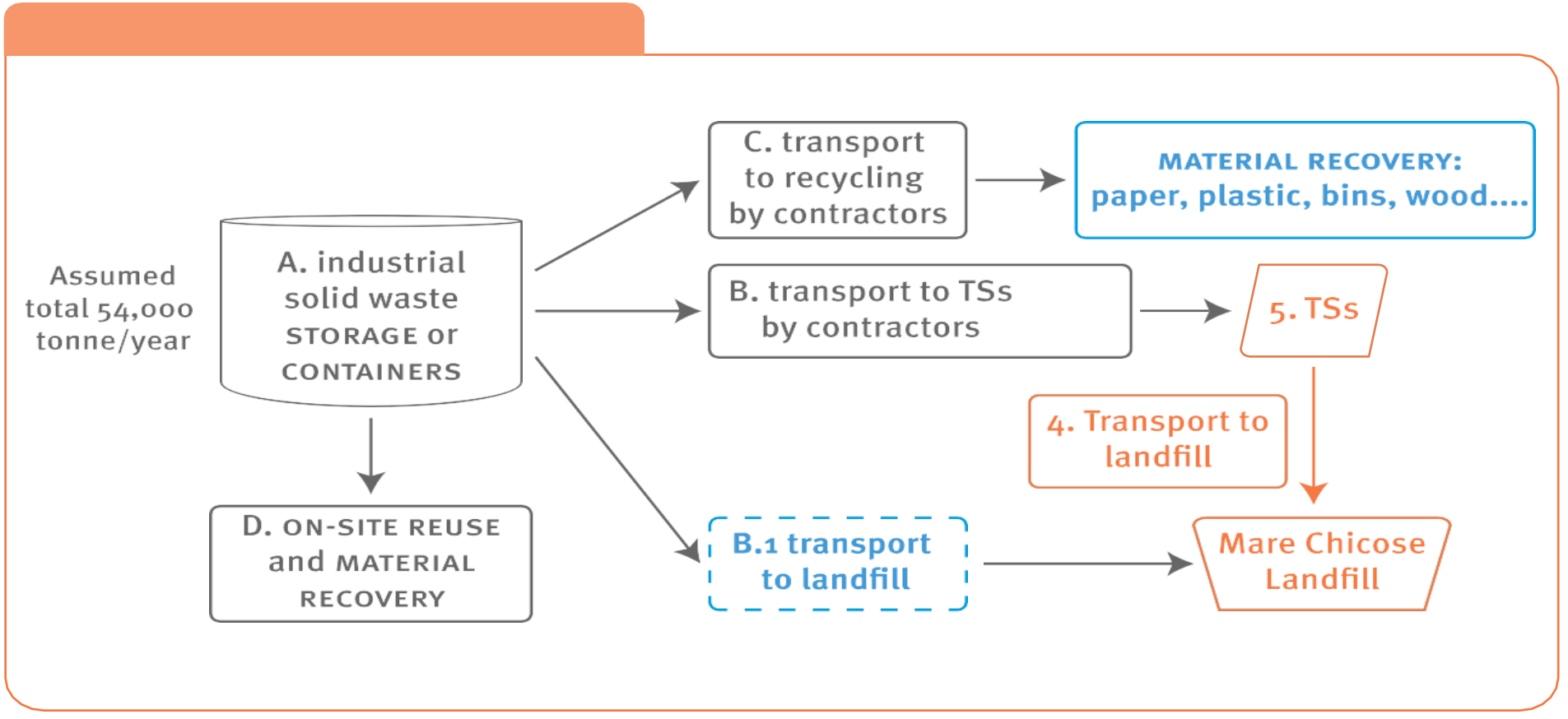
Country Context & Challenges

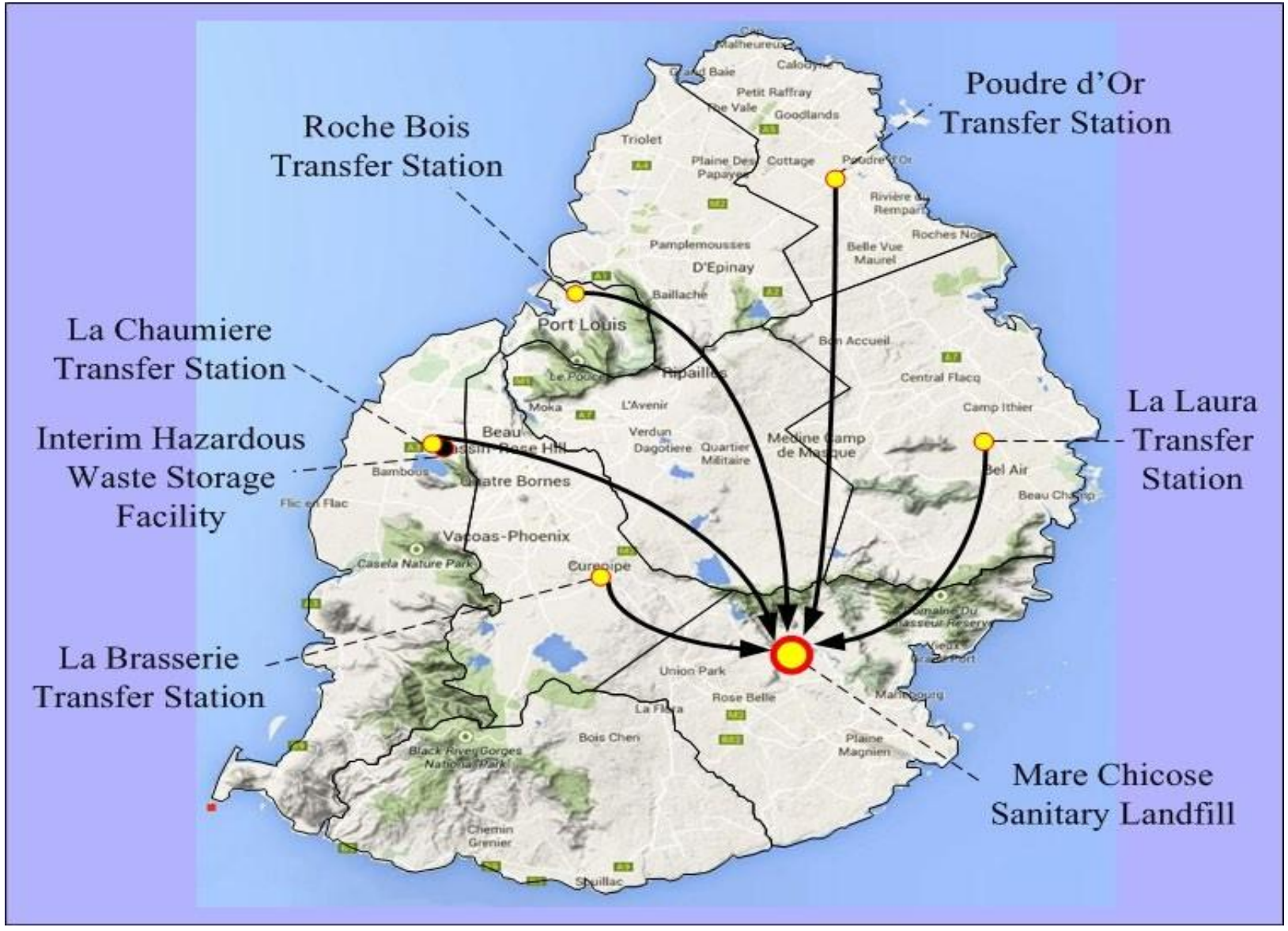
- Mauritius is an island nation in the Indian Ocean under SIDS
- Average amount of SW waste per capita at 1.18 kg/day i.e 543 000 t/year
- Given its level of development and consumption, high unit rate compared with Africa – GDP / capita ($ 12,000 – 2024)
- For most waste streams, island-based solutions need to be searched.
- Challenging for some waste streams, since economies of scale
- SW generation increased by 29% between 2010 and 2020, and by more than 100% over the last 20 years.
- It is expected that the quantity of domestic and commercial waste will increase in 2030 by 35% (medium growth) compared to 2019
- Total volume generated of 694 871 tons/year in medium growth scenario
- Household and commercial waste represents 95% of the total volume generated at national level.
- The domestic and commercial waste is collected on a door-to-door basis at least once a week throughout the island.

SWM System



- Above is a schematic diagram of the SWM system
- Includes municipal, abandoned and industrial waste and run by the public sector
- At present, waste is either recycled (at a very small percentage) or landfilled.


Assumed total 54,000 tonne/year
A. industrial solid waste STORAGE or CONTAINERS
C. transport to recycling by contractors
MATERIAL RECOVERY: paper, plastic, bins, wood....
B. transport to TSs by contractors
5. TSs
4. Transport to landfill
D. ON-SITE REUSE and MATERIAL RECOVERY
B.1 transport to landfill
Mare Chicose Landfill


Roche Bois
Transfer Station
Poudre d'Or
Transfer Station
La Chaumiere
Transfer Station
Interim Hazardous
Waste Storage
Facility
La Laura
Transfer
Station
La Brasserie
Transfer Station
Mare Chicose
Sanitary Landfill
Port Louis
Triolet
Goodlands
Petit Raffray
Plaine Des Papayes
Cottage
Pamplemousses
D'Epinay
Baillache
Ripailles
Moka
L'Avenir
Verdun
Dagotiere
Quartier Militaire
Medine Camp de Masque
Central Flacq
Camp Ithier
Bel Air
Beau Champ
Quatre Bornes
Bambous
Flic en Flac
Vacoas-Phoenix
Casela Nature Park
Curepipe
Union Park
Rose Belle
La Flora
Bois Cheri
Plaine Magnien
Black River Gorges National Park
Chemin Grenier
Souillac

Landfill Overview / Process / Challenges

Landfill Overview

- Located in the southern region of Mauritius as the only sanitary landfill and a cornerstone of its waste management infrastructure.
- Established in 1997 and occupies an area of approximately 45 hectares consisting of seven waste cells, which account for 78% of the site
- 10% of the area is allocated to site infrastructure, including a degassing unit, while 12% remains an unexploited plot.
- Receives waste from five transfer stations (comprising 80-85% of the total waste) and private generators (15-20%), processing around 1,100 Tons/daily.
- Of this, 95% is domestic waste, with the remainder comprising tyres, sludge, poultry waste, and condemned products.
- Conversion to electricity

Landfill Technical Process

Uses several operational practices aimed at managing waste and mitigating environmental risks including:

Waste Reception and Treatment:

- **Incoming waste is weighed, tipped, leveled, and compacted before being covered with biodegradable synthetic material or soil.**
- **Compaction to minimize methane emissions and optimize landfill capacity, although these measures have not always been effectively implemented.**

Leachate Management:

- **Due to high annual rainfall (ranging from 2,400 to 3,000 mm), leachate management is a critical aspect.**
- **Site maintains three leachate ponds to collect and temporarily store contaminated runoff, which is then transported in tankers for treatment.**

Gas Management:

- **Methane gas, produced during waste decomposition, is captured through 65 vertical and 35 horizontal gas wells connected to two degassing units with a capacity 1,500 Nm3/h each.**
- **Gas is either flared or used for electricity generation, with the site hosting two generators of 2.15 MW capacity each.**
- **Efficiency of these systems has been questioned, particularly regarding the prevention of methane accumulation.**

Capping and Environmental Monitoring:

- **Temporary capping using 0.75 mm LDPE geomembranes is deployed to limit environmental exposure.**
- **Permanent capping integrates multiple layers, including geotextiles and soil, designed for long-term stability.**
- **Environmental monitoring includes regular leachate, groundwater, and gas analyses, supplemented by dust control, larviciding and fly trapping.**

Challenges

- Methane as a byproduct of organic waste decomposition accumulates in pockets, increasing the risk of spontaneous combustion.
- Ongoing fire broke out reigniting debates about the landfill's operational shortcomings and its broader environmental impact.
- Fire spans approximately 43,400 m^2, or 10% of the site, and has proven challenging to contain.
- Primary cause lies in the accumulation of uncompacted waste, which facilitates the escape and ignition of methane gas.
- Due to space restriction, vertical extension, where waste piles reach up to 250 meters, exacerbates this problem by making fire suppression efforts more difficult.
- Fire releasing thick, toxic smoke, affecting air quality in the vicinity and further regions
- Residents report health concerns, especially for vulnerable populations like the elderly.
- Leachate management has also been disrupted, with waste temporarily stored at the landfill's entrance without protective lining.
- Raises the risk of soil and water contamination.

Systemic Issues / Solutions

- *Inadequate Compaction*: **Despite being essential for methane control, waste compaction has been neglected, exacerbating fire risks.**
- *Delayed Upgrades*: **Proposed improvements, such as thermal cameras for early fire detection, remain unimplemented. Currently, only manual inspections are conducted, which are inefficient for a site of this size.**
- Overcapacity: **Mare Chicose's overreliance as the sole landfill has led to saturation, making effective management increasingly difficult.**

- ***Enhanced Firefighting Capabilities**: Investment in equipment capable of reaching the upper layers of waste, such as aerial firefighting units, is critical.*
- ***Methane Control**: Upgrading degassing systems and mandating waste compaction can significantly reduce methane-related risks.*
- ***Waste Sorting and Recycling**: The 2019 Mauritius master plan proposed sorting waste at the source to reduce landfill input, particularly organic waste suitable for composting. Implementing this plan could alleviate the landfill's overcapacity.*
- ***Monitoring and Transparency**: Advanced thermal imaging systems should be deployed, and air quality reports must be made public to ensure accountability.*

Outlook and Needs

- Immediate solution to stabilize the landfill
- Specific industry based solutions at source
- Funding for technical studies and assistance
- Grassroot education program
- PPP for major developments