Waste characterization protocol ASTM D 5231-92 Standard Test Method

Dr Geeta Devi Somaroo

University of Mauritius

Mauritius

In-person presentation

Project Coordinators: Assc Prof D Surroop & Assc P Khadoo
Support staff: Dr N Jaffur

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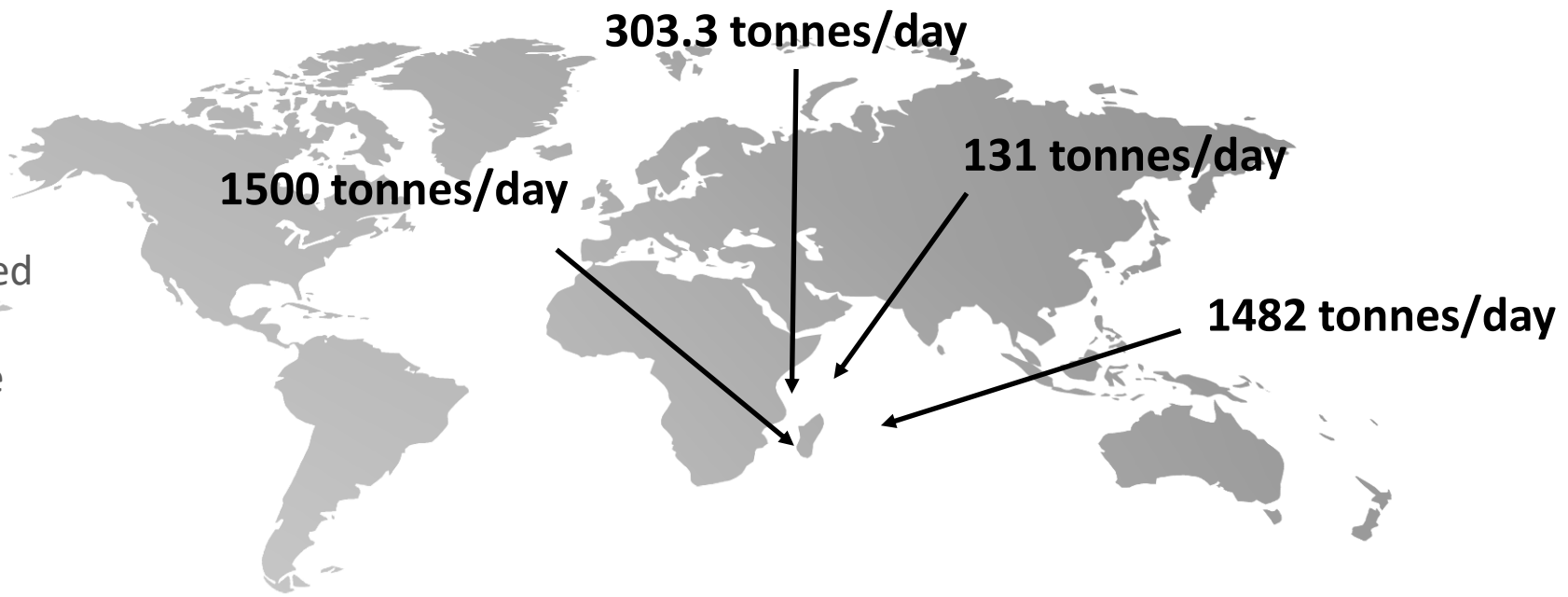
Background

2.01 billion tons of municipal solid waste are generated annually on a global level



Global waste is projected to reach 3.40 billion tonnes by 2050, more than double the population growth

Solid waste management is a major challenge for SIDS due to an alarming increase in waste generation resulting from economic growth, population increase, industrialization, lack of space and lack of sustainable waste management and treatment

Objectives

Waste characterization is a process that allows local authorities responsible for waste management to analyze and identify the different types of wastes produced on a national level.

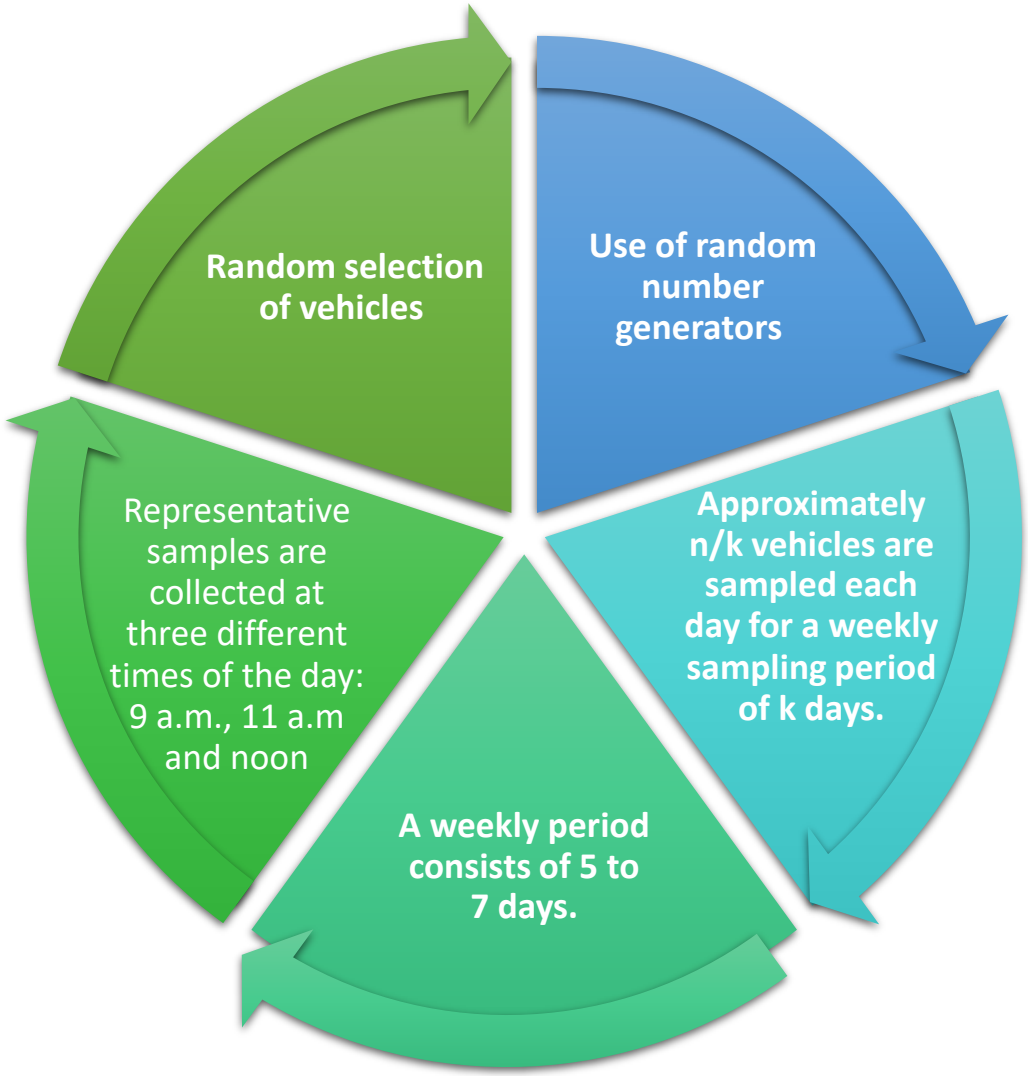
The main goal of the project was to develop a *Train the Trainers* programme on waste characterization following the protocol as developed by Professor Romeeela Mohee based on ASTM D 5231-92 Standard Test Method in Madagascar, Comores and Seychelles.

Specific objectives were:

- ❑ To categorize the different types of wastes in terms of food, yard, textile, plastics paper, cardboard, metals and glass

- ❑ To follow the test method as outlined in ASTM D 5231- Standard Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste:
  - Waste quantification
  - Waste classification by origin, physical properties and their potential for recovery or treatment.

Methodology



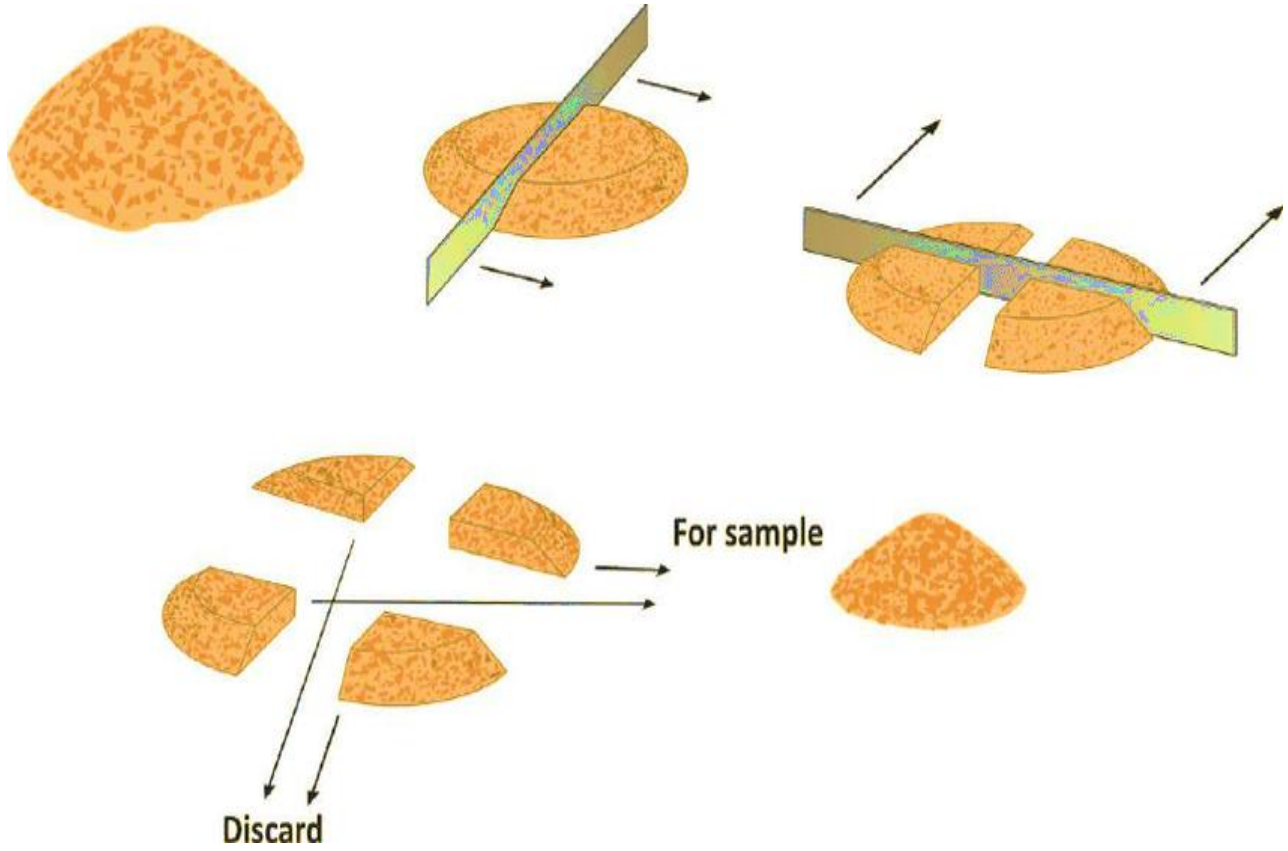
Domestic waste

Commercial waste

Methodology

Coning and quartering technique

Height of the waste pile is approximately 0.8 m before coning and quartering.



Methodology

Coning and quartering technique

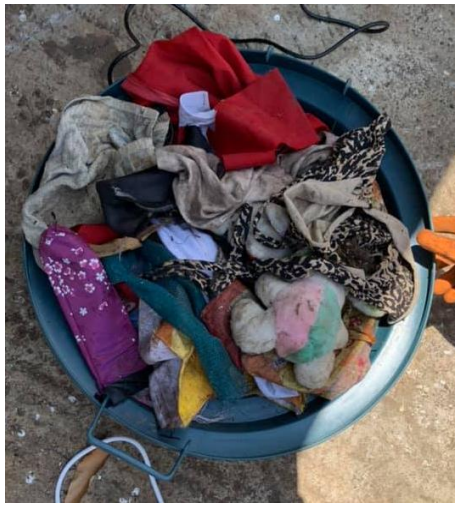
Methodology

Waste Sorting

Methodology

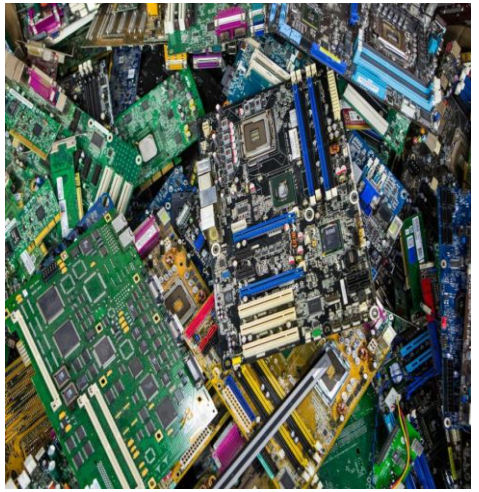
Waste Categories







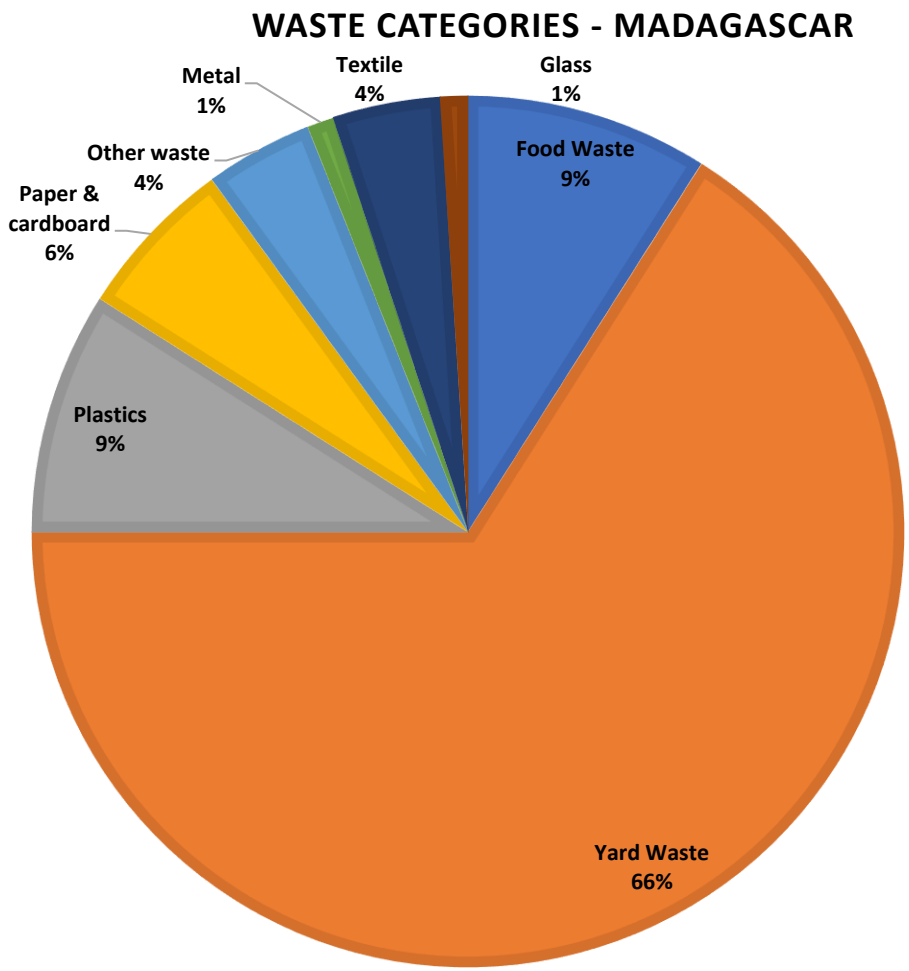


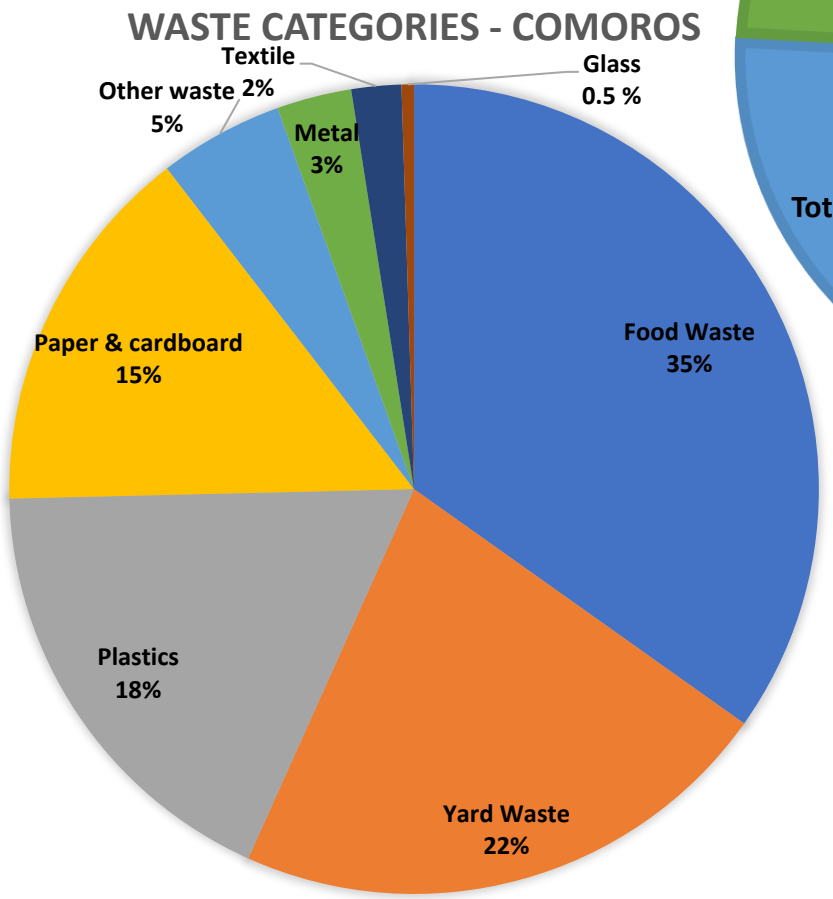


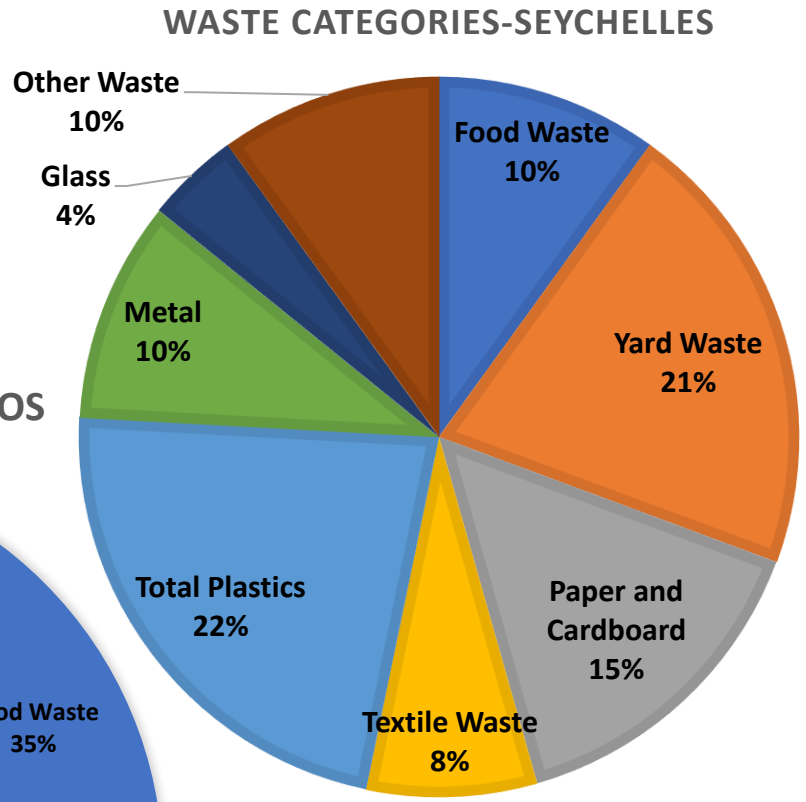
Methodology

Weighing of waste

Findings


WASTE CATEGORIES - MADAGASCAR
Metal 1%
Textile 4%
Glass 1%
Other waste 4%
Food Waste 9%
Paper & cardboard 6%
Plastics 9%
Yard Waste 66%

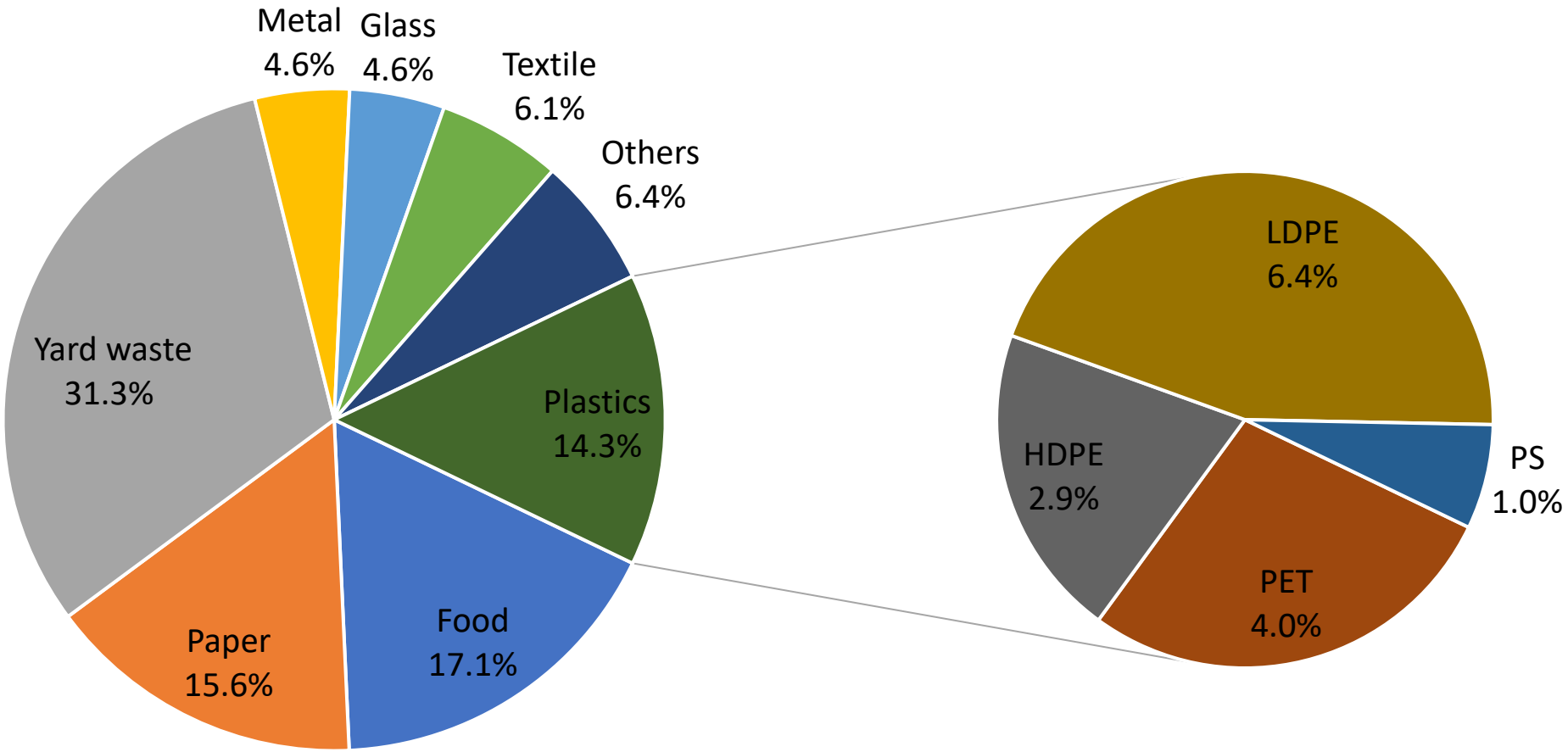

WASTE CATEGORIES - COMOROS
Textile
Glass 0.5 %
Other waste 5%
2%
Metal 3%
Paper & cardboard 15%
Food Waste 35%
Plastics 18%
Yard Waste 22%


WASTE CATEGORIES-SEYCHELLES
Other Waste 10%
Food Waste 10%
Glass 4%
Metal 10%
Yard Waste 21%
Total Plastics 22%
Paper and Cardboard 15%
Textile Waste 8%

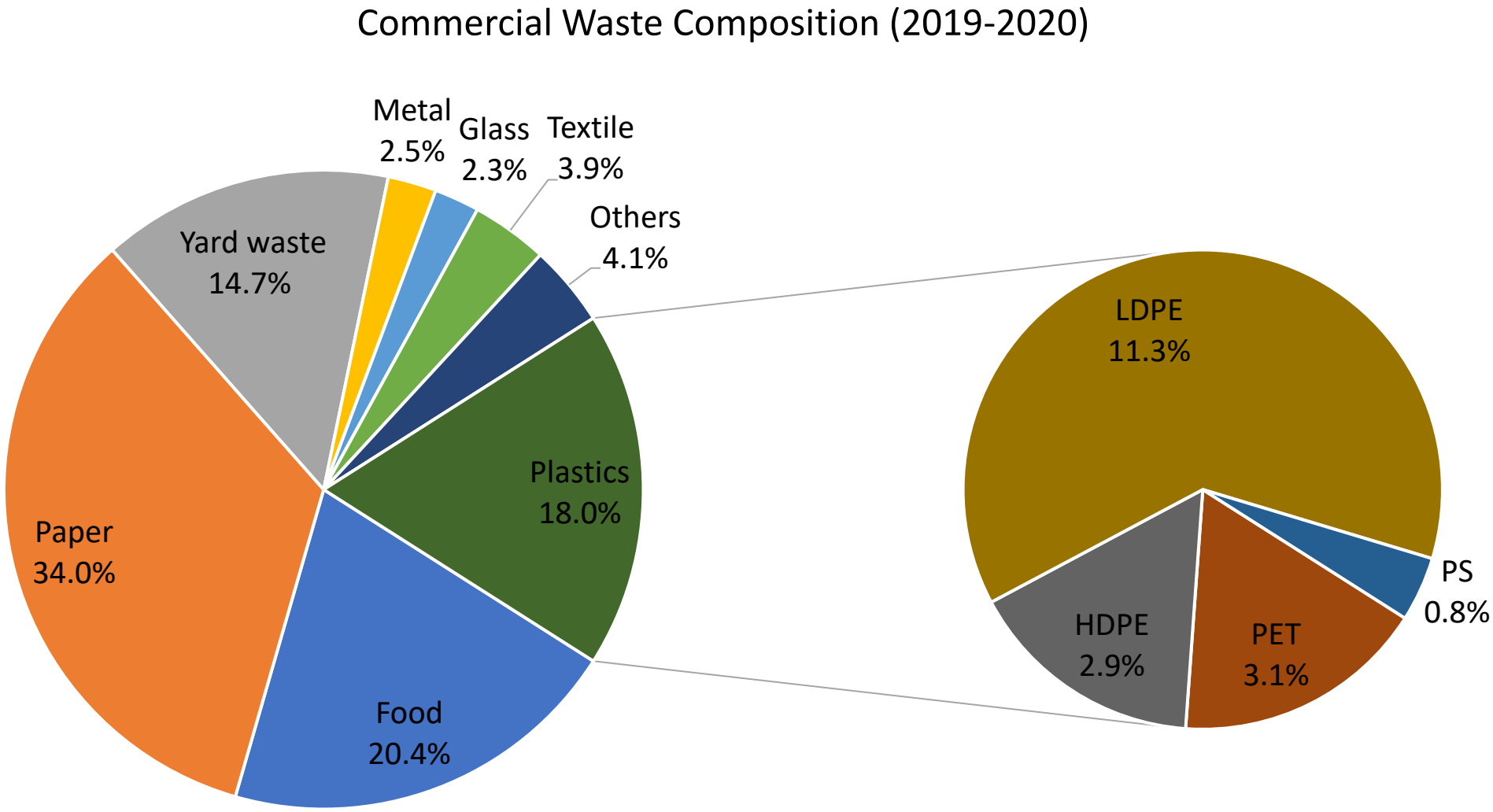
Findings

Waste Characterization Study in Mauritius

Composition of Domestic waste (2019-2020)



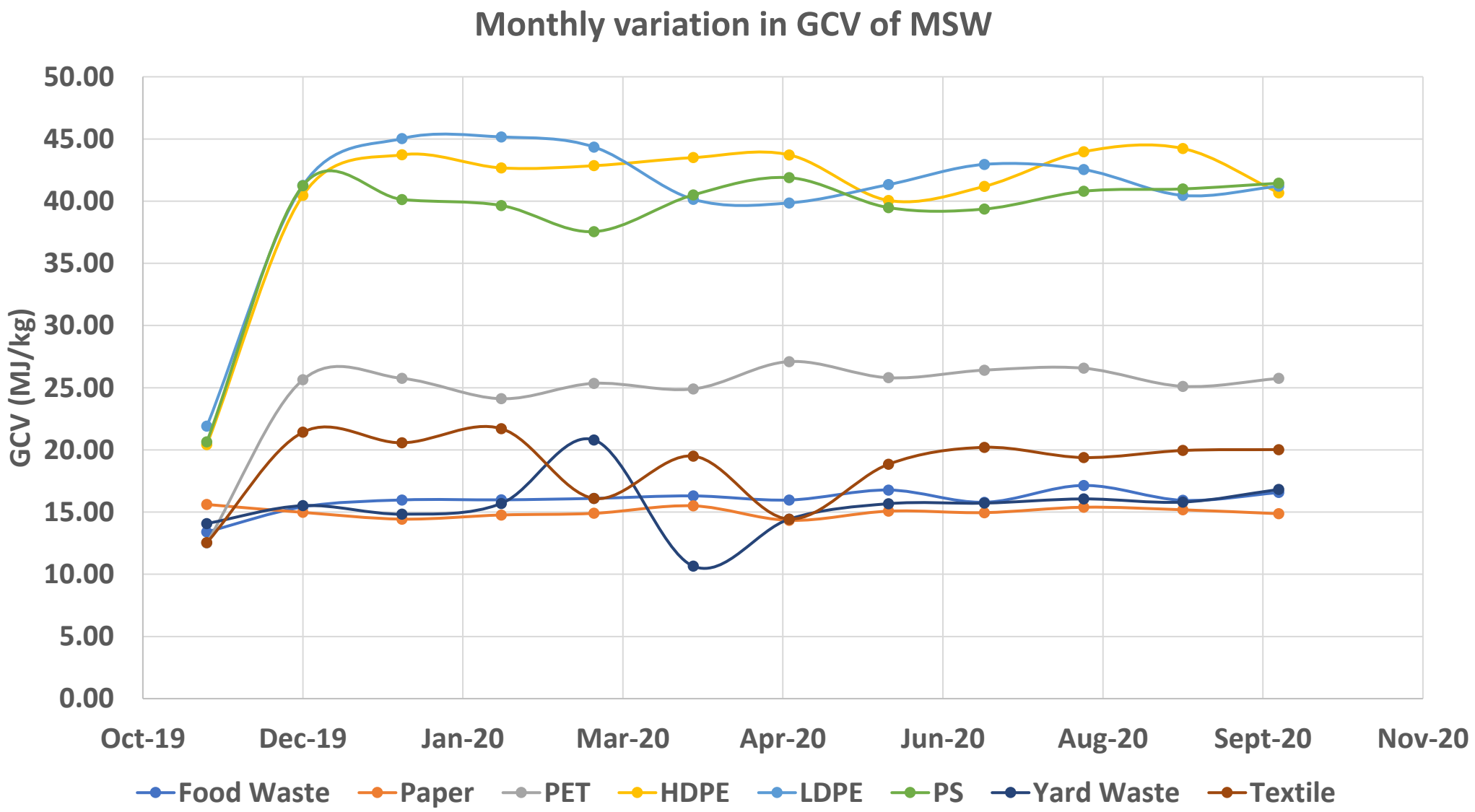
Findings


Commercial Waste Composition (2019-2020)
Metal 2.5%
Glass 2.3%
Textile 3.9%
Others 4.1%
Yard waste 14.7%
Plastics 18.0%
Paper 34.0%
Food 20.4%
LDPE 11.3%
PS 0.8%
HDPE 2.9%
PET 3.1%

Findings

Domestic waste	Composition of domestic waste		
	2002	2014	2019-2020
Food waste	25.0	31.0	17.1
Paper	12.0	16.0	15.6
Yard waste	43.0	26.0	31.3
Metal	1.0	3.0	4.6
Glass	1.0	2.0	4.6
Textile	3.0	4.0	6.1
Others	2.0	4.0	6.4
Plastics	13.0	14.0	14.3

Findings

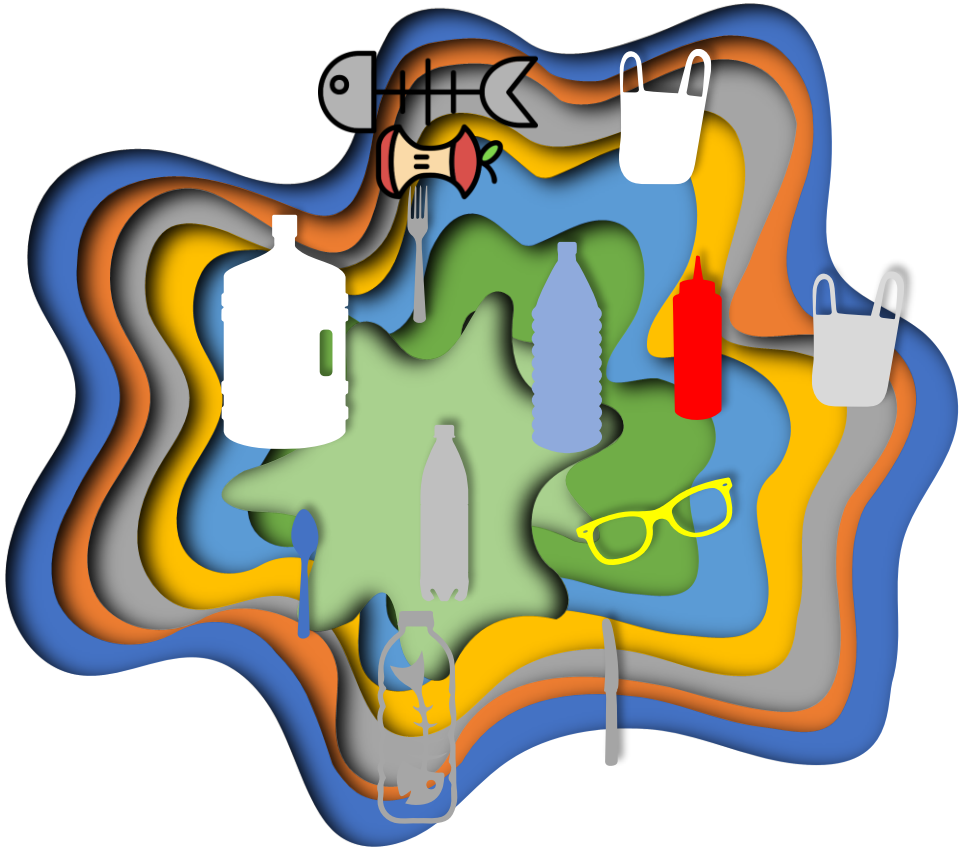

Monthly variation in GCV of MSW
GCV (MJ/kg)
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Oct-19
Dec-19
Jan-20
Mar-20
Apr-20
Jun-20
Aug-20
Sept-20
Nov-20
Food Waste
Paper
PET
HDPE
LDPE
PS
Yard Waste
Textile

Implications of work

- The method's structured approach ensures consistency and reproducibility, making it a reliable tool for waste composition analysis in landfill operations, transfer stations, and material recovery facilities.
- Detailed and statistically representative assessment of MSW composition
- Accurate data on wastes distribution – identification of dominant waste fractions and potential recyclables based on seasonal variation
- Optimization of waste processing facility designs
- Establish baseline on waste composition data for contractual agreements and regulatory compliance
- Support waste-to-energy feasibility studies by determining organic waste content and energy content

Conclusions

- Knowledge of the composition of waste from different sectors is essential to propose waste treatment methods that would be applicable in the short, medium and long-term basis.
- The results of solid waste characterization study can therefore be used for national strategic planning in the field of waste management.
- A high percentage of organic wastes could lead to the implementation of biological waste treatments such as composting and anaerobic digestion.
- Waste characterization results can also demonstrates recycling potentials for glass, and gasification, pyrolysis or combustion for plastic and textile which emanate from the different sectors. Nonetheless, these technologies must be properly studied prior to being adapted to any SIDS.
- The involvement of various stakeholders, governmental agencies and the communities is a stepping-stone for achieving sustainable waste management practices in the country. This implies the development of policies and sensitization campaigns at national level.
- One possible option for this achievement is the separate collection of different waste components at source, which will eventually be directed to specific treatment plants. This will therefore ensure the recovery of resources from wastes and also decrease the load on the landfill.
- Moreover, further studies on medical waste, e-waste and hazardous wastes are still being required and will be taken for future work.



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