Overview of plastic waste flows in Mozambique

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Keywords: plastic waste, circular economy, Mozambique.
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Mozambique is a low-income country located in the Southeast part of Africa. Its population of about 32 million continues to grow along with urbanisation and waste generation. Managing solid waste is challenging, with low recycling rates and reliance on open burning and dumping. Plastic waste (PW) generation is equally on the rise, and it is estimated to be over 430,000 tons annually that are mismanaged, with around 2,544 tons emitted into the ocean [1], [2]. Furthermore, research indicates that if the current solid waste management practices remain, by 2025, over 280,000 tons of PW will be mismanaged, making Mozambique one of the top African polluters [3].

This study, therefore, aims to present an estimation of the 2020 flows and stocks of PW in Mozambique using the Material Flow Analysis (MFA) methodology.

The required data was collected via interviews with key informants and retrieved from available international statistics and databases, national statistics, reports, and relevant literature. Following, the MFA was performed using SubSTance flow ANalysis (STAN), a freeware developed at the Vienna University of Technology [4].

In Mozambique, all the consumed plastic is imported, leading to a domestic PW generation of about 15.4 kg per capita per year [3], [5]. Overall, Polyethylene Terephthalate (PET) and Polypropylene (PP) are the most prevalent PW type, with 25% and 19% each, followed by Low-density Polyethylene (LDPE) (15%), High-density polyethene (HDPE) (15%) and others. As such, there are two primary sources of PW, domestic generation of about and imports.

After domestic generation and imports, the PW is either formally collected by local authorities, private service providers on a mixed waste form, and the local sorting and recycling companies or by informal waste collectors, also known as waste scavengers. Lastly, a significant portion of the generated plastic waste remains uncollected and disposed of by burning, burying, and dumping [5].

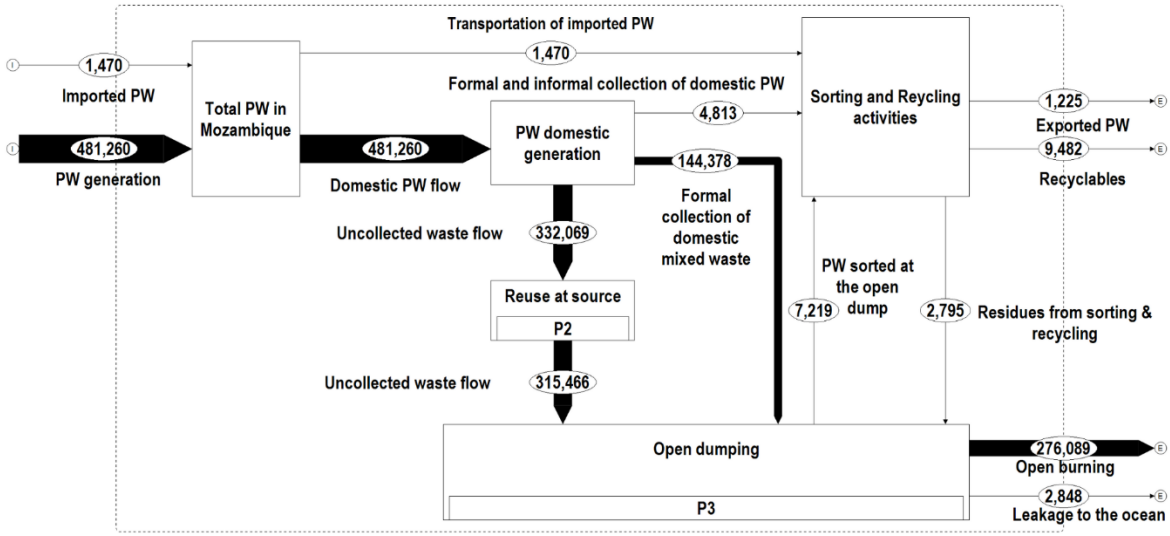

Fig. 1 Plastic waste flows and stocks in Mozambique, 2020

Figure 1 presents the overall results of the MFA study. In 2020, it was estimated that around 480,000 tons of PW were generated in the country, while about 1,500 tons were imported. Of the total PW in the waste management system, less than 0.5% is recovered and prepared to be recycled or exported, which indicates a potential to introduce separation activities at generation sources through, for example, awareness-raise and waste separation rulings for generators; coupled with robust investment on selective collection services. In turn, those activities can foster increased reuse practices at source and of enterprise's interest in sorting and recycling.

It was also clarified that information and relevant data on ongoing PW sorting and recycling activities - formal and informal, are scattered and under-documented. Particularly the role and impact of the informal sector,

which intervenes throughout the waste management system with collection at the generation point and final disposal sites, followed by sorting, cleaning, and selling PW to local recyclers or recyclables' exporters. Similarly, unclear is the available information on the context of import activities. On the one hand, Mozambique's law prohibits imports of waste; from the United Nations Commodity Trade Statistics Database, there are records of imports of products designated "waste, parings and scrap, of plastics" - HS3915. This situation possibly introduces ambiguity in data interpretation, which should be addressed.

Lastly, over 95% of PW end up buried or in open dumps, with about 60% open burned, representing a significant threat to the environment and human health. Understanding and characterising the magnitude and prevalence of the associated risks is a priority and an essential step to identifying mitigation strategies and sustainable PW management solutions.

Acknowledgements

This research was partially conducted under the Study on Sound Management of Chemicals with Relevant Legal Framework - FY 2022, supported by the Japanese Ministry of Economy, Trade, and Industry (METI). Its ongoing continuation has been done under the Safer End of Engineered Life (SEEL) programme from Engineering X, supported by the Royal Academy of Engineering and the Lloyd's Register Foundation.

References

[1] L. J. J. Meijer, T. van Emmerik, R. van der Ent, C. Schmidt, and L. Lebreton, "More than 1000 rivers account for 80% of global riverine plastic emissions into the ocean," *Science Advances*, vol. 7, no. 18, pp. 1–14, 2021, doi: 10.1126/sciadv.aaz5803.

[2] R. Singh, M. Solanki, and S. Singh, "Plastic Waste Management in Africa - An Overview," Centre for Science and Environment, New Delhi, India, 2023. [Online]. Available: https://www.cseindia.org/plastic-waste-management-in-africa-an-overview-11606

[3] J. Jambeck *et al.*, "Plastic waste inputs from land into the ocean," *Marine Pollution*, vol. 347, no. 6223, pp. 768-, 2015.

[4] O. Cencic, “About STAN,” *stan2web*. https://www.stan2web.net/infos/about-stan (accessed May 02, 2023).

[5] UICN-EA-QUANTIS, "National guidance for plastic pollution hotspotting and shaping action, Results of Mozambique (in Portuguese)." 2020.