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Development of Plastic Waste Reverse Logistics Facility Location Model

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Plastic waste pollution poses a major threat to the global environment. Interventions from the government and international authorities have helped mitigate the effects of plastic waste. Despite interventions from governments and international bodies like bans on single-use plastics, plastic waste pollution remains a pressing environmental issue. This necessitated the development of a reverse logistics system that is effective in the collection of plastic waste for recycling.

The study applied the p-median model to determine the optimal location for a fixed number of plastic waste collection centres in the wards in Ibadan North West local government area, Ibadan, with the objectives of optimising the cost associated with the setting up of the collection centre, transportation and incentives distribution. A Geographical Information System was used to determine the distance of the centroid point of each ward to the recycling station.

The model selected the following wards: Inalende, Oritamerin, Abebi, and Bere as the optimal locations to site the collection centres. The study demonstrates strategic location of plastic waste collection points has the potential to significantly enhance plastic waste recovery efforts, promote responsible waste disposal practices, and contribute to a cleaner environment.

This approach offers a replicable framework for other municipalities struggling with plastic waste pollution, paving the way for a more sustainable future.

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