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## Solving location allocation problem of waste recovery facilities through the use of network-based spatial analysis

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In 2016, the city of Santiago de Chile experienced serious environmental problems when two of its biggest sanitary landfills caught fire. These events collapsed the waste collection and disposal system, and particularly in one case, it caused extreme air pollution affecting a big part of the capital. These accidents triggered public concern related to the landfill locations and the huge volume of final disposal waste, also encouraging the construction of recycling facilities. Location-allocation is a problem that private and public companies face when they need to decide the best location for their new facilities. By using a street network, the location allocation problem can be approached according to the specific restriction/necessities that the facility requires such as: route distance, travel time, capacity coverage, demand coverage etc. This paper identified the optimal location of 10 waste treatment facilities by utilizing a network-based spatial analysis that efficiently solve the location-allocation problem according to certain conditions or settings, in this case, capacity coverage and distance optimization. This analysis required facility points (FP) and demand points (DP). The DP is the waste generated by each of the 343 districts in this study. The FP was determined by suitability analysis, land use and the metropolitan sanitary infrastructure requirements, specified in the Urban Plan of Santiago Metropolitan Region. Preliminary results show that, maximum capacity coverage is 98.1% with district coverage of 52.4% and a maximum distance of 4.500 meters. However, this result leaves one municipality covered by two or more facilities. Considering the politics and managing complications of this, the results were manually intervened so municipalities only had to deal with a maximum of two different facilities. In this last case, the capacity coverage decreases to 97.6% but results in a better district coverage distribution per facility.

### Biography

Ailyn Rojas Cabrera has obtained her Master's Degree in Environmental Sciences at Tsukuba University, and currently, she is pursuing her PhD in the Sustainable Environment Doctoral Program at the same university. She is one of the authors of the paper titles "The potential benefits of introducing informal recyclers and organic waste recovery to a current waste management system: the case study of Santiago de Chile" from 2017, and is currently investigating about alternative waste for giant squid waste.

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