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Abstract

The influence of socio-economic factors such as population and rapid economic growth, and the change of consumption and living patterns make waste management in Singapore a complex issue. Due to limited land and resources, the solid waste management scheme requires a comprehensive approach. Therefore, system dynamics (SD) modeling was applied to assess alternative strategies for solid waste management by interconnecting landfill capacity and recycling efficiency with reference to the projection on waste generation. Nine different scenarios were investigated to identify the best approach to maintain environmental sustainability without inhibiting the economic growth. Four subsystems (i.e. population, economy, waste recycling and waste disposal) have been incorporated into the SD model to broaden the effectiveness of the waste management system. Research findings revealed that high economic pattern and high recycling rate are recommended to satisfy the requirements for economic growth and environmental sustainability while extending landfill capacity for waste disposal. Even though, the balance of expenditure could be increased by the high recycling rate, it meets the need for long term incineration and landfill planning.

Keywords: Waste management, system dynamics (SD) modeling, forecasting, recycling, disposal