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Evaluation of greenhouse gas emission and treatment cost of municipal solid waste by using system dynamics modeling

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The inappropriate way of treating the solid waste leads to the increase in the emission of greenhouse gases and hike in the cost of treatment of solid waste. South Korea is facing the problem of treating the municipal solid waste in a cost effective way and decided the target to reduce the GHG emissions by 23% from waste sector by 2030 from business-as-usual (BAU) level. Hence this study aims to develop a model with the help of system dynamics to find an optimum methodology for disposal of municipal solid waste by using the emission unit and cost unit of treatment for the different methods of disposal, namely, landfill, recycling and incineration. In total seven scenarios made to find the best method for the disposal of municipal solid waste. The model is simulated for thirty years with initial year of 1990. Among all, SCENARIO 5 has been chosen as the best method where the percentage of waste going to recycling is higher than the percentage of waste going to the landfill for its treatment which has ended up in reducing the GHG emission and the cost of treatment. The need for the government policy has also been determined by using the parameter like new waste generation per capita. If the waste generation per capita is reduced, the total cost of treating the waste can be reduced with the reduction in the GHG emission from waste successfully.

Biography

Kanchan Popli has her expertise in system dynamics modelling in climate change research under the environmental studies. She has completed her engineering degree in Biotechnology from Kurukshetra University, India with awards in various competitions like sports, painting, science exhibitions etc. She has learned about the 'Product Management' during her summer training in Jade University of Applied Sciences, Wilhelmshaven, Germany. At present, she is pursuing her Master's degree at the Department of Environmental Science and Biotechnology, Hallym University, South Korea, on the project "Research & Development Center for reduction of Non-CO_2 Greenhouse gases (2016001690005)" funded by Korea, Ministry of Environment (MOE) as "Global Top Environment Research & Development Program".

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