

Evaluation of Strategies to Mitigate the Carbon Emissions from MSW: A Case Study

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Abstract : Municipalities throughout the world are marred with serious issues related to the Municipal Solid Waste (MSW) collection, treatment, and safe disposal. While the Waste Management sector contributes around 3-9 % of the overall anthropogenic methane emission, measures towards mitigating these emissions are rarely given attention in developing countries. In the case of Bangalore, India, around 5680 tons of MSW is generated in a day, and its collection and treatment efficiency are around 90-95 % and 26.4 %, respectively. About 33.4 % of the waste collected is directly landfilled without any treatment, further aggravating the situation. The potential of reducing the emissions emanating from the MSW of Bangalore city without any severe consequences on the current MSW management practices is evaluated in this study. Three emission scenarios consisting of the baseline condition (current practices - Case-1), the application of biocovers for methane oxidation in the dumpsites (case-2), and the diversion of Organic Fraction of MSW (OFMSW) along with the application of biocovers (case-3) are evaluated and compared with each other. The emissions are calculated based on the aerobic and anaerobic stoichiometric relations for the three scenarios. Laboratory scale column studies are carried out to determine the methane oxidation potential of three different biocover material (digested MBT (mechanically biologically treated) waste, Fresh MBT waste, and charcoal amended with fresh MBT waste). The results shown that around 40 % and 83 % reduction in carbon emissions can be achieved in case 3 and 2 in comparison to the baseline condition. The study clearly shows that with minor changes in the waste management practices, substantial reductions in the carbon emissions can be attained in Bangalore City.

Keywords : MSW, biocover, composting, carbon emission

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