Insight Medical Publishing
Environmental and Toxicology Studies Journal
2020
Vol.4 No.4

Assessment on Municipal Waste Released, Management and Recycling in Supply Chain in Major Three Cities of Nepal

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Abstract

In Nepal solid waste management is one of the major environmental issues, especially in the urban areas. While solid waste management (SWM) has become a major concern for municipalities and the country as a whole, the status of SWM is not fully understood due to the lack of SWM baseline data, which are also essential for effective planning. On the other hand plastics based waste management and recycling activities in the major cities of Nepal has not adopted in the sustainable manner. Such a back drop, this research attempts to assess the plastic waste released, management and recycling in supply chain in three cities in February to August, 2018. A total 150 city households level information (@ 50 HHs/city) were collected using personal interview schedule and a weekly total waste volume from household level had been taken. Further, waste collection, distribution, management and recycling data in supply chain were collected from street wrappers, small and big Kabaadi shops and plastic industries from cities using rapid market appraisal technique. This study revealed that about 47% household segregate their HH waste which is fund higher in Hetauda (83.8%), followed by Bharatpur (46.9%) and Butwal (28.6%). About 6.7% HHs have had public waste collection bin nearby their home whereas 71.1% surveyed HHs have had knowledge on solid waste management. About 40% HHs heard of importance of plastic waste recycling and majority (91%) express their readiness to segregate the plastic solid waste if recycling program is set up in municipal area. It revealed that 49% HHs concern about effect of human health and 40% concern the effect on environment from solid waste whereas 68.9% HH have preferred door-to-door type of waste disposal system. It is also noted that 23.3% of surveyed HHs in cities are practicing composting at their form yard using traditional composting methods (46.8% have used pits and 32.4% used compost bins). The household level waste composition analysis indicates that highest waste fraction is organic matter (69.4%), followed by plastic (19.8%) and 10.8% are metal, glass, paper, textile, rubbers and leather. The plastic waste composition at household source is found higher in Bharatpur (29.6%), followed by Hetauda (21.4%) and Butwal (3.8%). The average per capita waste generation per day is found to be 160 gram ranging 141-177 gram having 19.5% plastic waste in cities. For institutional establishments and sectors, the average daily waste generation is 5.3 kg. The composition of institutional waste is 30.5% organic, 29.8% plastic and 39.7% other. Similarly, the average daily waste generation from commercial establishments is 2.1 kg per shop and 9 kg per hotel or restaurant. On an average 44.1% organic matters, 26.5% plastic and 29.4% other are found in commercial waste composition. The composition of city dumping sites waste is 83% organic matter, 15.2% plastic and 1.8% glasses from 25 kg random weight sampled from city dumping sites. Total 7789.1 MT plastic waste per year is going to landfilling/dumping sites from Bharatpur, Butwal and Hetauda cities. The benefit-cost analysis of plastic industries shows that the B/C ratio is found higher (1.66-2.75) and profitable for using plastic items as a recycling materials only as compared to industries using plastic granules as a raw materials only (1.04-1.40). An average weekly recyclable waste collection per street waste collector in city is 225 having 7% plastic whereas 1335 kg recyclable waste per Kabadi shop has been collected (14% plastic). About 10.2% plastic solid waste are recycled, burnt and buried from city. Currently, 52 MT from Butwal, 55-65 MT from Bharatpur and 25 MT from Hetauda city collect waste daily collected from all sectors and filled up in city dumping cites without any composting plants and recycling and scientific waste management practices from municipal office and its PPP model private companies. Total 25-30 plastic recycling industries can be established in three cities whereas 17881 MT organic fertilizer per year can be produced from degradable waste in three city whereas NRs. 268.22 million (US $ 2.62 million) worth from three city will be earned per year. In supply chain management of plastic waste use, reuse and recycling, households, institutional and commercial establishments are major source of waste release in the city. This study suggests that municipal office needs to develop an appropriate policy and strategy framework together with technical guidelines on key issues such as organic composting, recycling and landfill operation from dumping sites. Furthermore, public awareness and private sectors involvement mechanism should be promoted for reduce, reuse, reduce and recycle (4R) of plastic waste as well as participatory market system development of solid waste in supply chain management though involvement of all concerned stakeholders.

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15th World Convention on Waste Recycling and Reuse; - September 16-17, 2020.

Abstract Citation:

Rishi Ram Kattel, Assessment on Municipal Waste Released, Management and Recycling in Supply Chain in Major Three Cities of Nepal, Recycling Summit 2020, 15th World Convention on Waste Recycling and Reuse; September 16-17, 2020.