Municipal Solid Waste Management in the Kingdom of Bahrain: Practices and Way for Sustainable Performance

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Abstract

The MSWM system in the Kingdom of Bahrain was evaluated comprehensively to identify its weaknesses and gaps. In addition, it quantified the current MSW generation, and projected the future generation, based on per capita generation. The MW landfill available spaces/volume and remaining lifespan were quantified for different recycling and compaction scenarios.

It was found in the conducted research that MSW disposal at Asker landfill increased by 74.421% from 1034921.1 tons in 2005 to 1805124.2 tons in 2016 (in 11 years), with a growth rate of 6.77%. This increase was associated with an increase of 65.69% in the disposal quantities of the DWS for the same period that was also associated with an increase of 54.17% in the population size.

An estimation of the remaining lifespan of the landfill based on different scenarios was found by using the available data and a mathematical modelling. It was shown that by the mid of 2018, Asker landfill site will reach its carrying capacity for the current baseline scenario, and therefore the current practice is considered unsustainable for handling the future MSW generation in the Kingdom of Bahrain.

A sanitary landfill must be considered as an urgent top priority action plan for the Kingdom of Bahrain was revealed, in order to cope with the near future MSW generation. In addition, the management of the already segregated MSW streams received at the landfill site can be relied on within the country's current capacity (e.g. C & D building waste, dead animals, WT) as a short-term work plan that can be initiated as a first step towards the a holistic management of this sector. Furthermore, improving the MSW compaction
efficiency at the landfill site as a short-term action plan would result in expanding its lifespan by a remarkable outcome.

The MSW disposal should not be relied solely on the disposal at sanitary landfill dedicated to such wastes; the principles of waste reduction, reuse, recycling and recovery should play a key role in the management of this sector within a long-term action plans.