

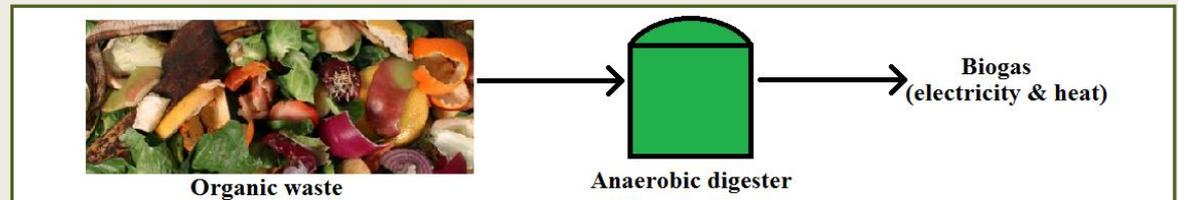
# Organic Waste Management and Energy Recovery in Northern Jordan

By Husam A. Abu Hajar

*“Our vision is to protect the environment, engage the refugees, and make useful products”*

Since the onset of the Syrian crisis in 2011, millions of Syrians have fled to neighboring countries seeking a safer shelter. Jordan, the Southern neighbor of Syria, has welcomed more than half a million refugees over the past few years. According to the United Nations High Commissioner for Refugees (UNHCR), the number of registered Syrian refugees living in urban areas in Northern Jordan is 500,000. Zaatari Refugee Camp located in Mafraq Governorate, is the world's second largest refugee camp and currently hosts 80,000 refugees.

The enormous influx of refugees has adversely affected the host municipalities due to the increased pressure on the infrastructure. One of the major problems facing the Mafraq Governorate is the lack of proper handling and management of the municipal solid waste (MSW). Approximately 750 m<sup>3</sup> of solid waste is produced daily from Zaatari camp and transported to an external garbage facility. The overproduction of MSW has exceeded the capacity of the existing landfills and resulted in serious environmental problems to the surrounding areas. Recycling projects are ongoing with the involvement of the refugees but these projects are limited to recyclable materials such as plastic and metal.



**Mafraq Landfill**



Our proposed project aims at mitigating the environmental consequences of the MSW existing management practices (mainly landfilling) by cutting the amount of MSW disposed at the landfills in half. This will be accomplished by in-situ anaerobic digestion of the organic portion of the MSW to produce energy that will offset some of the camp's energy demand. Unlike landfilling which poses serious threat to the environment, managing the organic wastes by the environmental-friendly anaerobic digestion approach yields lower greenhouse gas emissions. The digestion process also produces a nutrient-rich fertilizer that can be applied directly to the land or processed further to be sold for agricultural purposes.