

**Selection of suitable site for establishing a biogas unit using GIS: Case study in University of Kelaniya**

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Bio degradable waste management is one of emerging environmental issues in Sri Lanka due to higher moisture levels. As a first green university of Sri Lanka, the University of Kelaniya implements their green policy towards sustainable environment. Bio degradable waste can be managed either by composting or bio gas generation since they are the currently available most cost-effective management methods. Composting alone it needs bigger land to manage all biodegradable waste within the university. Bio gas unit will helps to reduce the land usage for waste management in the University. Bio gas can be used as an alternative fuel source to reduce the consumption of LP gas within the university. Generated sludge can used as fertilizer to preserve the gardening. The main objective of this case study is to identify a suitable site to implement a bio gas unit in the University of Kelaniya by using ArcGIS 10.2 software. Three major criteria were selected namely generated waste amount, bare land, and road accessibility. If it is closer to higher waste generation places, it will save the energy in transportation. Road accessibility is needed to bring waste to the bio gas unit. By using higher resolution satellite image of university of Kelaniya, boundary of the university, building layer and road layer were digitized using ArcGIS software. Since there were no records of biodegradable waste generation in different buildings in the university premises, primary data collection was done. Student hostels and canteens were used to identify the amount of bio degradable waste since they are the identified highest bio degradable waste generation places. Waste was measured by using a spring weighing scale. For analysis, collected data was added to the new layer called waste generated places. Layers were converted into raster format and then reclassify all the layers. Majority amount of waste was generated in gymnasium student canteen and girls' hostels which ranges from 300-340 kg per day. Buildings with higher waste generation was selected in separate layer. Bare lands were selected using higher resolution image classification and manually update it. Then selected building layer, road layer, and bare land layer were overlaid using weighted overlay method to find out the suitable sites for the bio gas unit. Map layout was developed to show the suitable sites for the bio gas unit in University of Kelaniya. The most suitable place was selected after visual observation. The proposed area for the bio gas unit should not be too closer to hostels, or lecture halls for safety purposes. This map could be used by any responsible party such as administration division or Green committee for their future waste management planning purposes. GIS is an important tool to identify suitable area maps to save time in decision making.

**Keywords:** Biodegradable waste, Bio gas unit, Decision making, GIS, Weighted map overlay