Recycling Farm Biomass for Biogas Production: A Feasibility Study in Rural Lebanon

Biogas technology can reduce the effects of global warming

Biomass is the third largest primary energy resource in the world, after coal and oil, and has the potential to be a partial substitute for fossil fuels, stated a feasibility study conducted by the Issam Fares Institute and the Faculty of Agriculture and Food Sciences (FAFS) at the American University of Beirut (AUB).

The current levels of methane (CH4), one of the naturally occurring greenhouse gases (GHG), is increasing significantly as a result of human activities including agricultural and farming, especially animal production. With the growing global concern over climate change and greenhouse effects, many scientists are investigating the use of alternative energy sources such as recycling agricultural wastes and dairy farm manure for biogas production in an effort to control the methane gas emissions and their attendant effects.

Control and recovery of energy-rich GHG (biogas) produced by anaerobic digestion of agricultural waste can be a new source of renewable energy with less harm to the environment. The controlled use of such gases will reduce the dependence on fossil fuels, reduce GHG emission and enable rural farmers to produce crops off-season by using inexpensive and non-polluting energy to warm agriculture greenhouses. Such investments have potential impacts on land and water resources, food security, health, biodiversity and climate change. In addition, the nutrient-rich digestate and effluent from the biodigesters used in the production of the biogas can be used as organic fertilizers.

With the continuous increase of fossil fuel prices, the introduction of on-farm bio-digesters in rural areas will help farmers save on energy costs.

Biogas technology suitable for maximizing scarce resources

Waste-to-bioenergy technologies to convert livestock and agricultural wastes-to-energy are mainly dominated by the use of anaerobic digesters. The anaerobic digestion converts the complex organic wastes to produce a gaseous mixture predominated by methane (CH4) and carbon dioxide (CO2) with methane percentages varying between 40% and 70%.

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Conclusion and Recommendations:

- Based on the findings of this pilot study, further research must be conducted to investigate the available farm waste volumes that can be potential source for energy.
- In addition, the study recommends allocating sites across rural Lebanon, where energy is scarce, to install biodigestion systems.
- Further recommendations suggest the involvement of the government in encouraging the implementation of biogas digesters through introducing low interest loans and credits for alternative energy systems. The government is also encouraged to build and operate biogas plants which can be managed by local municipalities.
- Moreover, the study recommends that public funds be assigned for further research and development in this particular area.

Further Reading:
Abiad, M.e.t.al. Recycling Farm Biomass for Biogas Production: A Feasibility Study in Rural Lebanon (2010)

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