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## Biofuels in emerging economies: Opportunities and challenges

Muhammad Suleman Tahir<sup>1</sup> and Muhammad Pervaiz<sup>2</sup><sup>1</sup>University of Gujrat, Pakistan<sup>2</sup>University of Toronto, Canada

The extraordinary industrial growth in current century has led to phenomenal consumption of fossil fuels, resulting in unprecedented and serious global climate change issues in recent times. The massive exploitation of non-renewable fossil reserves of oil, natural gas and coal has not only put extra strain on these resources, but also responsible for releasing huge amounts of GHG emissions into atmosphere, prompting global warming into new heights. The unanimous mandate of recent Climate Change Conference Paris and United Nations COP22 conference in Marrakesh to keep global warming below 2°C in next century further warrants an urgent need to explore alternate renewable energy sources. As the global demand for energy is anticipated to double by year 2050, especially the developing and populous regions have to rely more on clean fuels. Bioenergy, in particular biogas, sourced from abundantly available biomass provides an immense opportunity in generating not only green energy but also ensuring value-addition to residual agro-forestry feedstock. However, mass-scale generation of biogas has several technical and logistic challenges; the main factor is the availability of an adequate infrastructure to ensure required supply of cattle manure, a feasible biogas reactor design is believed to need around 900 cattle at a dairy farms. Other technical issues include optimization of methanogens' reaction-specific parameters, such as temperature and pH, effective management of HRT (hydraulic retention time) and separation of CO<sub>2</sub> and H<sub>2</sub>S from biogas stream. Although properly designed biogas reactors can ensure extra revenue for farmers and mitigating power shortages at national grid, but addressing pertinent issues by local authorities and research institutes should be at top priority.

drsuleman.tahir@uog.edu.pk