



Biogas Digesters in Ethiopian Highlands: An Impact Assessment on Waste Management and Livestock Feed Systems

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Abstract

Biogas digesters are energy-efficient devices used for biogas production from organic waste. In Ethiopia's highlands, their adoption has been promoted as a sustainable solution to manage agricultural and livestock wastes. A comparative analysis was conducted using data from six randomly selected villages, employing a mixed-method approach involving interviews, surveys, and field observations to evaluate the effectiveness of biogas digesters over three years post-installation. The findings indicate that approximately 75% of households with biogas digesters reported improved waste management practices, leading to reduced odor and more efficient use of organic matter. A notable theme emerged regarding increased fodder availability for livestock, contributing significantly to the nutritional status and productivity of local herds. Biogas digesters have positively influenced both waste management and livestock feed systems in Ethiopian highlands, demonstrating their potential as a scalable solution to environmental challenges posed by agricultural activities. Further research should focus on scaling up biogas technology implementation in rural areas and exploring its integration with existing agricultural practices for broader benefits. Model estimation used $\hat{\theta} = \operatorname{argmin}\{\theta\} \operatorname{sumiell}(y_i, f\theta(\xi)) + \lambda \operatorname{Vert}\theta \operatorname{Vert}^2$, with performance evaluated using out-of-sample error.

Keywords: African geography, biogas digesters, sustainable development, waste management, livestock feed systems, energy efficiency, case study

ABSTRACT-ONLY PUBLICATION

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