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PESTEL Analysis of the Development of Small-Scale Biogas Technology in Sub-Saharan Africa: A Systematic Review

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Abstract

Fossil fuels and traditional energy sources still constitute a greater share of energy supply in rural households of sub-Saharan Africa (SSA). Transition to small-scale biogas technology, clean energy in SSA includes the understanding of the factors affecting the development of the technology in the region. This study was performed as a systematic review of peer-reviewed and grey literature to reveal the political, economic, social, technological, environmental and legal (PESTEL) constraints and their impact on the sustainable development of this technology in the period from 2000 to 2020. Data was collected through a survey of scientific and grey literature. A total of 64 publications; comprising of 49 (77 %) peer -reviewed articles and 15 (23 %) grey literature were selected. Selection was done by double screening of the titles and full texts based on criteria like the focus on the small-scale biogas plants, constraints, drivers and prospects of the development of the technology in SSA. After PESTEL analysis, the main results reveal that SSA countries are still mobilising for the development of renewable energy policies. While governments are expected to increase the institutional and financial support, the private sector remains a huge potential in increasing investments on small-scale biogas plants. Sustainable credits are absent but can greatly increase wider adoption. Renewable energy incentive mechanisms are still to be well applied in some countries of the region for small-scale biogas development. Poor quality, operation and maintenance have led to the low technological efficiency of the plants. The governments' regulatory and financial supports are needed by the users and the private sector to adopt and innovate small-scale biogas plants to reduce energy poverty and spur economic growth. Collective action involving all local and international stakeholders is still required to increase the energy generation capacity of the small-scale biogas plants and their capacity for climate change mitigation.

Keywords: Biogas, constraint, evolution, impact, prospect, sub-Saharan Africa

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