Policy Brief
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Mainstreaming bio-slurry in Uganda's agricultural policy, planning and extension services.

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Summary: *The multipurpose nature of the biogas slurry (bio-slurry) as an organic fertiliser for soil fertility, crop yield, animal feed, and insect repellent, etc requires the Uganda's Ministry of Agriculture, Animal Industry and Fisheries (crop production, extension, and certification) to have a deliberate and thoughtful policy approach. Its widespread and sustainable integration into agronomic practices requires policy and regulatory frameworks and careful planning at national and subnational levels.*

Introduction

The use of bio-slurry is increasingly becoming prominent amongst the small holder farmers in most developing countries, Uganda inclusive. This is because it is regarded as a very effective organic fertiliser that enhances soil health and improves crop productivity[1].

Bio-slurry is a product of a biodigester technology. A biodigester technology is a system that utilizes anaerobic digestion to break down organic materials such as animal manure, crop material and food waste to produce biogas and a digestate in form of a liquid residue (bio-slurry)[2], [3].

According to the 2025 database of the Biogas Solutions Uganda Limited, there are over 10,000 biodigesters of different sizes and different forms (fixed dome and tubular) installed by the small-holder farmers in Uganda to-date, with the functionality rate estimated at 73.3 %. The existing biodigesters have the capacity to avert the greenhouse gas (GHG) emissions of 42,844 t CO2eq. They also have the capacity to produce approximately 134,144 tonnes of bio-slurry annually (ibid).

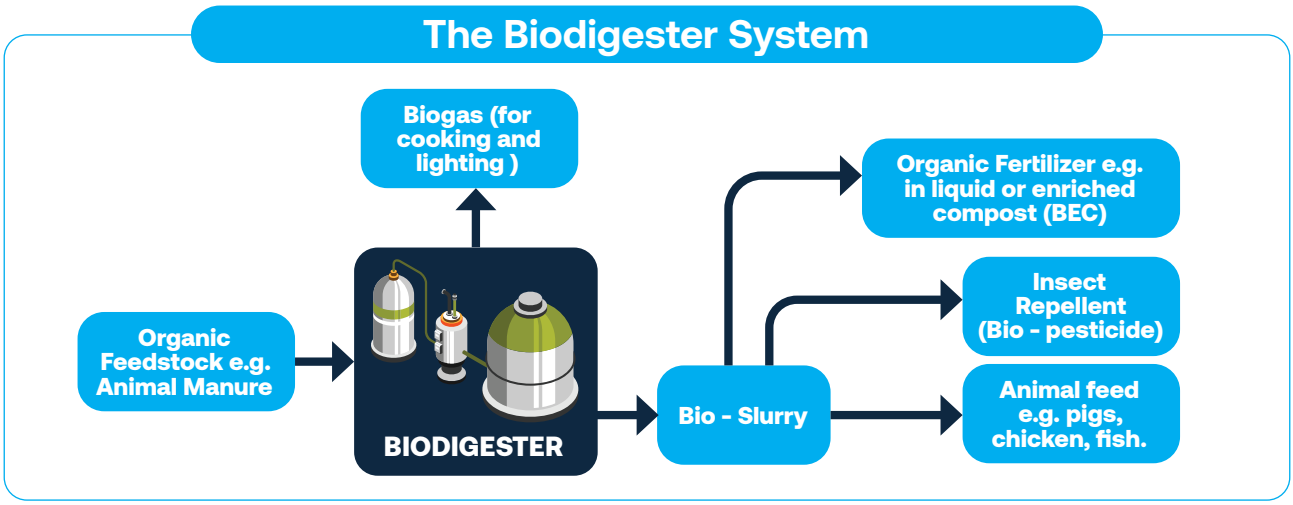
[1] Devarenjan, J., Herbert, G. J., & Amutha, D. (2019). Utilization of bio-slurry from biogas plant as fertiliser. International Journal of Recent Technology and Engineering (IRJTE), 8, 10-13.
[2] Issahaku, M., Derkyi, N. S. A., & Kemausuor, F. (2024). A systematic review of the design considerations for the operation and maintenance of small-scale biogas digesters. Heliyon, 10(1).
[3] Warnars, L. (2014). Bioslurry: a supreme fertiliser. Positive effects of bio-slurry on crops.

The biodigester technology not only produces biogas (for cooking, and lighting) and bio-slurry as fertiliser, but also importantly, it reduces the use of fuelwood for cooking and its devastating impact on environment by promoting clean cooking[4]. The biodigester technology therefore creates synergies between energy access, sustainable farming, and environmental conservation. In other words, it provides direct forward and backward linkages between energy, agriculture, and environment sectors in Uganda.

The value of bio-slurry

Bio-slurry contains readily available high amounts of plant nutrients and micronutrients compared to farmyard and composted manure, and thus nowadays being used as an effective source of organic fertiliser. It has high nitrogen, phosphorous, and potassium that are considered to be the macro nutrients required for the flourishing growth of plants.[5] It is relatively cheap and easily available compared to chemical fertilisers. It is also an environmentally friendly fertiliser for the small-scale farmers (ibid). Contemporary literature also shows that bio-slurry is also useful in fish farming for the growth of planktons for fish growing and breeding[6], [7] . It is also used as a natural repellent for various pests and insects, particularly those attracted to raw cow dung[8], [9].

[4] Devarenjan, J., Herbert, G. J., & Amutha, D. (2019). Utilization of bio-slurry from biogas plant as fertiliser. International Journal of Recent Technology and Engineering (IRJTE), 8, 10-13.
[5] *ibid*
[6] Kırkpınar, F. (2021). Uses of bio-slurry (biogas residue) as an inexpensive product for animal feed. In *4th International Students Science Congress Proceedings Book* (p. 11).
[7] https://www.academia.edu/126309056/Fish_farming_pisciculture_from_BIO_SLURRY_PRESENTED_BY#:~:text=Conclusion%3A%20Bioslurry%20offers%20an%20innovative,contributes%20to%20a%20healthier%20ecosystem.
[8] Warnars, L. (2014). Bio-slurry: a supreme fertiliser. Positive effects of bio-slurry on crops.
[9] https://www.biogassolutions.co.ug/



The challenge

Despite the glaring high value of the biodigester technology coupled with the efforts by Government of Uganda through Ministry of Energy and Mineral Development and Ministry of Agriculture, Animal Industry and Fisheries, and Non-Governmental Organizations to promote the technology, the rate of adoption has remained suboptimal over the years [10], [11].

Notable factors for low adoption are linked to existing gaps in national policy, legal, and planning frameworks. These frameworks are vital for laying down the necessary instruments to promote biodigester technology. Gaps also remain in the implementation of existing policy frameworks in addition to challenges in the valorisation of bio-slurry[12].

In addition to gaps in policy and planning frameworks, other factors that hinder mass adoption of the biodigester technology include suboptimal awareness of the full benefits of the technology, high upfront costs needed for the technology, culture, and biophysical[13].

[10] Lwiza, F., Mugisha, J., Walekhwa, P. N., Smith, J., & Balana, B. (2017). Dis-adoption of household biogas technologies in Central Uganda. *Energy for Sustainable Development*, *37*, 124-132.
[11] Namirembe, G., Mukwaya, P. I., Mugagga, F., & Kisira, Y. (2024). Insights into home biogas technology adoption dynamics through the lens of the diffusion of innovation theory in Uganda. Energy for Sustainable Development, 80, 101425.
[12] Mukisa, P. J., Ketuama, C. T., & Roubík, H. (2022). Biogas in Uganda and the sustainable development goals: a comparative cross-sectional fuel analysis of biogas and firewood. *Agriculture*, *12*(9), 1482.
[13] Mukisa, P. J., Ketuama, C. T., & Roubík, H. (2022). Biogas in Uganda and the sustainable development goals: a comparative cross-sectional fuel analysis of biogas and firewood. *Agriculture*, *12*(9), 1482.

The gap in policy and planning frameworks for bio-slurry valorisation

Uganda has a rich agricultural policy framework that includes among others, the National Agriculture policy (2013), National Fertiliser Policy (2016), National Agricultural Extension Service Policy (2016), National Fisheries and Aquaculture policy (2018), and the National Organic Agriculture Policy (2019). Notable among the policies is the promotion of organic agriculture as a holistic production management system which aims to avoid the use of synthetic and harmful pesticides, fertilisers, growth regulators, and livestock feed additives to reach a long-term goal of sustainable production of crops and animals.[14]

However, the above-mentioned policies do not explicitly provide for the value proposition of bio-slurry in terms of adequate guidelines, regulations, standards, and strategies for production, certification, demand creation and supply chain interventions to enhance its massive utilization / application in agronomic and agribusiness practices. Besides, the planning and budgeting processes at the national and sub-national levels do not deliberately consider the value proposition of bio-slurry for small holder farming

[14] Uganda National Organic Agriculture Policy (2019)

practices. The private sector including the agro-value chain or agribusiness actors, financial and micro financial institutions have also not fully integrated the value proposition of bio-slurry in their business financing models.

Conclusion and recommendations for policy, planning and practice

Considering the multipurpose role of the bio-slurry as source of organic fertiliser for crops, animal feed, and insect repellent, the biodigester technology becomes a cutting-edge technology that contributes to building organic bridges between renewable energy, agriculture, and environmental management. The technology requires a robust promotion for adoption by a critical mass of small holder farmers in Uganda to tap into its multi-ecological benefits. The policy, planning and innovative financing mechanisms are critical for both government and private-sector actors. In particular, the following recommendations for policy, planning and practice / extension services need to be considered:

- The Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) needs to review the existing agricultural policy frameworks to incorporate the value proposition of bio-slurry and bio-slurry enriched compost and explicitly provide for the guidelines, regulations, standards, and strategies for production, certification, demand creation and supply chain interventions to enhance massive utilization / application in agronomic practices.
- The Ministry of Agriculture, Animal Industry and Fisheries needs to work together with the Parliament of Uganda and other key stakeholders to incorporate the value proposition of bio-slurry and bio-slurry enriched compost in the National Organic Agriculture Bill (2024).
- The Ministry of Agriculture, Animal Industry and Fisheries through the Directorate of Agricultural Extension and District Agricultural Offices needs to mainstream bio-slurry into planning and budgeting for extension services delivery to boost massive uptake of biodigester technology among the farmers.
- The Ministry of Agriculture, Animal Industry and Fisheries through the Department of Crop Inspection and Certification working with relevant stakeholders needs to expedite the process of inspection and certification of the bio-slurry to promote its usage by farmers.
- The line ministries in the implementation of government's wealth creation programmes such as the Parish Development Model (PDM), Operation Wealth Creation (OWC) and National Agricultural Advisory Services (NAADS) need to recognize and integrate bio-slurry in their programming as a vital agro-input much needed by small holder farmers to boost their agricultural productivity, and agribusiness enterprises.

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