Comparative Analysis of Biogas Technology Profitability and Adoption Dynamics by Rural Households in West Africa

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01 • Introduction

Why biogas in West Africa?

Clean cooking + soil fertility + farm productivity.

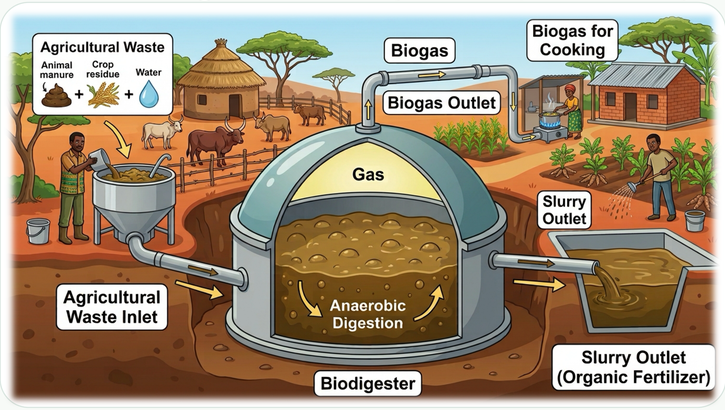

Fig.1: Biogas production process

Adoption is Limited & Uneven
Burkina Faso > Benin

Research question

What is the difference in the profitability of biogas use between rural households in Benin and Burkina Faso ?

Cooking with Firewood

Fig.2: Woman cooking with firewood, Benin

Cooking with Biogas

Fig.3: Woman cooking with biogas, Burkina Faso

02 • Materials and Methods

1 Study Area
Benin & Burkina Faso

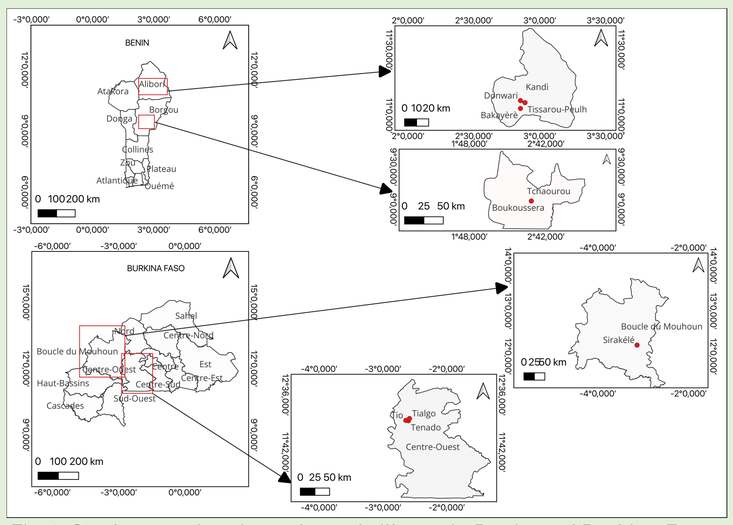

Fig.4: Study area showing selected villages in Benin and Burkina Faso

2 Research Design
Comparative research design

3 Data
Semi-structured interviews of 110 Households + Focus Group Discussions

4 Analysis
Cost–benefit Analysis
Costs = Installation costs + Variable costs
Benefit = Wood Savings + Compost Gain

03 • Results

Profitability gap

Fig. 5: Costs and Benefit of households biodigesters in Benin and Burkina Faso

Biodigester functionality

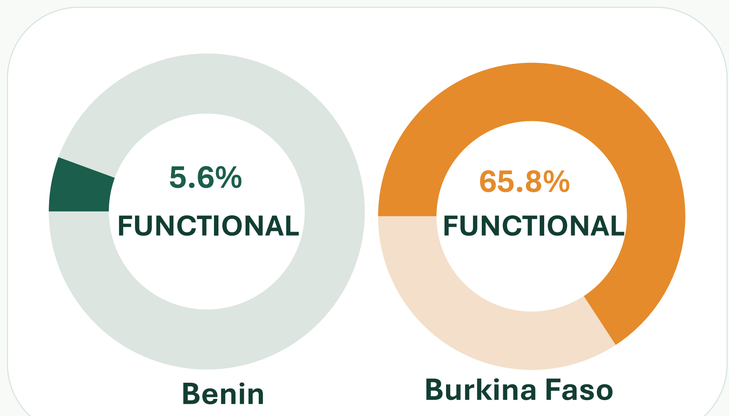

Fig. 6: Biodigesters functionality in Benin and Burkina Faso

Different Enabling Environment in Burkina Faso

High Firewood Price — **High Compost Production** — **National Biodigester Programme** — **Carbon Credit Programme**

Stronger programme support and post-installation learning in Burkina Faso.

Mixing device in Biodigester in Burkina Faso

Fig.7: Mixing cow dung and water device, Burkina Faso

04 • Conclusion

Biogas generates positive net returns in both Benin and Burkina Faso. The key difference is the magnitude of benefits, the ability of households to keep biodigesters functional and national supporting programmes.

Burkina Faso: ≈ 25× higher annual net benefit (Firewood Savings and Compost Gain) + 65.8% functional biodigesters

POLICY IMPLICATIONS

1. **Train households on biodigesters compost production, use and commercialization.**
2. **Scale national biogas programmes with long-term follow-up.**
3. **Biogas can be used as a hedge against rising energy prices, particularly firewood prices, in rural West Africa.**

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