BIO4HUMAN

Sustainable assessment of waste-to-energy management in humanitarian operations. Bio4HUMAN project approach.

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ECCE AB 25

Engineering for a Sustainable World: Summit for Clean Technologies & Brighter Legacy

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CONTEXT

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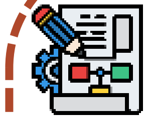
Waste Management Issue in Humanitarian Operations

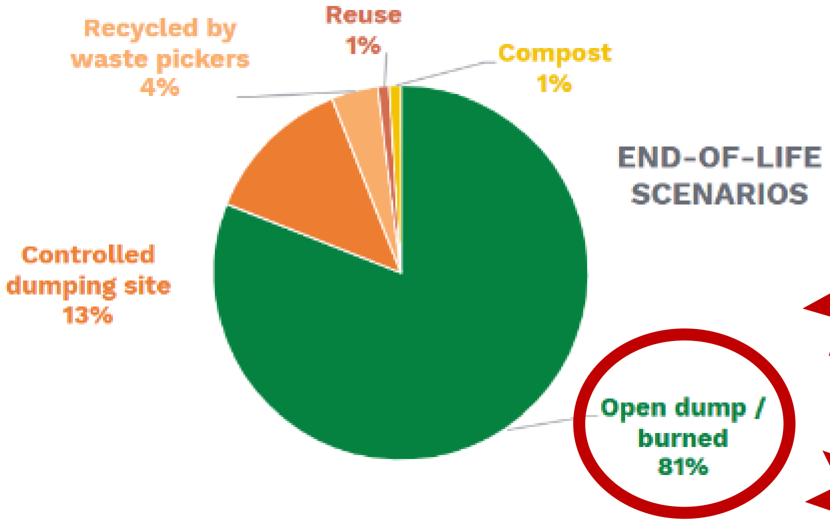


Lack of strategic planning

Lack of prioritization

Armed conflict

Lack of financial resources



End-of-life scenarios considered for reference scenarios in **DRC** and **South Sudan**

The **objective of Bio4HUMAN project** is To assess and compare the environmental impact of innovative bio-based solutions against current practices in the context of solid waste management in humanitarian settings.

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METHODOLOGY

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27 bio-based innovative technological solutions → **SMALL – SCALE BIO-BASED TECHNOLOGIES** →

Biodigesters (waste to energy)

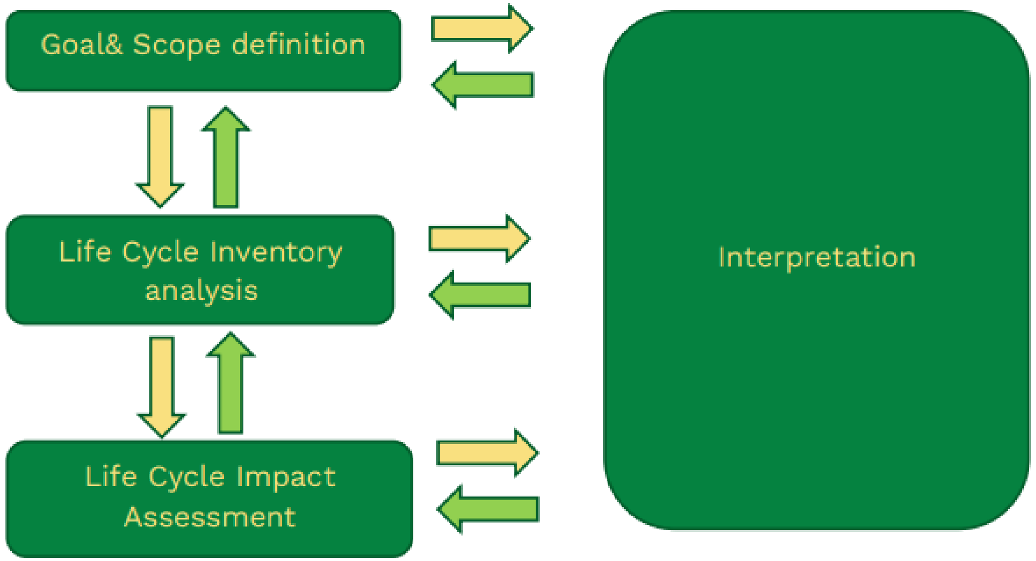
1. **Modular micro AD system – Qube Renewables**
2. **Single Stage Biogas Digester**
3. **Micro Biogas Digester**
4. **Domestic biogas technologies**

LCA approach

ISO standards on LCA:

ISO 14040:2006-Environmental management - Life cycle assessment - Principles and framework

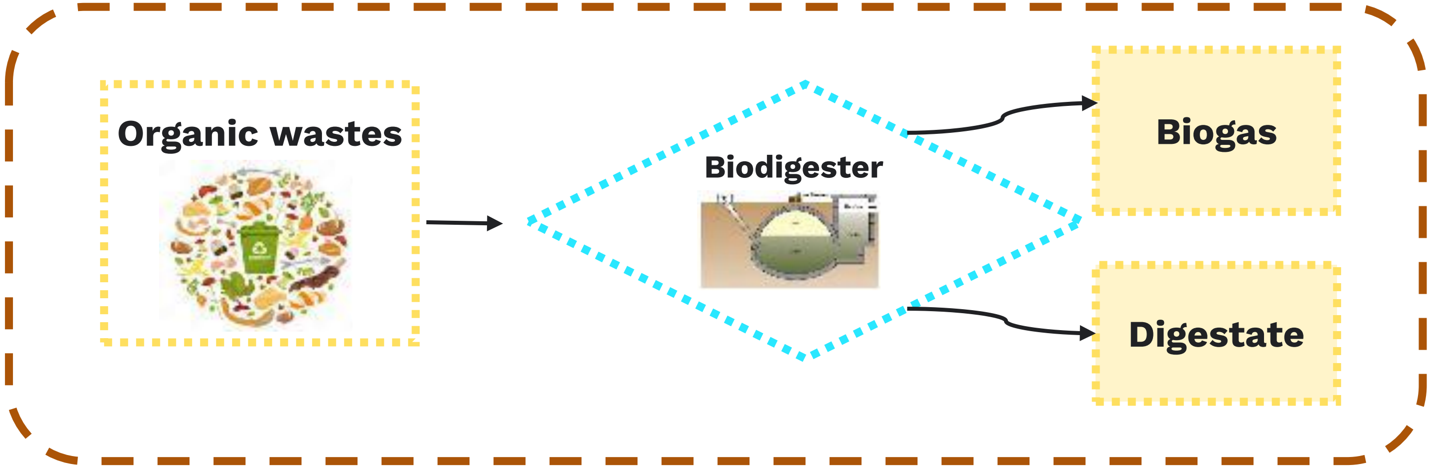
ISO 14044:2006- Environmental management - Life cycle assessment - Requirements and guidelines



Functional Unit: 1 MJ
System Boundary: Cradle-to- gate

METHODOLOGY

Country Example: University of Cape Coast, Ghana



Database

ecoinvent

Software

openLCA

Methodology

Environmental Footprint (EF)

EF V3.1

Impact categories

Global Warming Potential

CO_2

Fossil Depletion

RESULTS

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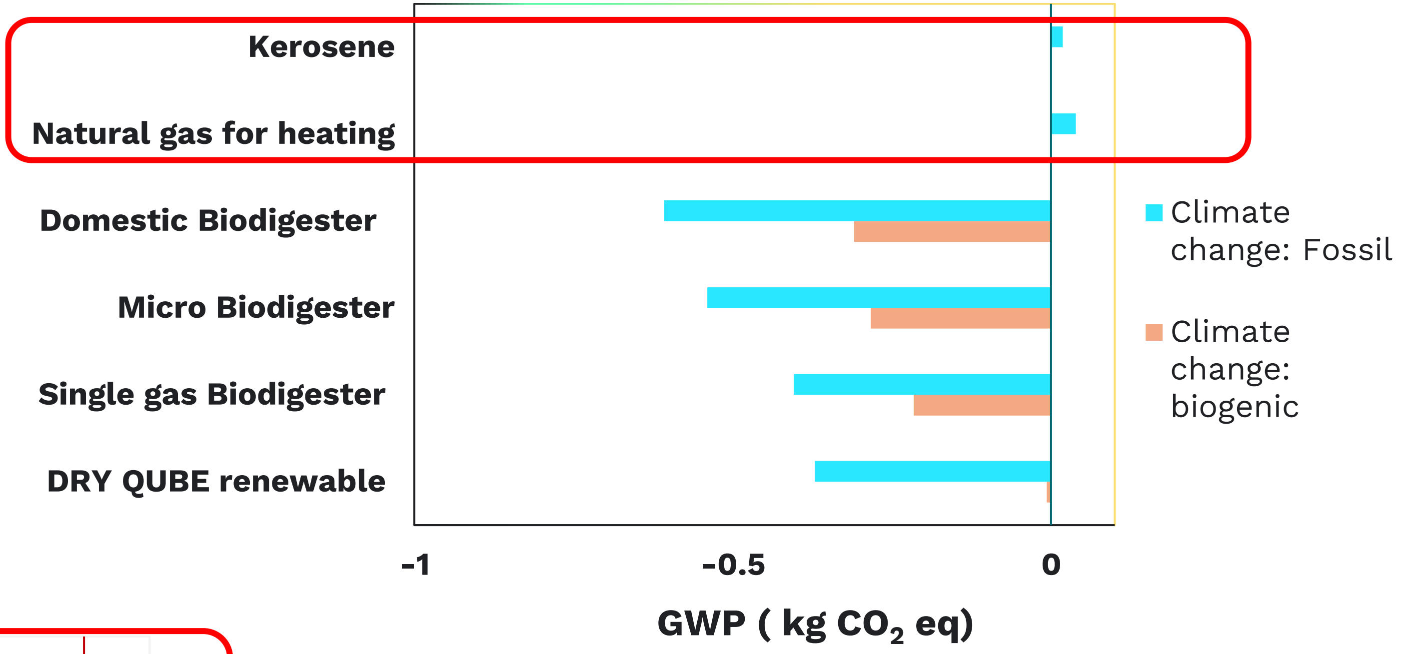
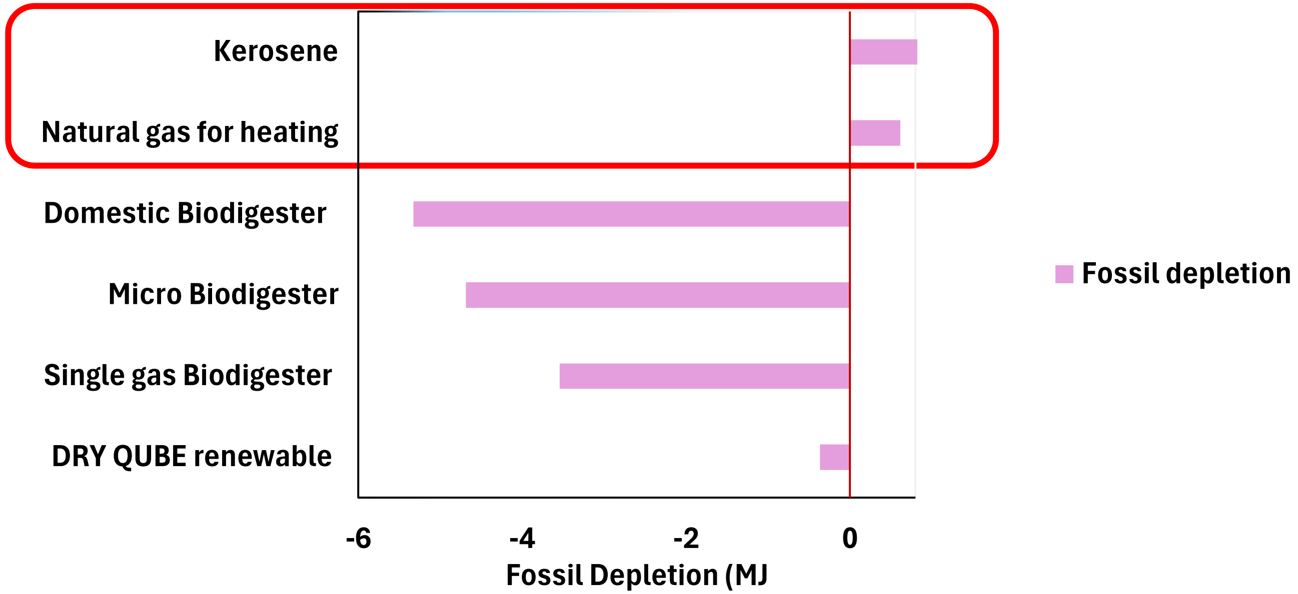


Biodigesters achieve **negative** climate change values, Indicating a net **reduction in greenhouse gas emissions**



Biodigesters drastically reduce fossil resource consumption compared to natural gas

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... and this continues

BIO4HUMAN

1

Environmental and community impact

Waste-to-energy technologies reduce waste and pollution while providing tangible benefits to affected populations, such as energy and useful products for daily needs.

2

Adaptability and scalability

The Bio4HUMAN approach is designed to be flexible and replicable, allowing its solutions to be applied across diverse humanitarian contexts and crises.

3

Integration of sustainability in humanitarian operations

Sustainability is not just an added layer, but a core element of effective humanitarian response, combining technological innovation with human-centered impact.

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Thank you

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