CIRAWA

Agroecological Solutions for Resilient Farming in West Africa

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Installation Guide for a Biodigester

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Summary:

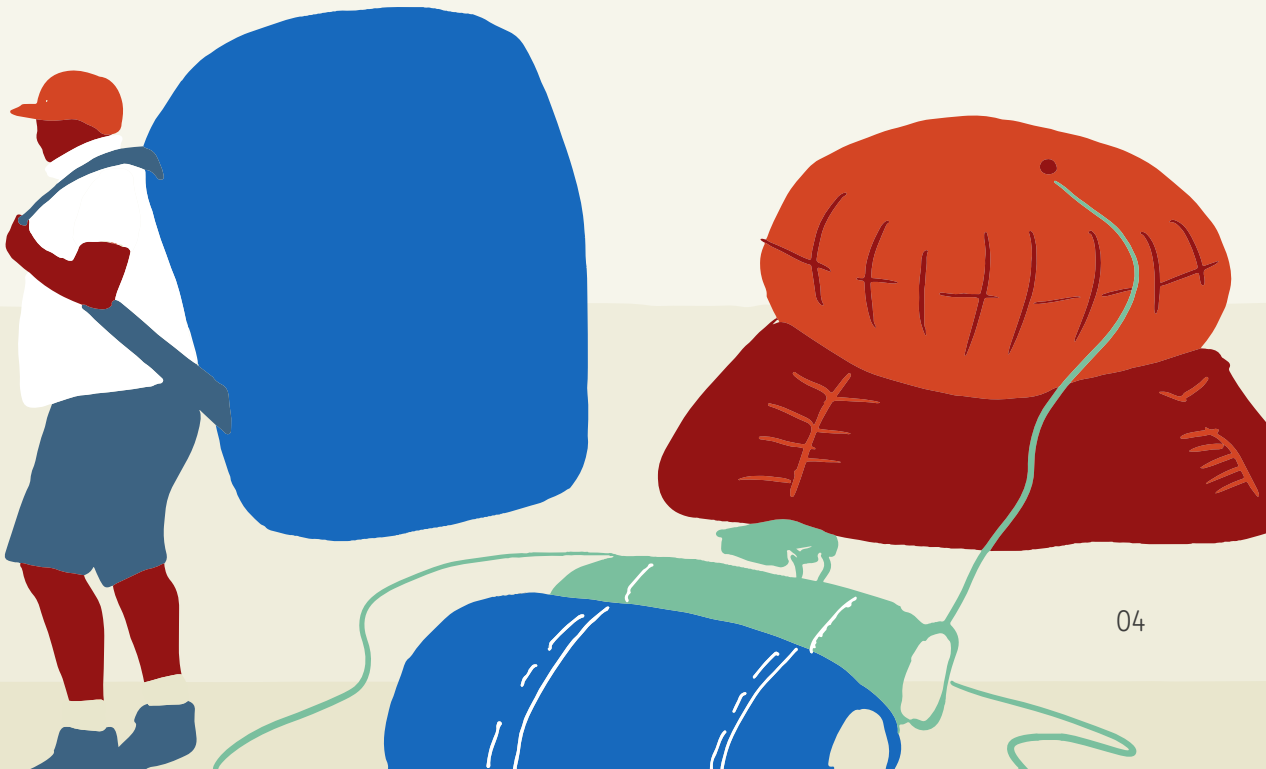
Introduction

This guide, produced by the CIRAWA project in collaboration with the Institut Sénégalais de Recherches Agricoles (ISRA), provides detailed instructions for installing and operating a geomembrane biodigester. CIRAWA is a four-year, EU-funded project focused on innovative agroecological solutions to build climate resilience in Cape Verde, Ghana, Senegal, and The Gambia.

In response to climate change impacts, this guide supports sustainable agroecological practices by covering all essential phases from setting up the platform to feeding and activating the biodigester. It aims to help manage waste effectively and optimise energy production.

What is a biodigester?

A biodigester is an anaerobic fermentation technology that converts various organic materials, such as animal manure and food waste, into biogas. This process not only has the advantage of producing a combustible, renewable gas such as methane, but also solid products that can be used as a biofertiliser for agricultural soils. This technology is essential for managing waste sustainably, reducing greenhouse gas emissions while improving climate resilience by recycling waste into usable natural resources.



Benefits of using a biodigester on your farm

Using a biodigester on your farm offers several benefits, including efficient waste management and reduced odours. It produces biogas that can be used for cooking, lighting, heating, or even powering small engines, saving on fuel costs. The digestate generated is a fertiliser that improves soil fertility, resulting in better yields and healthier plants. By converting organic waste into valuable resources, it reduces your need for chemical fertilisers and lowers waste disposal costs. Additionally, the biogas production helps decrease greenhouse gas emissions, and the overall system boosts resource efficiency on your farm, supporting long-term sustainability and climate resilience.


Animal waste
Electricity generation
Agricultural waste
Cooking
Food waste
Heating
Bio-fertiliser

Biodigester technical sheet

SN	Model		TY-BD-5
1	Capacity (m3)		5
2	Dimensions (m)		¢ 2.6 x 1.6
3	Fermentation capacity (m3)		3.5
4	Biogas storage (m3)		1.5
5	Maximum biogas production (m3/d)		3.5
6	Surface area (m2)		8
7	Inlet and outlet pipe		Physical education
8	Max. waste handling capacity (kg)	Food waste	90
9		Pig manure	84
10		Cow manure	105
11		Chicken manure	49
12		Vegetable waste	35

Different system components

SN	Photo		Specification
1		**TY-BD-5.0**	**Capacity:** 5 m3 **Dimension:** ¢ 2,6 x 1,6 metres
2		**Biogas storage bag**	**Capacity:** 0.5 m3 for additional biogas storage
3		**Biogas stove**	**Suitable gas Biogas/GN Pressure (kpa):** 1.6~12 Heating capacity 3 kW **Consumption:** 0,50 m3/h
4		**Biogas pump**	**Power:** 20 W, 220 V, 50 Hz **Max. flow rate:** 40 L/min **Pressure:** 25 Kpa
5		**Dehydrator and desulphuriser**	To eliminate moisture and H2S, with a desulphurising agent
6		**Biogas hose with connector**	Biogas pipe, Φ10mm, 20 metres, with valve, connector and holder

Phase I

Setting up the platform

The first step involves setting up the slab with a diameter of 4 metres for a 5 m3 biodigester dome.

Phase II

Identification of equipment

Collect and gather the necessary equipment: this step involves listing the various components, including the tarpaulin and accessories (feeding tank, outlet tank, fastening collars, desulphuriser, dehumidifier, gas pump, etc.).

Phase III

Installation of Equipment

This step involves assembling all the components of the biodigester:

- Fixation of the feeding tank to the tarpaulin.
- Fixation of the outlet tank for the digestate.
- Connection of the gas transfer pipe.
- Installation of the desulphuriser, dehumidifier, and gas pump.

Phase IV

Feeding and Activating the Biodigester

This crucial step involves starting up the biodigester by following these guidelines:

- Mix cow dung in a container with a ratio of 300 kg of dung to 300 litres of water for one week.
- Then, feed the biodigester daily at a rate of 100 kg of dung to 100 litres of water.
- Observe the activation after 20 days.
- Use the gas regularly.
- Collect the organic fertiliser in a drum or a collection pit.

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