Small-Scale Biogas Plant

HoMethan

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Content

- **History**
- **HoMethan Technology**
- **Benefits**
- **References**

History

- Through the EU FP7 Project S(p)eedkits IBBK developed an easily and fast deployable digester model for disaster areas.

- A first successful field test was conducted in a rural subsistence farming community in South Africa

- With that knowledge and experience in collaboration with a manufacturer IBBK gathered valuable experience to offer a simple and robust Biogas System for small farm and industry applications

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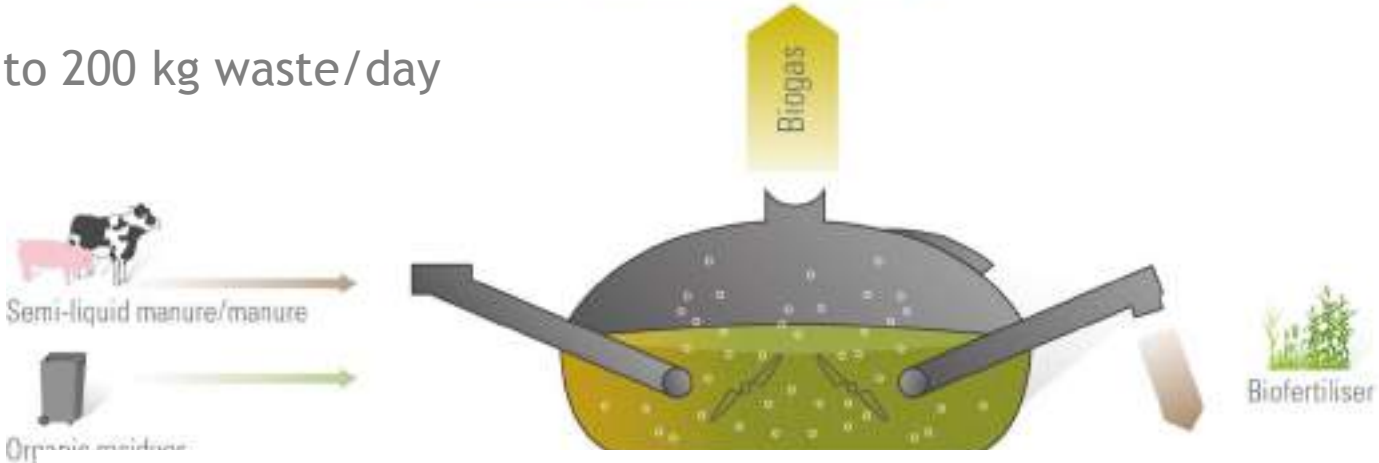
HoMethan Technology

5m³ biogas per day

Up to 200 kg waste/day



HoMethan Technology

5m^3 biogas per day

HoMethan Technology

The *new* biodigester generation

Features

- ✓ Our design transition from large and high-tech to small-scale biogas plants was accomplished while establishing a set of minimum requirements for **high-efficient** biogas production and a **user-friendly operation and maintenance**
- ✓ HoMethan overcomes the problems of popular technologies like leakages, corrosion, difficult installation and maintenance, short lifespan, low-efficiency, etc. HoMethan ensures tightness, offers a higher yield and wider application.
- ✓ Designed and patented in Germany
- ✓ **Autarkic** – no need of electricity and water
- ✓ Durable and approved membrane, UV and biogas components resistant
- ✓ Easy to transport, install and uninstall (easy relocation)
- ✓ Lifespan of 20 years under proper use

HoMethan Technology

Stirring System

Equipped with a

- ✓ **Manually-operated stirring system**
- ✓ **Manhole** for maintenance purposes (**no "black box"** system)
  - Special and safe digester opening for man-entry
  - Inspection of the process possible

Performance

- ✓ It is designed for max. 200 kg input material/day
- ✓ Output capacity is
  - ✓ 5m^3 biogas/day*
  - ✓ 190 kg digestate/day

*Figures based on fresh manure in warm regions.
Higher yields for other agro or food industry waste streams.

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Stirring System

Stirring benefits

- ✓ **Uniform fermentation mix**: It ensures homogenous composition and uniform distribution of bacteria population in all digester parts. It brings fresh waste and the fermentation mix inside the biodigester together, it balances nutrient concentration and composition differences
- ✓ **Uniform temperature distribution**, it balances temperature gradients
- ✓ Prevent the formation of stratification, gradients, floating and sinking layers
- ✓ Optimum release of gas bubbles from the fermentation mass

HoMethan Technology

Stirring System

Stirring design

- ✓ Manually-operated, no power requirements
- ✓ Transverse mixing, gentle and biology-friendly
- ✓ For all type of organic substrates

HoMethan Technology

Stirring System

Wider application

- ✓ All-climates
  - Dry regions: Basically, there is no need of processing water, therefore interesting for dry regions
  - Cold regions: Temperature evenly distributed and no need of adding cold processing water, therefore interesting for regions with even average temperature from 8-10°C onwards. Long experience in cold regions.
- ✓ All-organic waste producers
  - It boosts co-digestion
  - For low and high dry matter substrates, challenging substrates, etc.
  - No need of dilution basically up to 20% of dry matter content
  - All digestible organic waste can be used except from woody biomass

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Biogas uses

Lighting

Stoves/cooking

Rice cookers

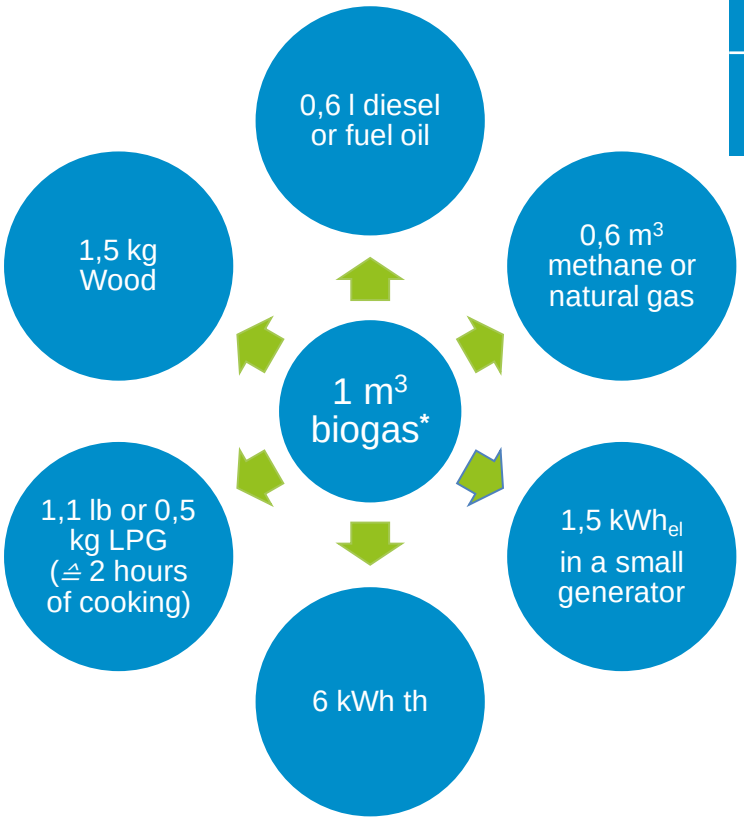
Boilers

Refrigerators

Biogas-powered generators

Energy content in biogas and equivalents

Rule of the thumb numbers

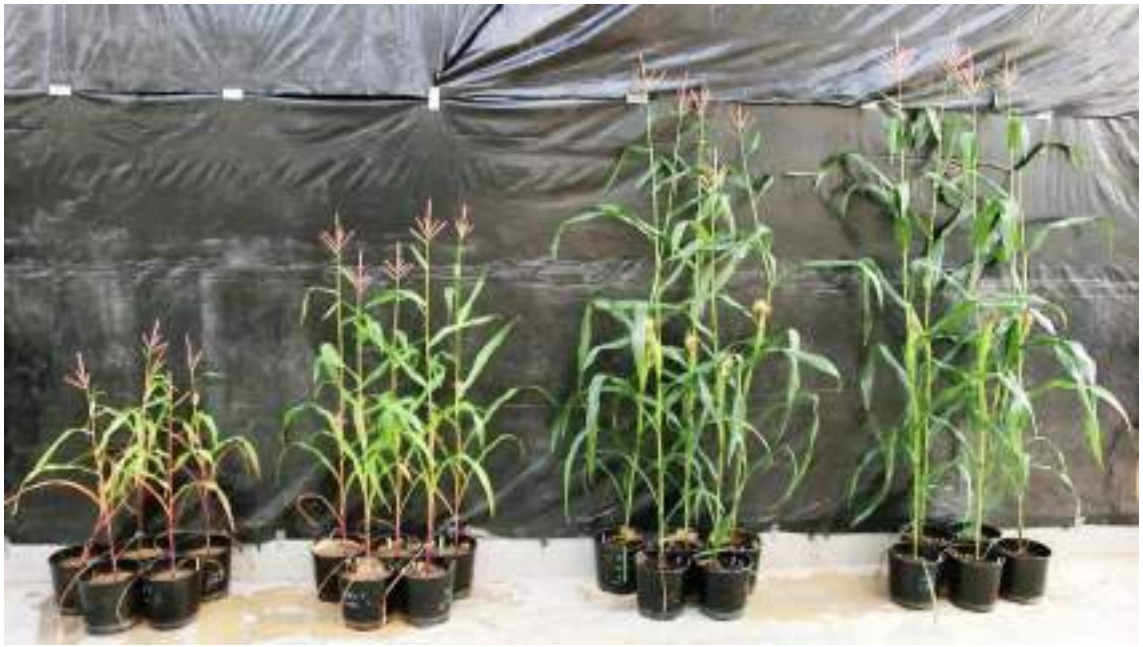


Approx. amount	daily	monthly	annually
Biogas (m3)	5 m³	150 m³	1800 m³
LPG equivalent (kg)	2,5 kg	75 kg	900 kg
Diesel equivalent (kg)	3 kg	90 kg	1100 kg

* 60% CH_4 and considering following lower calorific values:
  - LPG (12,9 kwh/kg)
  - Diesel (10 kwh/l)
  - Wood 12-20% residual moisture (4 kWh/kg)

Biofertiliser

Test with maize plants and cobs



Source: Agroscience

Maize plant	Maize plant + Manure	Maize plant + **Biofertiliser** (from Biogas plant)	Maize plant + Chemical fertiliser

Nutrient content in digestate and equivalents

Rule of the thumb numbers

- ✓ Arable land area, fertilising potential: 5 ha
- ✓ Digestate production at full-load:

Approx. amount	Kg/day	t/month	t/a
Digestate	190	5,7	70
mineral commercial fertiliser equivalent 15-15-15 (%) NPK	3,5	100	1,2

Indication: These are very rough figures, for indicative purposes only and may vary according to local conditions. Values are based on experience and average data for: animal waste (considered as worst case) without dilution, warm regions and average soil requirements. Outputs are highly substrate-dependent and subject to local conditions. This is only to be used as guidance. Each soil type and plant species has its own specific requirements

Profitability

Case study at full load

Input

200

kg/day

Biogas production per month

150 m³ biogas

≙ 75kg LPG
or *90L diesel*

Organic fertiliser production per month

5,7 t digestate

≙ 100 kg mineral fertiliser 15-15-15% NPK

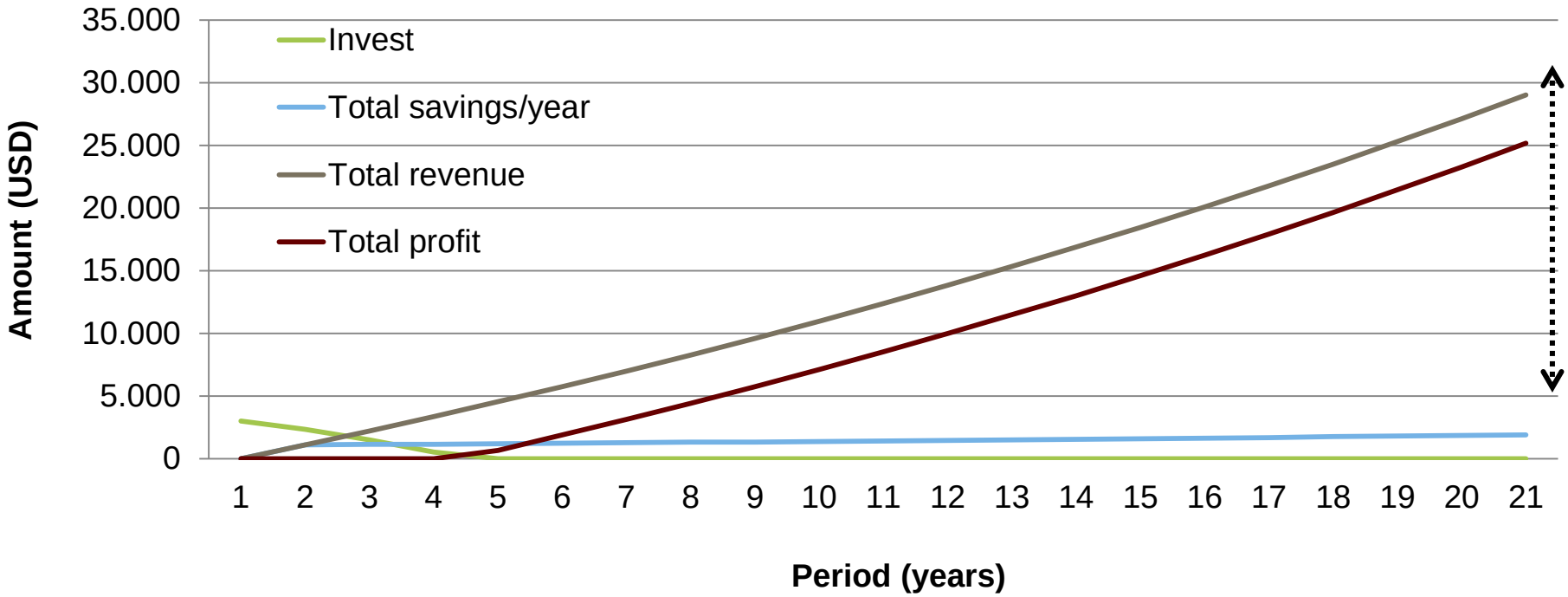
Total savings per month

90 USD (LPG)
+
90 USD (Fertiliser)
= 180 USD/Month

- Scenario:
  - 1,2 USD/kg LPG
  - 0,9 USD/kg Fertiliser
- Increasing prices for LPG and fertiliser (inflation): 3 % / a
- Investment: 3.000,0 USD
- Interest rate: 15%

Profitability

Case study over the entire lifetime



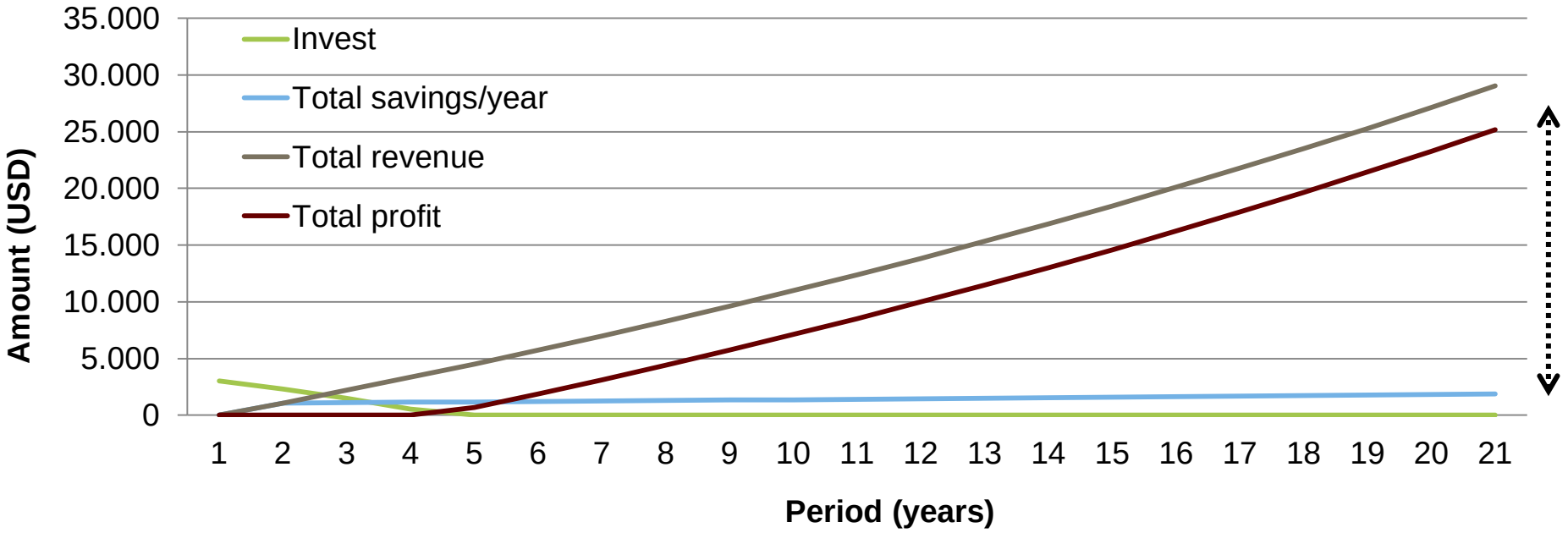
- Scenario:
  - 1,2 USD/kg LPG (retail price)
  - 0,9 USD/kg mineral fertiliser (retail price)
- Increasing prices for LPG and fertiliser: 3 % / a
- Investment: 3.000 USD; interest rate: 15 %

Amortisation: 1,5 years

Profitability

Case study over the entire lifetime

Considering only biogas savings; disregarding fertiliser



- Scenario:
  - 1,2 USD/kg LPG (retail price)
  - ~~0,9 USD/kg mineral fertiliser (retail price)~~
- Increasing prices for LPG and fertiliser: 3 % / a
- Investment: 3.000 USD; interest rate: 15 %

Amortisation: 4,3 years

Further co-benefits

Become more independent

You're assured a constant supply of energy 24/7 so you're not exposed to fluctuating supplies or power cuts. The system is user-friendly and built to last, with reliable technology made and patented in Germany.

Save money

Forget about energy bills and fertilizer expenses. You'll be spending less money on vital supplies, producing more (and better crops) at less expense, which boosts the efficiency of your farm.

Depending on your needs, the plant could easily generate more than enough energy to cover your present needs – creating other opportunities to increase your earnings.

Improve your harvests

You'll be growing healthy, organic food on your own farm, with minimal wastage and maximum output. With the HoMethan digestate to enrich your land, you'll lose fewer crops and boost your yields. And any rotten food gets back to the system. With more resilient and sustainable output, you can achieve better recognition for your products.

Enjoy greater convenience

There's no need to bring in heavy gas bottles, or gather and store wood, and you also have a solution to deal with waste. It brings hygiene, keeps your site clean and it is odor-free.

Transformation

Save up to 8 t CO_2 per year

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Colombia, dairy farm 3.136 m above sea level

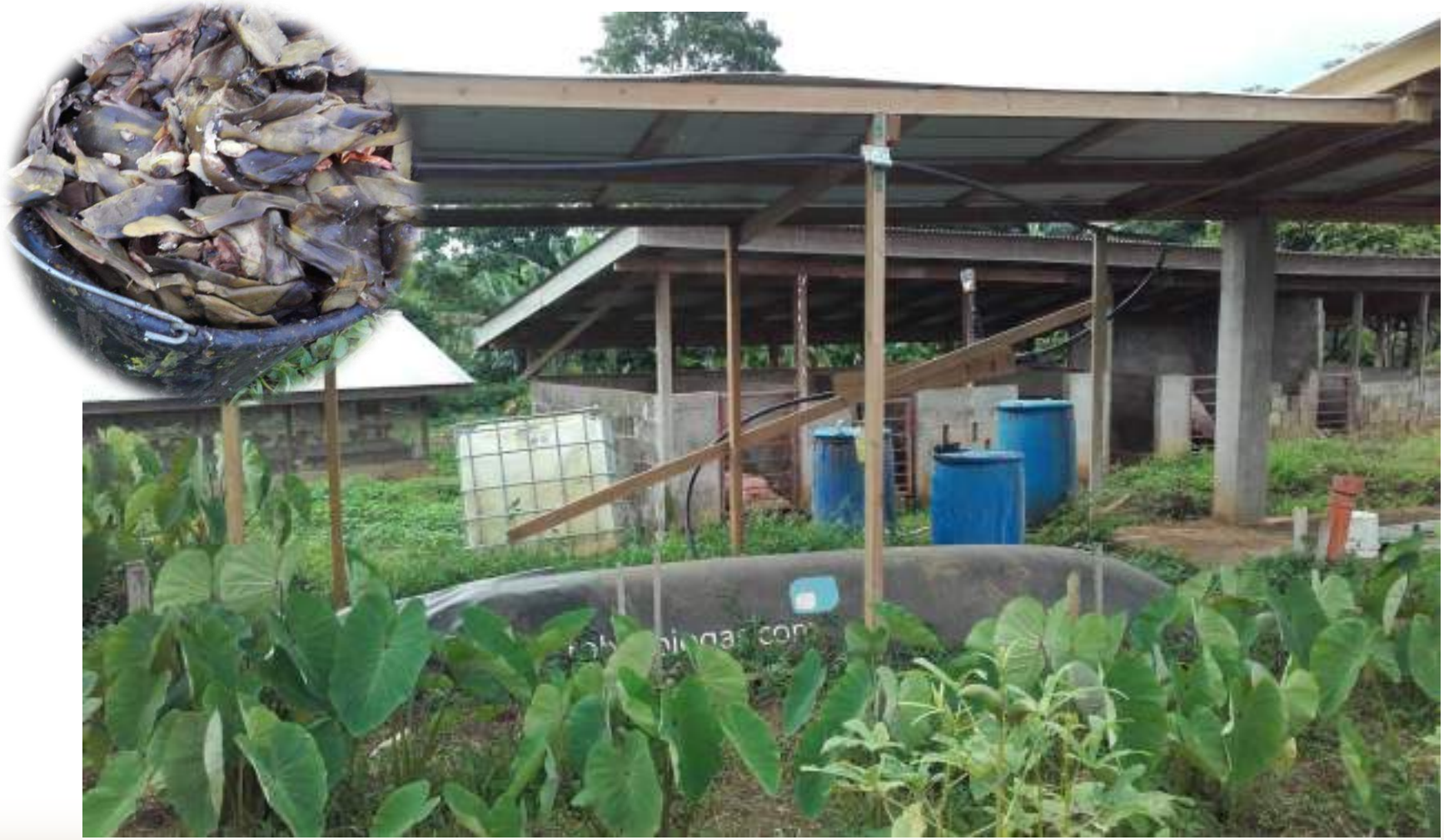
Gas is mainly used for cooking and digestate is applied to grazing land and kitchen garden

Colombia/Coast, Vocational school with an off-grid demonstration farm powered with renewable incl. biogas

The school is currently shifting from treating cattle manure to fish & crop waste

Grenada/Carribbean, farming school

Co-digestion of pig manure and canteen biowaste. Gas is used for slaughtering and cooking



Grenada/Carribbean, pig farm

Pig slurry. Gas is used for household cooking and slaughtering.

Grenada/Carribbean, pig farm

Co-digestion of pig manure and kitchen biowaste. Gas is used for cooking

Grenada/Carribbean, pig farm

Co-digestion of pig manure and kitchen biowaste. Gas is used for cooking, baking and electricity generation. The fertiliser is spread into vegetable crops.

Grenada/Carribbean, household/restaurant biowaste

Fruit and vegetable waste. Gas is used for cooking

Grenada/Carribbean, agriculture farm

Mango and cassava peels. Gas is used for cooking

Brazil, shrimp production site

Head shrimp waste

Stir up
your agro-business!

Further references

Educational video

http://bit.ly/39Ua324

Testimonials

https://bit.ly/2kSApO0

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