

Welcome To The Biggest Farmer **Biogas** Network!



**2nd
Edition**

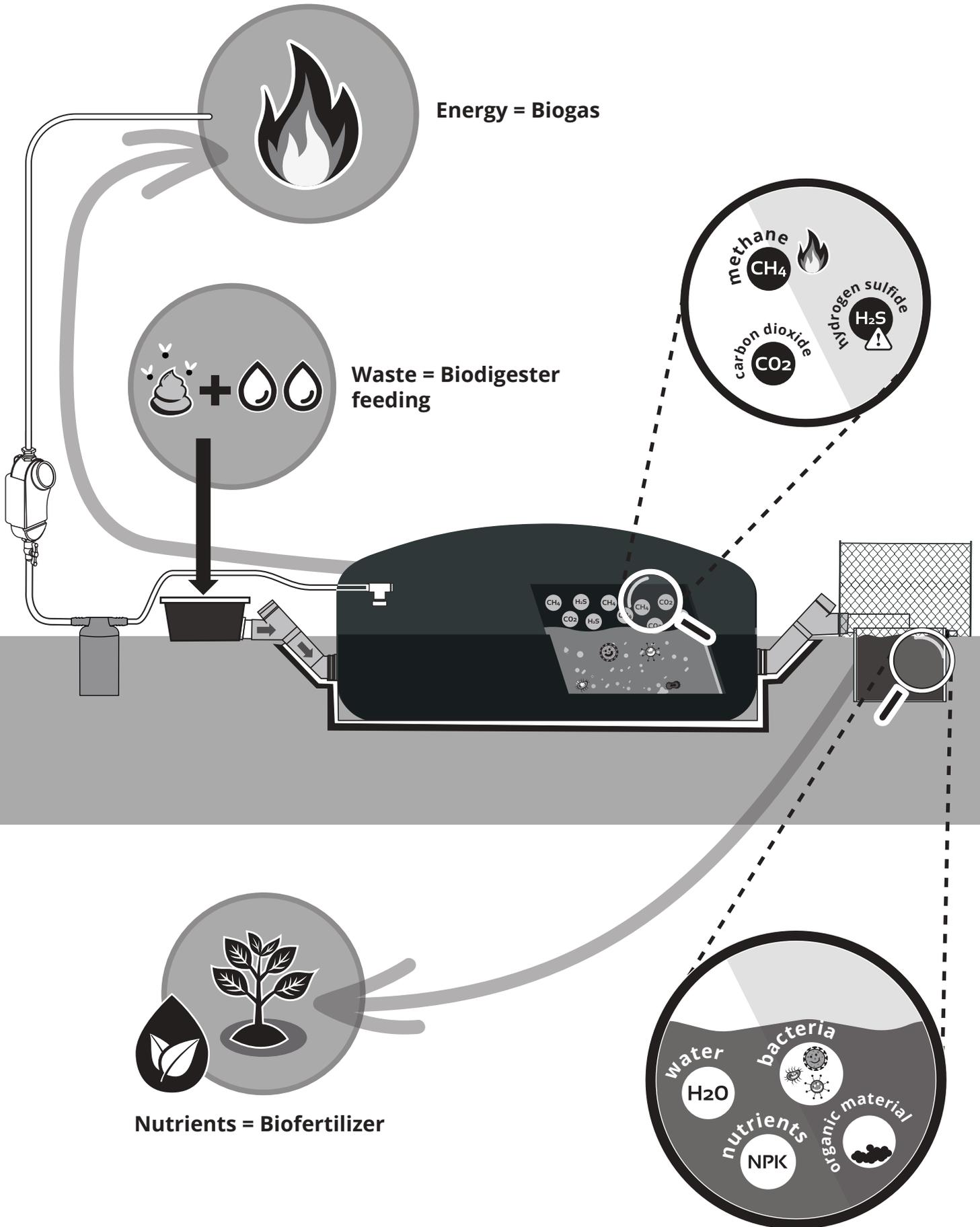
*Includes
Regenerative
Farming Tips*

Get The Most Out Of Your
Biodigester!

USER MANUAL

 **SISTEMA.bio**[®]

Understanding Your Biodigester

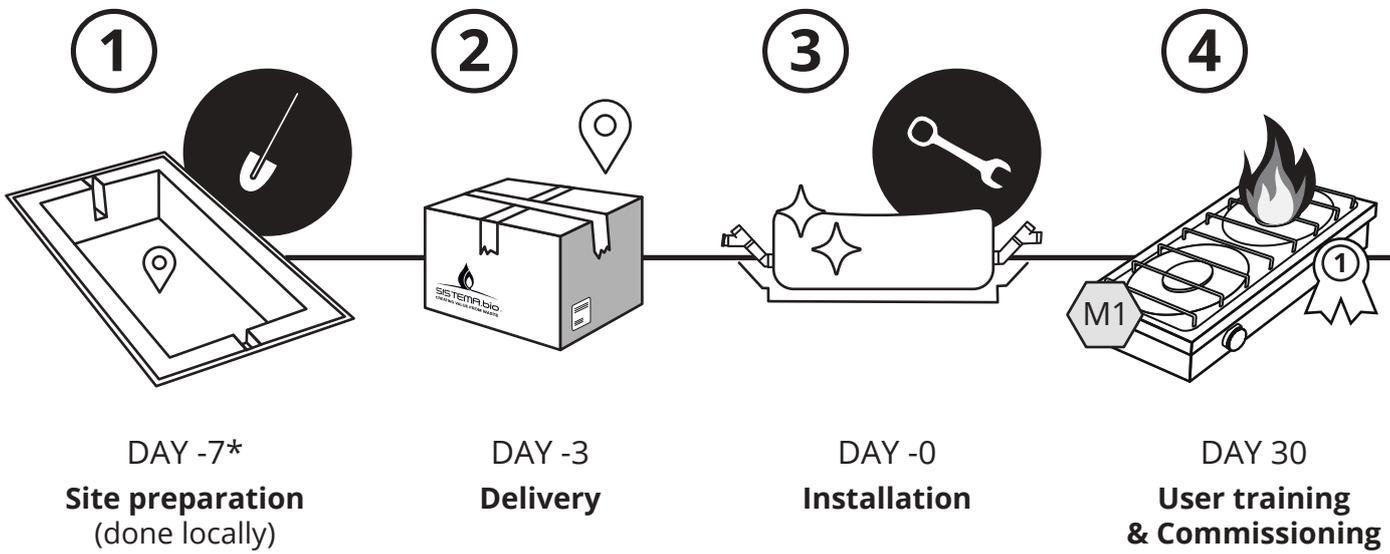
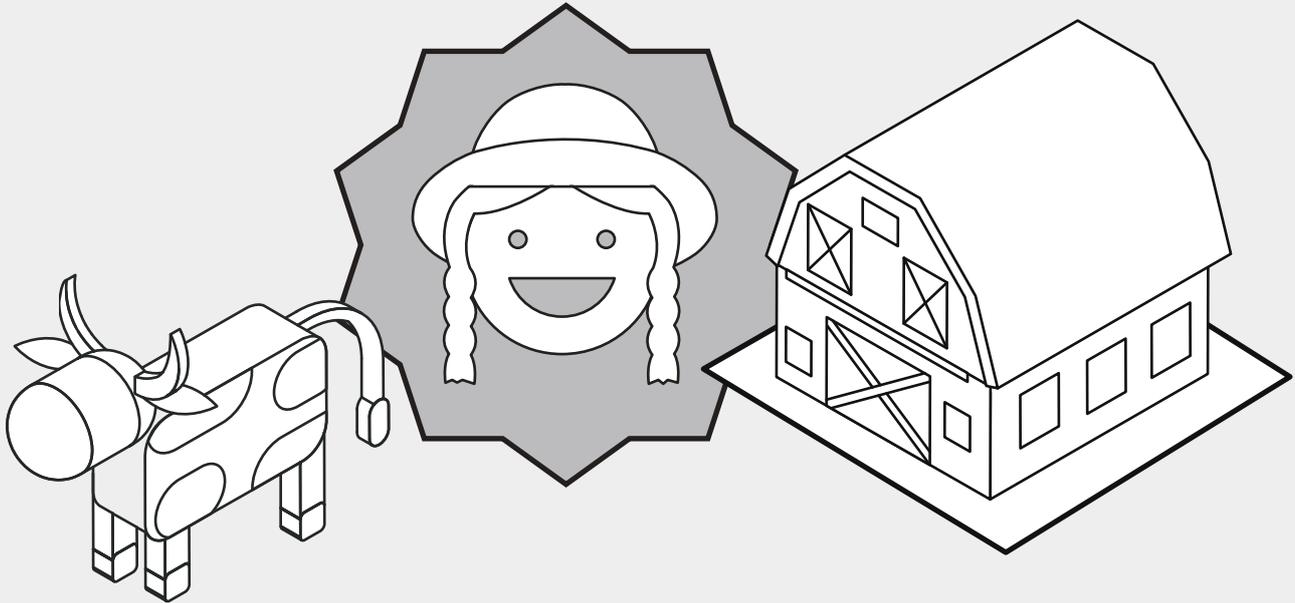


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Your Journey With Sistema.bio

You are onboarding the **Sistema.bio digester's journey!**



Monitoring

Monitoring visits

*All dates are approximative and informative.
**Might incur a payment as per warranty policy.

What are the benefits of your Customer's Journey?



1 year warranty for the gas line & appliances, and 10 years for the black membrane of the biodigester!



Minimum 3 physical visits covering the installation, your user training and the follow-up of the installation.



After sales servicing is available to answer any doubt you might have or do repairs on your installation when needed!

5



DAY 90

**Adoption call
& optional visit**

6



DAY 180

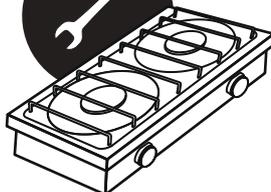
**Impact measurement
& Training**

7



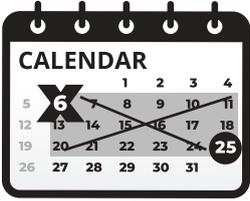
YEAR 5

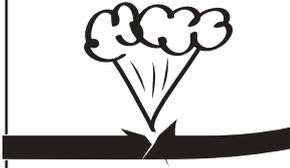
**Proactive Installation
adjustment****



PERMANENTLY
WHEN NEEDED
Service visits**

Glossary Of Symbols And Icons

General Icons	
	DO NOT
	DO
	Frequency
	Counterweight
	Soil
	Unhappy client
	Favorable/ Unfavorable environmental effects
	Reuse/ recycle

Safety Icons	
	Biogas leakage/leak
	Risk of fire
	Caution
	Fatal

For the USER



If you encounter any issues while using your system, refer to the troubleshooting steps on pages 34-39 in this manual. If the problem persists, don't hesitate to contact customer care for support.



Youtube video and reference number from the youtube list

For the TECHNICIAN



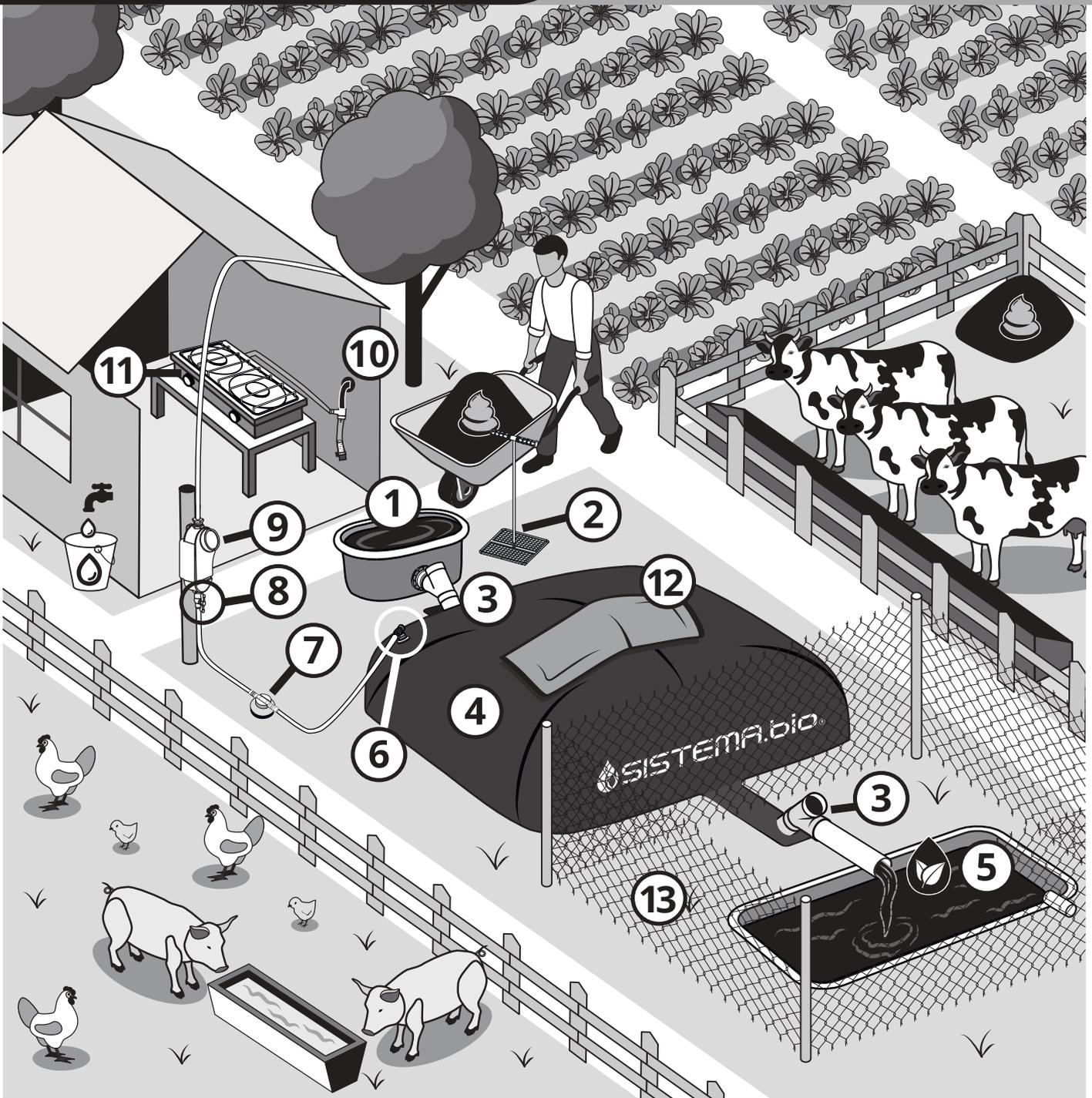
Follow the helper notes provided at the bottom of the page to identify the pages to cover during specific visits.



With a pen, circle/highlight and fill in the appropriate details on pages 20, 40, 41, 42, 43 and other relevant pages.



Scan this QR code to access the master playlist with all the videos included in this manual. Throughout the manual, you'll also find process-specific playlists organized exactly where you need them.



Know the elements of your installation

- | | | |
|------------------------------------|--------------------------|-----------------------------------|
| 1. Feeding tank | 6. Biogas outlet | 11. BioStove |
| 2. Manure Mixer | 7. Pressure relief valve | 12. Counterweight |
| 3. Inlet and outlet reactor piping | 8. Isolation valve | 13. Biofertilizer tank protection |
| 4. Biodigester | 9. Biogas filter | |
| 5. Biofertilizer tank | 10. Water trap | |

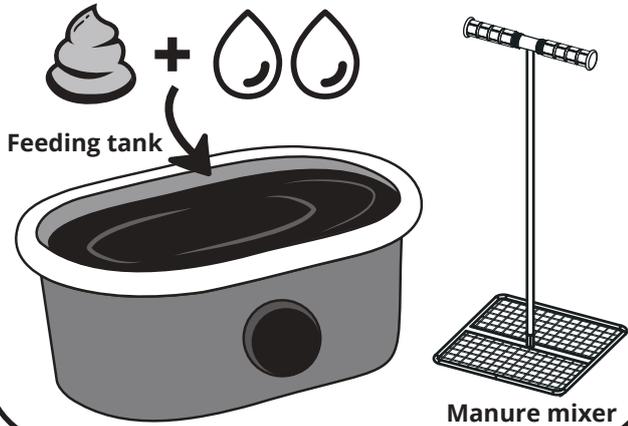
Note: Components might differ depending on the region and the local context of the project.



Biodigester Functional Components

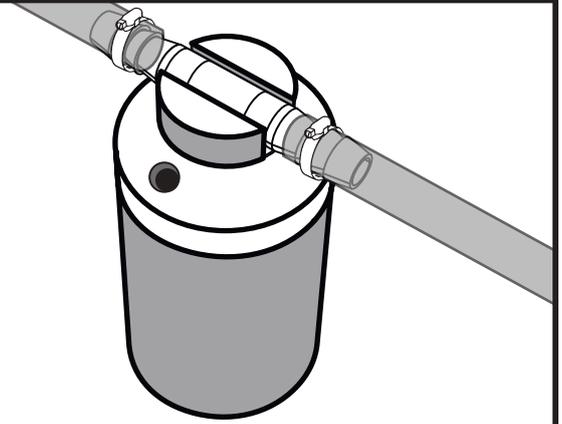
1

Feeding tank: Long-lasting tank that allows you to mix dung and water using the manure mixer. It also helps you identify and remove unwanted elements.



7

Pressure relief valve (PRV): It controls the pressure in the biodigester using water for counter-pressure.



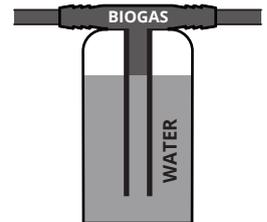
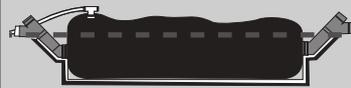
5

Biofertilizer tank: It allows you to store your biofertilizer before using it!

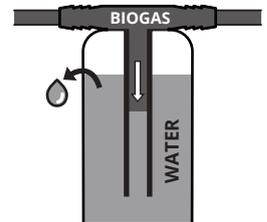


NOTE: All these components require regular operation and maintenance actions as explained later in the manual! Components might differ depending on the region and the local context of the project.

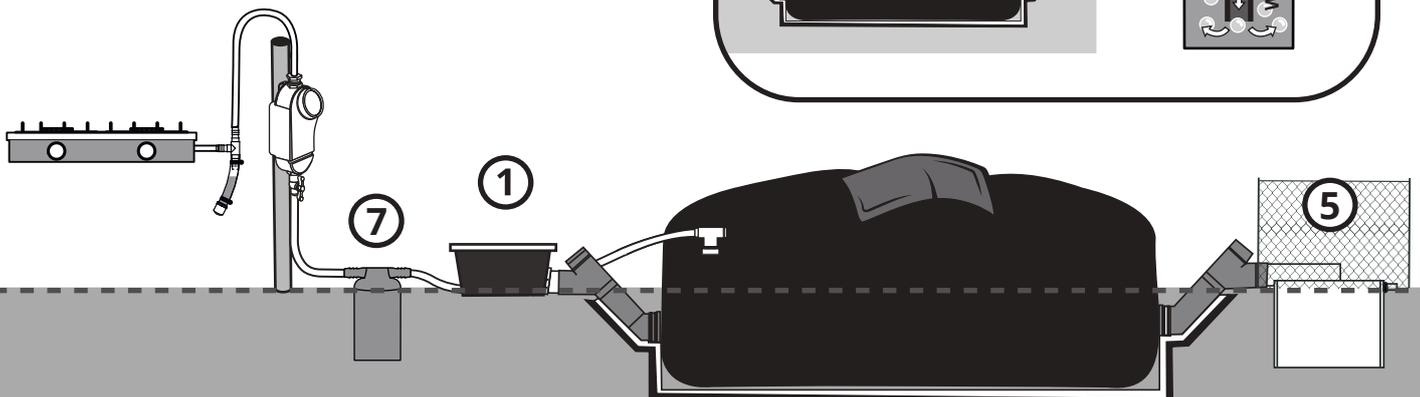
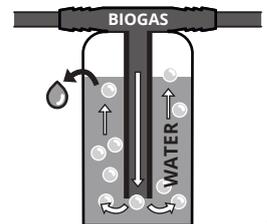
a. LOW PRESSURE



b. PRESSURE INCREASE



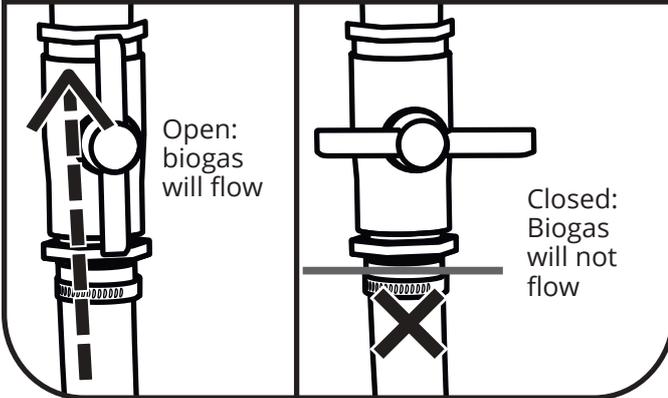
c. HIGH PRESSURE



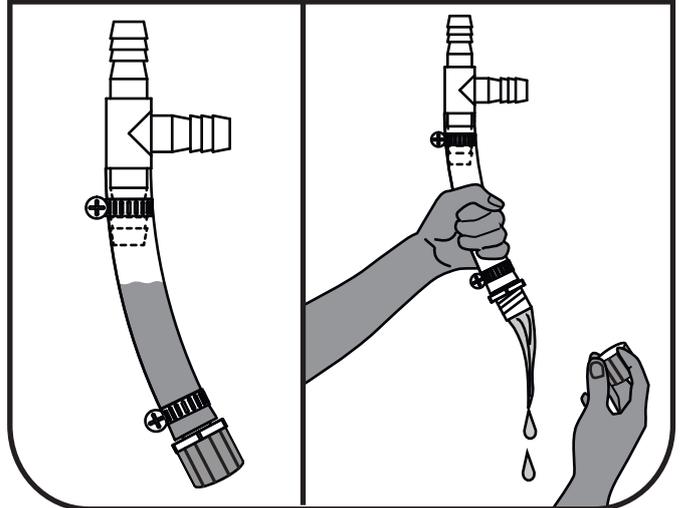


Biodigester Functional Components

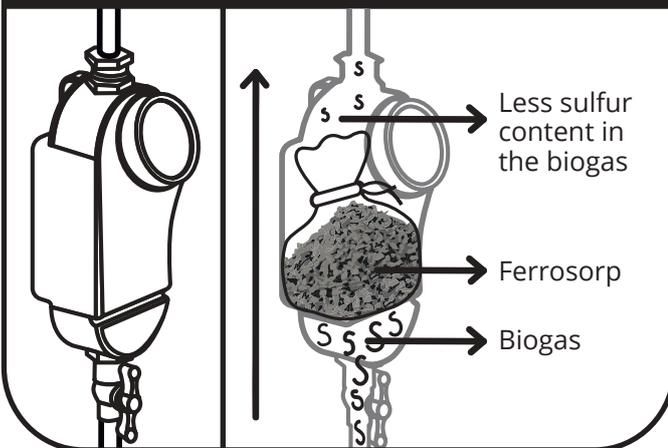
8 Isolation valve: It allows you to close and stop the biogas flow.



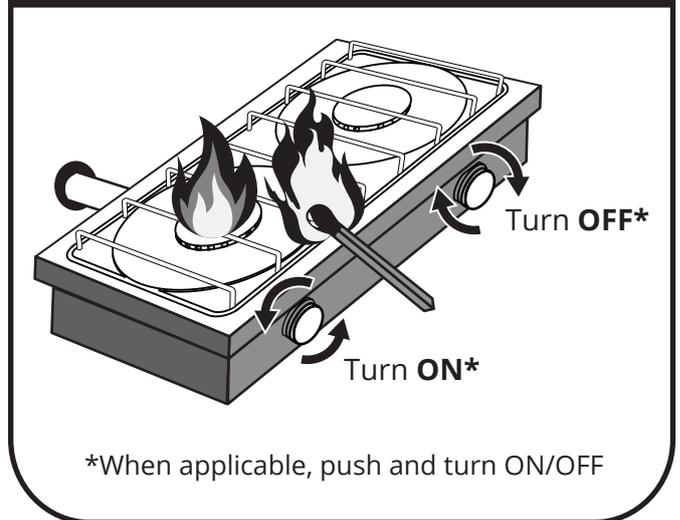
10 Water trap: When the temperature drops, the water in the biogas condensates and is collected by the water traps.



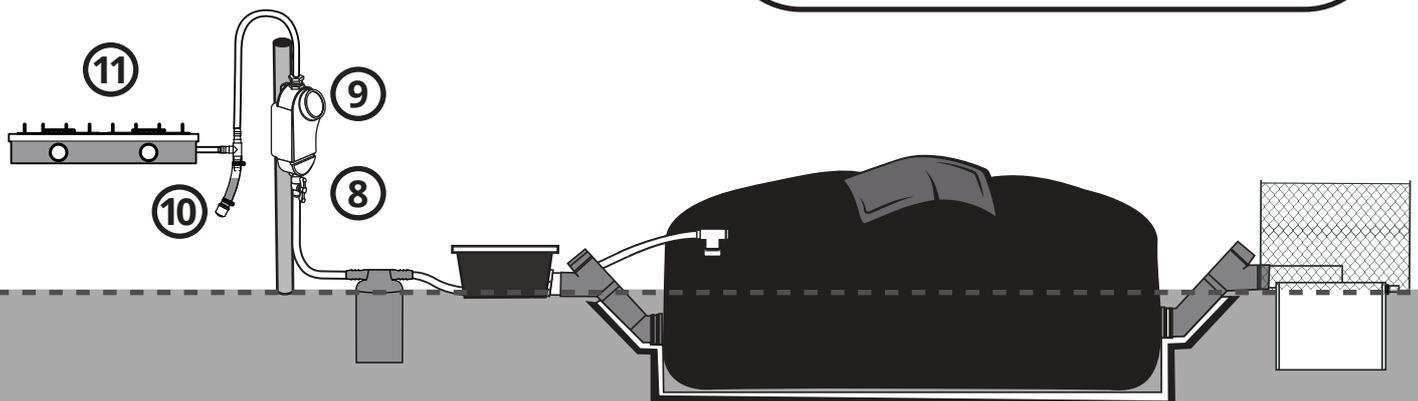
9 Biogas filter: Removes H₂S from biogas, making the system safer and extending the lifespan of metallic appliances.



11 BioStove: Appliance included in the standard kit.



NOTE: All these components require regular operation and maintenance actions as explained later in the manual! Components might differ depending on the region and the local context of the project.





Safety

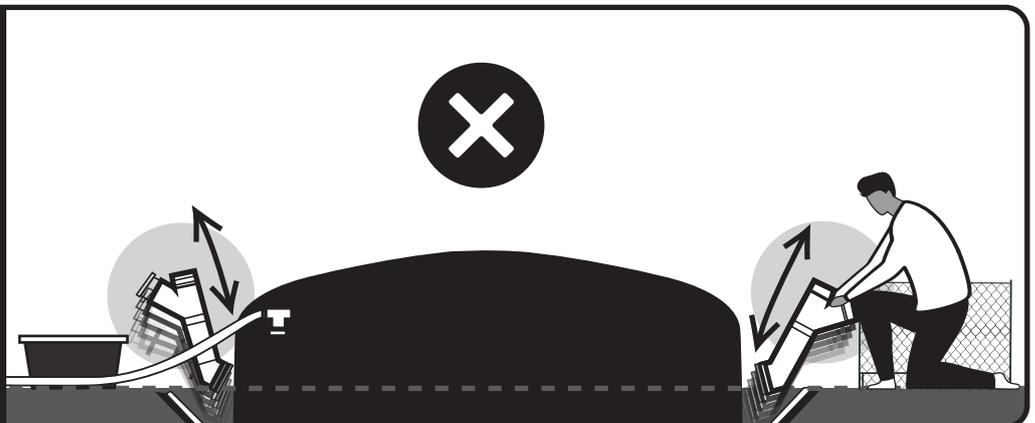
Biodigester

SISTEMA.bio

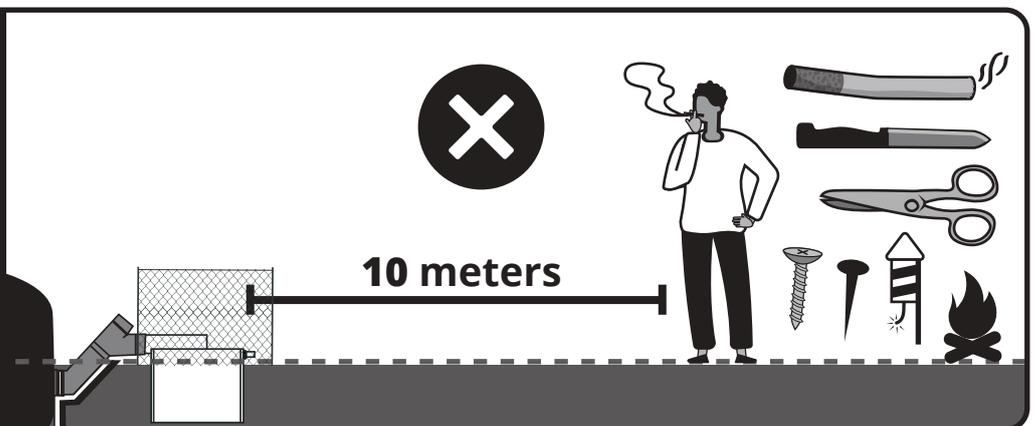
DO NOT
allow unattended
children around the
digester, **DO NOT**
jump on or run
on the digester.



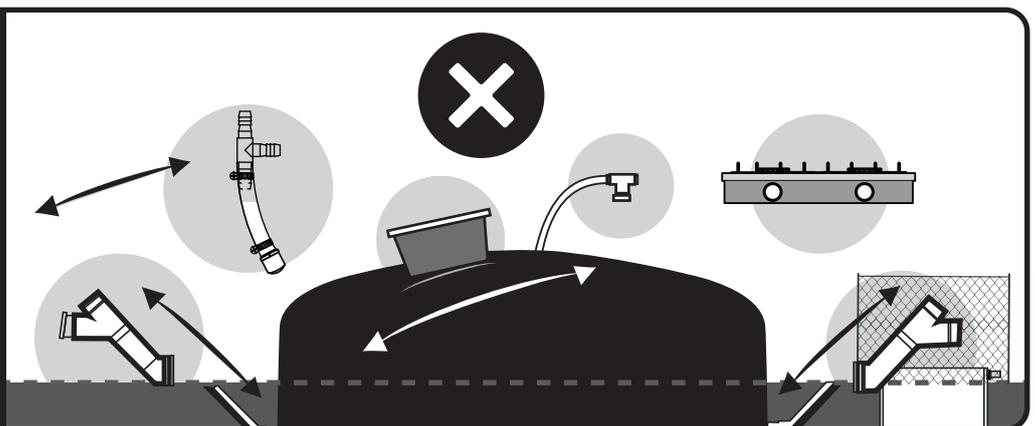
DO NOT
pull, lift or raise
the level of the pipes
that enter or exit
the digester.



DO NOT
smoke, use sharp
objects or create
flames near the
biodigester area.



DO NOT
change the
position of the
biogas components.





Safety

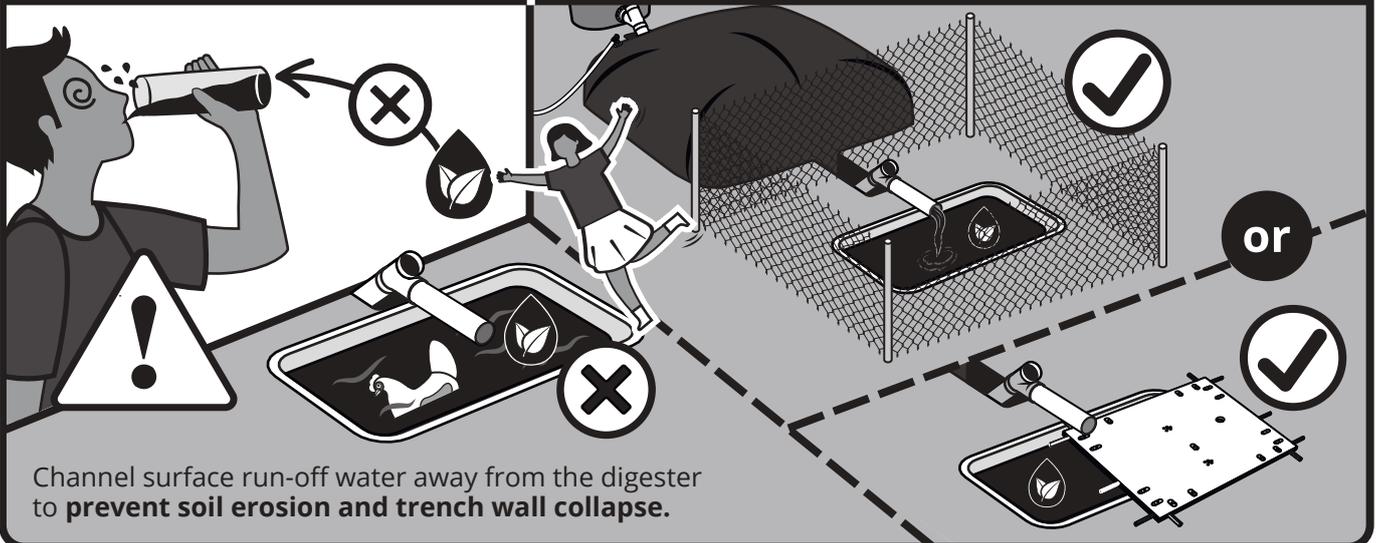


Biofertilizer



DO NOT drink the biofertilizer, avoid direct contact with eyes and skin.

ADD A FENCE OR COVER around your biofertilizer tank to prevent accidents. The cover should be childproof, strong enough to withstand 30 kg, durable over time, and have limited spaces to prevent animals and children from falling in.



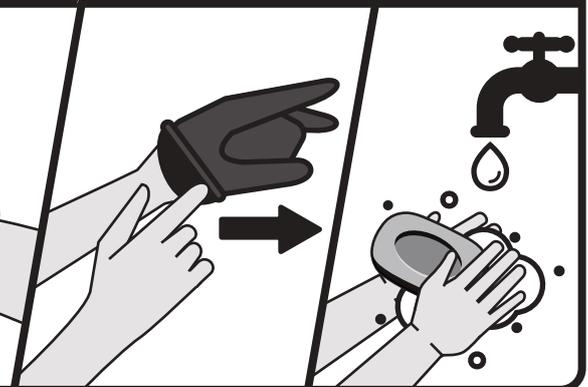
Channel surface run-off water away from the digester to **prevent soil erosion and trench wall collapse.**



1. Use gloves for handling manure and biofertilizer.



2. Wash your hands after handling.



1. STOP applying biofertilizer **3 weeks before harvesting.**

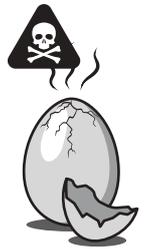
2. WASH fruits and vegetables before eating.





DO NOT inhale biogas directly under any circumstances.

Biogas is **toxic**. Inhaling it can be **deadly**.

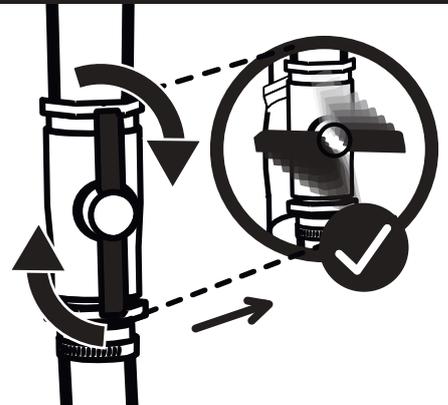


OUTDOORS / INDOORS

1. A biogas leak can smell like **ROTTEN EGGS**.

2. Once a leak is detected indoors, **LEAVE** the house as there is risk of fire and toxicity.

3. **CLOSE** the isolation valve to **STOP** the biogas flow.



4. **VENTILATE** the house so the gas can dissipate.

5. **DETECT** and **REPAIR** the leak.

6. **CALL** your customer care service for long term repair.



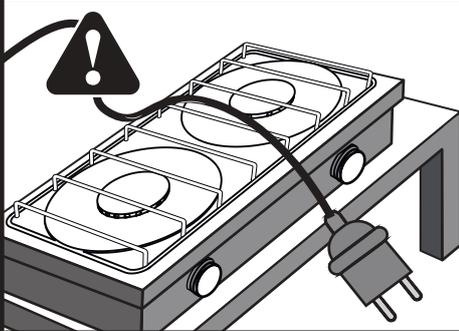


Safety



Biogas

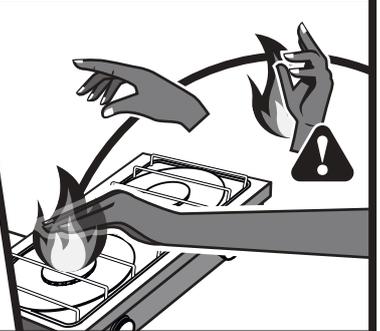
DO NOT let any wires or connections go over the stove. Place the BioStove on a solid and a steady surface.



DO NOT place curtains or any other inflammable object near the flames.

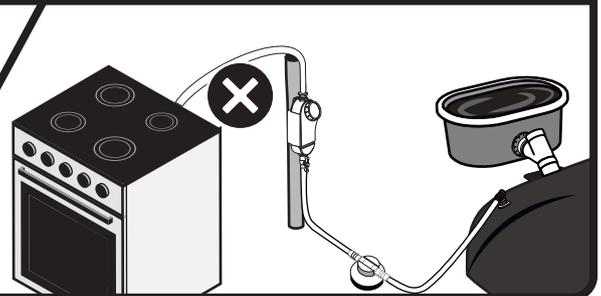
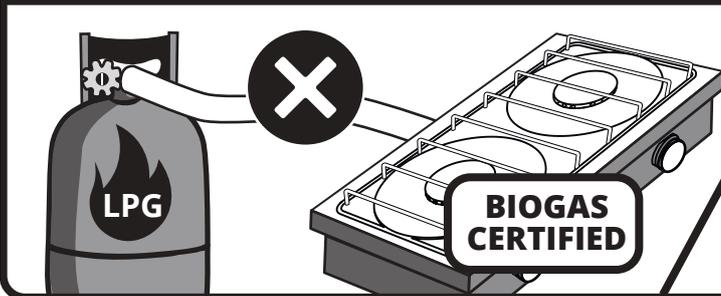


BE CAREFUL while using the BioStove as you can burn yourself.

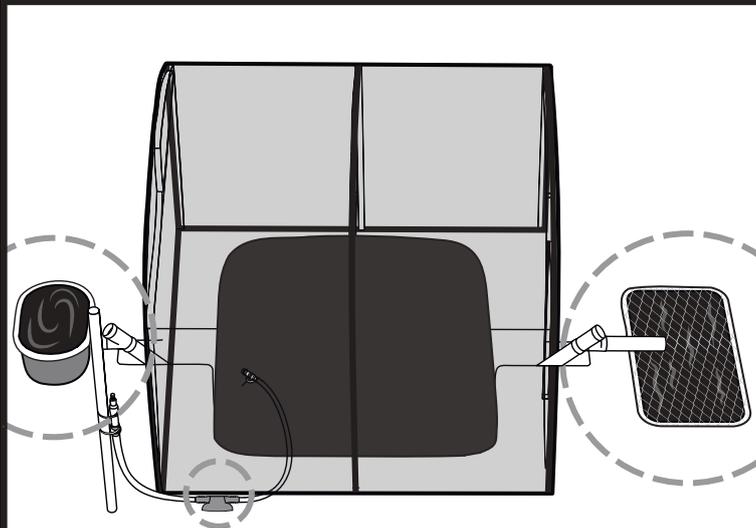


DO NOT connect the BioStove to any gas source other than the biodigester.

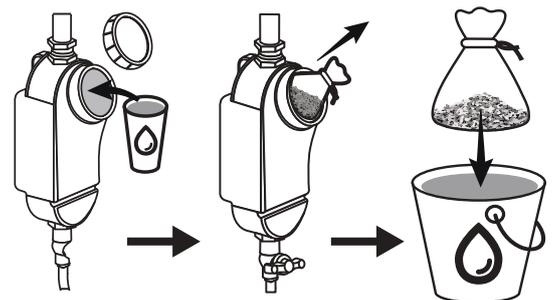
DO NOT connect the biogas line to a natural gas stove.



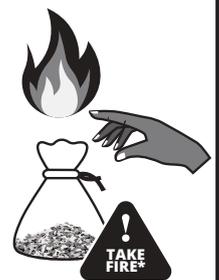
IF THE BIODIGESTER IS **INSTALLED IN A GREENHOUSE**, pressure relief valve and biofertilizer tank must be installed outside the greenhouse. The greenhouse must be **fully ventilated** before entering.



Safety During Regeneration



After closing the valve and unscrewing the lid, pour a liter of water in the filter, then after removing the bag from the biogas filter during regeneration, **dip it in a bucket of water** to prevent it from heating up and causing a fire.



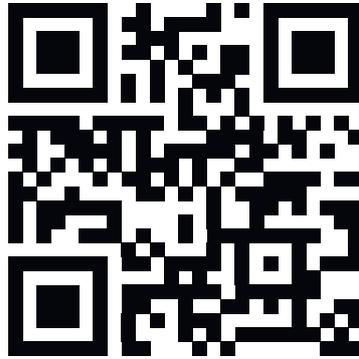
*when the filtration media is in the air.



Biodigester Startup



Scan or click on the QR codes along the document.

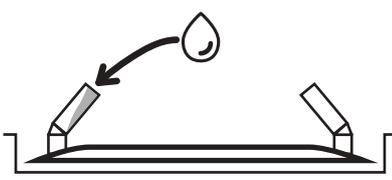
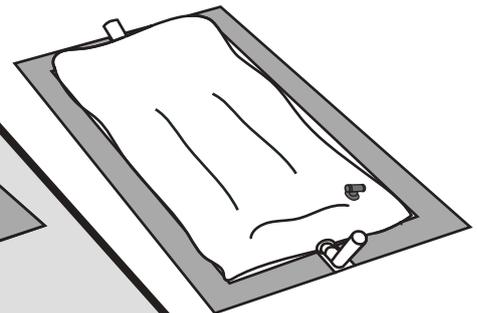
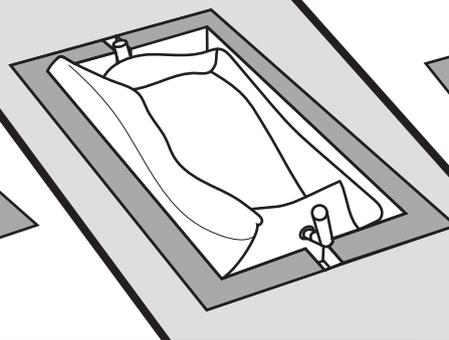
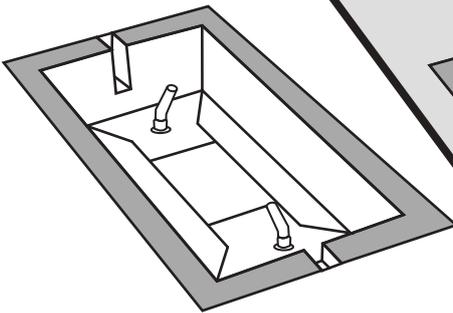


Scan or click on this QR code to access the videos supporting the section "Biodigester startup".

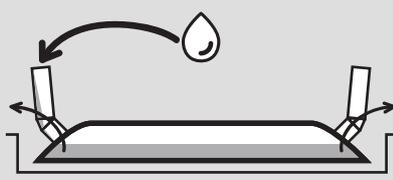
STEP 1 Fill the reactor with water until water reaches the inlet and outlet elbows.



(i5)



Filling = 0%



Filling = IN PROGRESS



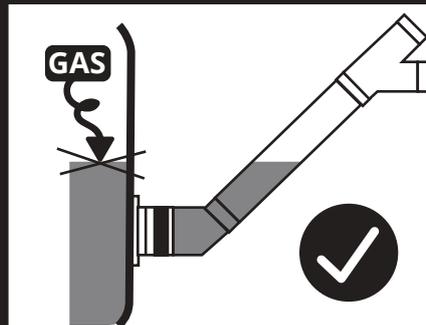
Filling = 100%



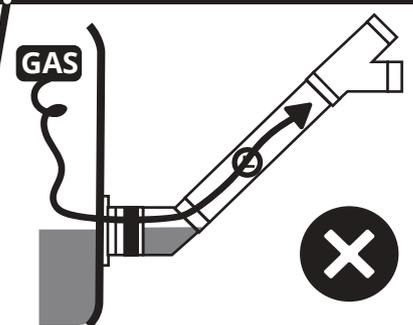
Water volume required to fill the biodigester

	m3	liters
Sistema 6	3	3,000
Sistema 8	4	4,000
Sistema 12	6	6,000
Sistema 16	8	8,000
Sistema 20	10	10,000
Sistema 30	15	15,000
Sistema 40	20	20,000

Good hydraulic seal: gas is trapped inside the reactor.



No hydraulic seal: gas can escape.

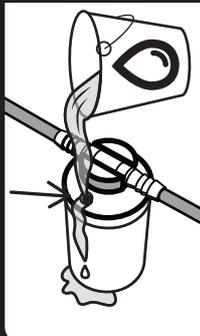




Biodigester Startup

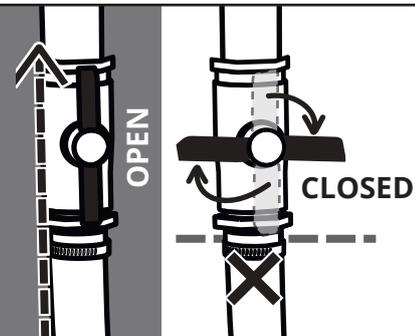
QR CODE for videos on page 13

STEP 2
Fill the PRV with water until it overflows.

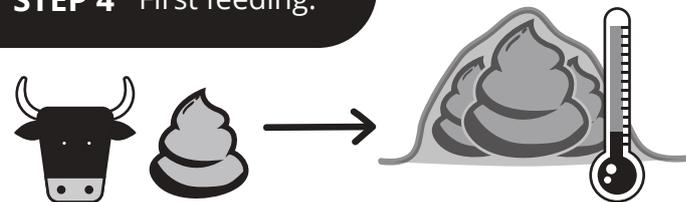


STEP 3 Close the gas line.

 (OM3), (OM3bis), (OM4)



STEP 4 First feeding.



We recommend using **cow manure** for the first feeding.

Storing manure piled under a tarp for 5 days before the first feeding will improve the startup of the digester.

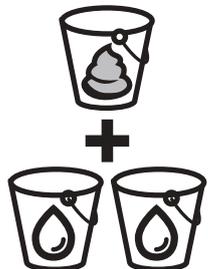
Add as much **biofertilizer** (also called **digestate** or **bioslurry**) as possible from a working digester to shorten the startup time.



STEP 4 **QUANTITIES FOR FIRST FEEDING**

	Cow manure First feeding - L or Kg 			Cow manure  20L buckets		
	 Warm >23 °C	 Temperate 15 to 23 °C	 Cold 12 to 15 °C	 Warm >23 °C	 Temperate 15 to 23 °C	 Cold 12 to 15 °C
Sistema 6	450	350	250	23	18	13
Sistema 8	650	500	350	33	25	18
Sistema 12	900	650	450	45	33	23
Sistema 16	1300	1000	650	65	50	33
Sistema 20	1800	1350	900	90	68	45
Sistema 30	2600	2000	1350	130	100	68
Sistema 40	3500	2650	1800	175	133	90

DILUTE 1 part cow dung with 2 parts water

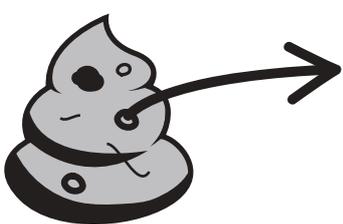


*NOTE: For any other type of waste, your technician will write the instructions on page 40 of this manual.

Example: **SISTEMA 6**
Warm climate

 **450L or Kg**
or **23 buckets** +   **900L or Kg**
or **46 buckets**

Remove the following elements from the manure before feeding into the digester.



REMOVE

- Sand, stones
- Grass, fibers, leaves, wood, wood chips
- Soil
- Plastic, metal, glass
- Citric fruits
- Cooking oil, as it can cause operational issues





QR CODE for videos on page 13

DO NOT FEED with manure from animals that were given antiviral or antibiotic medication **during the previous 5 days.**



<5 days
before feeding

FEEDING STEPS*



(OM7)



1. Dilute manure.

2. Use the Manure mixer to mix the manure and water.

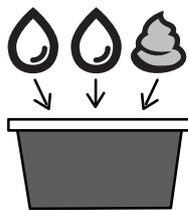
3. Let the mixture (slurry) rest for 5 minutes.

4. Remove floating materials.

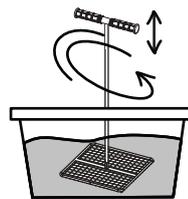
5. Feed the reactor.

6. Remove settling materials like stones and sand frequently.

*Applies for first feeding as well as daily feeding.



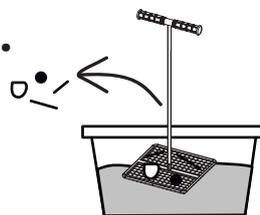
1.



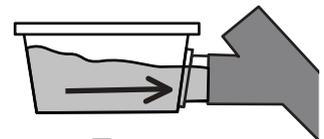
2.



3.



4.



5.



6.



WAIT FOR THE REACTOR TO INFLATE



TIME TO INFLATE:*

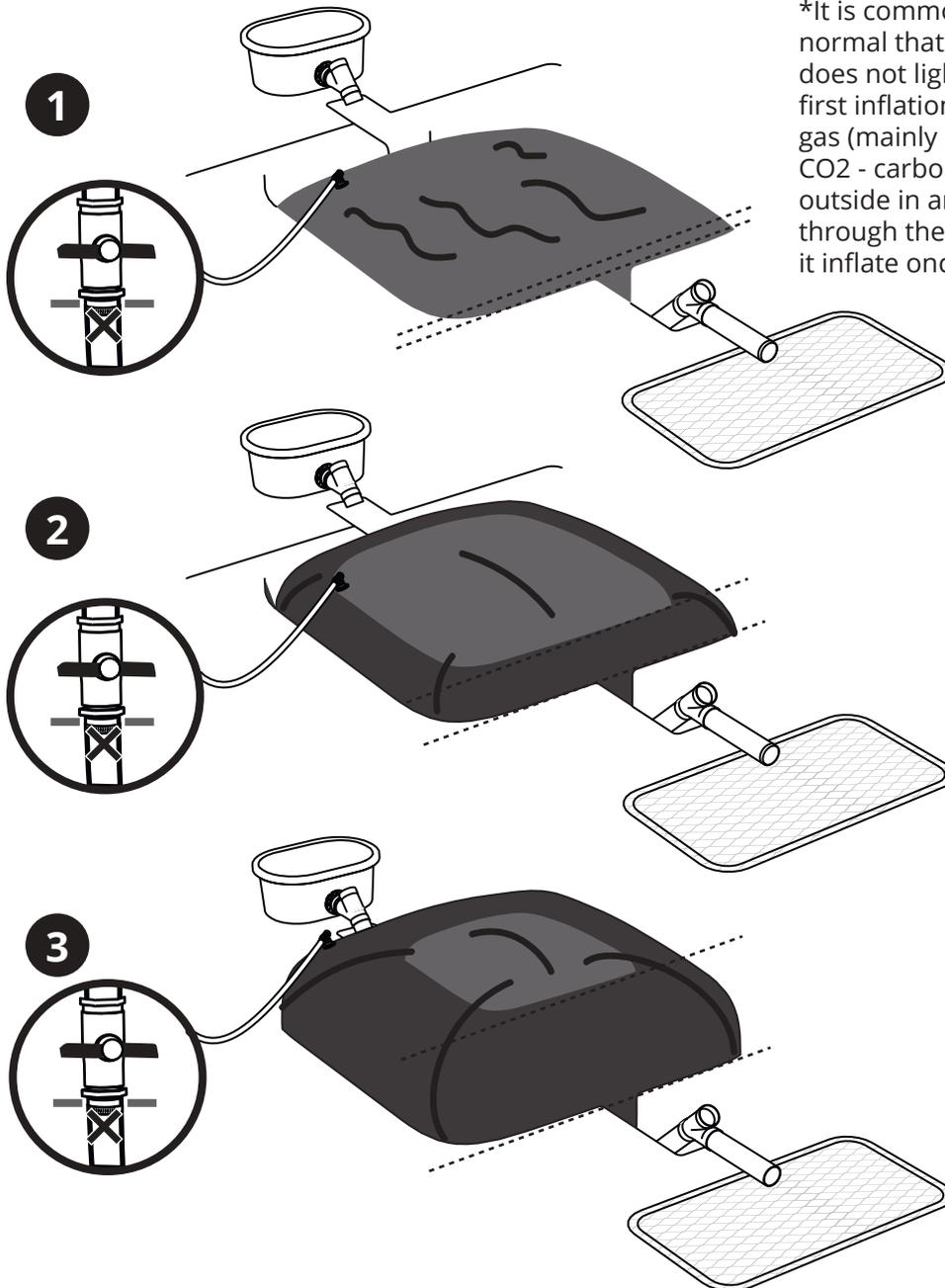
Up to 3 weeks in warm climate/season



3 weeks to 1.5 months in temperate climate/season



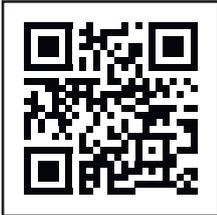
1.5 to 2.5 months for cold climate/season



*It is common and normal that the biogas does not light after the first inflation: drain the gas (mainly containing CO₂ - carbon dioxide) outside in an open space through the PRV, and let it inflate once again.



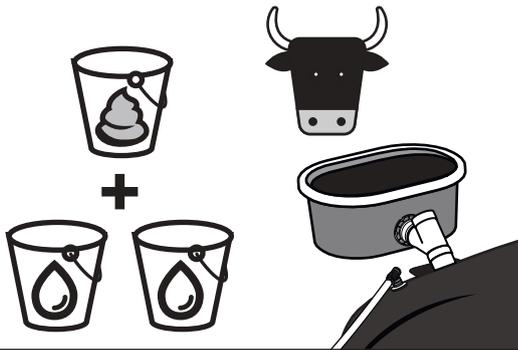
How To Use Your System



Maintain Your Digester

FEEDING. Feed your digester EVERY DAY with 1 volume of cow dung and 2 volumes of water.

NOTE: for other waste types, please consult your technician.



Daily feeding*

*See **feeding steps** in page 10



CALENDAR						
	1	2	3	4		
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

AGITATION

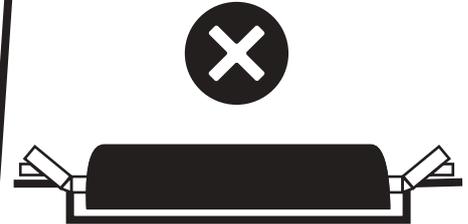
Agitate **once a week**

DO NOT agitate



Agitate only when the digester is **DEFLATED**

CALENDAR						
	1	2	3	4		
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	



when **INFLATED**

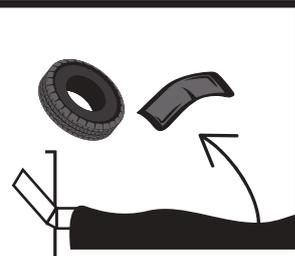
1

Remove any **sharp objects** from shoes to avoid damaging the reactor



2

Remove **counterweights** before starting agitation

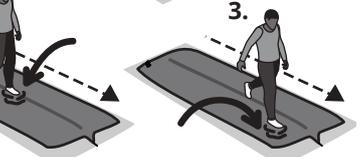
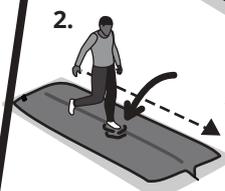
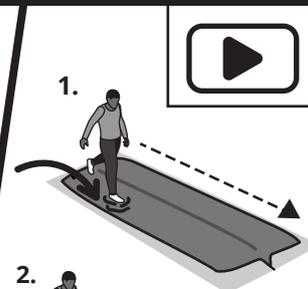


3

Agitate by walking slowly along your biodigester, shifting all your weight from one leg to the other.



Sistema **6 to 12**



Sistema **16 to 40**



How To Use Your System

SISTEMA.bio

MEMBRANE DAMAGE REPAIR

1. WASH
with soap
and brush



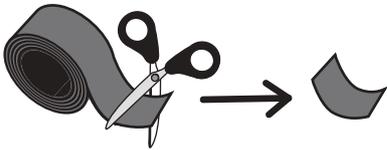
2. RINSE
with clean
water



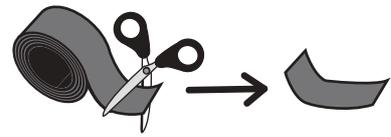
3. DRY the
membrane



4. APPLY a small patch of butyl tape



5. APPLY a
larger one
covering the
first patch



NOTE: this is a medium term repair to allow you to use your reactor! Please call your customer care service for long term repair.

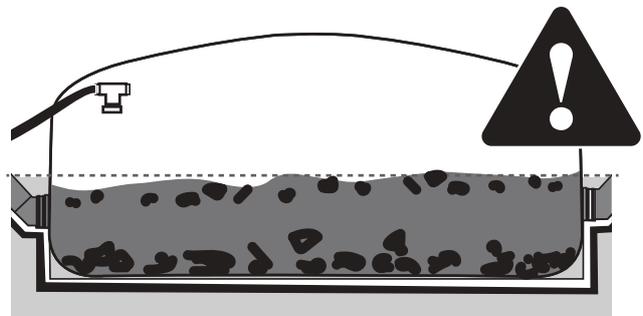
LONG-TERM MAINTENANCE

CALENDAR

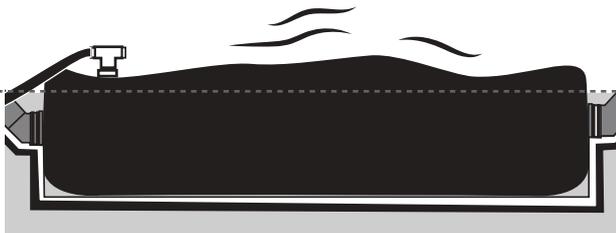
Every 5 to 7 YEARS
or whenever it is
required.

When is it required to **reactivate** a digester?

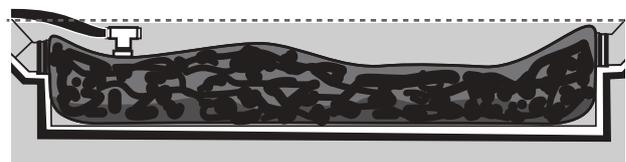
- When there are **solids accumulated** inside.



- When it hasn't been **agitated in a long time.**



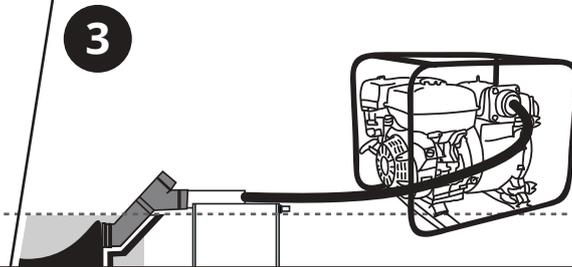
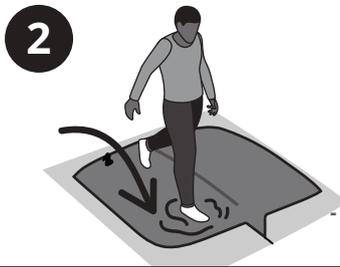
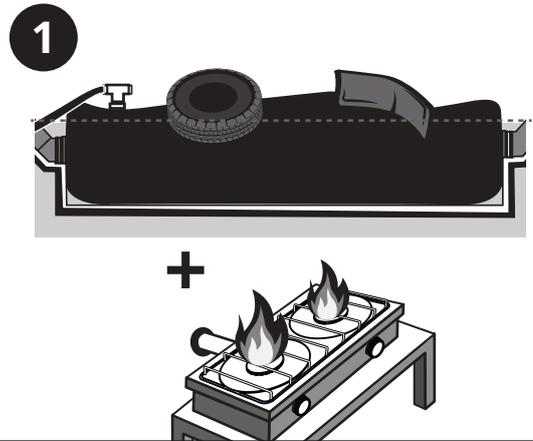
- When not enough water has been added. The digester will be very **heavy in undiluted slurry/hard to agitate.**



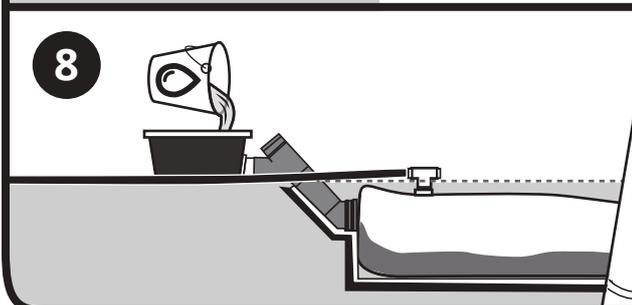
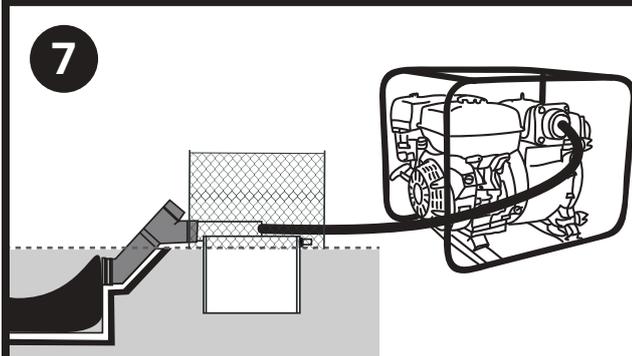
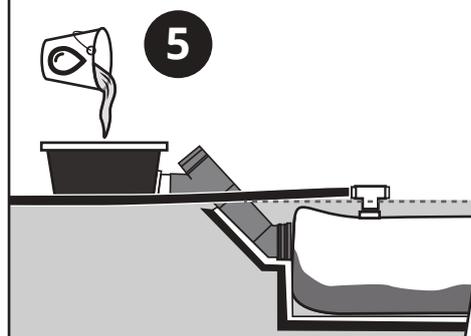


Process: Reactivating a digester

1. **Deflate** the digester by using counterweights, while using all the burners of the BioStove to burn the remaining biogas.
2. **Agitate** the digester vigorously.
3. **Drain** the digester with a 3" slurry pump down to half the height of the trench.
4. **Agitate** vigorously.



5. **Refill** with water.
6. **Agitate** vigorously.
7. **Drain** the digester down to half the height of the trench.
8. **Refill** with water.
9. Proceed with the **first feeding** (follow steps on p. 15).





Biodigester Productivity

Digester size		SIS 6	SIS 8	SIS 12	SIS 16	SIS 20	SIS 30	SIS 40
 Warm Climate >23 °C	Daily feeding: cow manure 	50 L or Kg/day	65 L or Kg/day	90 L or Kg/day	130 L or Kg/day	180 L or Kg/day	260 L or Kg/day	350 L or Kg/day
	Daily biogas production 	1.7 m3/day	2.4 m3/day	3.3 m3/day	4.8 m3/day	6.7 m3/day	9.6 m3/day	12.9 m3/day
	Daily cooking time on 1 burner 	3.4 Hr/day	4.8 Hr/day	6.6 Hr/day	9.6 Hr/day	13.4 Hr/day	19.2 Hr/day	25.8 Hr/day
	Weekly biofertilizer production 	0.9 m3/week	1.4 m3/week	1.9 m3/week	2.7 m3/week	3.8 m3/week	5.5 m3/week	7.4 m3/week
 Temperate Climate 15 - 23 °C	Daily feeding: cow manure 	35 L or Kg/day	50 L or Kg/day	65 L or Kg/day	100 L or Kg/day	135 L or Kg/day	200 L or Kg/day	265 L or Kg/day
	Daily biogas production 	1.3 m3/day	1.8 m3/day	2.3 m3/day	3.6 m3/day	4.9 m3/day	7.2 m3/day	9.6 m3/day
	Daily cooking time on 1 burner 	2.6 Hr/day	3.6 Hr/day	4.6 Hr/day	7.2 Hr/day	9.8 Hr/day	14.4 Hr/day	19.2 Hr/day
	Weekly biofertilizer production 	0.7 m3/week	1.1 m3/week	1.4 m3/week	2.1 m3/week	2.8 m3/week	4.2 m3/week	5.6 m3/week
 Cold Climate 12 - 15 °C	Daily feeding: cow manure 	25 L or Kg/day	35 L or Kg/day	45 L or Kg/day	65 L or Kg/day	90 L or Kg/day	135 L or Kg/day	180 L or Kg/day
	Daily biogas production 	0.8 m3/day	1.2 m3/day	1.5 m3/day	2.2 m3/day	3 m3/day	4.5 m3/day	6 m3/day
	Daily cooking time on 1 burner 	1.6 Hr/day	2.4 Hr/day	3 Hr/day	4.4 Hr/day	6 Hr/day	9 Hr/day	12 Hr/day
	Weekly biofertilizer production 	0.5 m3/week	0.7 m3/week	0.9 m3/week	1.4 m3/week	1.9 m3/week	2.8 m3/week	3.8 m3/week



QR CODE for videos on page 17

Use the energy you produce and maintain your biogas line!

(OM9), (OM11), (OM12), (OM2), (OM3), (OM4)

FIRST BIOGAS FLAME

1. OPEN the valve

A 1 MINUTE** **B** **C**

OPEN* **CLOSE**

*When applicable, push and turn ON/OFF

2. ROTATE the handle and let the biogas escape (A) while you try lighting it with a match. Once the flammable biogas reaches the burner, you will see the flame (B). **It might take up to **one minute** for the first flame. To CLOSE, rotate clockwise (C).

DO NOT let the flame get **TOO BIG** as you will waste part of your biogas heat!

(OM17)

DO align the flame with the bottom section of the pan.

IMPROVE YOUR FLAME USING COUNTERWEIGHTS

DO NOT use any sharp objects that could damage the reactor.

Put a counterweight on top of the reactor. Counterweight should not exceed 30kgs.

ONLY use one of the following options:

a. BioCounterweight b. Tyres c. Sand bags

(TS5)

CLEANING THE BURNER

CALENDAR

Every week to every month depending on need.

Use

- brush
- water with lemon juice
- soapy water

Clean the cookstove burner to **unclog the burner holes**.

(TS13)



How To Use Your System

QR CODE for videos on page 17

PRESSURE RELIEF VALVE (PRV)

CALENDAR

	1	2	3	4
5	6	7	8	9
10	11	12	13	14
15	16	17	18	19
20	21	22	23	24
25	26	27	28	29
30	31			

Fill the pressure relief valve with water 2 TIMES A WEEK

NOTE: Ensure no dirt accumulates inside the PRV.

(OM2), (OM1)

Filled PRV: Gas is stored in the reactor

Empty PRV: Gas can escape

WATER TRAP CHECK

CALENDAR

	1	2	3	4
5	6	7	8	9
10	11	12	13	14
15	16	17	18	19
20	21	22	23	24
25	26	27	28	29
30	31			

2 times a week

1. Water trap is full
2. Close the biogas valve
3. Drain the water trap
4. Close the water trap
5. Re-open the biogas valve

(OM6)

WATER ACCUMULATION IN THE GAS LINE

CALENDAR

	1	2	3	4
5	6	7	8	9
10	11	12	13	14
15	16	17	18	19
20	21	22	23	24
25	26	27	28	29
30	31			

Every day

NOTE: Do not hang loads such as clothes on the gas line.

(TS1)



How To Use Your System

QR CODE for videos on page 17

HOW TO REGENERATE THE FILTER MEDIA

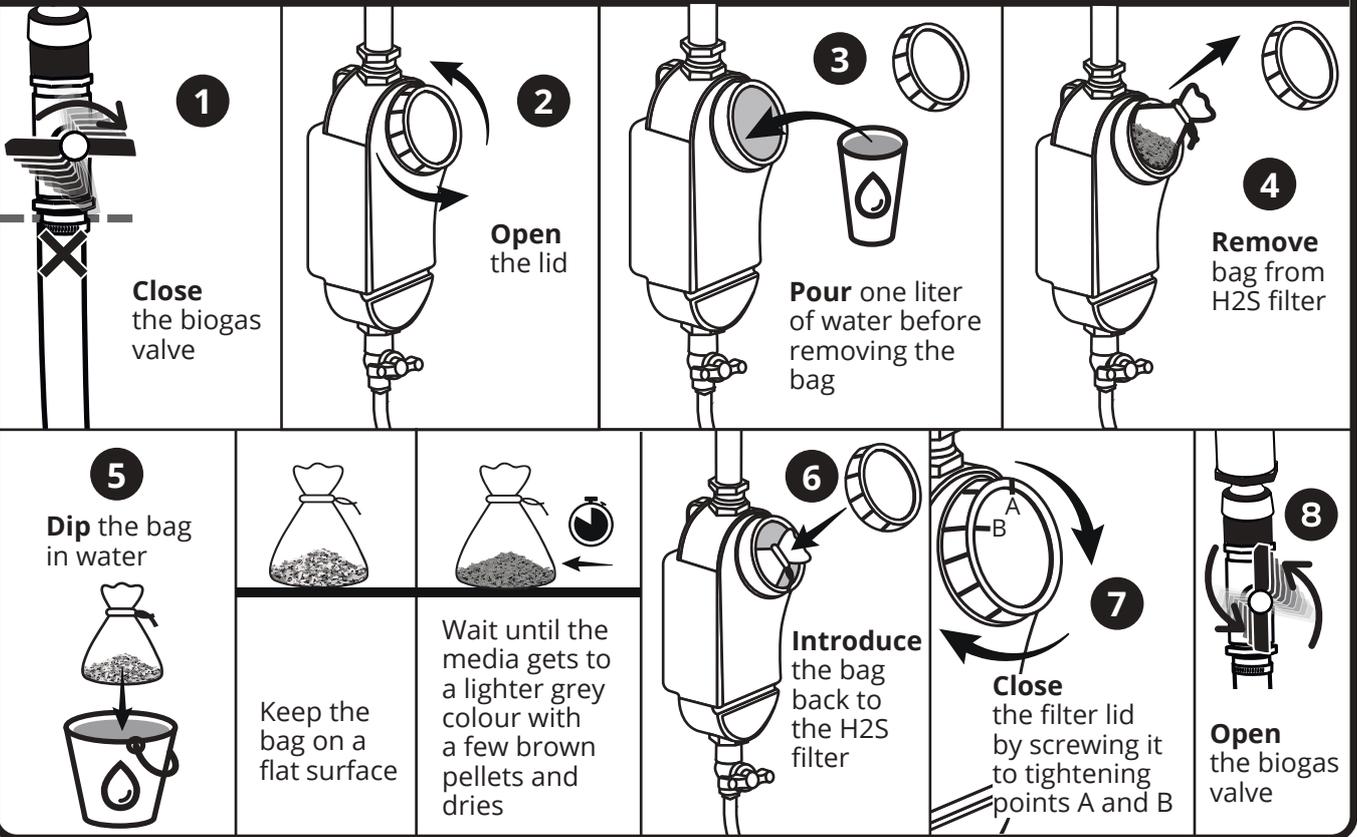
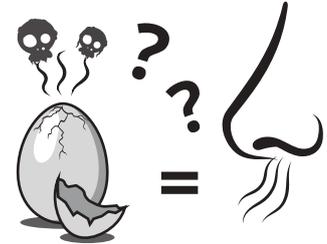
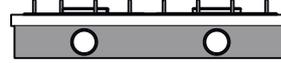
CALENDAR						
		1	2	3	4	
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Check every month

Indicators that the **filter media** needs regeneration:



- **Unpleasant smell** in biogas



GAS LEAK INSPECTION

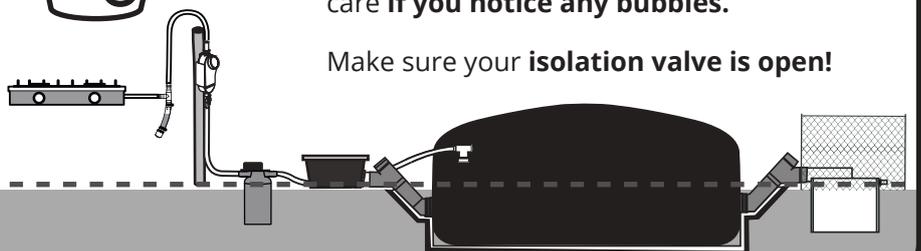
CALENDAR

Every 3 months



Use **soapy water** on every **gas line connection** (filters, valves, pipes and fittings) while the **digester is inflated** to check for bubbles (leaks). Call customer care **if you notice any bubbles**.

Make sure your **isolation valve is open!**





Apply **2 to 5 liters** of biofertilizer per square meter. Follow this dosage for every crop cycle and for every soil preparation cycle.



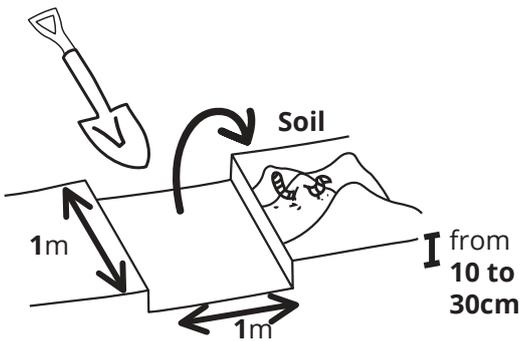
Biofertilizer Manual



Bioslurry Protocols

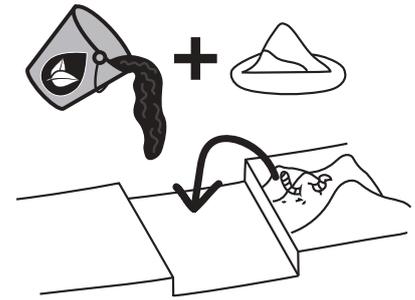
Soil preparation before planting

1 Remove the soil

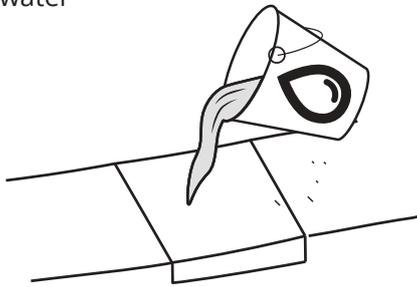


2 Mix and let rest. Apply 2 to 5 liters of biofertilizer per square meter.

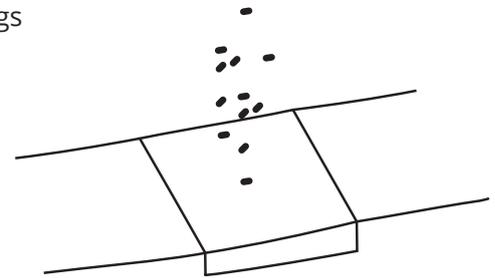
NOTE: let the soil rest for at least 2 days before planting.



3 Before planting: add water



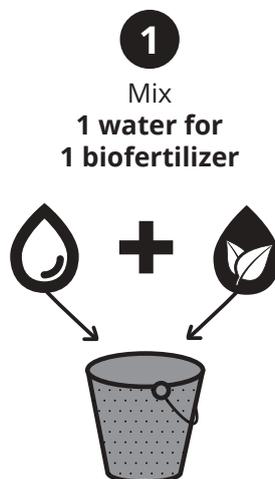
4 Plant: add seeds or seedlings



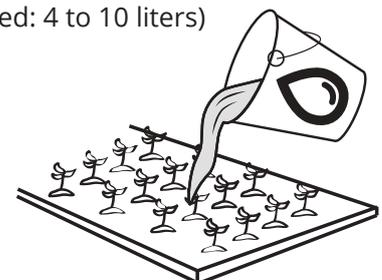
Crop and vegetable fertilization

During dry seasons, dilute 1 part of biofertilizer with 1 part of water.

No need for dilution during rainy seasons.



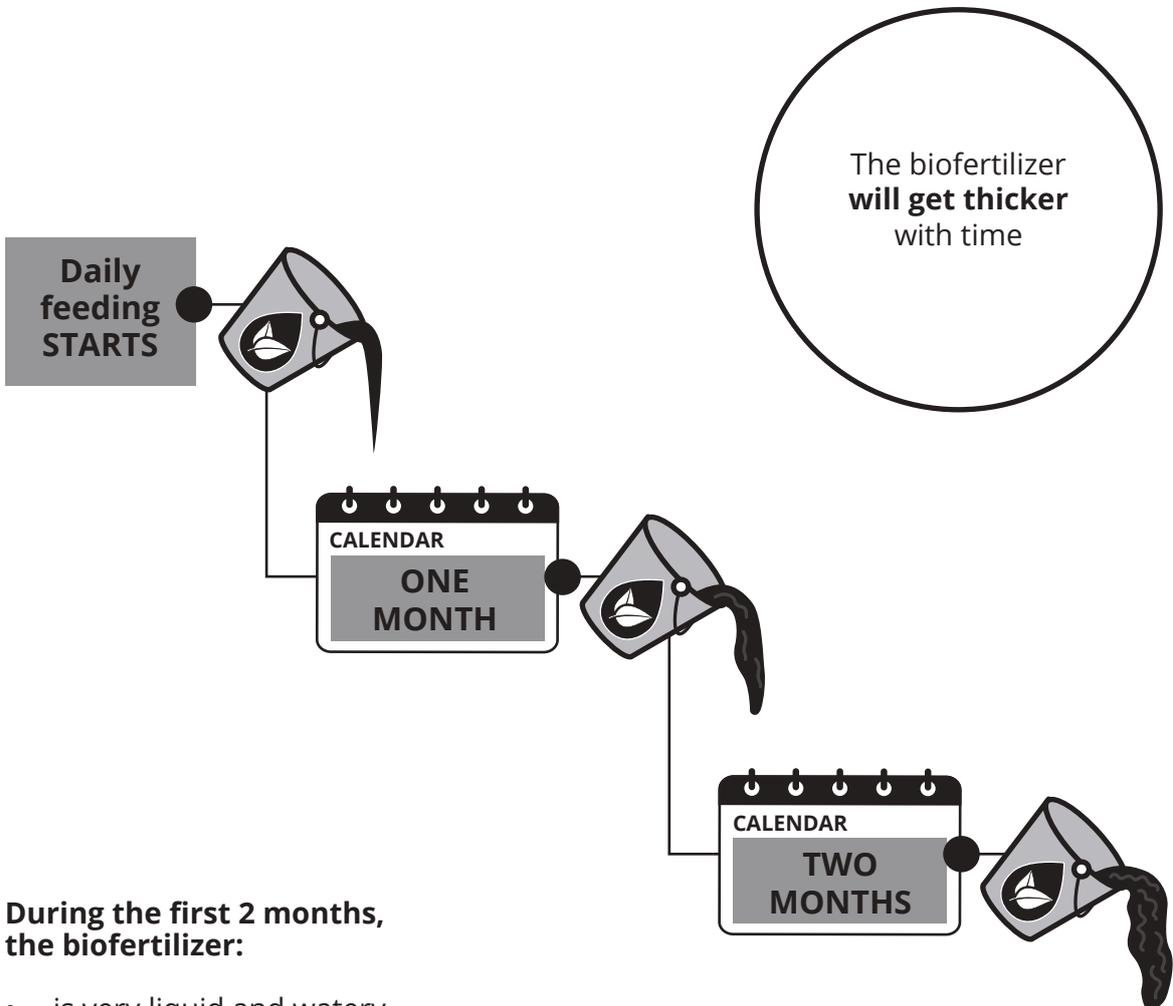
2 POUR: Apply 2 to 5 litres of biofertilizer per square meter (when the biofertilizer is diluted: 4 to 10 liters)



NOTE: Stop applying biofertilizer at least **3 weeks** before harvest. Wash all fruits and vegetables well before eating.



BIOFERTILIZER CONSISTENCY



During the first 2 months, the biofertilizer:

- is very liquid and watery
- can be smelly
- can attract mosquitoes



Biofertilizer And Regenerative Agriculture

SISTEMA.bio



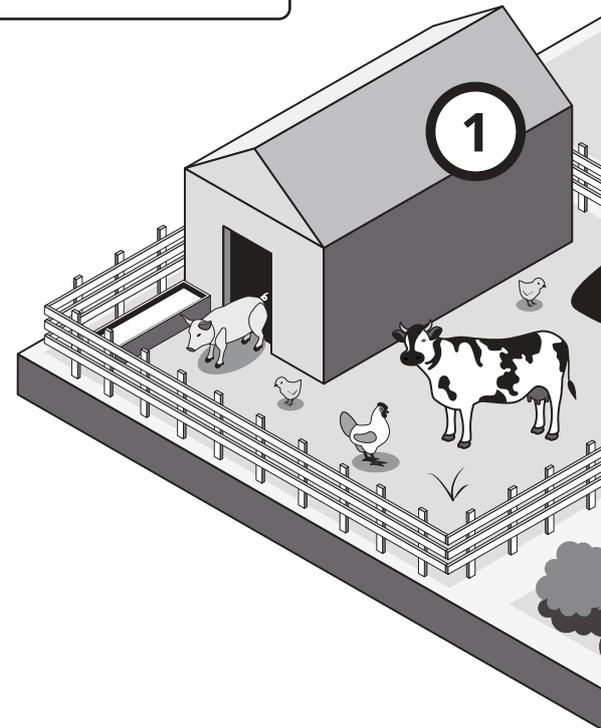
1_Livestock integration

Rotational grazing allows farmers to copy natural herd movements, evenly spreading manure as fertilizer and preventing overgrazing. This enhances soil health, encourages vegetation growth, and helps trap carbon in the soil.



2_Biogas

A clean cooking solution that uses agricultural waste to produce renewable energy sustainably.



3_Bioslurry

Apply biofertilizer to improve farming yields. It improves soil structure, water retention, nutrients cycling & biodiversity.



Chemical Use Reduction: Progressively reduce the use of chemical fertilizers and pesticide to conserve soil biology and build resilient soils.

Example:

Year 1: 10 to 20% reduction

Year 2: 20 to 40% reduction

Year 3: 40 to 60% reduction in chemical fertilizer



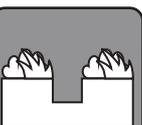
4_Water Management

Use water-efficient irrigation techniques to conserve water and minimize soil erosion. e.g drip irrigation, zaï holes (moisture retention pits) and rainwater harvesting.



5_Reduced/ No tillage

Tilling will break soil structure. Instead, sow seeds with minor and superficial land preparation so as to reduce soil erosion, and soil disturbance to preserve soil biology.



6_Hedges and side Trenches

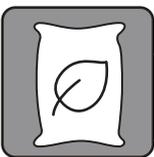
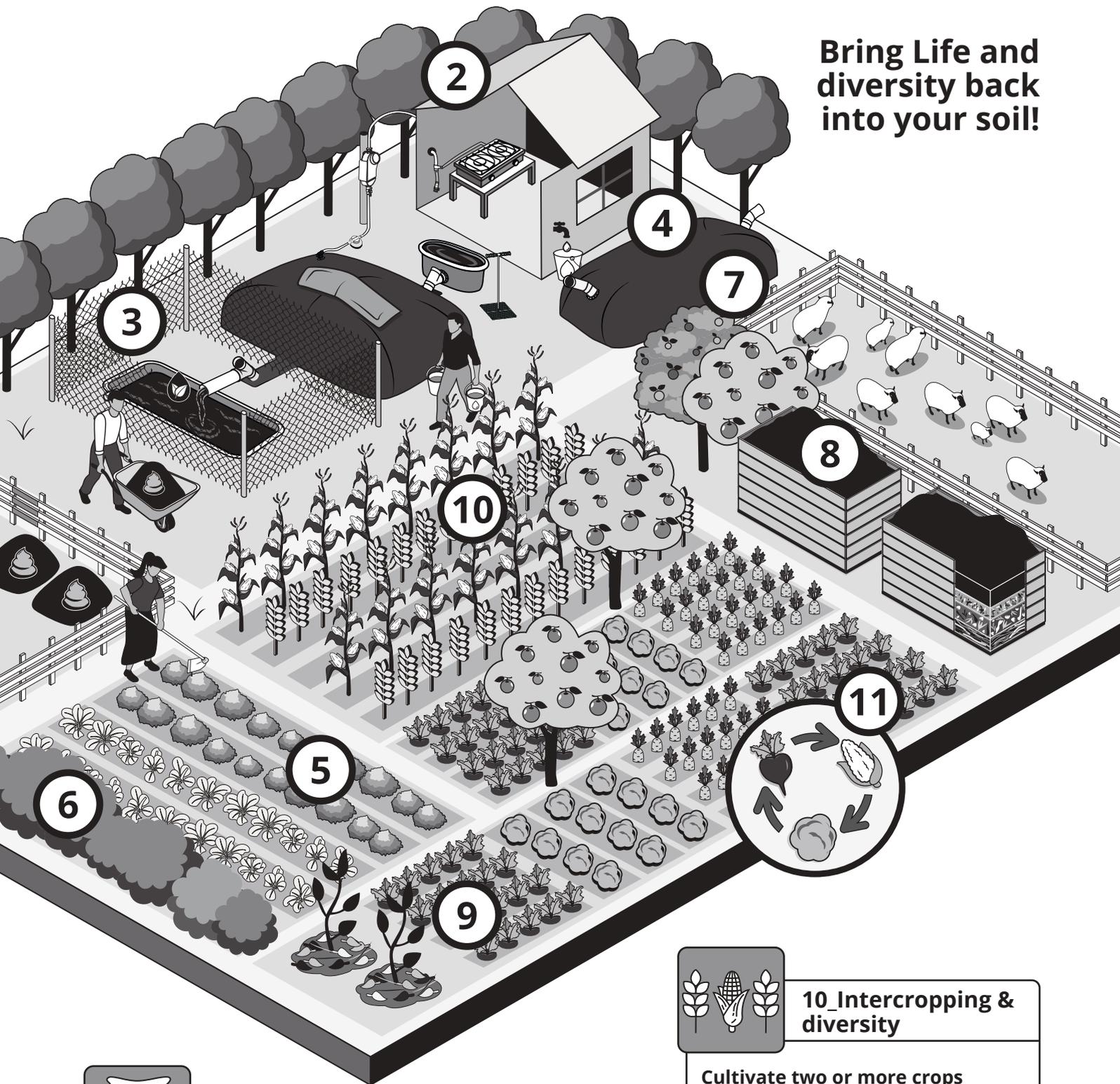
Plant hedges and make side trenches to improve biodiversity & water retention, and to prevent soil erosion.



7_Agroforestry

Incorporate indigenous fruit & nut trees to improve the farms biodiversity and generate income. Trees provide timber and shade, break the wind and improve soil retention.

Bring Life and diversity back into your soil!



8_Organic Compost

Use agriculture leftovers and green materials mixed with biofertilizer to make organic compost.



9_Mulching/ Maintaining soil cover

Cover the soil around your plant with leaves and other organic material to preserve the soil moisture.



10_Intercropping & diversity

Cultivate two or more crops simultaneously on the same field to increase yield by utilizing resources better and control pests.



11_Crop Rotation

Plant different crops in the same area at different times to restore soil nutrients and grow more food.



Maximize The Biodigester's Benefits

FEEDING REGULARITY

IRREGULAR FEEDING:

- Digester is starving
- Small flame

CALENDAR

		1	2	3	4
5	6	7	8	9	10
12	13	14	15	16	17
19	20	21	22	23	24
26	27	28	29	30	31

OVERFEEDING:

- Digester is too full of CO₂ and lacking CH₄
- NO flame

DO NOT feed MORE than recommended.

CORRECT FEEDING:

- Happy digester
- Beautiful flame

CALENDAR

		1	2	3	4
5	6	7	8	9	10
12	13	14	15	16	17
19	20	21	22	23	24
26	27	28	29	30	31

DRY DUNG

IF YOU HAVE DRY DUNG

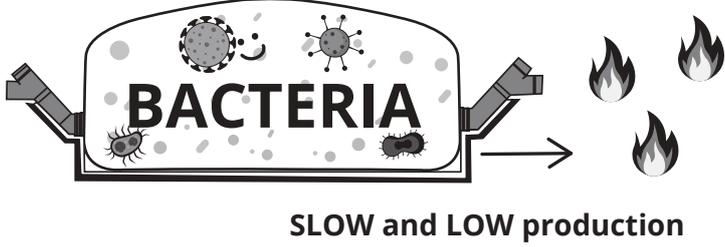
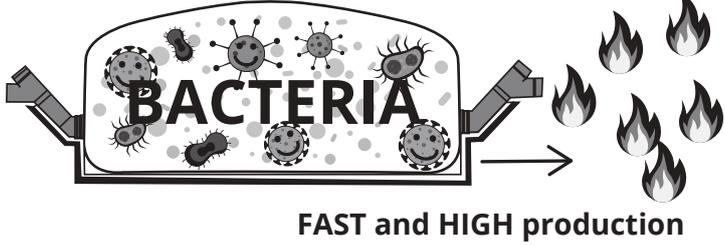
ONE DAY BEFORE FEEDING → FEEDING DAY

1. ONE day before feeding: Moisten 1 volume dry dung with 1 volume of water, then top up with water to create the consistency of wet cow dung.

2. During feeding, do water dilution (1 volume of cow dung with 1 volume of water).



Maximize The Biodigester's Benefits

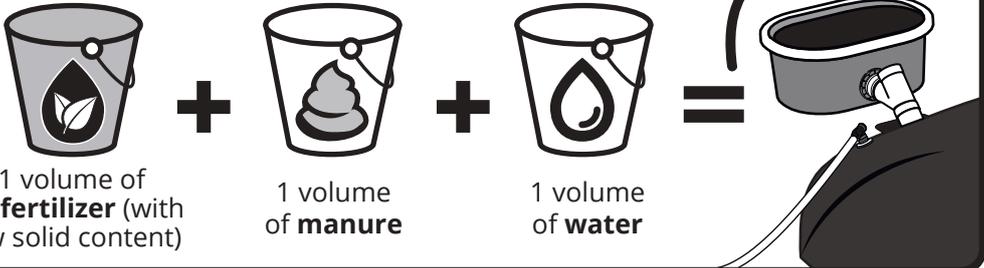
TEMPERATURE & BIODIGESTER PRODUCTIVITY	
<p>The COLDER the weather, the slower and lower the biogas production will be.</p>	 <p><15°</p>  <p>SLOW and LOW production</p>
<p>The WARMER the weather, the faster and higher the bacteria will produce more biogas.</p>	 <p>>20°</p>  <p>FAST and HIGH production</p>

BIOFERTILIZER RECIRCULATION

FOR COLD CLIMATE AND TO REDUCE WATER CONSUMPTION

Recirculate daily:

This improves reactor performance in cold areas/seasons and helps reduce water consumption.



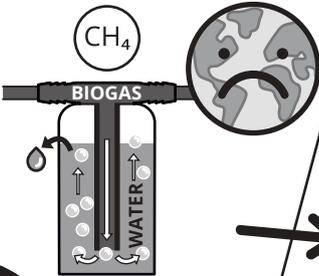
1 volume of **biofertilizer** (with low solid content) + 1 volume of **manure** + 1 volume of **water**

 If you recirculate biofertilizer regularly, add water during the rainy season while mixing to dilute it. **Use 15% of the biodigester's volume** (e.g., for an S6 with 6000L, add 1000L).

DO NOT LET YOUR BIOGAS ESCAPE

If your biodigester is very **inflated** and the **PRV is bubbling**:

 (TS10)

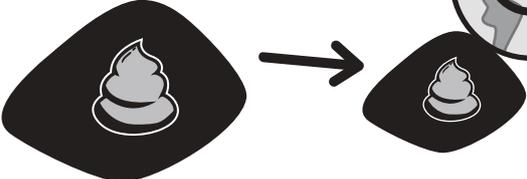



• BURN your gas so the PRV does not bubble anymore



OR

• REDUCE the feeding






Maximize The Biodigester's Benefits

SISTEMA.bio

ANIMAL DIET

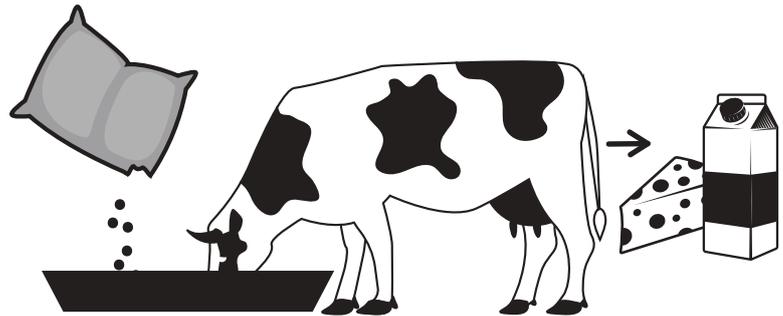
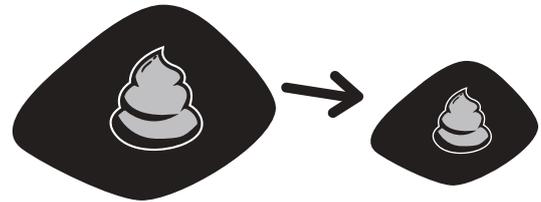
If your cows get rich food supplement, the **dung will be richer**, which will lead to **acidity in the digester**. Slightly reduce the feeding if such supplementing is happening!

If your cow diet gets richer (dairy meals for example), this will increase the quantity of H₂S in your biogas. **Contact us to adjust your biogas treatment.**

LOW



Reduce daily feeding

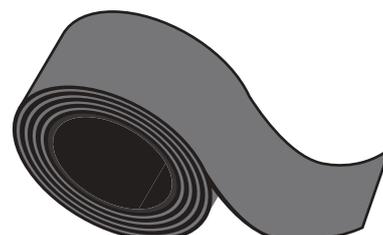


Spare parts

TRANSPARENT FLEXIBLE PIPE replacement: every 2 to 3 years approx. Contact Sistema.bio if you need replacement.



BUTYL TAPE for temporary membrane repair when external damage happens.





Biodigester Specifications

COMPONENT	MATERIAL	SPECIFICATIONS
Feeding tank	HDPE	Refer to corresponding digester model
Manure mixer	Galvanized/Zinc Plated MS pipe	76 cm x 26 cm x 20.5 cm (h x l x w)
Reactor	LLDPE	Refer to corresponding digester model
Biofertilizer tank	HDPE	Refer to corresponding digester model
Pressure relief valve	HDPE and UPVC	6" diameter, 20 mbar back pressure
Isolation ball valve	UPVC	1" diameter
Biogas filter	HDPE	48 mm x 18.5 mm x 20 mm (h x l x w)
Transparent / flexible gas line	UPVC	1" diameter
Gas line	HDPE	1" diameter
Water trap	ABS and UPVC	1" diameter
Single burner (when applicable)	Cast aluminum	7 x 45 x 10 cm (h x l x w)
BioStove	Structure: stainless steel or coated mild steel Burner: Cast aluminum	BioStove-2: 19 x 58 x 36 cm (h x l x w) BioStove-3 SS: 10 x 57.5 x 27 cm (h x l x w)

Digester size	Approximate total kit weight	Feeding tank volume	Slurry volume in the digester	Gas storage in the digester	Biofertilizer tank volume <i>(May vary by project)</i>
	kg	Liters	m ³	m ³	m ³
Sistema 6	67	110 L	4	2	1
Sistema 8	93	110 L	5.5	3	2
Sistema 12	109	110 L	8	4	2
Sistema 16	137	110 L	11	6	4
Sistema 20	163	110 L	15	8	4
Sistema 30	219	110 L	22.5	12	8
Sistema 40	257	110 L	30	15	8

Note: Components might differ depending on the region and the local context of the project.



Maintenance And Care Plan

IMAGE	ACTIVITY	VIDEO QR CODE	VIDEO NAME
	Feeding <i>(and removal of settled and floating solids)</i>		OM8
	Use your biogas! So it does not bubble through the PRV!		OM13, OM9, OM11, OM12, OM2, OM3, OM4, OM17, TS5 & TS13
	Use your bioslurry! <i>(If you have extra, consider taking it to your fields to donate or sell to neighbors)</i>		Biofertilizer Manual (1), Bioslurry Protocols (2) & Sistema.bio fertilizer Uses Series (3)
	Agitation of your digester to mix the floating layer with the slurry inside the digester		OM13
	Check Water Accumulation in Gas Line		TS1
	Cleaning the Burner <i>(on need basis)</i>		TS13
	PRV Filling with Water		OM1
	Water Trap Check		OM6
	H2S Filter Media Regeneration <i>(Check for regeneration every month. Regenerate if the media is black)</i>		OM5
	Media replacement <i>(Contact Customer Service to order new)</i>		Contact Customer Service to order new
	Gas Line Leak Inspection		N/A

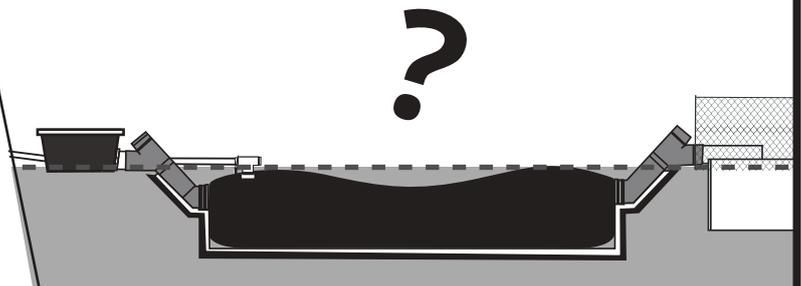
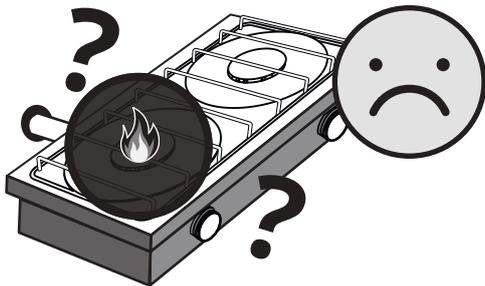
UM PAGE	DAILY	2X A WEEK	WEEKLY	EVERY 2 WEEKS	MONTHLY	ANNUALLY
14 & 15	✓					
21 & 29	✓					
24		✓				
17			✓			
17		✓				
21			✓			
22		✓				
22		✓				
23	On need basis - when media turns black					
						✓
23						✓

O&M
summary
in the table



ISSUE:

- I do not have sufficient biogas to cook
- I do not have biogas in my BioStove, and my digester is flat!



• **Is there enough water in the inlet and outlet pipes?** Make sure they are filled so that biogas cannot escape. Refer to section **“Biodigester startup”** “Fill the reactor with water until water reaches the inlet and outlet elbows.” on page 13. Videos: I3, I5.

• **Have you completed your first feeding?** Refer to section **“Biodigester startup”**, “First feeding” on page 14 & 15. Video: OM7.

• **Has enough time passed since the first feeding?** Refer to section **“Biodigester startup”**, “WAIT FOR THE REACTOR TO INFLATE” on page 16.

• **Are you following the feeding instructions?** Refer to section **“How to use your system”**, “Maintain your digester” on page 14 and **“Maximize the biodigester’s benefits”**, “FEEDING REGULARITY” on page 28 & 29. Videos: OM7, OM8.

• **Is your pressure relief valve filled with**

water? Refer to section **“How to use your system”**, “PRESSURE RELIEF VALVE” on page 22. Videos: OM2, OM1.

• **Were the BioStove valves, the water trap or the biogas filter left open?** Close them! Refer to section **“How to use your system”**, “FIRST BIOGAS FLAME” on page 21, “WATER TRAP CHECK” on page 22 and **“HOW TO REGENERATE THE FILTER MEDIA”** on page 23. Videos: OM6, TS12, OM5.

• **Is there a leak?** Refer to section **“How to use your system”**, “GAS LINE LEAK INSPECTION” on page 23.

• **Cold weather, rainy season?** You can recirculate your biofertilizer to improve biodigester productivity during cold seasons. Refer to section **“Maximize the biodigester’s benefits”**, “TEMPERATURE & BIODIGESTER PRODUCTIVITY” on page 29.

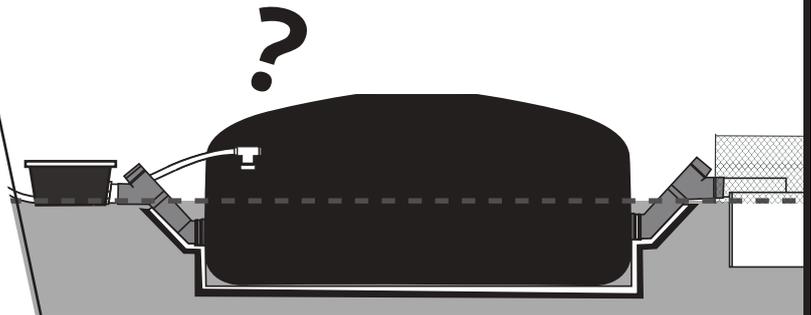
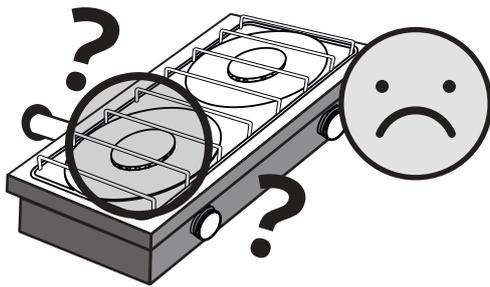
• **Are the burner and the BioStove installed in different rooms?** Check if somebody else is using the biogas!

If your biogas production is still low: CONTACT CUSTOMER CARE - SEE PAGE 45.



ISSUE:

• I do not have biogas in my BioStove or it does not light, and my digester is inflated!



• **Have you placed a counterweight on your digester?** Refer to section **“How to use your system”**, **“IMPROVE YOUR FLAME USING COUNTERWEIGHTS”** on page 21. Video: TS5.

• **Were the gas valves left closed?** Open them! Refer to section **“How to use your system”** **“Use the energy you produce and maintain your biogas line!”** on page 21. Videos: OM3, OM3bis, OM4.

• **Are you regularly draining your water traps?** Refer to section **“How to use your system”**, **“WATER TRAP CHECK”** on page 22. Video: TS3 & OM6.

• **Is your biogas line sagging?** In biogas line low points, water can accumulate and block the biogas from flowing! Elevate the gas line to direct the accumulated water towards the water trap or the PRV. Refer to section **“How to use your system”**, **“WATER ACCUMULATION IN THE GAS LINE”** on page 22. Videos: TS1, TS6.

• **Is the filtration media in the biogas filter blocking the biogas flow?**

Follow the protocol on page 23 **“How to regenerate filter media, or replace it by new one. Try to burn the gas on your BioStove! Refer to section **“How to use your system”**, **“HOW TO REGENERATE THE FILTER MEDIA”** on page 23. Video: OM5.**

• **Is the gas line folded at any point?** Inspect your gas line and make sure there is no blocking point.

• **If only 1 of the 2 BioStove burners does not have a flame**, the burner valve might be blocked. Contact Customer Care.

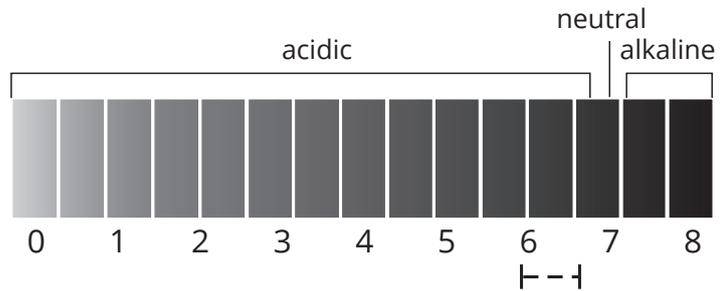
• **Are you overfeeding your digester?** Refer to section **“Maximize the biodigester’s benefits”**, **“FEEDING REGULARITY”** on page 28. Measure the pH of the biofertilizer from your outlet pipe using a calibrated pH meter (please follow pH meter calibration instructions). If the pH level of the biofertilizer is low and you continue to feed your digester, it could stop the bacteria from producing biogas. This will lead to too much carbon dioxide and not enough methane.

If your biogas production is still low: CONTACT CUSTOMER CARE - SEE PAGE 45.



ISSUE:

- Slight acidification:
pH 6 to 6.5 & biogas
does not burn



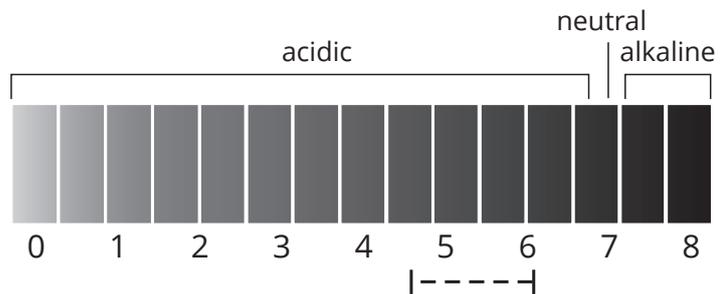
- 1. Stop feeding** the reactor & **empty** the digester of biogas through the biogas filter and stay away.
- 2. Agitate** the digester thoroughly.
Video: OM13.

- 3. Let it rest** for 3 days or until it inflates.
- 4. Try lighting** the biogas stove.
- 5. If the gas does not burn, repeat from step 1.**

If your biogas still does not light: CONTACT CUSTOMER CARE - SEE PAGE 45.

ISSUE:

- Slight acidification:
pH 4.5 to 6 & biogas
does not burn



- 1. Stop feeding** the reactor & drain all the biogas through the biogas filter and stay away.
- 2. Agitate** the digester thoroughly.
Video: OM13.
- 3. Empty** at least half of the digester.
- 4. Refill** the digester with:
 - A) water mixed with as much biofertilizer as possible
 - B) water mixed with 5-10kg of limestone powder for a Sistema 6 (increasing

- proportionally to the digester size).
- 5. Let it rest** for 1-3 weeks or until it inflates.
 - 6. Try lighting** the BioStove.
 - 7. If the gas does not burn, empty the digester of biogas** through the biogas filter and stay away. Then let it rest for 1-3 weeks or until it inflates and produces a flammable gas.

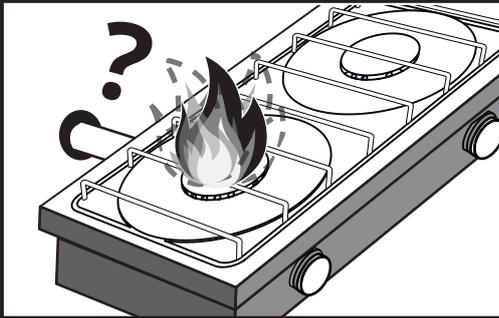
If your biogas still does not burn: CONTACT CUSTOMER CARE - SEE PAGE 45.



Basic Troubleshooting

ISSUE:

- The flame in my BioStove is intermittent/dancing



There might be water accumulated somewhere in the gas line.

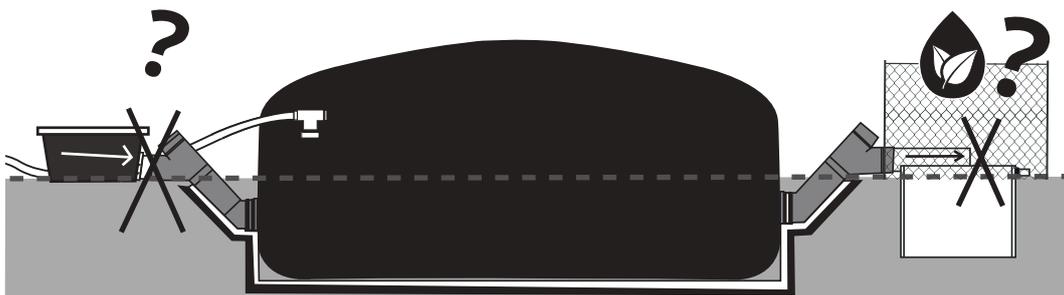
• **Is your biogas line sagging?** In biogas line low points, water can accumulate and block the biogas from flowing! Elevate the gas line to direct the accumulated water towards the water trap or to the PRV. Refer to section **“How to use your system”, “WATER ACCUMULATION IN THE GAS LINE”** on page 22. Videos: TS1, TS6.

• **Are you regularly draining your water traps?** Refer to section **“How to use your system”, “WATER TRAP CHECK”** on page 22. Videos: TS3, OM6.

If your biogas still does not light: CONTACT CUSTOMER CARE - SEE PAGE 45.

ISSUE:

- The slurry is not entering the digester
- The biofertilizer does not come out of the digester



• **If your biofertilizer only comes out when the digester is inflated,** there is no problem!

• **Unclog your inlet or outlet pipes** from dry or solid material that may be blocking the flow. Use a thin, flexible stick (like bamboo) to unblock the pipe through the

Y fitting. Video: TS11.

• **Is the inlet pipe lower than the outlet pipe?** Elevate the feeding tank slightly by placing stones or soil under it.

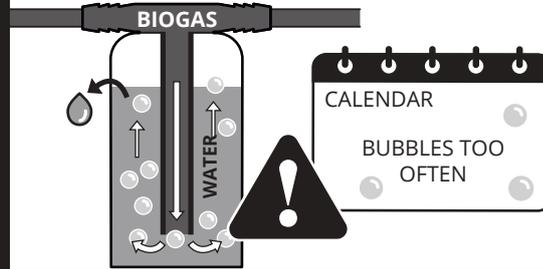
If your slurry is still not flowing: CONTACT CUSTOMER CARE - SEE PAGE 45.



Basic Troubleshooting

ISSUE:

- My pressure relief valve bubbles too often!



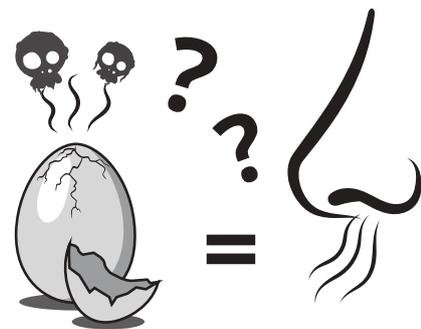
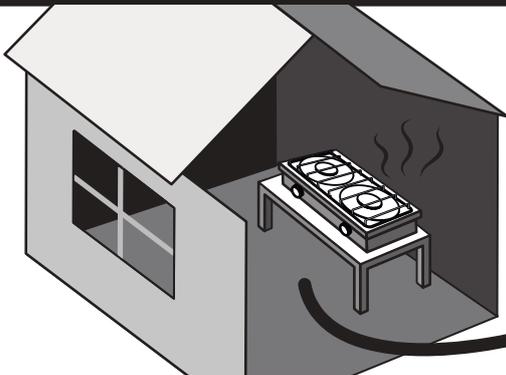
- **Are you filling your pressure relief valve regularly?** Refer to section “**How to use your system**”, “**PRESSURE RELIEF VALVE**” on page 22. Videos: OM2, OM1.
- **You might be producing too much biogas!** Please burn your excess gas or use it to warm water in a pan! If it still bubbles regularly,

progressively reduce feeding. Refer to section “**Maximize the biodigester’s benefits**”, “**DO NOT LET YOUR BIOGAS ESCAPE**” on page 29. Video: TS10.

If your digester still produces too much biogas: CONTACT CUSTOMER CARE - SEE PAGE 45.

ISSUE:

- There is a gas/rotten eggs smell in the kitchen



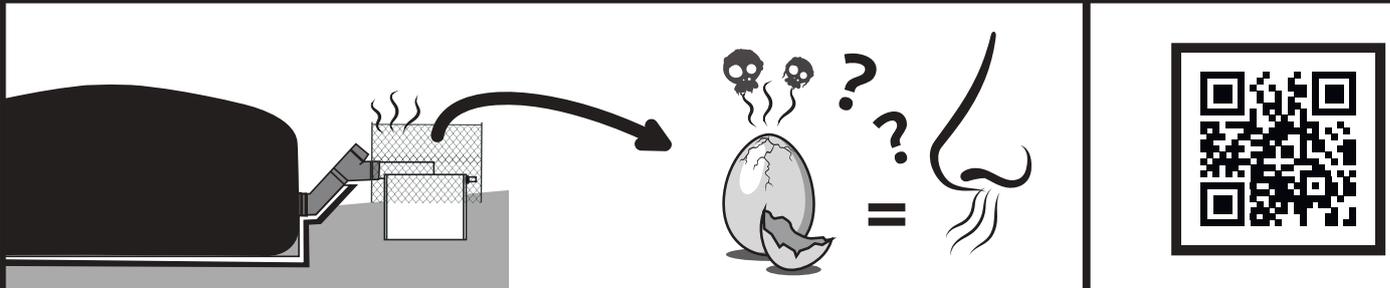
- **Does it smell while you light your BioStove?** Do not wait long before presenting the match to the burner to limit the release of unburned biogas. Refer to section “**How to use your system**”, “**IMPROVE YOUR FLAME USING COUNTERWEIGHTS**” on page 21. Videos: OM11, OM12.
- **Are you frequently regenerating the media in your filter?** Refer to section “**How to use your system**”, “**HOW TO REGENERATE THE FILTER MEDIA**” on page 23. Video: OM5.

- **Were the BioStove valves, water trap or biogas filter left open or not properly closed?** Close them! Refer to section “**How to use your system**”, “**FIRST BIOGAS FLAME**” on page 21, “**WATER TRAP CHECK**” on page 22 and “**HOW TO REGENERATE THE FILTER MEDIA**” on page 23. Videos: OM6, TS12, OM5.
- **Is there a leak?** Refer to sections “**How to use your system**”, “**GAS LINE LEAK INSPECTION**” on page 23 and “**Safety**”, “**Biogas**” on page 11.

If you still detect a biogas smell in your kitchen: CONTACT CUSTOMER CARE - SEE PAGE 45.



ISSUE: • There is a gas/rotten eggs smell near the digester



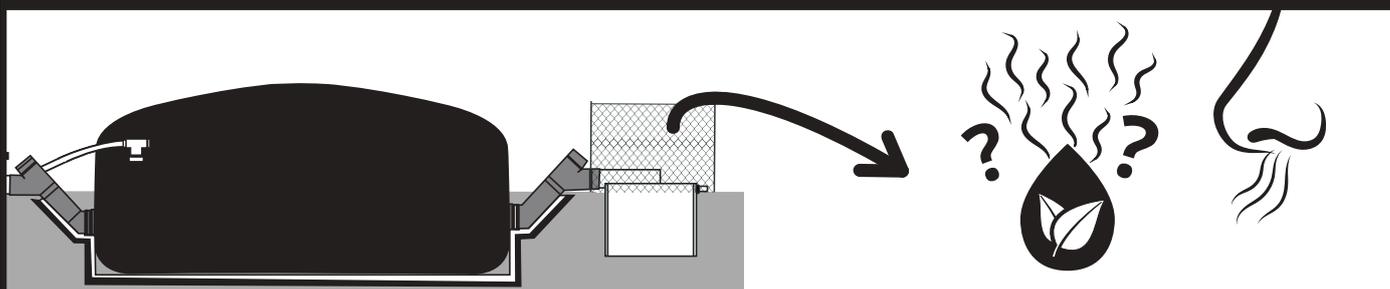
- **Can you see water in the inlet and outlet pipes?** Make sure they are filled so that biogas can't escape. Refer to section "**Biodigester startup**" "Fill the reactor with water until water reaches the inlet and outlet elbows." on page 13. Video: i3.
- **Is your pressure relief valve filled with water?** Refer to section "**How to use your system**", "PRESSURE RELIEF VALVE" on page 22. Videos: OM1, OM2.
- **Is there a leak?** Refer to section "**How**

to use your system", "GAS LINE LEAK INSPECTION" on page 23.

- **Is your biogas filter properly tightened and with the filter gasket?** Refer to section "**How to use your system**", "HOW TO REGENERATE THE FILTER MEDIA" on page 23. Video: OM5.

Is the transparent pipe between the digester and the filter cracked? CONTACT CUSTOMER CARE - SEE PAGE 45.

ISSUE: • My biofertilizer stinks!



- **Are you overfeeding your digester?** Refer to section "**Maximize the biodigester's benefits**", "FEEDING REGULARITY" on page 28, and follow the instructions page 40 and page 20. Measure the pH of the biofertilizer from your outlet pipe using a calibrated pH meter (please follow pH meter calibration instructions). If the pH level of the biofertilizer is low and you continue to feed your digester, it could keep the bacteria from producing

biogas: too much carbon dioxide and not enough methane.

Are you feeding your digester with organic waste other than animal dung? Some wastes are too rich to be properly digested and require specific control of the feeding quantities! CONTACT CUSTOMER CARE - SEE PAGE 45.



Disposal

- The **packaging** of your biodigester kit is **recyclable**. We recommend you to take it to the nearest **recycling center or equivalent***.
- Used **ferrosorp** from the filtering media can be disposed of in the bin or added to **compost to enrich it with iron and sulphur** -shred first!
- Once the **20 year lifetime** of your **digester is over** and it is no longer in use, take its **components** to a **local recycling center**.

- If you **need information on recycling centers**, feel free to call us.



*The deactivated filter media should be **handled with caution as it can take fire**. Kept away from flammable material and quickly applied to soil to minimize the risk of fire. Follow instructions page 23.



Details To Keep In Mind

Technician's name:

Installation date:

Type of waste:

Daily feeding volume:

Dilution:

Serial number:

CLIENT SIGNATURE
acknowledging
training reception:



Monitoring And Service Visit Schedule

MONITORING VISITS	
MONITORING 1 (M1)	
Date of Visit	
Technician Name	
Instructions Given to Client	
Client Signature	
MONITORING 2 (M2) WILL BE DONE REMOTELY/ ON THE PHONE	
Date of the Call	
Customer Agent Name	
Instructions Given to Client	
Client Signature	
MONITORING 3 (M3)	
Date of Visit	
Technician Name	
Instructions Given to Client	
Client Signature	

SERVICE VISITS	
SERVICE VISIT 1 (SV)	
Date of Visit	
Technician Name	
Instructions Given to Client	
Client Signature	
SERVICE VISIT 2 (SV)	
Date of Visit	
Technician Name	
Instructions Given to Client	
Client Signature	
SERVICE VISIT 3 (SV)	
Date of Visit	
Technician Name	
Instructions Given to Client	
Client Signature	



About this section.

This section provides a general summary of the warranty. Detailed terms and conditions are defined in the user and partner contracts, which take precedence.

WARRANTY PERIOD

The Seller gives a warranty of one (1) year starting on the date of installation, applicable when there is any damage in the material and manufacturing process of the Sistema.bio components. Further, the Seller gives a warranty of ten (10) years exclusively for the geomembrane of the digester starting also on the date of installation.



For the gas line & appliances



For the black membrane of the biodigester!

WHAT IS COVERED BY THE WARRANTY?

It is important to note that the warranties do not cover any damage caused by any negligence of the Buyer, accidents, vandalism, alteration of the Sistema.bio components by the Buyer or abnormal storage and or non-compliance, on the part of the Buyer, with the risk and prevention instructions and with the user manual.

The warranties herein above are limited to repairs, replacement or product change and/or raw materials in general, labor and transportation expenses. The Seller's liability to the Buyer shall not exceed the cost of the Sistema.bio. The Seller shall not be liable for consequential losses in any form.

RESPONSIBILITIES BEFORE INSTALLATION

In the period between delivery and installation (Pre-Installation), the farmer or implementation partner shall be responsible for the safe custody of the unit and all its components.

Any damage occurring during this time including but not limited to rodent bites, physical breakage, environmental exposure, or natural disasters will not be covered under warranty. If any component is found to be damaged or missing, mishandling, lost, stolen, or tampered with prior to installation, the cost of repair or replacement shall be borne by the farmer or the partner.

Sistema.bio reserves the right to inspect and verify the claim before approving any replacement or repair. The decision of the Sistema.bio will be final and binding in all warranty-related matters.



At Sistema.bio, your safety and well-being are our top priorities

Your Safety and Feedback Matter. If you ever experience or witness a safety problem, risk to your health, unfair treatment, or any other concern related to the biodigester system or the way our team works with you, please let us know. Please report your concern*.

Important Safety Notice

Your safety is very important to us. We strongly recommend that you read and follow all safety instructions in this user manual and use the biodigester system as described.

If you choose not to follow these instructions, the company cannot accept responsibility or liability for any accidents, injuries, damage to property, or other harm that may occur.



How To Report A Concern*



We're here to listen, act, and ensure everyone stays safe. Don't hesitate to reach out!

1. CALL US AT:

• Global Customer Success

Email: customersuccess@sistema.bio

• Customer Care, India

Email: customercare.india@sistema.bio

Phone: +91 9607606660

• Customer Care, Africa (Kenya & Uganda)

Email: customercare.africa@sistema.bio

Phone: +254 711 082888

• Customer Care, LATAM

Email: atencionalcliente@sistema.bio

Phone for Mexico: +52 1 55 9199 2411

Phone for Colombia: +57 310 3482 564

• Website Request Form

You can also directly submit a request on our website.



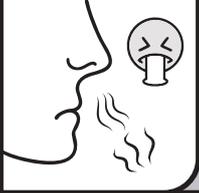
2. ANONYMOUS REPORTING

You can also submit an anonymous report through our online form.





SAFETY IN THE KITCHEN



RISK OF TOXICITY AND DEATH DUE TO Hydrogen Sulphide (H₂S)

If inhaled in long term, it can lead to breathing difficulties, illnesses and death.

PREVENTION

- Frequently **regenerate or replace the filter medium** in the biogas filter as instructed in the User Manual.
- **DO NOT release too much unburnt gas to flow** for long before lighting the fire.
- Put ignition source on the stove and then turn on gas knob for gas to flow
- Conduct frequent **biogas line checks**.
- A biogas leak gives an **unpleasant smell** like **decaying matter or rotten eggs**.
- Once a leak is detected indoors, **LEAVE** the house as there is risk of toxicity and **CLOSE** the isolation valve to **STOP** the biogas flow.



IF YOU NOTICE A FOUL SMELL (ROTTEN EGGS)

- Open the windows and doors and get out of the house.
- If eye irritation, coughing, shortness of breath, nausea, and headache are severe, call emergency services.

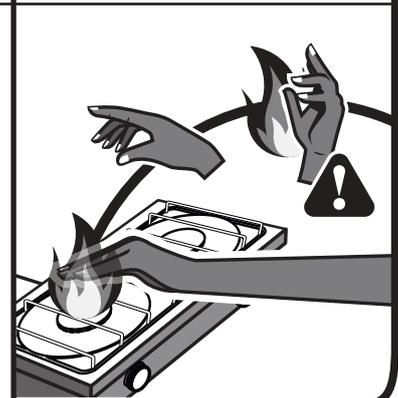
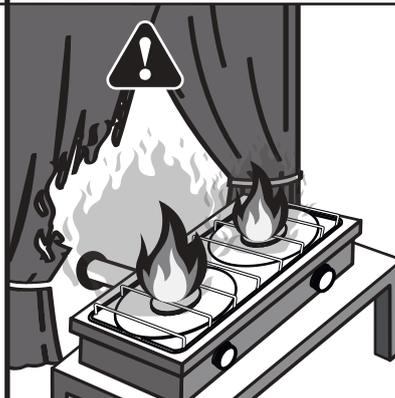
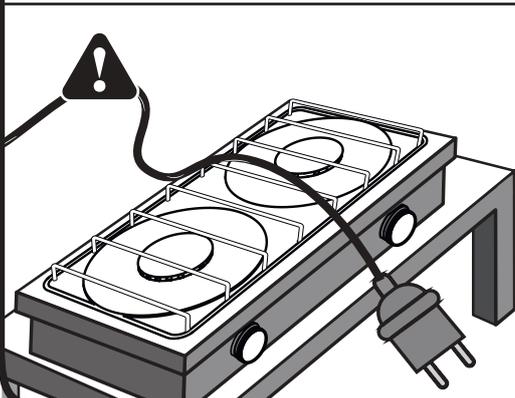


RISK OF FIRE AND BURNS

DO NOT let any wires or connections go over the stove. Place the BioStove on a solid and a steady surface.

DO NOT place curtains or any other inflammable object near the flames.

BE CAREFUL while using the BioStove as you can burn yourself.

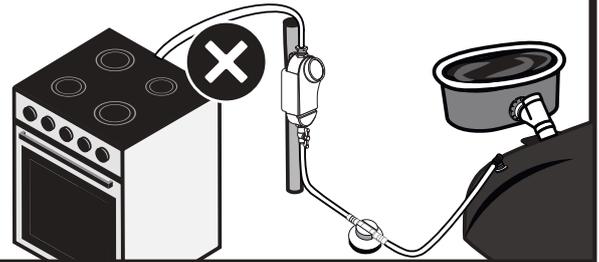
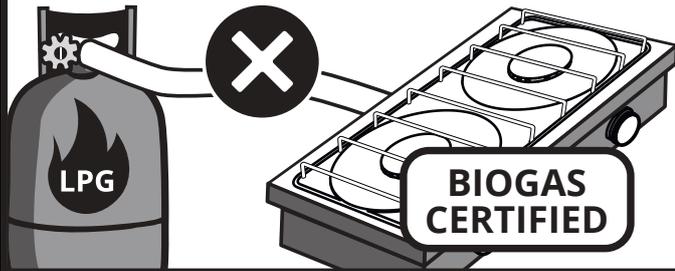




Emergency Response Plan For Farmers

DO NOT connect the BioStove to any gas source other than the biodigester.

DO NOT connect the biogas line to a natural gas stove.



IN CASE OF FIRE

- CLOSE the isolation valve to STOP the biogas flow.
- Evacuate the area.
- If safe to do, fight small fires using water or a fire extinguisher if available.

IN CASE OF A BURN

- Run cold water over the burnt area.

Call for Help: Call emergency services if symptoms are severe.

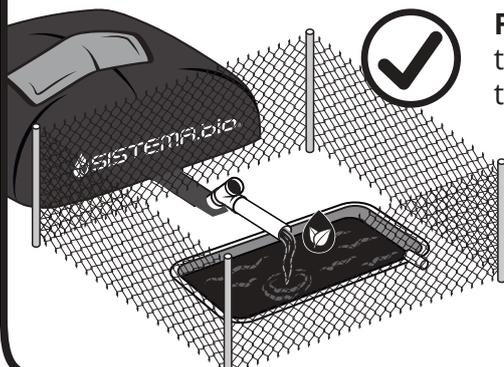


SAFETY AT THE BIODIGESTER



RISK OF DROWNING

PREVENTION



Fence or cover the biofertilizer tank at all times.



DO NOT leave children unattended around the biogas system and the biofertiliser tank.



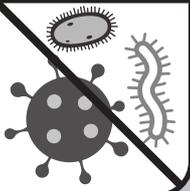


Emergency Response Plan For Farmers

IN CASE OF AN ACCIDENT



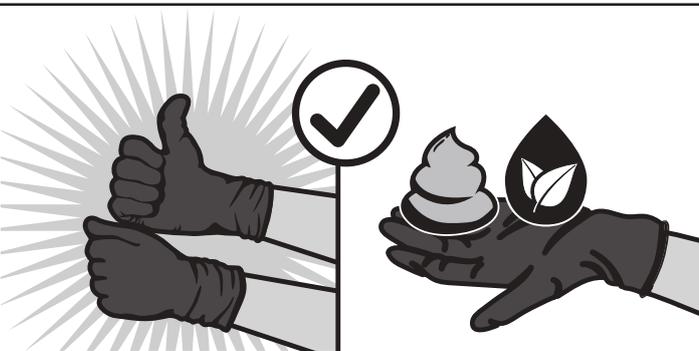
In case of falls into the biofertilizer tank, help retrieve the animal/person from the pit and provide first aid assistance, then seek medical help immediately.



RISK OF INFECTION DUE TO PRESENCE OF BACTERIA IN BIOFERTILIZER AND MANURE

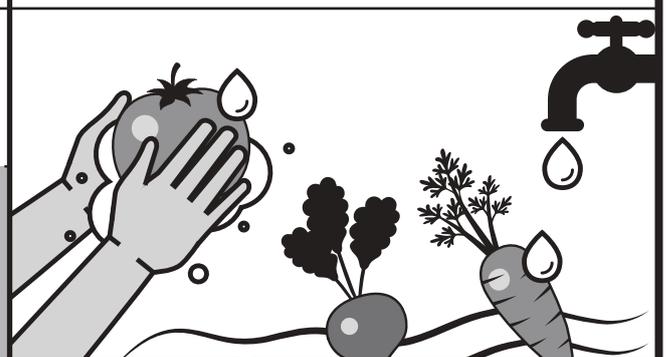
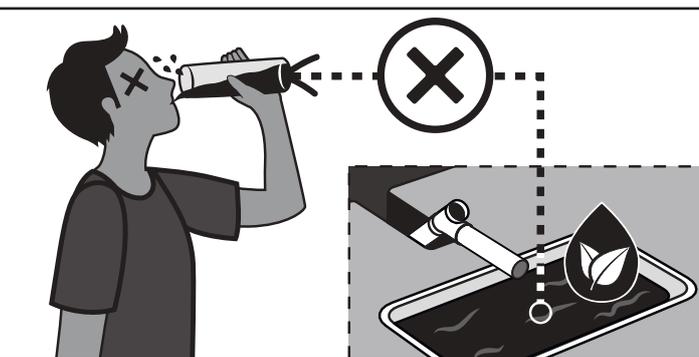
Use gloves when handling manure and biofertilizer

Wash your hands with soap and water



DO NOT drink biofertilizer

Wash your vegetables



IN CASE OF EXPOSURE TO BIOFERTILIZER



General Safety Tips

- **Wear Protective Gear:** Always use gloves when handling manure and biofertilizer.
- **Emergency Contacts:** Keep a list of your local emergency numbers in an accessible location e.g. hospital, clinic, dispensaries and fire engines where applicable.
- **For SKIN contact:** Wash the area with soap and water for at least 3 min.
- **For EYE contact:** Use clean water and rinse for 5 min.
- **If ingested or inhaled:** Seek medical help immediately.

In case of such incidents, please contact Sistema.bio using the customer care number provided in Page 45.



Customer Care

SISTEMA.bio

IMPORTANT!

Please remember to call us when:

- When you change phone number, so we can update your latest phone number and keep close communication with you!
- When the status of your digester has changed, for example: if your digester does not work anymore and needs servicing, or if you do not use your digester anymore!

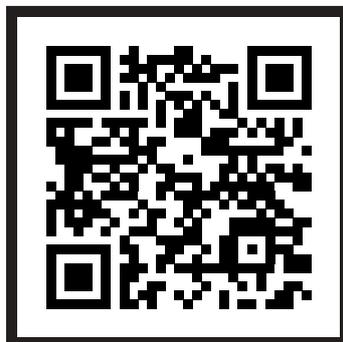


THANK YOU FOR KEEPING CLOSE COMMUNICATION WITH US!

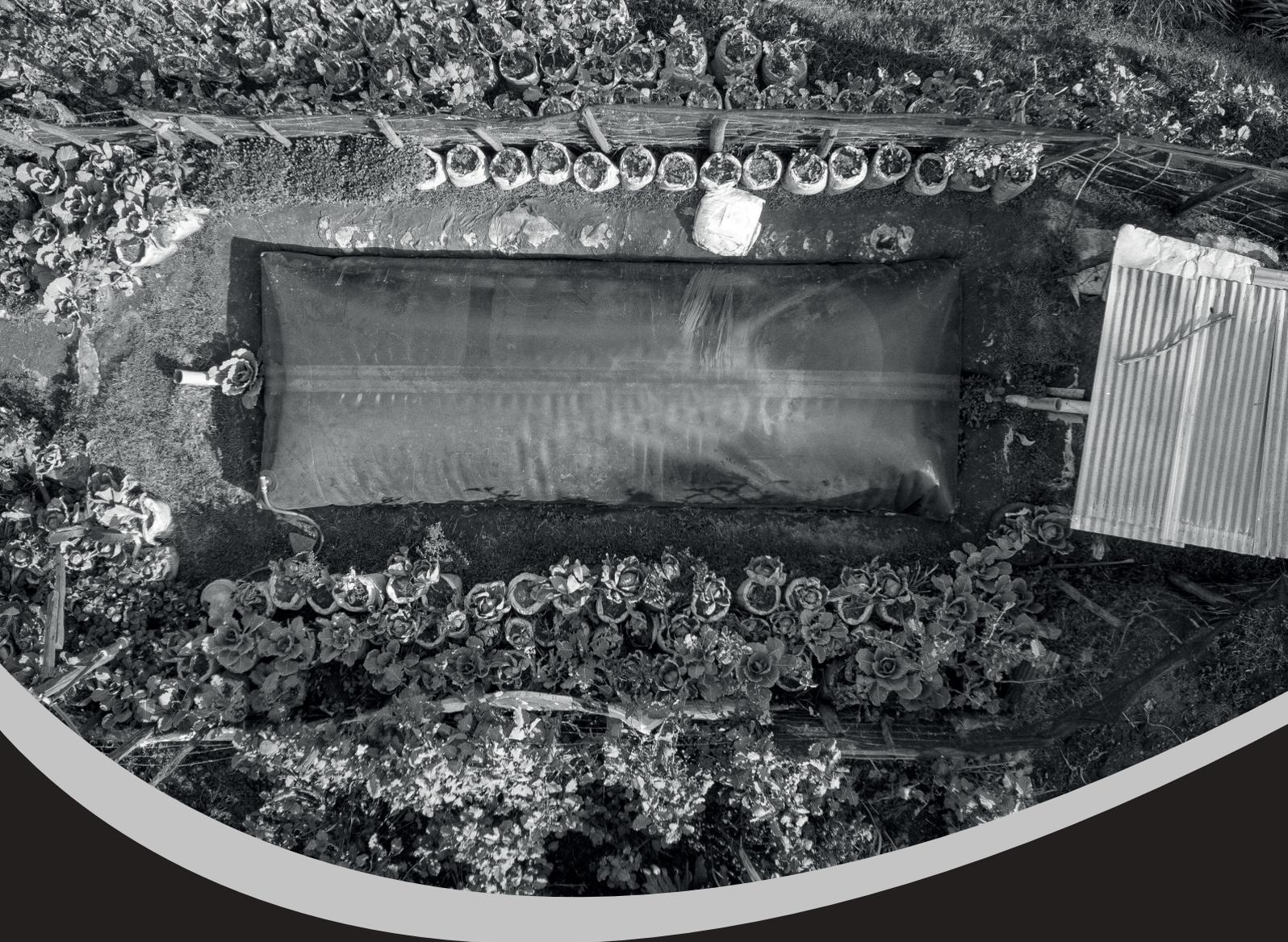


Local Sistema.bio Customer Care

Please refer to **page 45** to get the regional and global customer care phone numbers and email addresses.



If you have any issues, please contact Sistema.bio Customer Care. Scan the QR code to see the up-to-date list of regional phone numbers and emails on our website.



FOR MORE INFORMATION, VISIT
www.sistema.bio

#CreatingValueFromWaste

 www.sistema.bio

 [Sistema Biobolsa / Sistema.bio](#)

 [Sistema_bio](#)

   [Sistema.bio](#)

