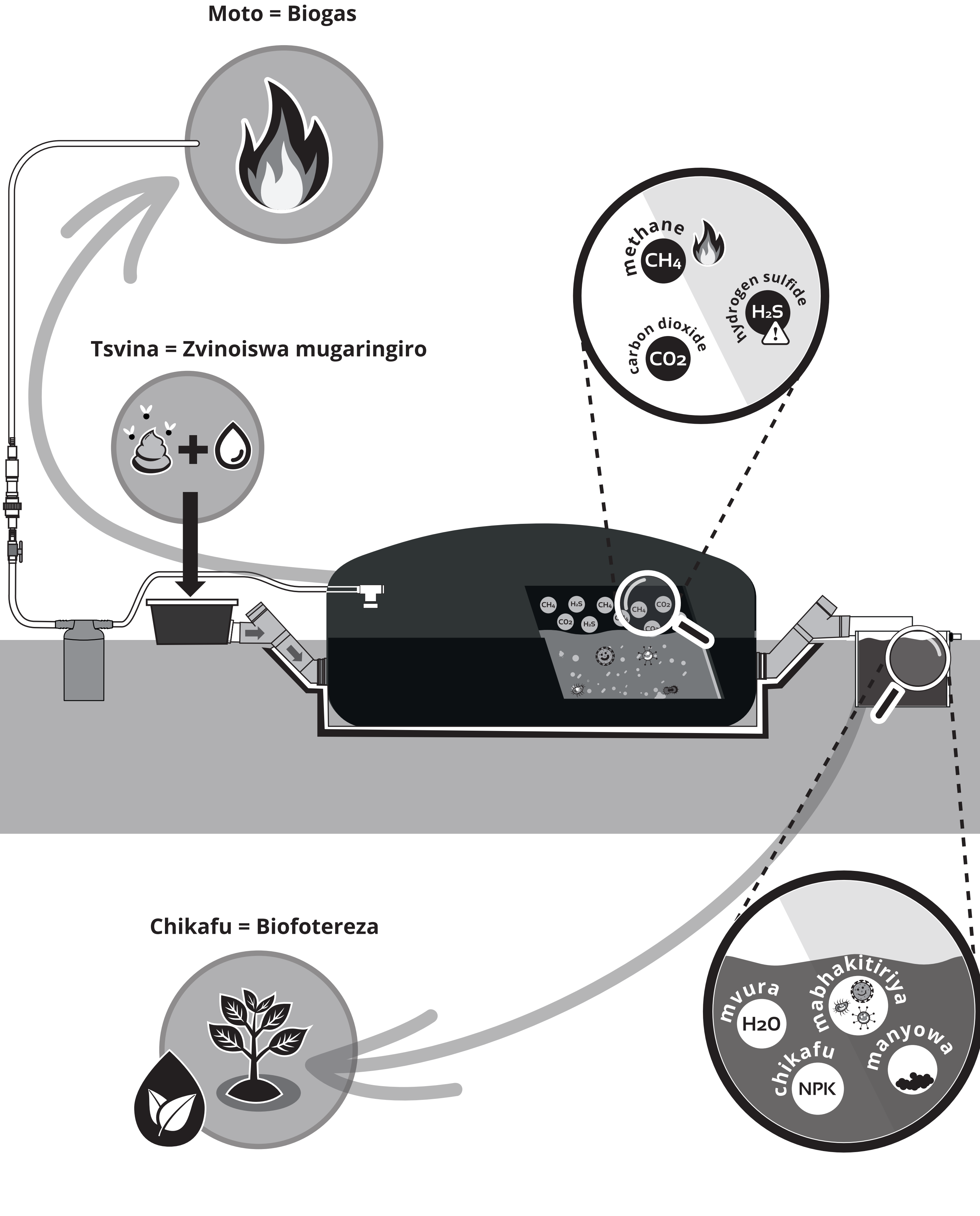
Tinokugamuchira kumusangano mukuru wevarimi vebiogas!

Kohwa pakuru negaringiro rako **garingiro!**

BHUKU ROMUSHANDISI **BHUKU**

SISTEMA.bio®
CREATING VALUE FROM WASTE

Kuzwisisa garingiro rako



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Cherechedzo/Gwaro renyanzvi/nevarairidzi:

- Pazuva rekuisa, dzidzisa achashandisa zvirimukati kubva peji yechitatu kusvika gumi netatu.
- Pazuva rekutanga kushandisa, dzidzisa achashandisa zvirimubhuku remushandisi rese.

Garingiro ragadzwa

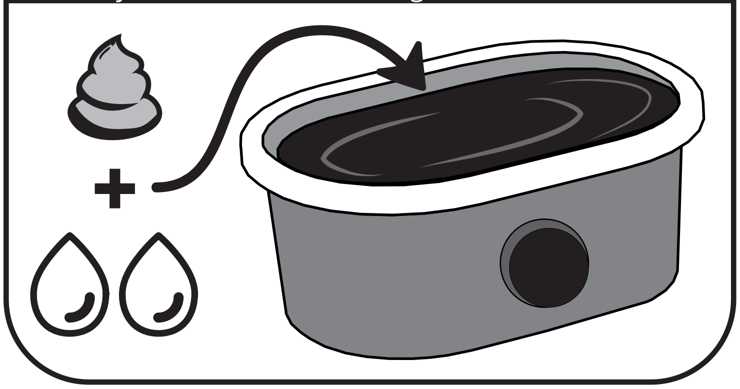
Ziva **zvinhu** zvauchagadza

1. Tangi rekuisira manyowa
2. Paipi yereactor yekupinza uye yekuburitsa
3. Reactor
4. Tangi reBiofotereza
5. Panobuda napo Biogas
6. Vharuvhu inosunungura mweya wakamanikidzwa
7. Vharuvhu inopatsanura
8. Firita reBiogas
9. Musungo wemvura
10. Chitofu chebiogas
11. Zvinoenzanisa

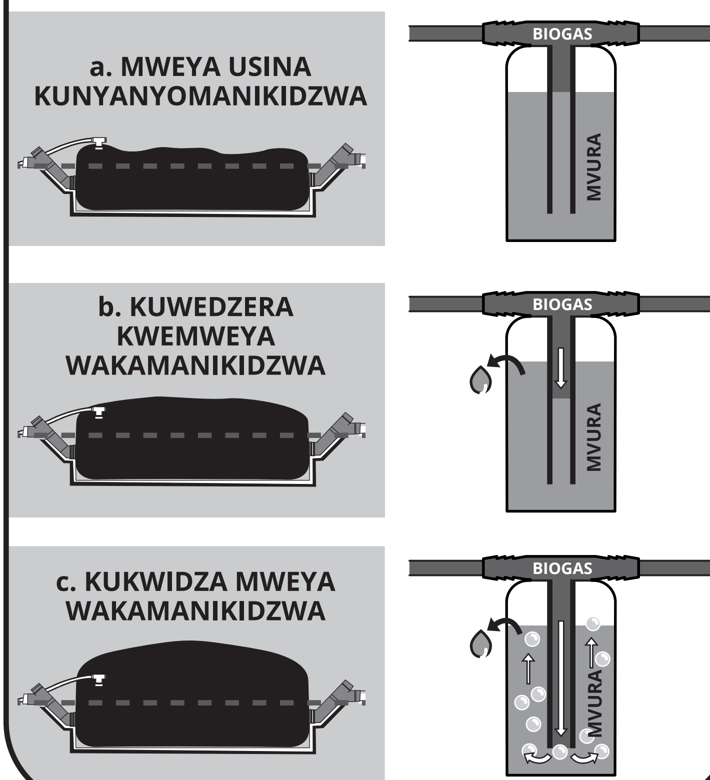
Note: Midziyo inogona kusiyana zvichienderana nedunhu uye mamiriro emunharaunda yepurojekiti.

Zvikamu zvinoshanda zvegaringiro

1 **Tangi rekuisira manyowa:** Tangi rinogara kwenguva refu rinokutendera kusanganisa ndove nemvura. Uyezve zvinokubatsira kuona uye kubvisa zvinhu zvisingadiwe.



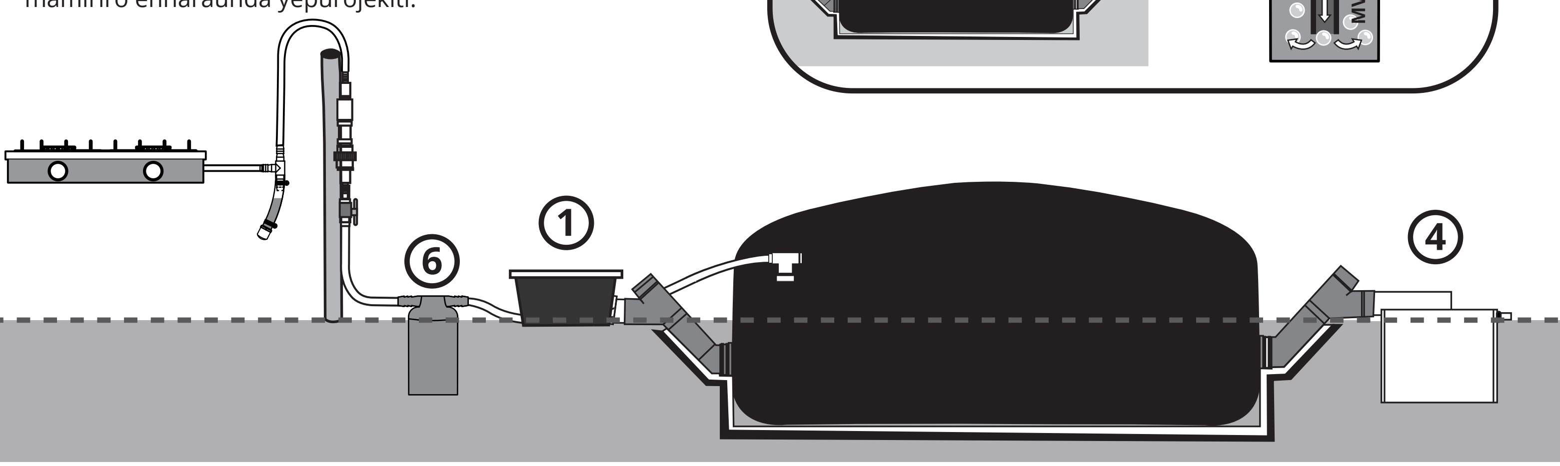
6 **Pressure relief valve (PRV):** Inidzora puresha mubiodigester ichishandisa mvura kurwisa mweya wakamanikidzwa.



4 **Tangi reBiofotereza**: Rinobvumira kuti uchengetedze biofotereza yako usati waishandisa!

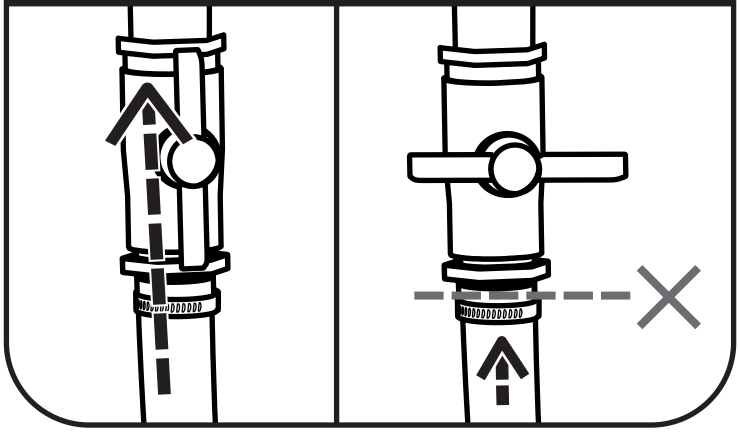
RANGARIRA: Zvikamu zvese izvi zvinoda kushandiswa nguva nenguva uye zviito zvekuchengetedza zvinotsanangurwa gare gare mubhuku iri!

Zvikamu zvinogona kusiyana zvichienderana nedunhu uye mamiriro enharaunda yepurojekiti.



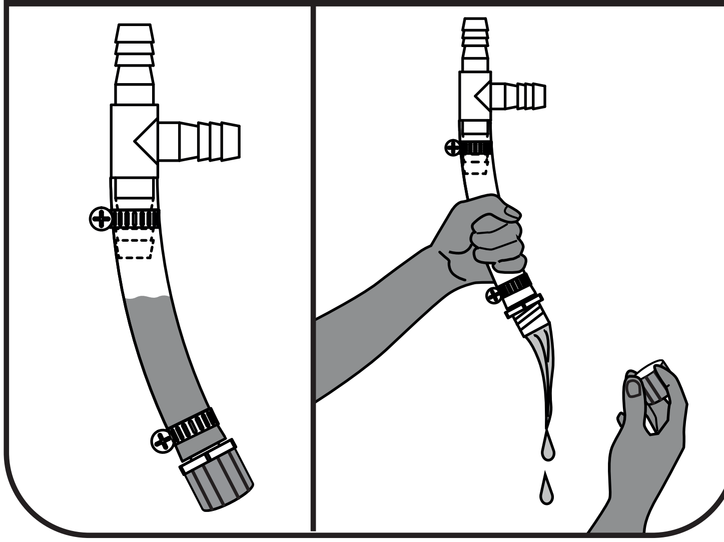
7 Vharuvhu inopatsanura:

Inobvuma kuti uvhare uye kumisa kuyerera kwebiogas.



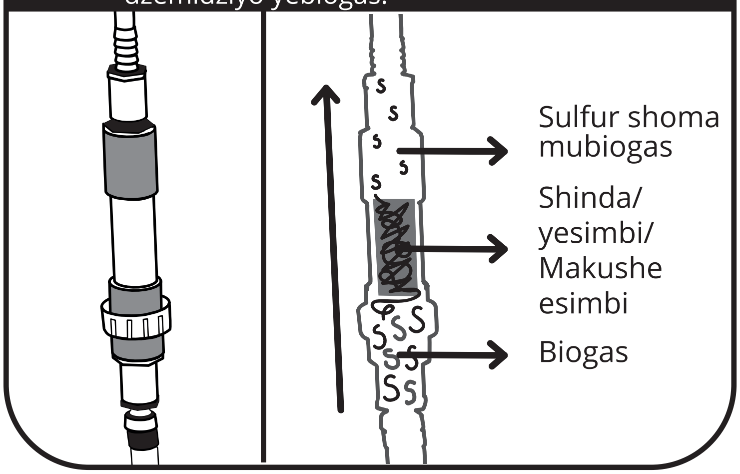
9 Musungo wemvura

Kana tembiricha yadzika, mvura iri mubiogas inozochinja yozouunganidzwa mumusungo wemvura.



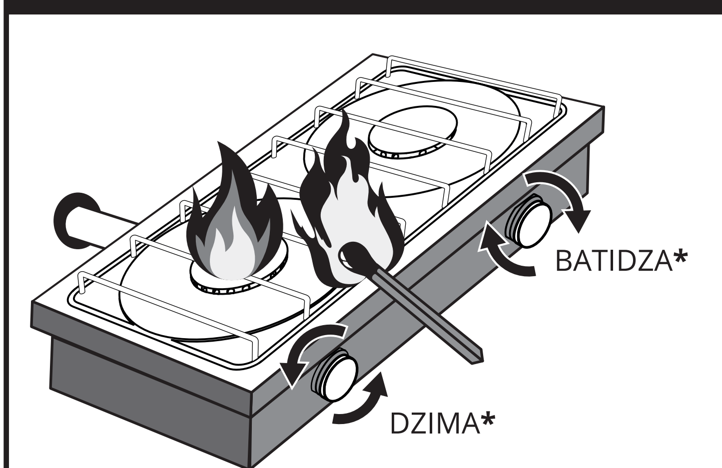
8 Firita yeBiogas:

Inoderedza munhuhwi uyezve uwandu hwesulfur mubiogas. Inowedzera nguva inorarama simbi dzese dzemidziyo yebiogas.



10 Chitofu chebiogas:

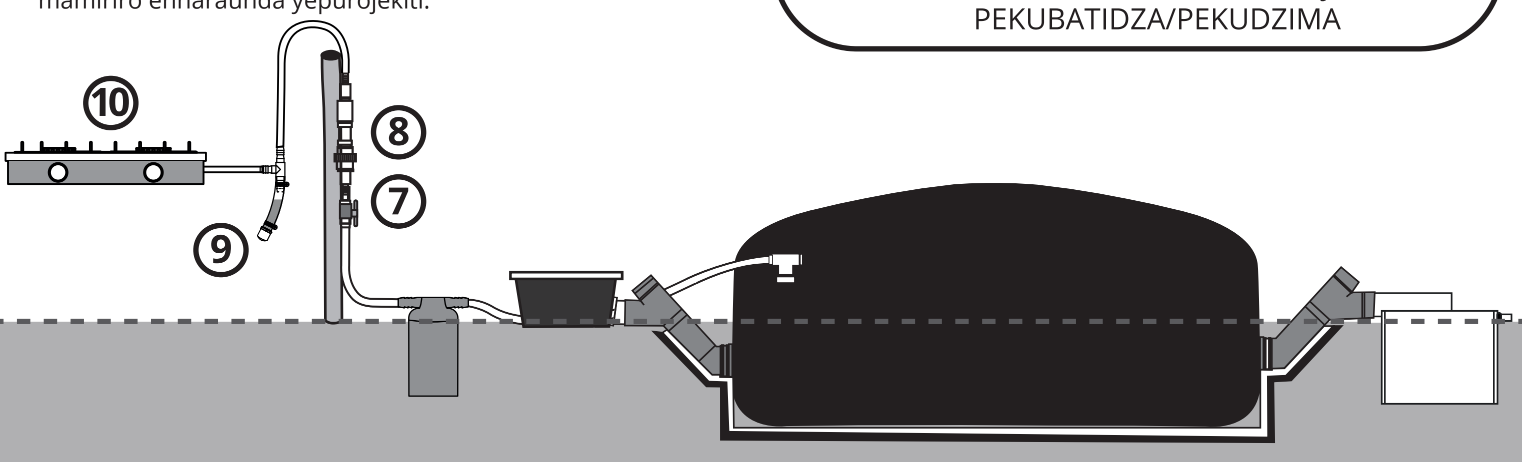
Mudziyo unowanika mukit yakajairika.



*Kana zvichibvuma, dzvanya PEKUBATIDZA/PEKUDZIMA

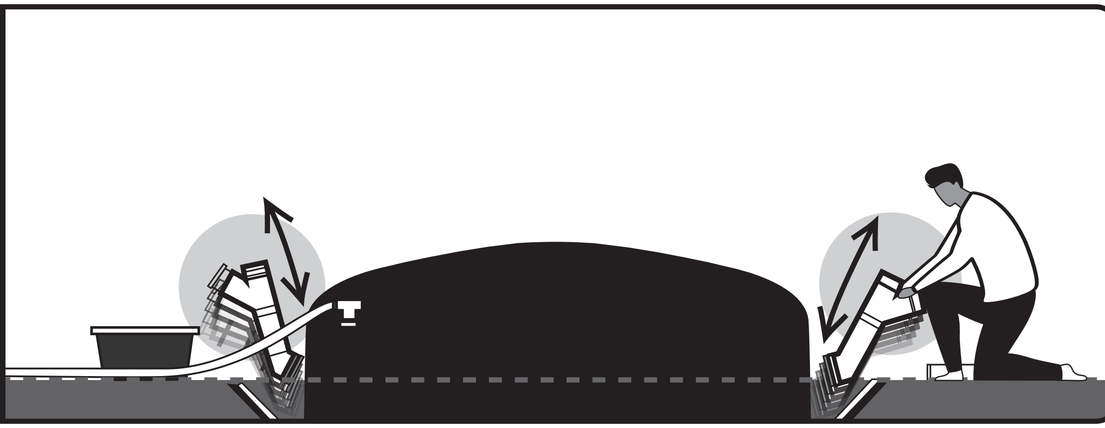
RANGARIRA: Zvikamu zvese izvi zvinoda kushandiswa nguva nenguva uye zviito zvekuchengetedza zvinotsanangurwa gare gare mubhuku iri!

Zvikamu zvinogona kusiyana zvichienderana nedunhu uye mamiriro enharaunda yepurojekiti.

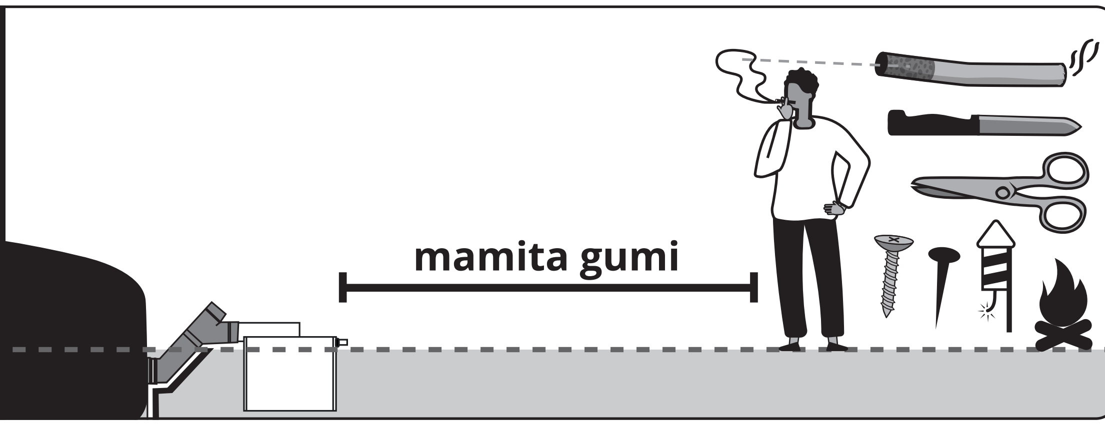


USA
bvumire vana vega padhuze nedigester negaringiro, **USA svetukira kana kumhanya pamusoro pegaringiro** pagaringiro

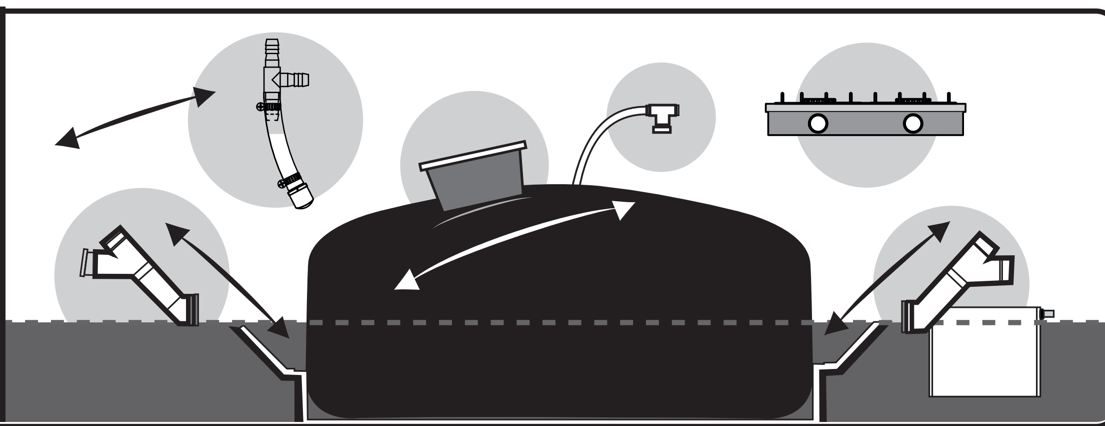
USA
dhonza, kwidza kana kusimudza mwero wemapaipi ano **pinda kana kuti kubuda** mugaringiro



USA
puta/svuta fodya, kushandisa zvinhu zvinobaya kana kucheka kana zvino konzera moto padhuze nenzvimbo ine garingiro.



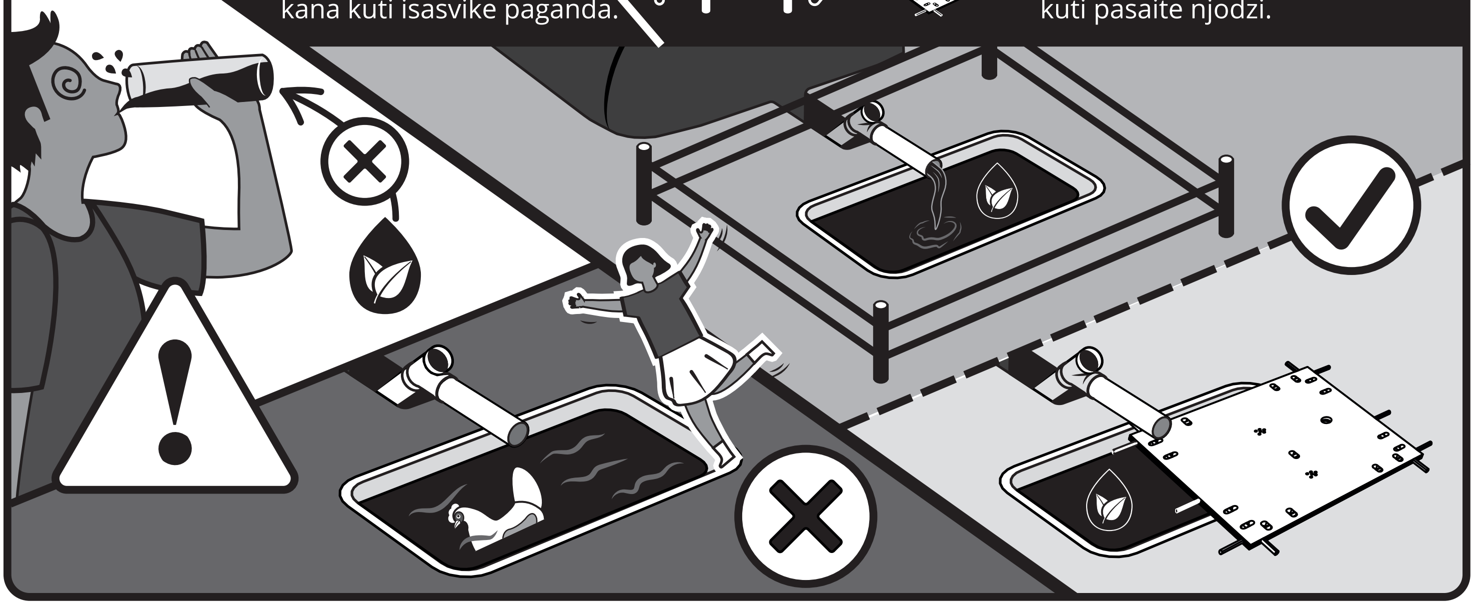
USA
chinja nzvimbo ye midziyo yebiogas.



Biofotereza

USA nwa biofotereza, dzivisa kuti isapinde mumaziso kana kuti isasvike paganda.

Isa fenzi kana chivharo padhuze netangi rebiofotereza kuti pasaite njodzi.



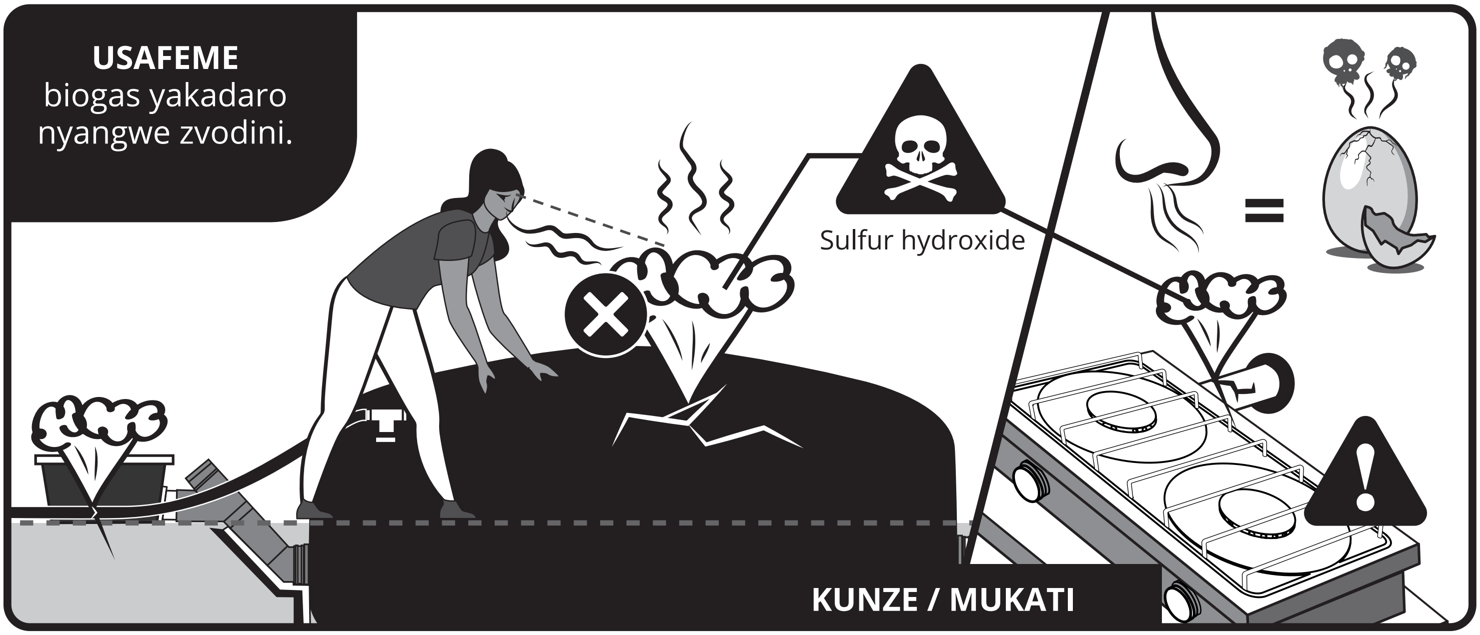
1. **Shandisa magirovhosi** kubatisa **manyowa nebiofotereza**.

2. **Geza mawoko** wapedza kushandisa.

1. **MIRA** kuisa biofotereza **3 mavhiki matatu usati wakohwa.**

2. **GEZA** michero nemuriwo usati wadya.

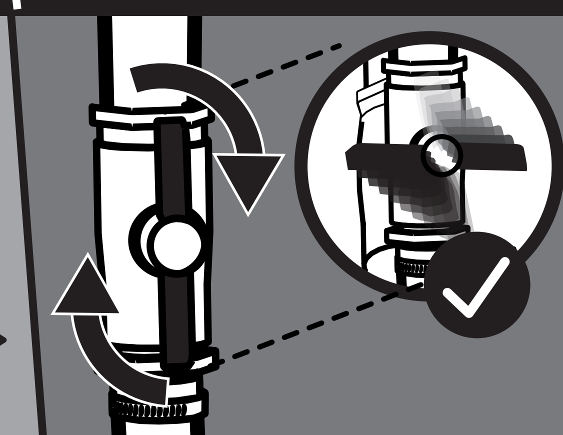
Biogas



1. Kuvhinza kwebiogas kuno kunhuwa zvinofanana ne **MAZAI AKAORA.**

2. Kana kuvhinza kwanzwikwa mumba, **BUDAI mumba sezvo** panenge paine **njozi yekuti paite moto**.

3. VHARA vharuvhu rekupatsanura KUMISA kuyerera kwebiogas.

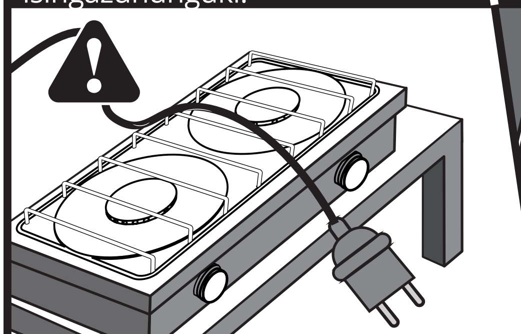


4. Ita mumba MUPINDWE NEMHEPO kuitira kuti mweya upere.

5. TSVAKIRIDZA uye GADZIRA pari kuvhinza.

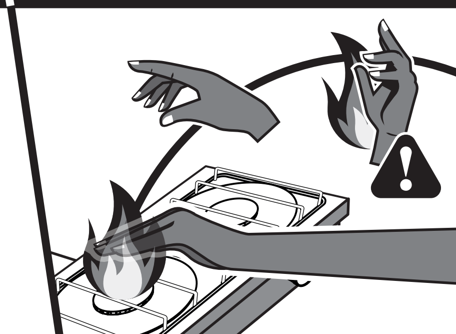
6. FONA kuti uwane rubatsiro.

USAREGA tambo dzemagetsi kana tambo dzawabatanidza dzifambe pamusoro pechitofu. Isa chitofu chebiogas panzvimbo yakasimba uyezve panzvimbo isingazunungukI.

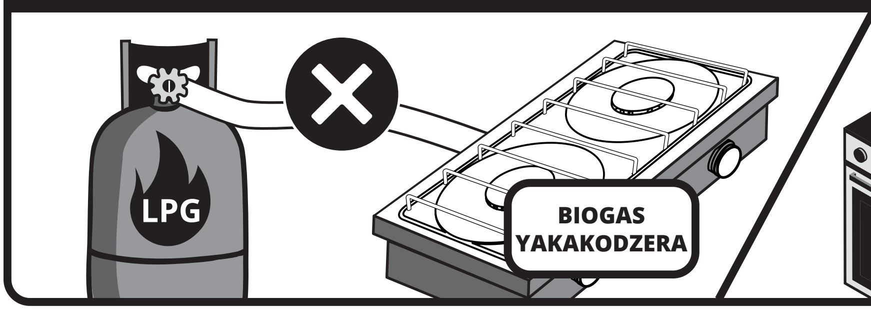


USA isa maketeni kana zvimwe zvingabata moto padhuze nemoto.

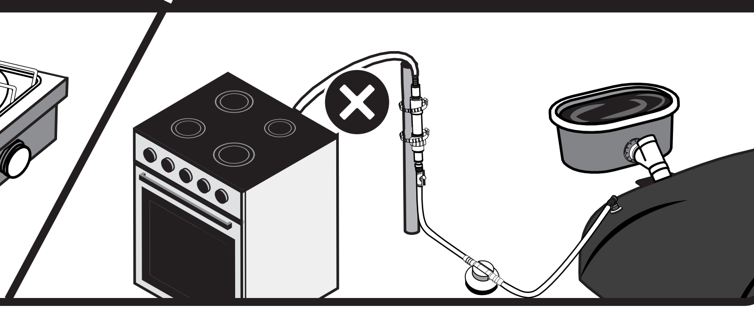
CHENJERA kana uchishandisa chitofu chebiogas. Pane njodzi yekutsva.



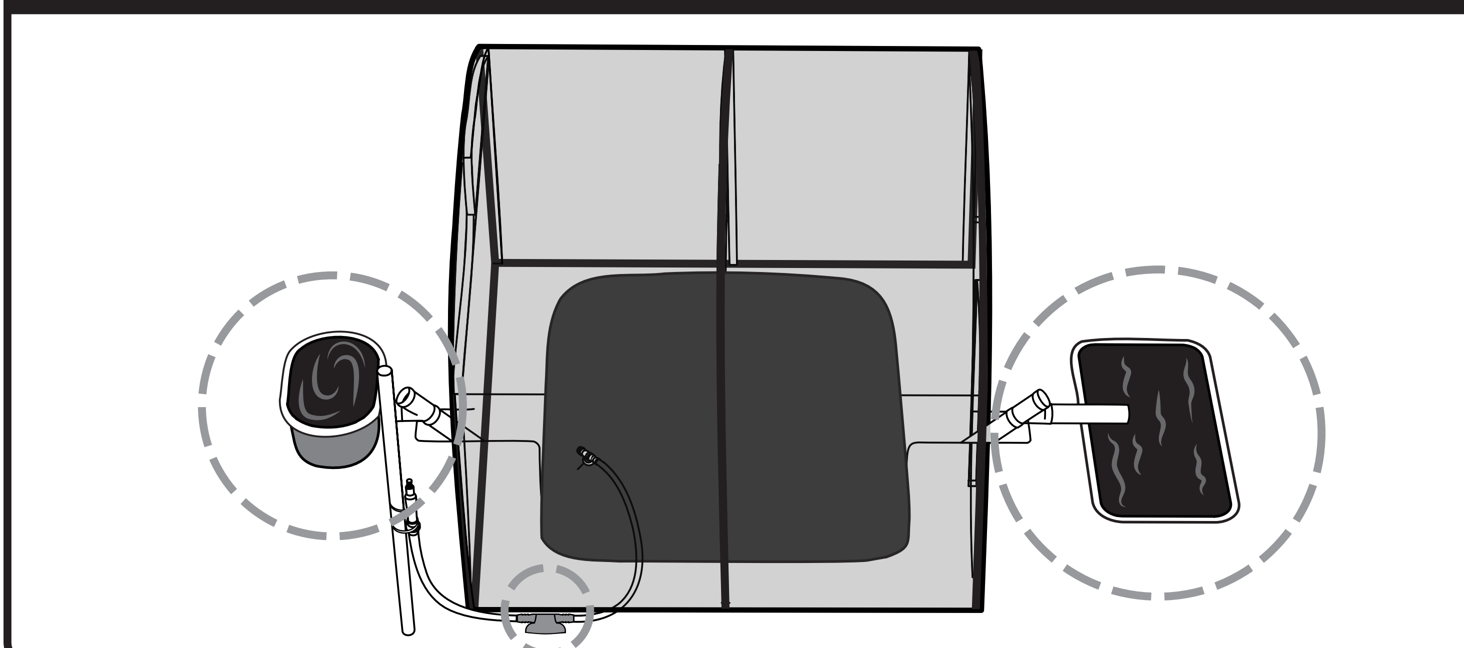
USA batanidza **chitofu chebiogas** kune mamwe magasi kunze kwebiodigester.



USA batanidza paipi yebiogas pa **chitofu chegasi chekare**.



KANA BIODIGESTER YAISWA MUGREENHOUSE,
vharuvhu rinoburitsa mweya wakamanikidzwa netengi rebiofertilizer rinofanirwa kuiswa panze greenhouse. Greenhouse inofanirwa kufefetedzwa pasati papindwa.

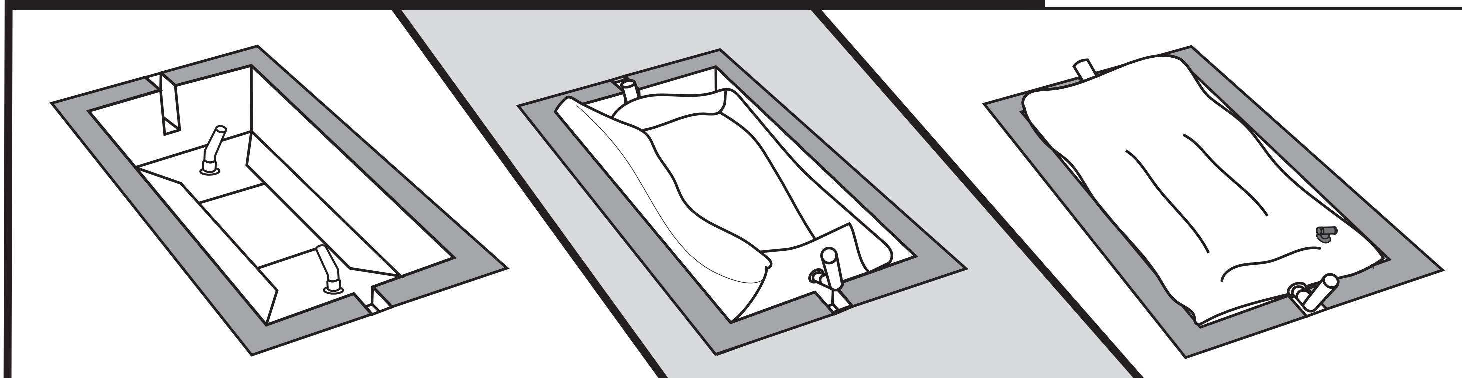


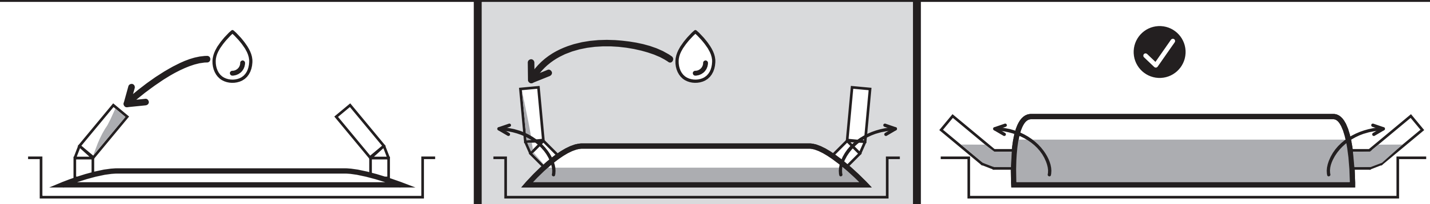
Biodigester yekutangisa

Shandisa **QR CODE** kuti uone mavideo anotsanangura kuti ungaite sei kuti digester yako igadzirire kushandiswa.

DANHO ROKUTANGA Zadza reactor nemvura kusvika mvura yava pagokora pekupinda napo nepekubuda napo.

15





Kuzadza = 0%

Kuzadza = KURI KUITWA

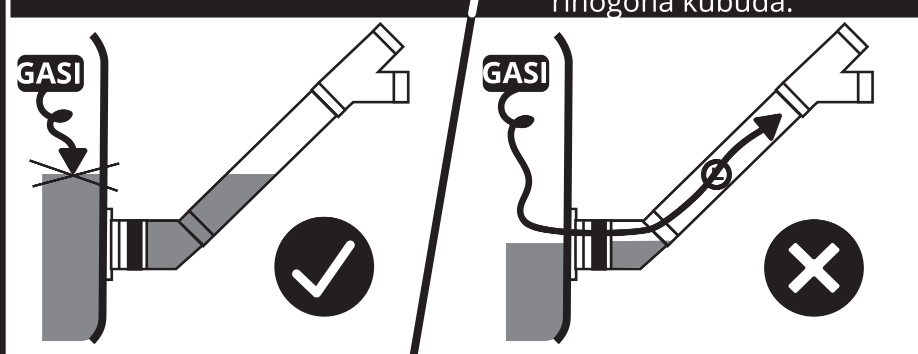
Kuzadza = 100%

Mvura inodiwa kuti uzadze biodigester

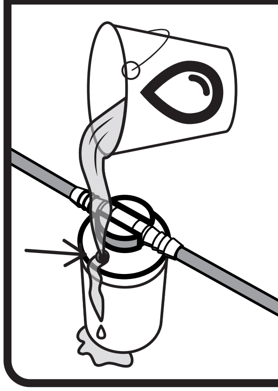
	m3	marita
Sistema 6	3	3,000
Sistema 8	4	4,000
Sistema 12	6	6,000
Sistema 16	8	8,000
Sistema 20	10	10,000
Sistema 30	15	15,000
Sistema 40	20	20,000

Good hydraulic seal: gas rakavharirwa mureactor.

Pasina chivharo chehydraulic: gasi rinogona kubuda.

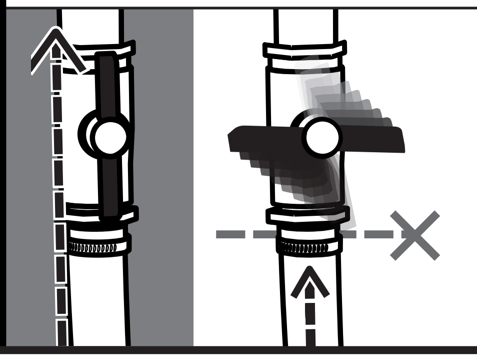


DANHO REPIRI
Zadza PRV nemvura.

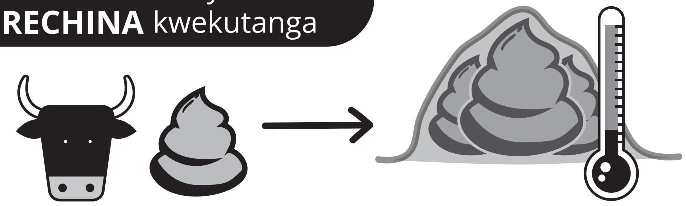


DANHO RETATU
Vhara paipi yegasi.

(OM3), (OM3bis), (OM4)



DANHO RECHINA
Kudya kwekutanga

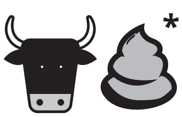


Tinokurudzira kushandisa **manyowa emombe** pekutanga **kuzadza kwekutanga**

Kuchengeta manyowa yazadzwa pasi petarp kwemazuva gumi/ gumi neshanu usati wapa chikafu kekutanga kunobatsira kutanga kwegaringiro.

Isa zvakanyanya **biofertilizer** (inodaidzwa zvakare **kunzi zvagaiwa kana kuti bioslurry**) zvinogoneka kubva pagaringiro rinoshanda inoshanda kupfupisa nguva yekutangisa.

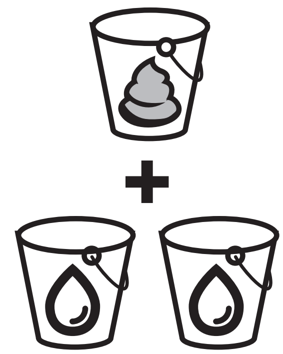
DANHO RECHINA



*	**Manyowa emombe** Kudya kwekutanga **- L or Kg**			**Manyowa emombe** Kudya kwekutanga **-** 20**L migomo**		
	Kudziya >23 °C	**Tembiricha** 15 to 23 °C	**Kutonhora** 12 to 15 °C	**Kudziya** >23 °C	**Tembiricha** 15 to 23 °C	**Kutonhora** 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**

*RANGARIRA: Paimwe tsvina, nyanzvi/mazvikokota yako ichanyora zvaunofanira kuita papeji 32 (panopera bhuku rekushandisa)

GARA UCHISANGANISA **chidimbu chimwechete chendove yemombe ne zvidimbu zviviri zvemvura**

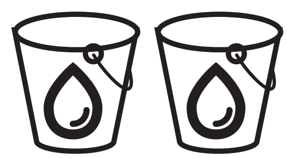


Muenzaniso:

SISTEMA 6 Kudziya kwemamiriro ekunze

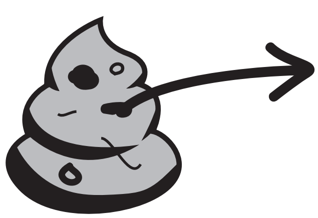
450L kana Kg kana **migomo makumimaviri nematatu**

+



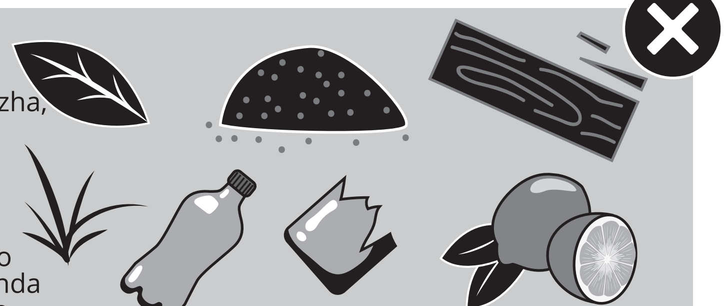
900L kana Kg kana **Migomo inokwana kuita makumi mana nenhanhatu**

Before feeding, check and filter the manure

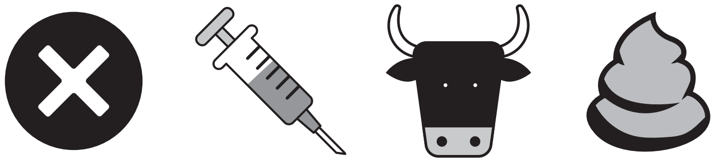


BVISA

- Jecha, matombo
- Uswa, mafibers, mashizha, wood, wood chips
- Ivhu
- Purasitiki,simbi, girazi
- Michero yecitrus
- Mafuta ekubikisa, sezvo zvichikonzera kusashanda zvakanaka kwemudziyo



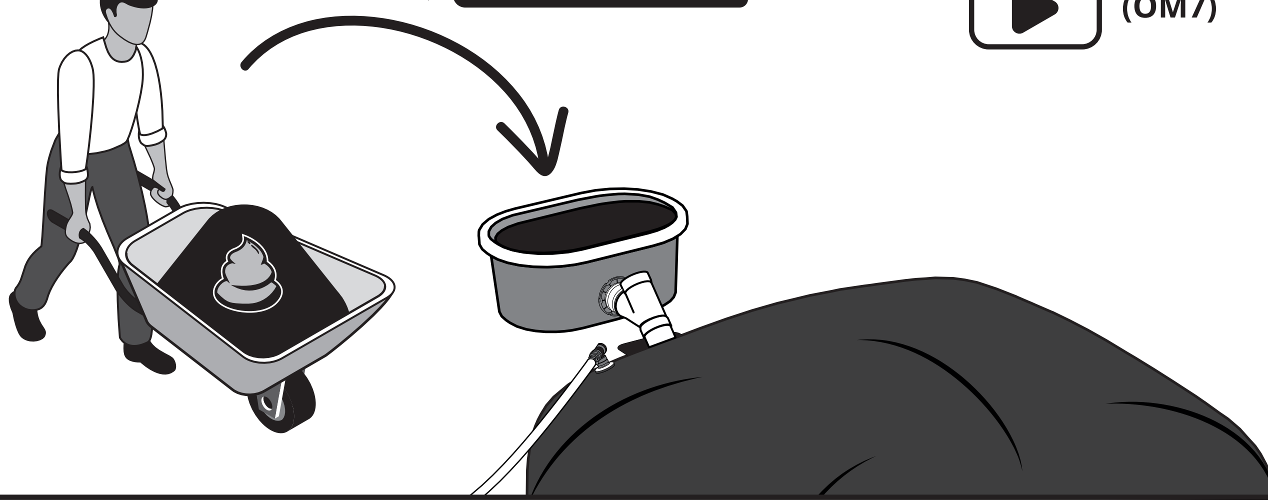
DMUSAISE ndove/tsvina nemanyowa inobva kumhuka dzakapiwa antiviral kana mushonga unouraya bhakitiriya **mukati memazuva mashanu apfuura**.



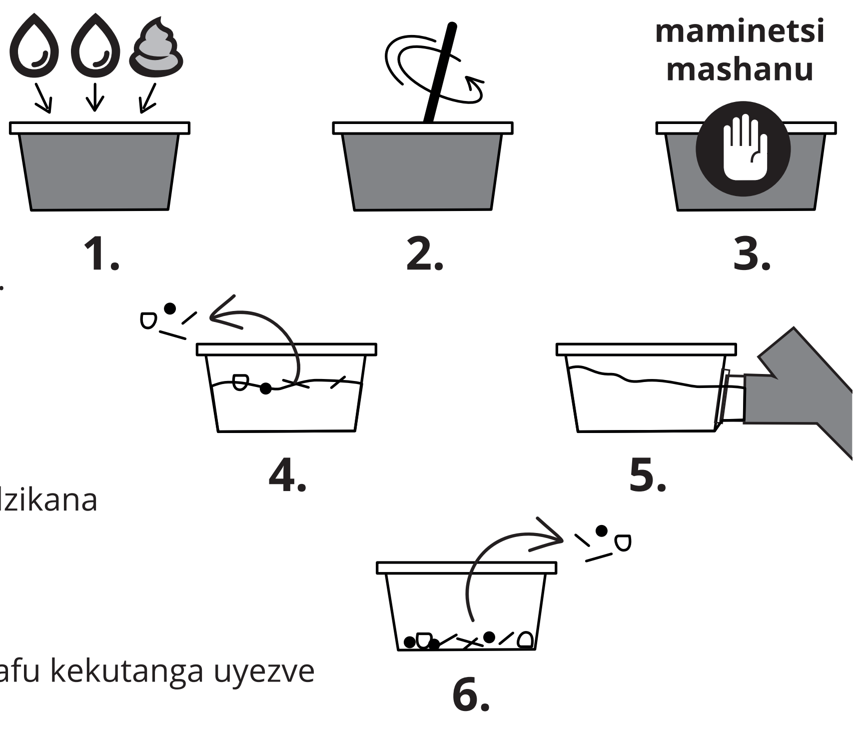
<mazuva mashanu usati wapa chikafu

MATANHO EKUPA CHIKAFU*

(OM7)



1. **Sanganisa** manyowa.
2. **Sanganisa** manyowa nemvura.
3. **Rega** musanganiswa **(manyowa)** ugadzikane kwemaminetsi mashanu.
4. **Bvisa** zvinenge zvakayangarara zvinhu
5. **Zadza** reactor.
6. **Bvisa** zvinenge zvakagadzikana materials like stones nejecha nguva zhinji.



*Zvinoshanda pakupa chikafu kekutanga uyezve kudya kwemazuva ose.

SISTEMA.bio
CREATING VALUE FROM WASTE

MIRIRA REACTOR KUTI IZARE MWEYA

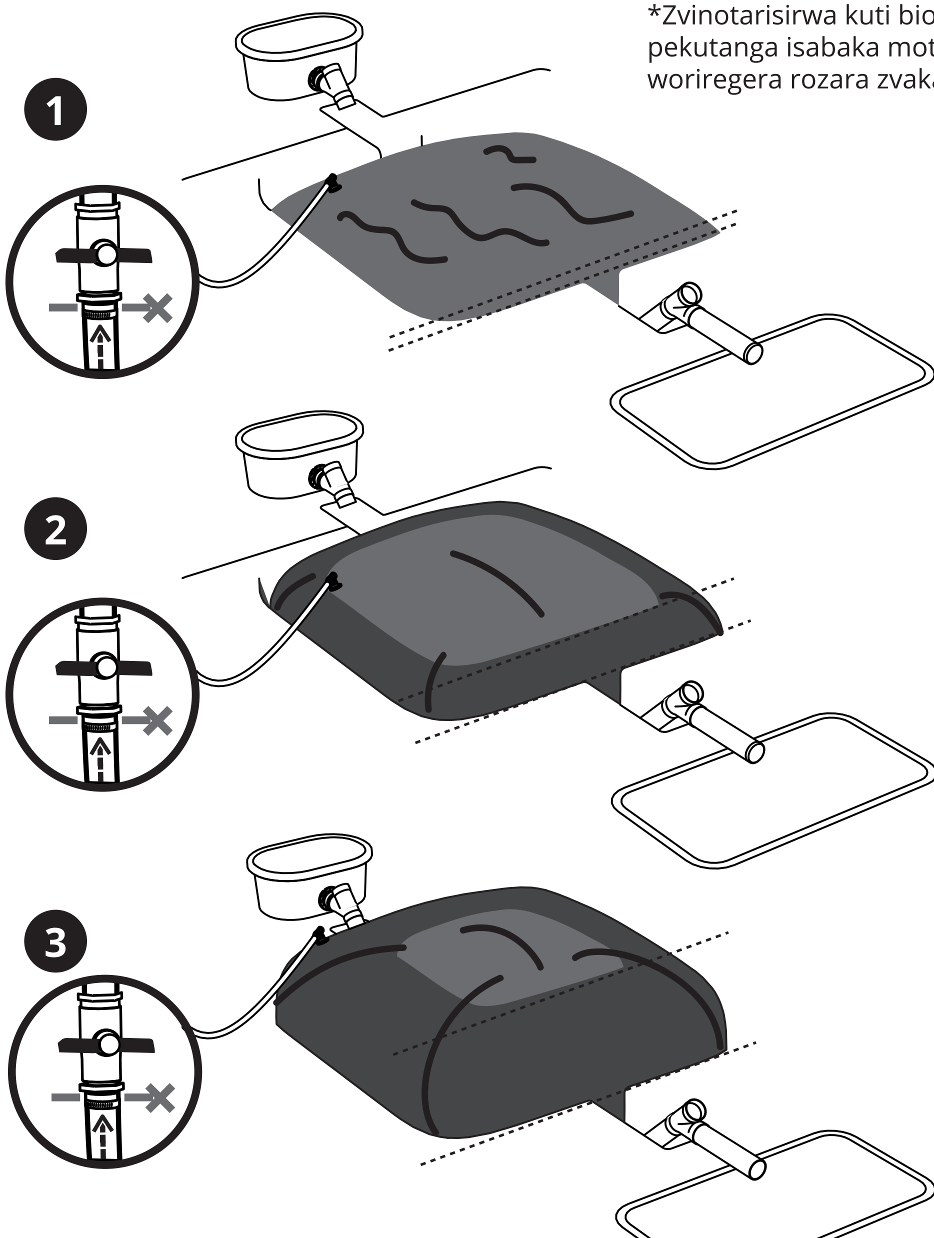
NGUVA YEKUKUDZA:*

Kusvika pamavhiki matatu zvichienderana nemamiriro ekunze/ mwaka unodziya

Mavhiki matatu kusvika mwedzi umwechete nechidimbu zvinoenderana nemamiriro ekunze/mwaka undodziya zviri pakati nepakati

Mwedzi umwechete nechidimbu kusvika miviri mechidimbu zvinoenderana nemamiriro ekunze/ mwaka unotonhora

*Zvinotarisirwa kuti biogas painozara pekutanga isabaka moto: bvisa gasi ririmo woriregera rozara zvakare.

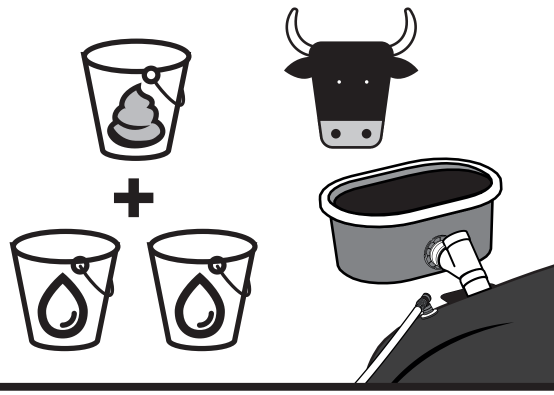


RANGARIRA: Panoperera dzidziso yezuva rekugadza/kuisa garingiro.

Unoshandisa sei mudziyo wako

Chengetedza garingiro rako

KUPA CHIKAFU. Ipa chikafu kugaringiro rako MAZUVA ESE nechikamu chimwechete chemanyowa emombe nezvikamu zviviri zvemvura.



Chikafu **chezuva nezuva***

*Tarisa **matanho ekupa chikafu** mupeji 10

(OM8)

KARENDA

			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	

KUTSIKA TSIKA

Tsika tsika **kamwe pavhiki**

(OM13)

kana YABVISWA MWEYA

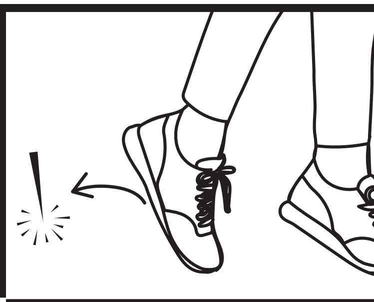
KARENDA

			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	

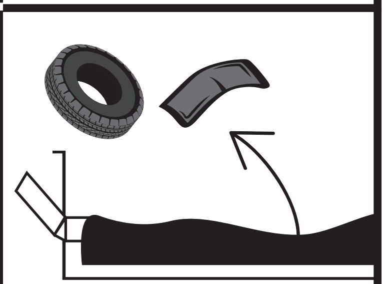
USA tsike tsike

kana YAKAZARA

1. Bvisa **zvinhu zvinobaya kana kucheka kubva** pashangu kudzivisa kukuvadza reactor

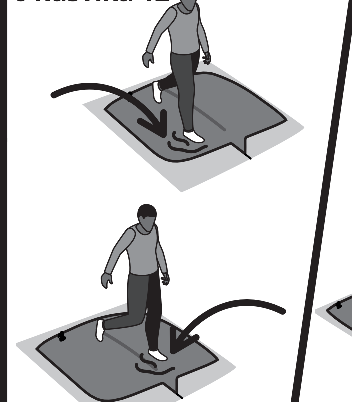


2. Bvisa **zvinoenzanisa** usati watanga kutsika tsika

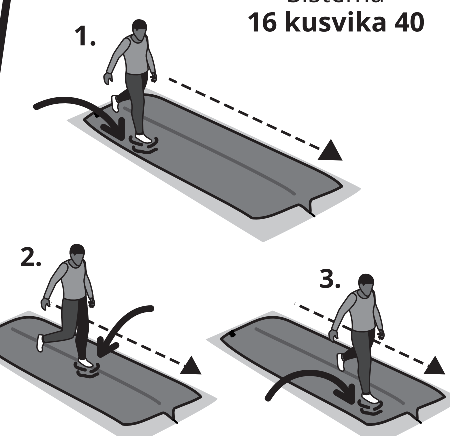


3. Tsika tsika nekupfamba zvishoma nezvishoma pagaringiro, uchisudurutsa huremu hwako kubva kune rimwe gumbo uchiyenda kune rimwe.

Sistema **6 kusvika 12**

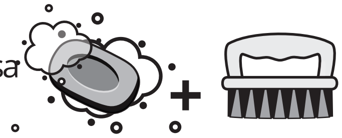


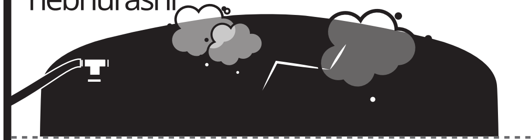
Sistema **16 kusvika 40**



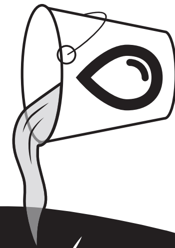
KUKADZIRISA KUKUVADZWA KWEMEMBRANE

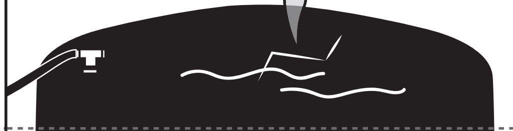
1. GEZA uchishandisa sipo nebhurashi



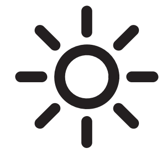


2. SUKURUDZA nemvura yakachena

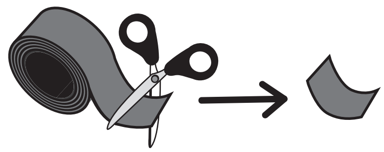


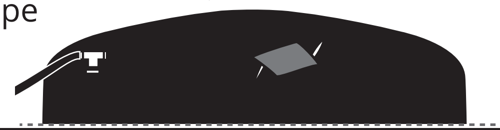


3. Siya **ZVIOME**

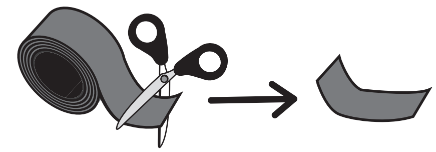


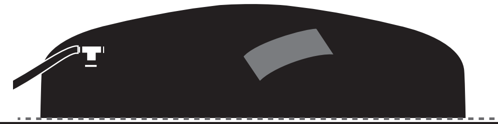
4. ISA chidimbu chidiki chebutyl tape





5. SHANDISA hombe yacho kuvhara chigamba chekutanga





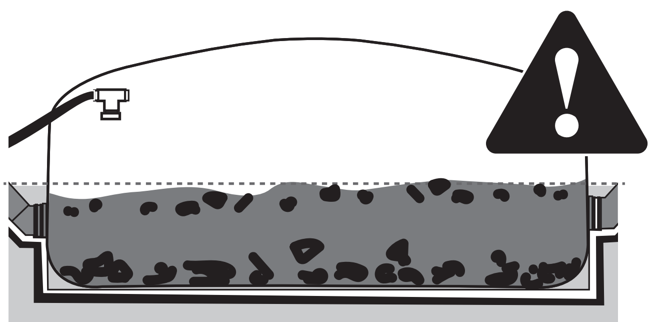
KUCHENGETEDZA KWENGUVA REFU

KARENDA

PAMAKORE mashanu kusvika manomwe ega ega kana pese pazvinenge zvichidiwa.

Zvakakodzera unogona kutangidza patsva garingiro rako mushure mekurasa zvinenge zvirimo:

- Pane zvakaomarara **zvaunganidzwa** mukati.

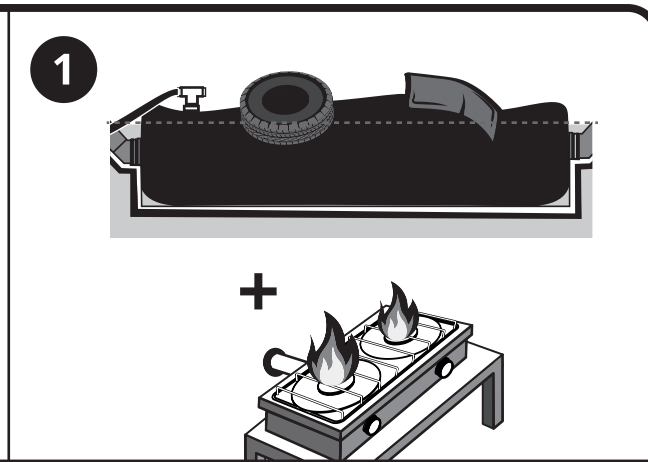


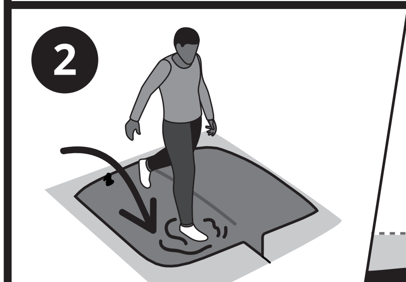
- Hazvisati **zvasanganiswa kwenguva refu.**

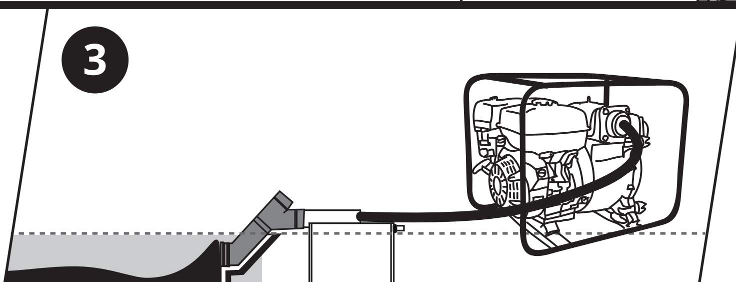
- Mvura shoma inenge yawedzerwa. **Garingiro rinorema kana manyowa asina kusanganiswa manyowa anonetsa kutsika tsika.**

Maitiro

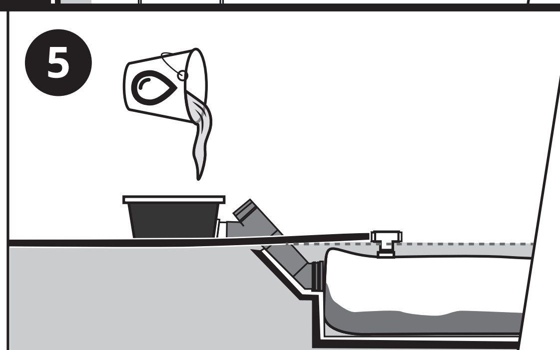
1. **Bvisa** mweya mugaringiro uchishandisa zvinoenzanisa. Wozoshandisa, zvitanda zvemoto zvese zvechitofu chebiogas kupisa biogas inenge yasara.
2. **Tsika** tsika garingiro zvakasimba.
3. **Rasa** zviri mudigester rine 3” pombi dzemanyowa kusvika pahafu yehurefu wemugero.
4. **Tsika** tsika zvakasimba

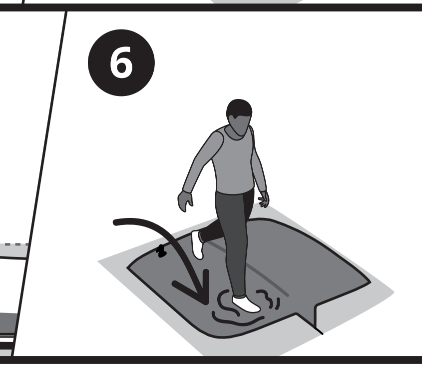


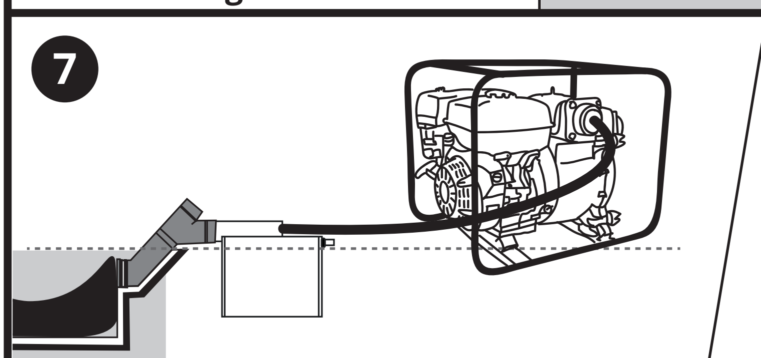


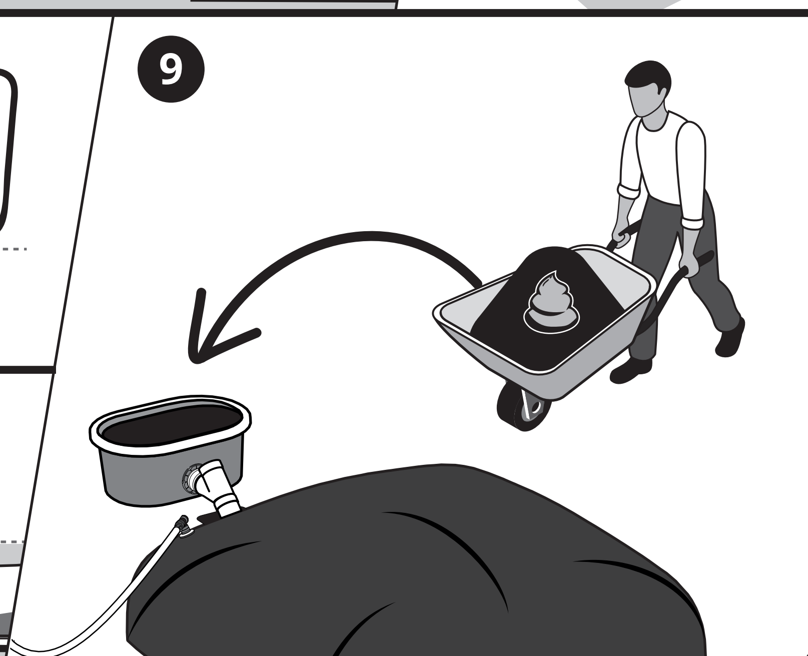


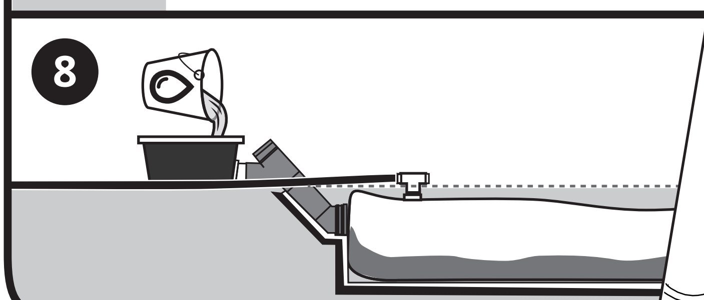
5. **Zadzisa** nemvura.
6. **Tsika** tsika zvakasimba.
7. **Rasa** zviri mugaringiro kusvika pa hafu yehurefu hwemugero.
8. **Zadzisa** nemvura.
9. Pfuurira mberi upe **chikafu kekutanga!**











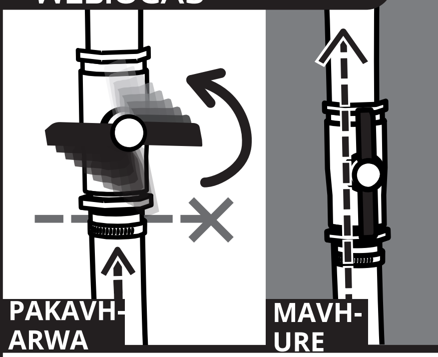
Kushanda kwegaringiro

	Kukura kwegaringiro	SIS **6**	SIS **8**	SIS **12**	SIS **16**	SIS **20**	SIS **30**	SIS **40**
Mamiriro ekunze anodziya **>23 ºC**	Kudya kwezuva nezuva: manyowa emombe	**45** L kana Kg/ pazuva	**65** L kana Kg/ pazuva	**90** L kana Kg/ pazuva	**130** L kana Kg/ pazuva	**180** L kana Kg/ pazuva	**260** L kana Kg/ pazuva	**350** L kana Kg/ pazuva
	Biogas rinogadzirwa pazuva	**2** m3/pazuva	**2.4** m3/pazuva	**3.3** m3/pazuva	**4.8** m3/pazuva	**6.7** m3/pazuva	**9.6** m3/pazuva	**12.9** m3/pazuva
	Nguva yekubika pazuva rega rega uchishandisa chitofu chimwechete	**3.4** awa pazuvaa	**4.8** awa pazuva	**6.6** awa pazuva	**9.6** awa pazuva	**13.4** awa pazuva	**19.2** awa pazuva	**25.8** awa pazuva
	Biofotereza inogadzirwa pavhiki	**0.9** m3/pavhiki	**1.4** m3/pavhiki	**1.9** m3/pavhiki	**2.7** m3/pavhiki	**3.8** m3/pavhiki	**5.5** m3/pavhiki	**7.4** m3/pavhiki
Mamiriro ekunze anodziya zviri pakati nepakati **15 - 23 ºC**	Kudya kwezuva nezuva: manyowa emombe	**35** L kana Kg/ pazuva	**50** L kana Kg/ pazuva	**65** L kana Kg/ pazuva	**100** L kana Kg/ pazuva	**135** L kana Kg/ pazuva	**200** L kana Kg/ pazuva	**265** L kana Kg/ pazuva
	Biogas rinogadzirwa pazuva	**1.3** m3/pazuva	**1.8** m3/pazuva	**2.3** m3/pazuva	**3.6** m3/pazuva	**4.9** m3/pazuva	**7.2** m3/pazuva	**9.6** m3/pazuva
	Nguva yekubika pazuva rega rega uchishandisa chitofu chimwechete	**2.6** awa pazuva	**3.6** awa pazuva	**4.6** awa pazuva	**7.2** awa pazuva	**9.8** awa pazuva	**14.4** awa pazuva	**19.2** awa pazuva
	Biofotereza inogadzirwa pavhiki	**0.7** m3/pavhiki	**1.1** m3/pavhiki	**1.4** m3/pavhiki	**2.1** m3/pavhiki	**2.8** m3/pavhiki	**4.2** m3/pavhiki	**5.6** m3/pavhiki
Mamiriro ekunze anotonhora **12 - 15 ºC**	kudya kwezuva nezuva: manyowa emombe	**25** L kana Kg/ pazuva	**35** L kana Kg/ pazuva	**45** L kana Kg/ pazuva	**65** L kana Kg/ pazuva	**90** L kana Kg/ pazuva	**135** L kana Kg/ pazuva	**180** L kana Kg/ pazuva
	Biogas rinogadzirwa pazuva rega rega	**0.8** m3/pazuva	**1.2** m3/pazuva	**1.5** m3/pazuva	**2.2** m3/pazuva	**3** m3/pazuva	**4.5** m3/pazuva	**6** m3/pazuva
	Nguva yekubika pazuva rega rega uchishandisa chitofu chimwechete	**1.6** awa pazuva	**2.4** awa pazuva	**3** awa pazuva	**4.4** awa pazuva	**6** awa pazuva	**9** awa pazuva	**12** awa pazuva
	Biofotereza inogadzirwa pavhiki	**0.5** m3/pavhiki	**0.7** m3/pavhiki	**0.9** m3/pavhiki	**1.4** m3/pavhiki	**1.9** m3/pavhiki	**2.8** m3/pavhiki	**3.8** m3/pavhiki

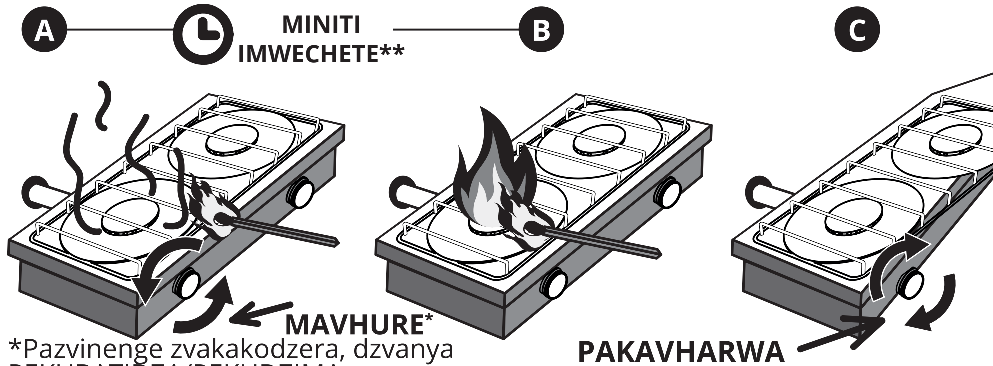
Shandisa moto wawagadzira uye chengetedza paipi yebiogas rako!

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

MOTO WEKUTANGA WEBIOGAS



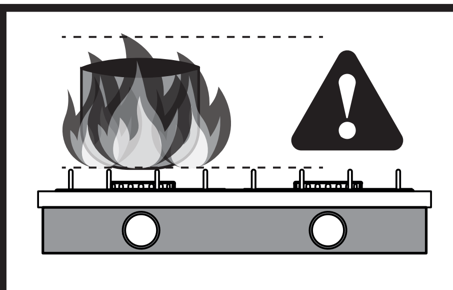
1. VHURA vharuvhu



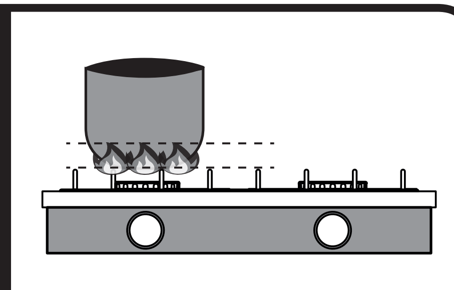
*Pazvinenge zvakakodzera, dzvanya PEKUBATIDZA/PEKUDZIMA

2. TENDEREDZA chibato kuti biogas ibude (A) uchizama kubatidza moto nemachisi. Kana **biogas yakusvika pachitanda chemoto**,uchaona moto (B).**Zvingatore **miniti rimwe** kuti moto wekutanga ubate. Kuti UVHARE, tenderedza uchitevedzera mafambiro echiringazuva(C).

USA
siya moto uchiwedzera/ uchikura.



Enzanisa moto nekukura kwehari
enzanisa moto nekukura kwehari.



VANDUDZA MOTO WAKO UCHISHANDISA ZVINOENZANISA

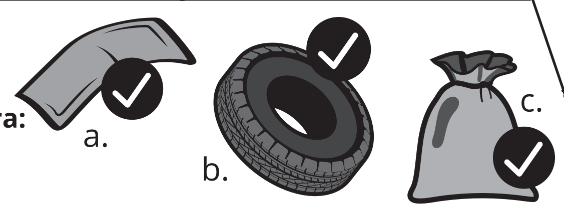
USA shandise zvinhu zvinobaya kana kucheka zvingakuvadza reactor.

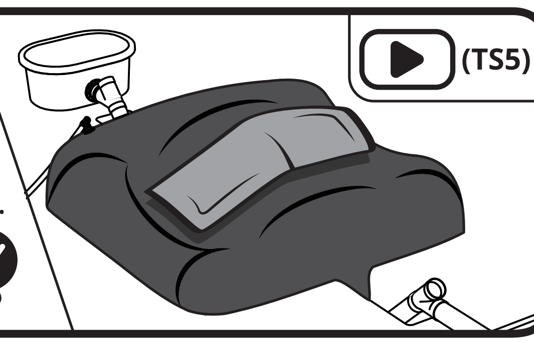
(TS5)

Isa zvinoenzanisa pamusoro pereactor.

Shandisa chimwe CHETE chezvisarudzo zvinotevera:

a. Zvinoenzanisa
b. Mavhiri
c. Masaga ejecha





KUGEZA CHITANDA/ CHIGUNI CHEMOTO

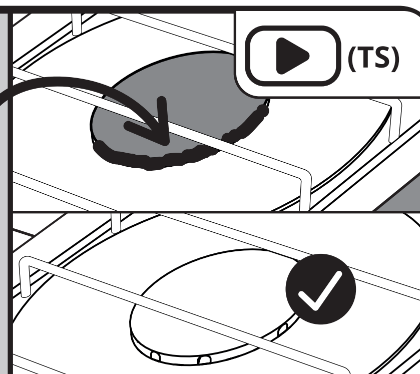
KARENDA

Vhiki rega rega kana mwedzi wega wega zvichiendererana nezvinodiwa.

Shandisa
- bhurashi
- mvura ine maremoni
- mvura inesipo

Shambidza chitofu chekubika nemoto **kubvisa zvavhara maburi anobuda moto.**

(TS)

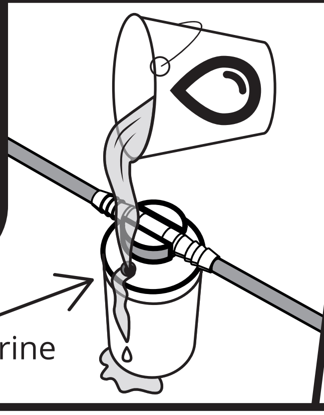


VHARUVHU RINOSUNUNGURA MWEYA WAKAMANIKIDZWA

KARENDA

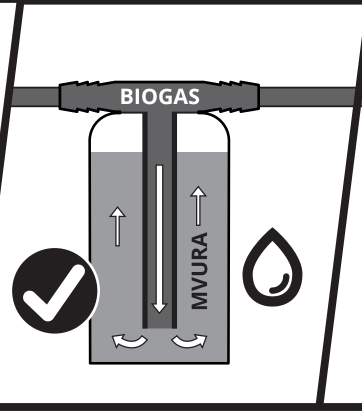
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

(OM2), (O&M1)

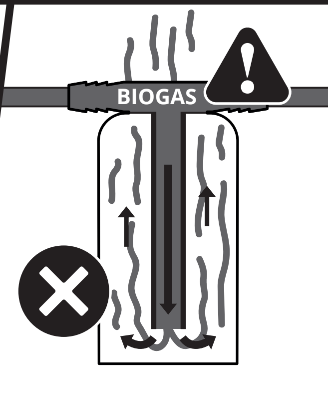


Zadza mweya wakamanikidzwa vharuvhu rinosunungura rine **mvura KAVIRI PAVHIKI**

PVR yazadzwa: **Gasi rino** chengetwa mureactor



Bvisa zviri muPRV: **Gasi rinogona kubuda**



KUTARISA PANOBATWA MVURA

KARENDA

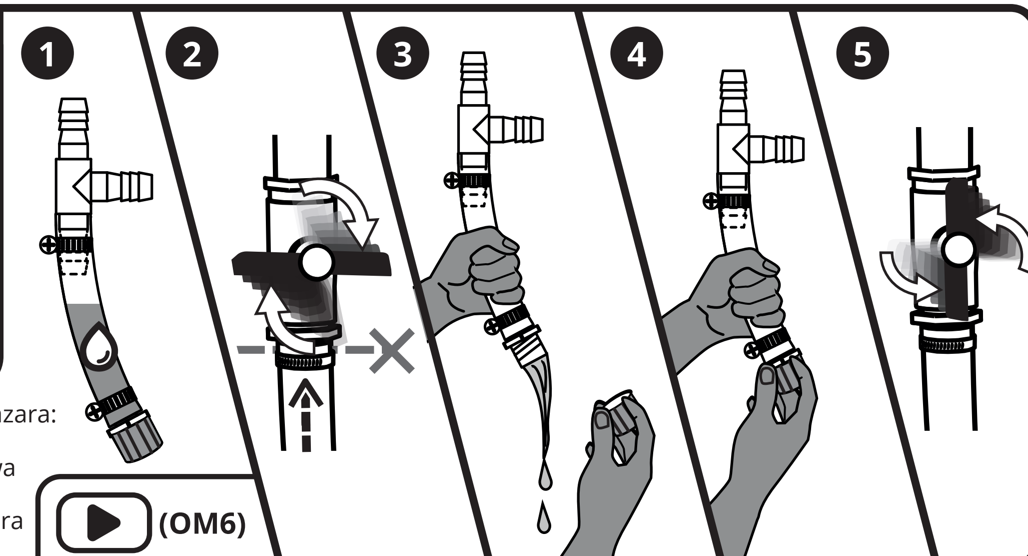
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Kaviri pavhiki

Kana panochengetwa mvura pakazara:

1. **Vhara** vharuvhu rebiogas
2. **Bvisa** mvura panochengetedzwa mvura
3. **Vhara** panochengetedzwa mvura
4. **Vhura** vharuvhu rebiogas

(OM6)



KUUNGANA KWEMVURA MUPAIPI YEGASI

KARENDA

			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	

Mazuva ese

Tarisa paipi yakanjenjemera kuti maungana mvura here woirasa nguva nenguva nekuisimudza.

Mvura yakaungana inokanganisa kufamba kwegasi.

(TS1)

KUISWA KWEFIRITA

KARENDA

		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	

Mavhiki maviri ega

(OM5)

Zvinoratidza kuti **shinda yesimbi** iri mufirita yakuda **kuiswa imwe**:

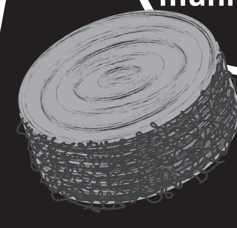
- **Biogas yakubuda irishoma** muimba yekubikira,
- **Kusanhuwa zvakanaka** mubiogas,
- **Mvura ineruvara rutema** inenge ichibuda mufirita.

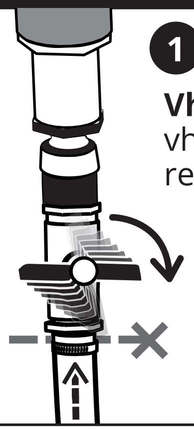
Paunotarisa shinda yesimbi:

- Haisi kuoneka here/yakadyika?
- Yakasviba uye yakakora.

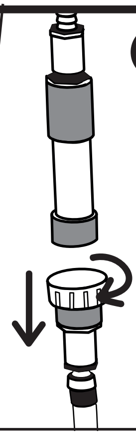
$

SHINDA YESIMBI inogona **kutengwa munharaunda**

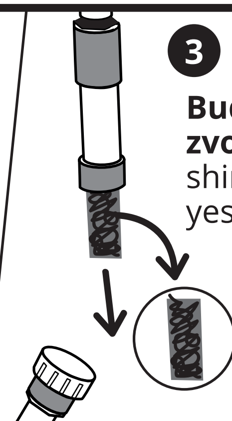




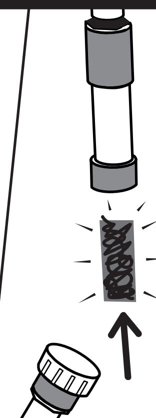
1 **Vhara** vharuvhu rebiogas



2 **Vhura** firita

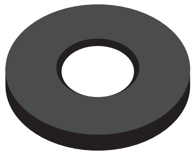


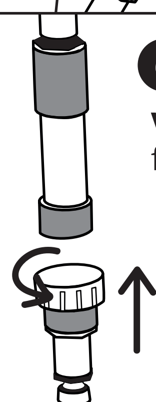
3 **Buditsa/ zvomora** shinda yesimbi



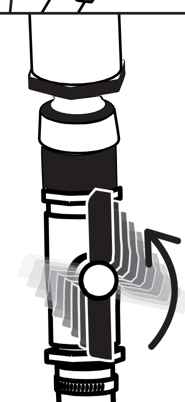
4 **Tsiva. Usazadzisa firita sezvo** zvigona kuvhara kubuda kwegasi

5 Iva nechokwadi chekuti **gasket rerubber rakachena** uye raiswa zvakanaka usati wavhara firita





6 **Vhara** firita



7 **Vhura** vharuvhu rebiogas

KUONGORORA KUTI HAPANA PARI KUVHINZA PAIPI YEGASI HERE?

KARENDA

Kamwe pagore

Shandisa mvura ine sipo pese **pane panobatanidzwa mapaipi egasi** (mafirita, mavharuvhu, mapaipi nemafitting) **garingiro richiri nemweya** kuti utarise parikubuda mweya (pari kuvhinza).

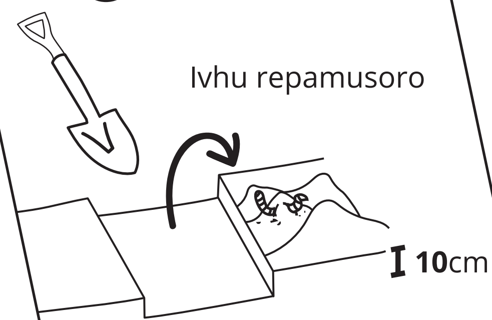
Iva nechokwadi chekuti **vharuvhu rinopatsanura rakavhurika!**

Kugadzirwa kwevhu usati wadyara:

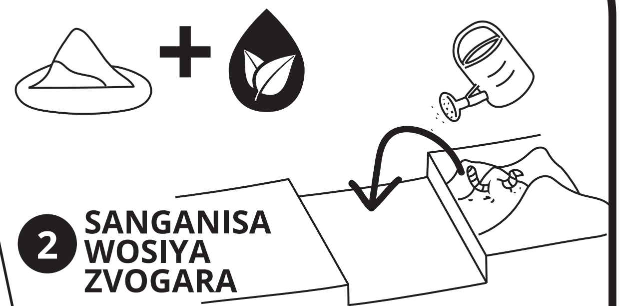
Isa kusvika marita makumi maviri **ebiofotereza pasquare mita yega yega** (kana padanho rega rega), sanganisa ivhu nebiofotereza.

Rega ivhu rigare kwemazuva maviri usati wadyara (padanho rechitatu nerechina).

1 BVISA



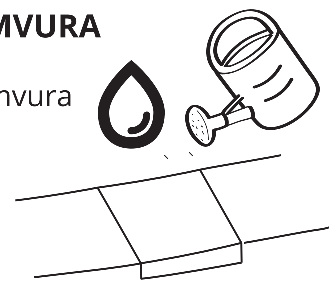
2 SANGANISA WOSIYA ZVOGARA



Chikamu chimwechete chebiofotereza biofertilizer: chikamu chimwechete chevhu rakabviswa

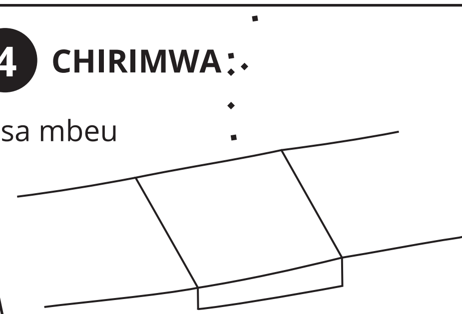
3 MVURA

Dira mvura



4 CHIRIMWA

Isa mbeu



Kuiswa kwemanyowa pazvirimwa nemuriwo

Mumwaka wakawoma, sakanganisa chikamu chimwechete chebiofertilizer nechikamu chimwechete chemvura. Pamwaka wekunaya kwemvura apana chikonzero chekusanganisa.

Pakusanganisa: Isa marita maviri kusvika gumi emusanganiswa pasquare mita yega yega (kana padanho rega rega).

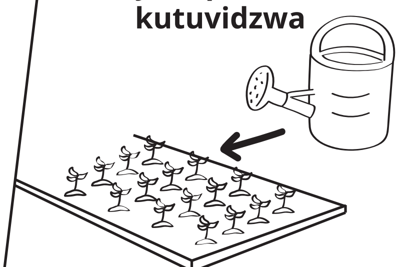
Pasina kusanganisa: Isa marita rimwechete kusvika mashanu ebiofertilizer pasquare mita yega yega (kana kuti padanho rese).

1 SANGANISA

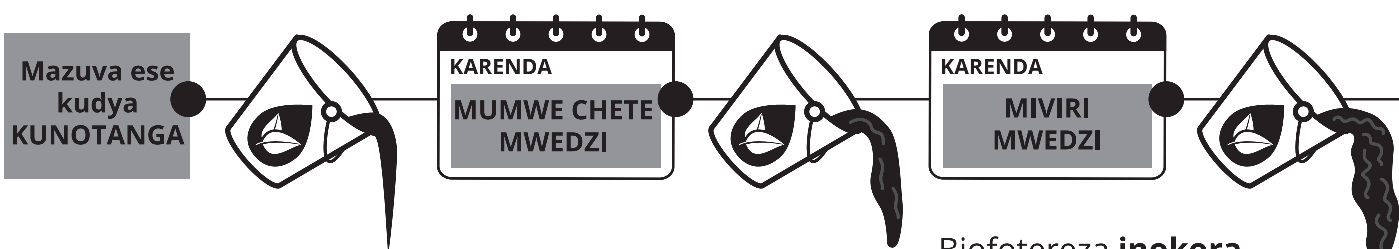
Sanganisa **chikamu chimwe chemvura: 1 biofotereza**

2 DIRA

Isa **biofotereza yakapomhodzwa/ kutuvidzwa**



KUISWA KWEBIOFOTEREZA KWAKAFANANA



kudya KUNOTANGA
- inonyanya kuita mvura
- inogona kunhuwa
- inogona kukwezva mosikito utunga

Biofotereza **inokora** nekufamba kwenguva

Wedzera zvaungawana kubva mugaringiro

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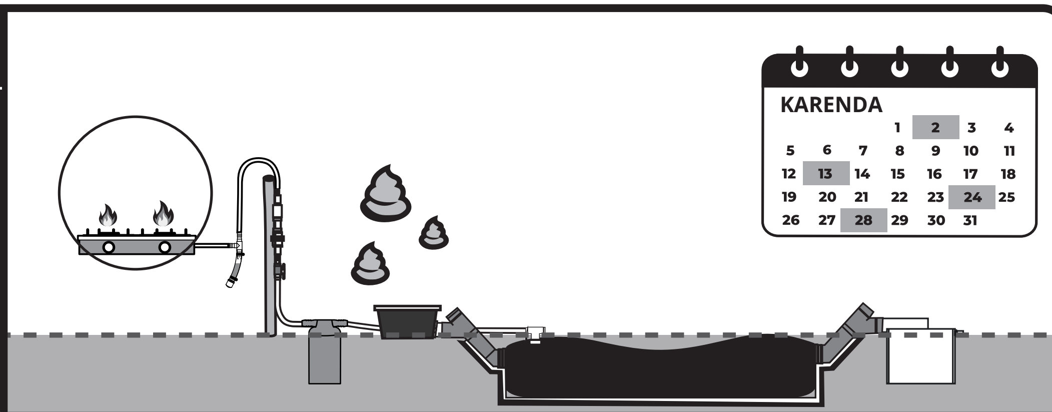
KUPA CHIKAFU NGUVA NENGUVA

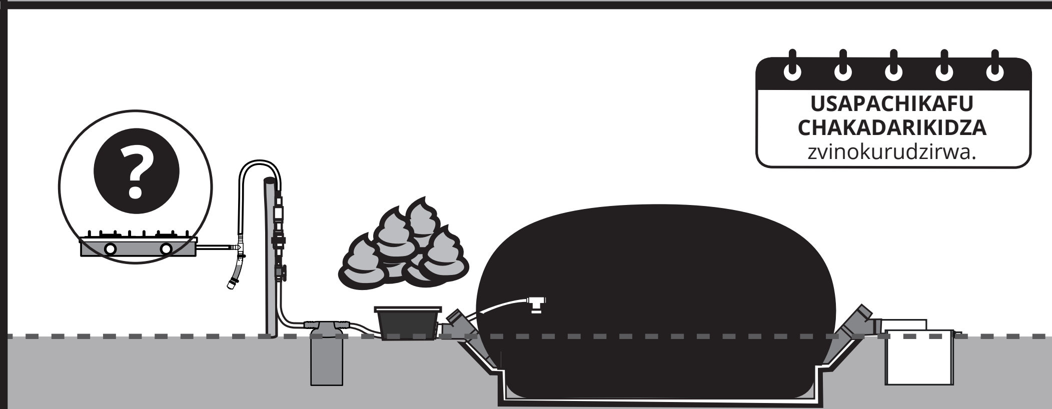
KUSAPA CHIKAFU ZVAKAFANIRA:

- Garingiro harina chikafu
- Moto mudiki



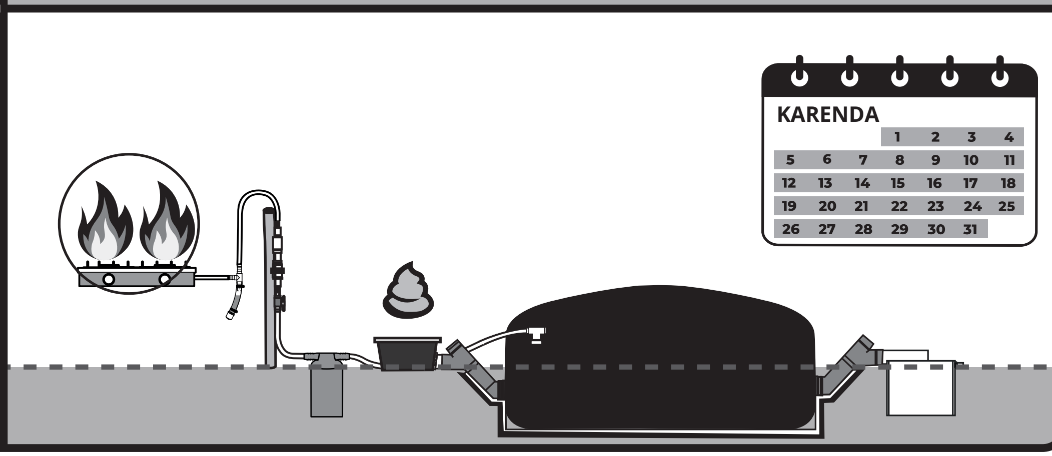
KUPACHIKAFU CHAKAPFURIKIDZA:

- Garingiro rakazara CO_2 zvakanyanya uye haina CH_4
- HAPANA moto

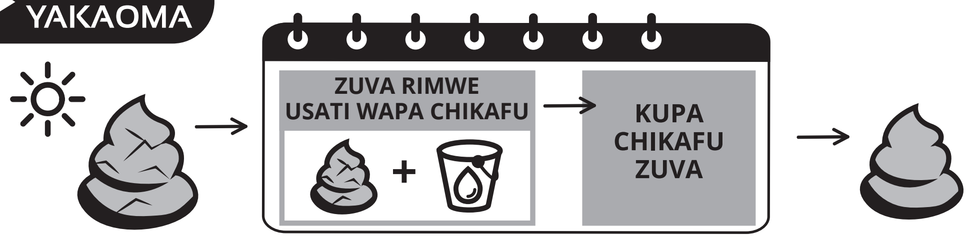


KUPA CHIKAFU CHINODIKANWA:

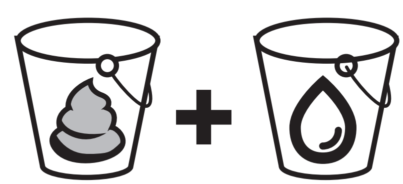
- Digester inogadzira gasi rakanaka
- Moto wakanaka



NDOVE YAKAOMA



1. ZUVA REKUTANGA usati wazadza chikafu: mumugomo nyorovedza chikamu chimwechete chendove yakaoma, wowedzera nemvura kuti uwane ndove yemombe yakanyorova.

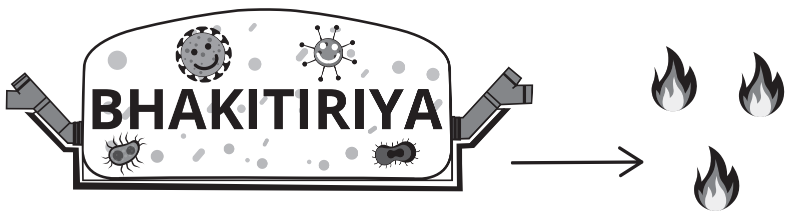


2. Panguva yekupa chikafu **sanganisa nemvura zvinemwero** (chikamu chimwe chendove yendove yemombe nechikamu chimwe chemvura).

MAMIRIRO EKUNZE NEKUSHANDA KWEGARINGIRO

Mamiriro ekunze **ANOTONHORA**, anoita kuti kugadzirwa kwebiogas kuite **kushoma uye kuderere.**

<15º



Kugadzira KUSHOMA uye KWAKADERERA

PANODZIYA, mabhakitiriya anogadzira biogas yakawanda nekukurumidza.

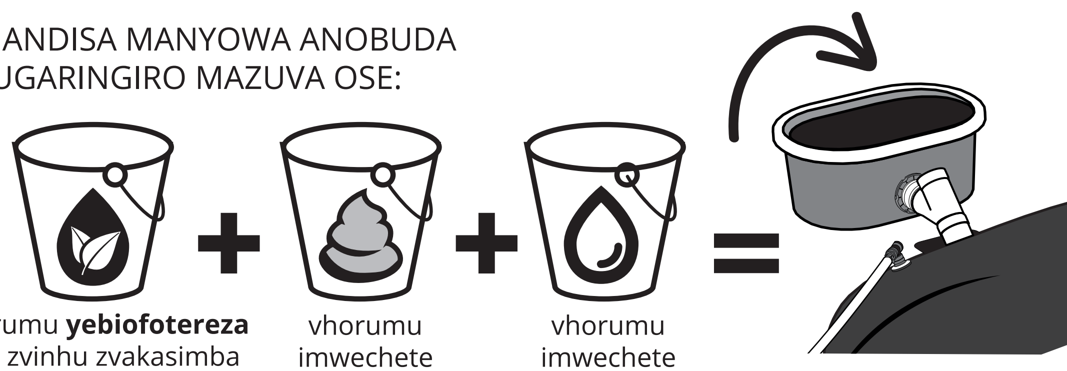
>20º

Kugadzira NEKUKURUMIDZA uye KWEPAMUSORO

BIOFOTEREZA KUSHANDISA ZVEKARE

Izvi zvinowedzera kushanda kwereactor mumwaka/munzvimbo dzinotonhora uye zvinobatsira kuti pashandiswe mvura shoma.

SHANDISA MANYOWA ANOBUDA MUGARINGIRO MAZUVA OSE:

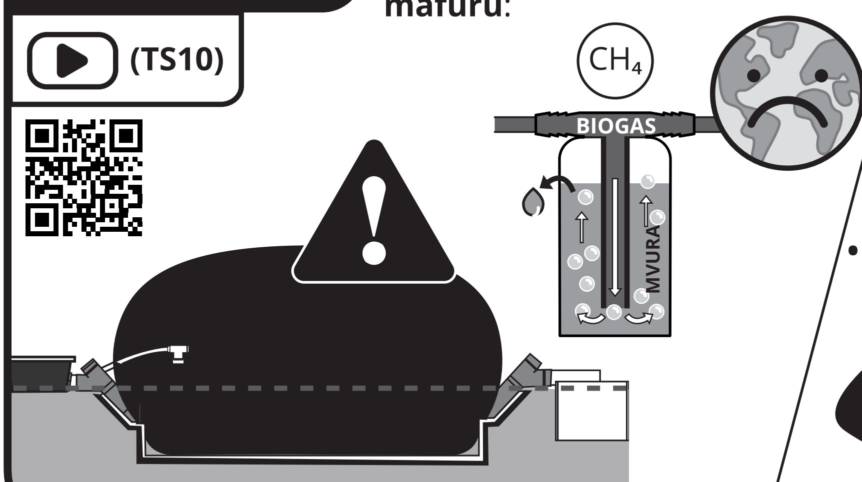


vhorumu **yebiofotereza** (ine zvinhu zvakasimba zvishoma) + vhorumu imwechete ye **manyowa** + vhorumu imwechete ye **mvura** =

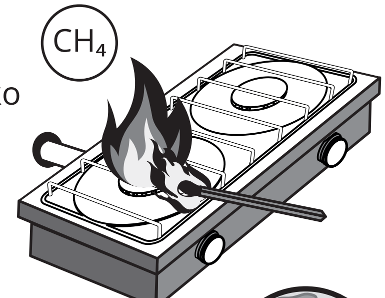
USAREGERE BIOGAS YAKO ICHIRASIKA

(TS10)

Kana biodigester garingiro rako rakanyanya kuzara **uyePRV ichiita mafuru**:

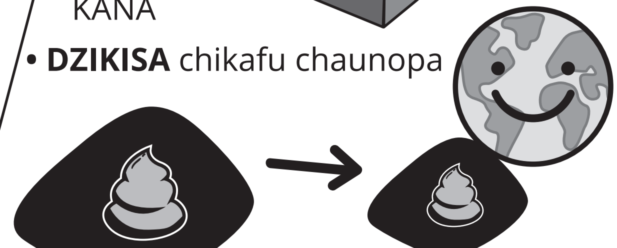


• **PISA** gasi yako



KANA

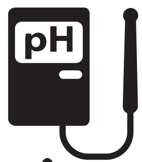
• **DZIKISA** chikafu chaunopa



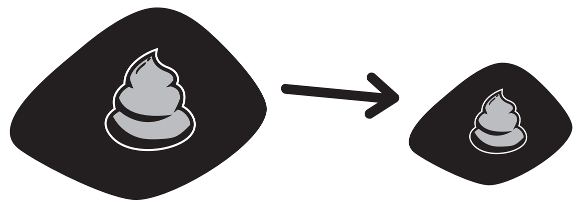
KUDYA KWEMHUKA

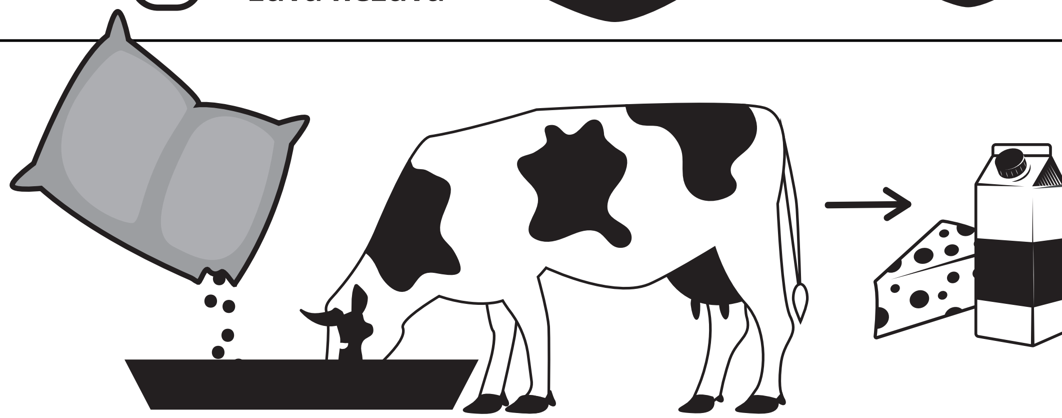
Kana mombe dzako dzichipwa zvokudya zvakapfuma/ **zvechirungu dzisingafuri sora**, ndove yacho inenge yakapfumawo, **zvichakonzera kuvava mudigester**. Deredza zvishoma chikafu kugaringiro kana uchipa zvipfuyo chikapfu chakapfuma!

YAKAKWIRA



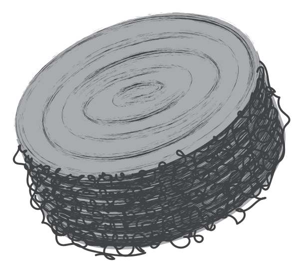
Deredza chikafu chaunopa zuva nezuva



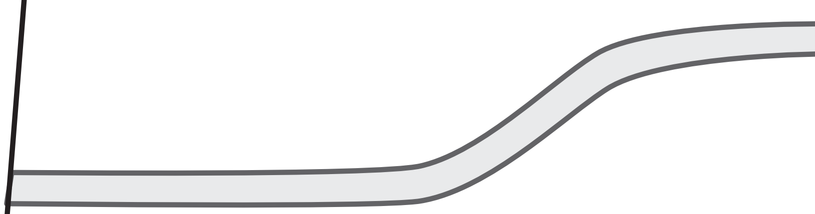


Zvekutsivisa

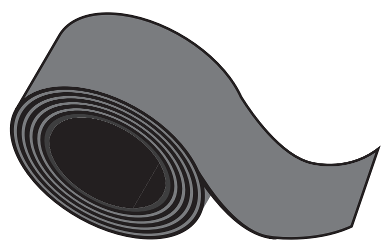
Kutsiva SHINDA YESIMBI: pamavhiki maviri kana kamwe pamwe pamwedzi. Unogona kuitenga pedyo newe.



PAIPI INONJENJEMERA INOBVUMA KUPETEKA/ KUFONYOKA kutsiva: ita izvi kwemakore maviri kana matatu ega ega. Bata veSistema.bio/ Lanforce Energy kana uchida itsva.



BUTYL TAPE yekugadzira/ kunama membrane kwenguva diki kana kukuvara kwekunze kukaitika.



Garingiro tsanangudzo

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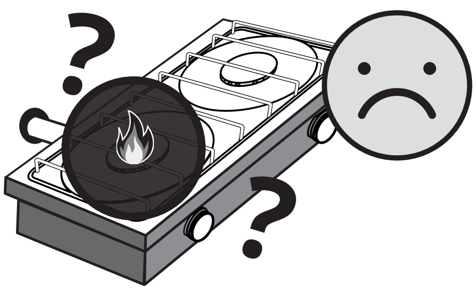
CHIKAMU	ZVINHU	TSANANGUDZO
Tangi rekupa chikafu	HDPE	Tarisa garingiro inoenderana nerauri kushandisa
Reactor	LLDPE	Tarisa garingiro inoenderana nerauri kushandisa
Tangi rebiofotereza	HDPE	Tarisa garingiro inoenderana nerauri kushandisa
Vharuvhu rinosunungura mweya wakamanikidzwa	HDPE neUPVC	6" dhayamita, 20 mbar mweya wakamanikidzwa
Vharuvhu rebhora rinopatsanura	UPVC	1" dhayamita
Firita reBiogas	PVC	2" dhayamita
Paipi yegasi inonjenjemera kana inobvuma kufonyoka/ kupeteka	UPVC	1" dhayamita
Paipi yegasi	HDPE	1" dhayamita
Musungo wemvura	ABS neUPVC	1" dhayamita
Chitanda/ chiguni chemoto chimwe chete (pazvinoshanda)	Cast aluminum	7 x 45 x 10 cm (h x l x w)
BioStove chitofu chebiogas	**Chimiro:** mutobvu kana mutobvu wakashongedzwa **Chitanda chemoto:** Cast aluminum chiguni chemoto	Chitofu: 12 x 68.5 x 38 cm (h x l x w) Chitofu chebiogas 2: 19 x 58 x 36 cm (h x l x w)

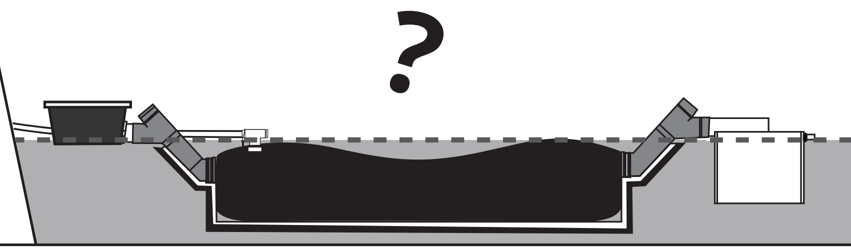
Kukura kwegaringiro	Hungangova uremu hwekit	Tangi rekupa chikafu uwandu	Huwandu wemanyowa mudigester mugaringiro	Gasi pekuchen getera mugaringiro	Uwandu hwe Biofotereza iri mutangi	Kukura kwenzvimbo inodiwa kureba * upamhi kusiya kwe tangi rebiofotereza
	kg	Marita	m3	m3	m3	m * m
Sistema **6**	67	110 L	4	2	1	5 * 3.6
Sistema **8**	93	110 L	5.5	3	2	6 * 3.6
Sistema **12**	109	160 L	8	4	2	7 * 3.6
Sistema **16**	137	160 L	11	6	4	9 * 3.6
Sistema **20**	163	160 L	15	8	4	11 * 3.6
Sistema **30**	219	160 L	22.5	12	8	15 * 3.6
Sistema **40**	257	160 L	30	15	8	19 * 3.6

Kugadzirisa pasingashande

NYAYA:

- Handina biogas inokwana kuti ndibike
- Handina biogas chitofu changu, uye garingiro rangu harina chinhu kana!



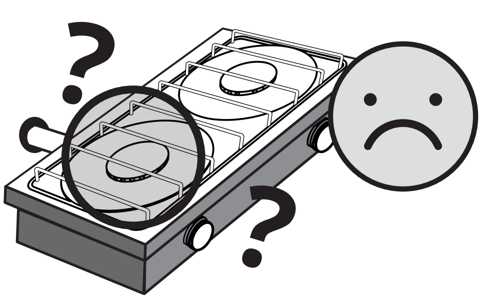


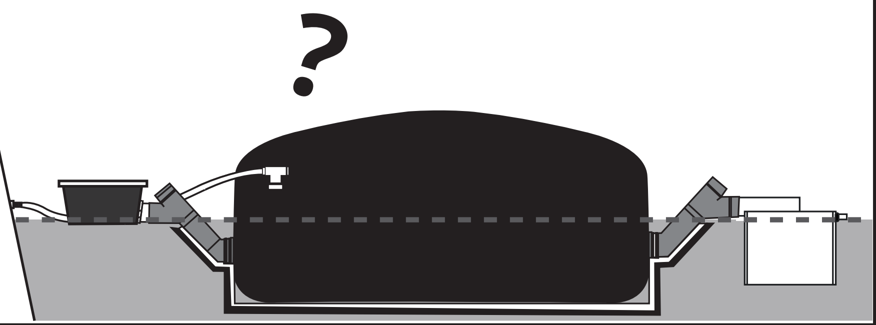
- **Pane mvura yakakwana here pamapaipi anopinda neanobuda?** Iva nechokwadi kuti akazara kuitira kuti biogas isarasike. Tarisa chikamu **"Kutanga kushandisa garingiro"** "Zadza reactor nemvura kusvika mvura yava pagokora pekupinda napo nepekubuda napo." papeji 10. Mavhidhiyo: I3, I5.
- **Wapedza here kuisa chikafu kekutanga?** Tarisa chikamu **"Kutanga kushandisa garingiro"**, "Kudya kwekutanga" papeji 11. Mavhidhiyo: OM7.
- **Papfura nguva yakakwana here kubvira pakaiswa chikafu chekutanga mugaringiro? kuzadza?** Tarisa chikamu **"Kutanga kushandisa garingiro"**, "MIRIRA REACTOR KUTI IZARE MWEYA" papeji 13.
- **Urikutevedzera here zvinodiwa pakupa chikafu kugaringiro? mitemo?** Tarisa chikamu **"Ungashandisa sei mudziyo wako"**, uye "Kuwedzera mashandiro egaringiro" papeji 14 uye **"Maximize the biodigester's benefits"**, "KUPA CHIKAFU NGUVA NENGUVA" papeji 22. Mavhidhiyo: OM7, OM8.
- **Vharuvhu rako remweya wakamanikidzwa razadzwa here ne mvura?** Tarisa chikamu **"Ungashandisa sei mudziyo wako"**, "VHARUVHU INOSUNUNGURA MWEYA WAKAMANIKIDZWA" papeji 19. Mavhidhiyo: OM2, O&M1.
- **Mavharuvhu echitofu , musungo wemvura kana firita yebiogas, zvambosiiwa zvakavhurwa here?** Mavhare! Tarisa chikamu **"Unoshandisa sei sisitimu mudziyo wako yako"**, ne "MOTO WEKUTANGA WEBIOGAS" papeji 18, "KUTARISA PANOBATWA MVURA" papeji 19 uye "KUISWA KWEFIRITA" papeji 20. Mavhidhiyo: OM6, TS12, OM5.
- **Pane parikuvhinza here?** Tarisa chikamu **"Unoshandisa sei mudziyo wako"**, "KUONGORORA KUTI HAPANA PARI KUVHINZA PAIPI YEGASI HERE" papeji 20.
- **Mwaka unotonhora, nguva yekunaya?** Unogona kutora fotereza yako kuti uvandutse kushanda garingiro rako pamwaka wechando. **"Tarisa chikamu Vandudza mashandiro egaringiro"**, "MAMIRIRO EKUNZE NEKUSHANDA KWEGARINGIRO" papeji 23.
- **Zvitofu zvakaiswa mumakamuri/ dzimba dzakasiyana siyana?** Tarisa kana mumwe munhu achishandisa biogas!

kana biogas rako riri iri kugadzirwa richiri shoma: BATA NYANZVI YAKO! MAZVIKOKOTA

NYAYA:

- Handina biogas muchitofu changu yangu kana kuti harisi kubaka moto, uye asi garingiro rangu rakazara!



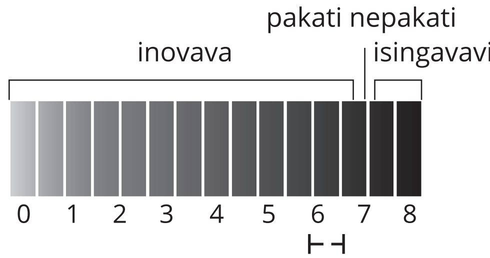


- **Wamboisa zvinorema pa garingiro rako here?** Tarisa chikamu **"Ungashandisa sei mudziyo wako"**, "VANDUDZA MOTO WAKO UCHISHANDISA ZVINOENZANISA" papeji 18. Mavhidhiyo: TS5.
- **Mavharuvhu egasi akasiiwa akavharika here?** Mavhure ivo! Tarisa chikamu **"Ungashandise sei mudziyo wako"** "Shandisa moto wawagadzira uye chengetedza paipi yebiogas rako!" papeji 18. Mavhidhiyo: OM3, OM3bis, OM4.
- **AUnogara uchibvisa mvura here mumusungo?** Tarisa chikamu **"Ungashandisa sei sisitimu yako"**, "KUTARISA PANOBATWA MVURA" papeji 19. Mavhidhiyo: TS3.
- **Paipi yako iri kurembuka here?** Mupaipi rebiogas panzvimbo dzakadzikira, mvura inogona kuungana yovhara kuti gasi isayerere! Simudzira paipi yegasi kuti mvura yaungana iendeswe kumusungo wemvura kana paPVR. Tarisa chikamu **"Ungashandise sisitimu yako sei"**, "KUUNGANA KWEMVURA MUPAIPI YEGASI" papeji 19. Mavhidhiyo: TS1, TS6.
- **Shinda yesimbi iri mufirita rebiogas yakavhara here kuyerera kwegasi?** Vhura firita wobvisa shinda yomutobvu. Shandisa kamuti/katanda kutarisa kuti hapana shinda yemutobvu yasarira mukati. Edza kubatidza gasi pachitofu chako! Tarisa chikamu **"Ungashandise sisitimu yako sei"**, "KUISWA KWEFIRITA" papeji 20. Mavhidhiyo: OM5.
- **Pane nzvimbo yakapeteka/kufonyoka paipi yegasi here?** Ongorora paipi yegasi yako uve nechokwadi kuti hapana nzvimbo ingavhara kuyerera kwegasi.
- **Kana rimwe divi rechitofu chako isingabate moto,** vharuvhu rinogona kunge ravharika. Fonera nyanzvi yako!
- **Uri kunyanya kupa chikafu chakawanda kugaringiro rako here?** Tarisa chikamu **"Wandudza mashandiro egaringiro rako"**, "KUPA CHIKAFU NGUVA NENGUVAY" papeji 22. Yera pH yebiofertilizer fotereza inobuda mupaipi inorasa uchishandisa mita yepH yakaenzaniswa (tapota tevera mitemo yekushandisa mita yepH yakakaenzaniswa). Kana pH mubiofotereza iri shoma woenderera mberi nekupa chikafu mugaringiro rako, zvinogona kukanganisa bhakitiriya kugadzira biogas: carbon dioxide yowandisa nemethane shoma.

Kana kugadzirwa kwebiogas yako kuchiri kushoma: BATA NYANZVI YAKO!

NYAYA:

- Ine kakuvava **pH 6 kusvika 6.5**

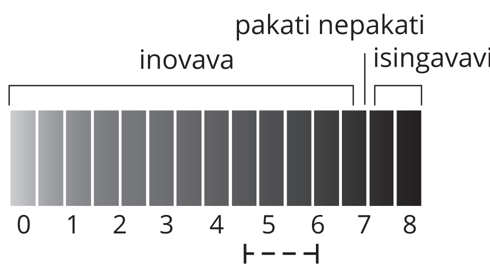


1. **Mira kupa chikafu** reactor uye **wobvisa** biogas iri mugaringiro uchishandisa vharuvhu rekubudisa mweya wakamanikidzwa.
2. **Tsika** tsika digester garingiro zvakasimba. Mavhidhiyo: OM13.
3. **Siya rizorore** kwemazuva matatu kana kuti kusvikira pazara mweya zvakare.
4. **Zama kubatidza** chitofu chebiogas.
5. Kana gasi rikaramba kubata moto, **dzokorodza kubva padanho rekutanga.**

Kana biogas rako richiri kuramba kubata moto: BATA NYANZVI YAKO!

NYAYA:

- inonyanya kuvava: **pH 4.5 kusvika 6**

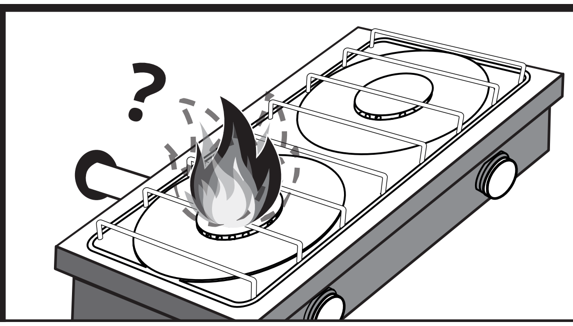


1. **Mira kupa chikafu** kugaringiro uye **buritsa** biogas rese.
2. **Tsika** tsika digester garingiro zvakasimba. Mavhidhiyo: OM13.
3. **Bvisa** chidimbu chiri pakati nepakati chezviri garingiro.
4. **Zadzisa** digester garingiro ne:
   A) mvura yakasanganiswa nebiofotereza yakawanda kubva mugaringiro rinoshanda
   B) mvura yakasanganiswa neupfu hweraimu hunorema pakati pemakg mashanu kusvika gumi pachipimo cheSistema 6 (uchiwedzera pashoma nepashoma zvinoenderana nekukura kwegaringiro rako).
5. **Siya zvigare** kana kusvikira kwevhiki imwechete kusvika mavhiki matatu kusvikira pazara mweya.
6. **Zama/Edza kubatidza** chitofu
7. Kana gasi rikatadza kubata moto, **bvisa biogas iri mugaringiro** kuburikidza nevharuvhu rekubvisa mweya wakamanikidzwa wosiya zvigare zvakadaro kwemavhiki anokwana kuita imwechete (1) kusvika mavhiki matatu (3) kana kusvikira pazara mweya uye pogadzirwa gasi rinobata moto.

Kana biogas yako ichiri kuramba kubata moto:
BATA NYANZVI YAKO!

NYAYA:

- Moto uri muchitofu changu unoramba uchidzima uchitamba tamba



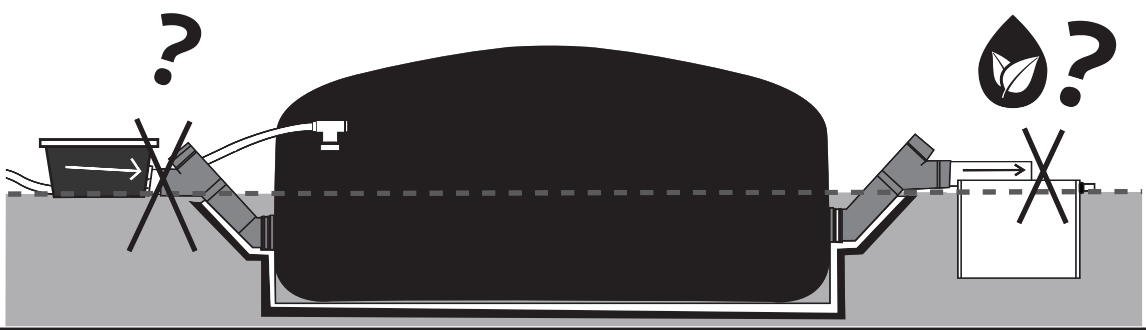
Panogona kuve nemvura yaungana mupaipi regasi.

- **Paipi yako irikurembuka/kutiva here?** Mupaipi rebiogas panzvimbo dzakadzikira/kuderera, mvura inogona kuungana yovhara kuyerera kwegasi! Simudza paipi regasi iendese mvura yaungana panobatwa mvura kumusungo wemvura kana paPRV. Tarisa chikamu "**Unoshandisa sei sisitimu yako"**, "KUUNGANA KWEMVURA MUPAIPI YEGASI" papeji 19. Mavhidhiyo: TS1, TS6.
- **Unogara uchibvisa zvirimu musungo wemvura here?** Tarisa chikamu "**Unoshandisa sei sisitimu yako"**, "KUTARISA PANOBATWA MVURA" papeji 19. Mavhidhiyo: TS3, OM6.

Kana moto wako uchirikutamba:
BATA NYANZVI YAKO!

NYAYA:

- Manyowa haasi kupinda mugaringiro
- Biofotereza haisi kubuda mugaringiro

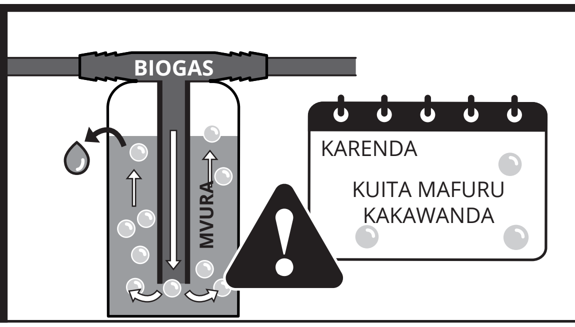


- **Kana biofotereza yako ichibuda chete kana garingiro razara gasi,** hazvina kushata!
- **Bvisa zvakavhara mapaipi ekupinza nekubudisa** zvingava zvakaomerera kana zvakakora zvakasimba zvavhara kuyerera kwegasi. Shandisa danda diki, rinobvuma kubhenda (rakaita sebamboo) kuvhura mapaipi nepane chimiro chaY. Mavhidhiyo: TS11.
- **Paipi yekupinza yakadzikira kupfuura paipi yekuburitsa here?** Kwidza mbichana tangi rekuzadza manyowa uchishandisa matombo kana ivhu pasi petangi.

Kana manyowa ako achiri kutadza kuyerera:
BATA NYANZVI YAKO!

NYAYA:

- Vharuvhu rangu rekubvisa mweya wakamanikidzwa rinoita mafuru kakawanda!

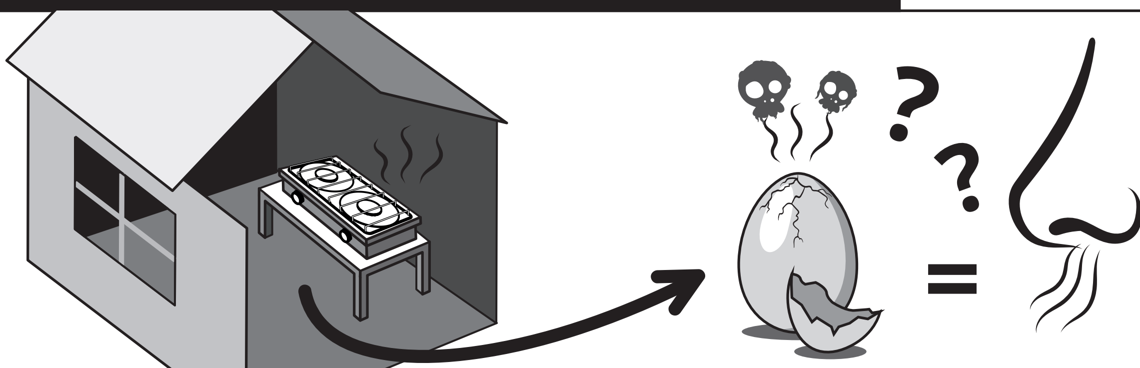


- **Uri kuzadza vharuvhu rako remweya wakamanidzwa vharuvhu nguva nenguva here?** Tarisa chikamu "**Unoshandisa sei mudziyo wako**", "VHARUVHU RINOSUNUNGURA MWEYA WAKAMANIKIDZWA" papeji 19. Mavhidhiyo: OM2, O&M1.
- **Unogona kunge uchigadzira biogas yakawandisa!** Tapota pisa gasi rako rakawandisa kana kurishandisa kudzisa mvura mupani! Kana pachiri kuita mafuru, deredza kupa chikafu zvishoma nezvishoma. Tarisa chikamu **"Vandudza zvaungawana kubva mugaringiro rako"**, "USAREGERE BIOGAS YAKO ICHIRASIKA" papeji 23. Mavhidhiyo: TS10.

Kana garingiro rako richigadzira biogas rakawandisa: BATA NYANZVI YAKO!

NYAYA:

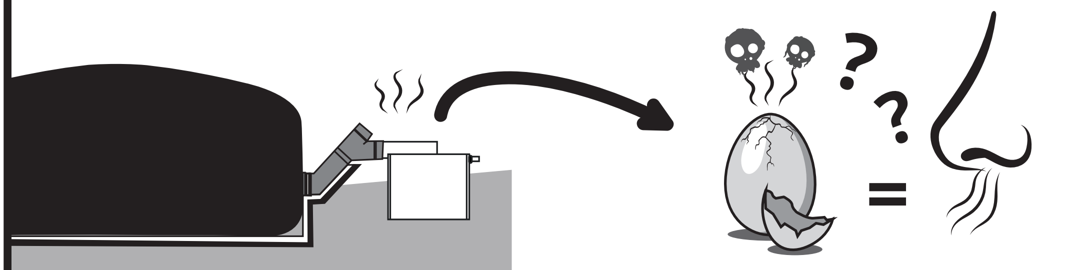
- Pane kunhuwa kwegasi/mazai akaora muimba yekubikira



- **Panonhuwa here paunobatidza pachitofu chako chekubikira?** Usatore nguva refu usati wabatidza mechisi yako kuitira kuti usarasikirwe nebiogas yakawanda isina kutsva. Tarisa chikamu "**Unoshandisa sei sisitimu yako**", "VANDUDZA MOTO WAKO UCHISHANDISA ZVINOENZANISA" papeji 18. Mavhidhiyo: OM11, OM12.
- **Unogara uchichinja shinda yesimbi here mufirita yako?** Tarisa chikamu "**Unoshandisa sei mudziyo wako**", "KUISWA KWEFIRITA" papeji 20. Mavhidhiyo: OM5.
- **Mavharuvhu echitofu chekubikira, musungo wemvura kana firita rebiogas, zvakambosiiwa zvakavhurika kana kusavharwa zvakanaka here?** Mavhare! Tarisa chikamu "**Unoshandisa sei mudziyo wako ne**", "MOTO WEKUTANGA WEBIOGAS" papeji 18, "KUTARISA PANOBATWA MVURA" papeji 19 uye "KUISWA KWEFIRITA" papeji 20. Mavhidhiyo: OM6, TS12, OM5.
- **Pane pari kuvhinza here?** Tarisa zvikamu "**Unoshandisa sei ur system**", "KUONGORORA KUTI HAPANA PARI KUVHINZA PAIPI YEGASI HERE" papeji 20 uye "**kuchengetedzeka**", "Biogas" papeji 8.

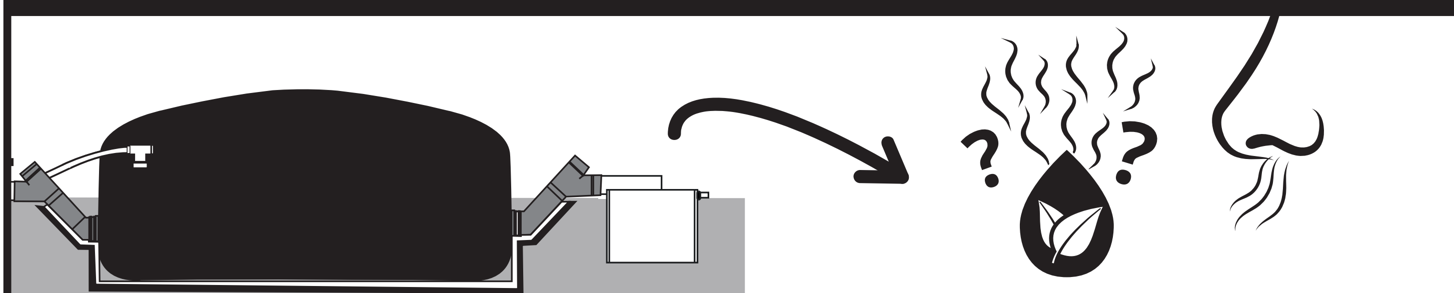
Kana uchiri kunzwa kunhuwa kwebiogas mumba mekubikira mako: BATA NYANZVI YAKO!

NYAYA: • Pane kunhuwa kwegasi/mazai akaora pedyo negaringiro



- **Uri kuona mvura here panopinda napo nepanobuda mapaipi?** Iva nechokwadi kuti akazara kuitira kuti biogas isarasike. Tarisa chikamu **"Kutanga Biodigester"** "Zadza reactor nemvura kusvika mvura yava pagokora pekupinda napo nepekubuda napo." papeji 10. Mavhidhiyo: I3, I5.
- **Vharuvhu rekubvisa mweya wakamanikidzwa razadzwa nemvura here?** Tarisa chikamu **"Ungashandisa sei mudziyo wako"**, "VHARUVHU RINOSUNUNGURA MWEYA WAKAMANIKIDZWA" papeji 19. Mavidhiyo: O&M1, OM2.
- **Pane parikuvhinza here?** Tarisa chikamu **"Unoshandisa sei mudziyo wako"**, "KUONGORORA KUTI HAPANA PARI KUVHINZA PAIPI YEGASI HERE" papeji 20.
- **Firita yebiogas yako yakasungirirwa zvakanaka uye zvakasimba here uye nefirita yegasket?** Tarisa pa chikamu **"Unoshandisa sei mudziyo wako"**, "KUISWA KWEFIRITA" papeji 20. Mavidhiyo: OM5.
- **Paipi inonjenjemera rinowanika pakati nepakati pegaringiro nefirita yakatsemuka here?** Fonera nyanzvi yako!

NYAYA: • Biofotereza yangu inonhuwa!



- **Uri Kunyanya kupa chikafu chakawandisa kugaringiro rako here?** Tarisa chikamu **"Wandudza zvaungawana kubva mugaringiro"**, "KUPA CHIKAFU NGUVA NENGUVA" papeji 22. Yera pH yebiofotereza inobva mupaipi rinorasa nemita yepH yakaenzaniswa (tevera mitemo yekushandisa mita yepH yakaenzaniswa). Kana pH mubiofotereza iri shoma uye woenderera mberi kupa chikafu kugaringiro rako, zvinogona kukanganisa bhakitiriya kugadzira biogas: carbon dioxide yakawanda nemethane shoma.
- **Urikuzadza garingiro rako ne mamwe marara anowora asiri endove yemhuka here?** Imwe tsvina yakanyanyopfuma inozonetsa kuti igayiwe zvakanaka uye inoda kuti udzore uwandu hwayo paunenge uchipa chikafu kugaringiro! Bata nyanzvi yako .

Kurasa

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CREATING VALUE FROM WASTE

- **Zvashandiswa** kurongedza kit yako yegaringiro **unogona kuzvishandisa zvekare.** Tinokurudzira kuti uendese panzvimbo inoita **zvemarara iri pedyo newe**.
- **Shinda yesimbi yashanda** inogona ku **raswa kana** kuiswa mu **manyowa kuti apfumiswe neiron uyezve nesulphur** - yatanga yatsemurwa tsemurwa!
- Kana **makore makumi maviri** egaringiro rako apera uye usisaishandise, **tora midziyo yacho uendese kune vanotora marara achazoshandiswa zvakare**.
- **Kana uchida kuva neruzivo rwenzvimbo dzinoona nezvekushandisa zvekare kwemara**, sununguka kutibata parunhare.

Mashoko ekurangarira

Zita renyanzvi: ______________________________

Zuva rekuisa garingiro: ______________________________

Rudzi rwetsvina/ marara: ______________________________

zuva nezuva: Mupimo wetsvina/marara anoiswa mugaringiro: ______________________________

Zvasanganiswa: ______________________________

Serial number: ______________________________

Mashoko ekubatika nawo

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Zuva nesiginecha yemushandisi inobvuma kuti VAGAMUCHIRA DZIDZO:

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