

## APPENDIX A

### QUESTIONNAIRE

Dear respondent, this questionnaire is designed to gather data about the influencing factors for household decisions on adoption and use biogas technologies and the implementation benefits in terms of the socio-economic, environmental, health and climate issues in relation among households in the rural areas of Offinso North district in the Ashanti region of Ghana. Your kind cooperation in this research is very much appreciated. Your anonymity and confidentiality are assured.

#### SECTION A: YOUR PERSONAL DATA

Please indicate your response to statements by ticking [] the appropriate box.

1. Age: Below 20 years [] 20-29 years [] 30-39 years [] 40-49 years [] 50-59 years [] 60 years or above []
2. Gender: Male [] Female []

#### THE LEVEL OF KNOWLEDGE AND PERCEPTION OF HOUSEHOLDS ON THE USE OF BIOGAS TECHNOLOGY

This category contains statements about the level of knowledge and perception of households on the use of biogas technology. Please indicate your level of agreement to the statements using the 5-point Likert scale below by ticking [] the appropriate box:

**1= Strongly disagree 2= Disagree 3= Undecided 4= Agree 5 = Strongly agree**

S/N	Statement	1	2	3	4	5
1.	The advantages of biogas energy are not widely known					
2.	The family is reluctant to the use of biogas technology					
3.	The price of biogas technology installation is greater					
4.	There are not many livestock					
5.	Water supplies are insufficient and unreliable					
6.	Having a sufficient and dependable water source is challenging					
7.	The ability to obtain credit is challenging					
8.	Training linked to biogas technology is difficult to get access to					
9.	Crop yields are directly increased by biogas					
10.	Time saved by biogas can be used for other tasks that generate cash					

**WHETHER INFLUENCING FACTORS FOR HOUSEHOLD DECISIONS ON ADOPTION AND USE OF BIOGAS TECHNOLOGY HAS ANY EFFECT ON THE SOCIO-ECONOMIC, HEALTH, ENVIRONMENT AND CLIMATE ASPECTS AND IDENTIFY THE MAJOR CHALLENGES HINDERING THE ADOPTION OF THE BIOGAS TECHNOLOGY**

This category contains statements about whether influencing factors for household decisions on adoption and use of biogas technology has any effect on the socio-economic, health, environment and climate aspects and identify the major challenges hindering the adoption of the biogas technology. Please indicate your level of agreement to the statements using the 5-point Likert scale below by ticking [√] the appropriate box:

**1= Strongly disagree 2= Disagree 3= Undecided 4= Agree 5 = Strongly agree**

S/N	Statement	1	2	3	4	5
1.	Adoption is still going slowly					
2.	There are not enough resources					
3.	The infrastructure is subpar					
4.	Travel expenses and erratic supplies					
5.	Installations of biogas entail significant financial outlays					
6.	The expensive management and upkeep of biogas plants					
7.	There aren't enough subsidies					
8.	Higher pricing for biogas and lower prices for fossil fuels					
9.	Political backing and targeted initiatives to advance biogas technologies are lacking					
10.	Lack of private sector involvement and ineffective public-private sector collaboration are obstacles to the uptake of biogas					
11.	Lack of consumer interest and public participation					
12.	Projects involving biogas fail because they conflict with local beliefs					
13.	Lack of understanding among the populace as a whole					
14.	Lack of knowledge and minimal communication with potential adopters					
15.	Adoption of biogas technologies is hampered by low literacy rates					
16.	There is difficulty to switch from old technology that is free to a stove that has upfront expenses, and other demands are prioritized					
17.	Noise toxicity					
18.	Concerns about odor					
19.	Biogas digesters require a lot of water resources					

**THE APPROACHES USED BY THE GOVERNMENT AND NGOS IN THE  
DEVELOPMENT, DESIGNING AND IMPLEMENTATION OF BIOGAS  
TECHNOLOGY IN-ORDER TO ESTABLISH THE CAUSES OF THE SYSTEM  
FAILURE**

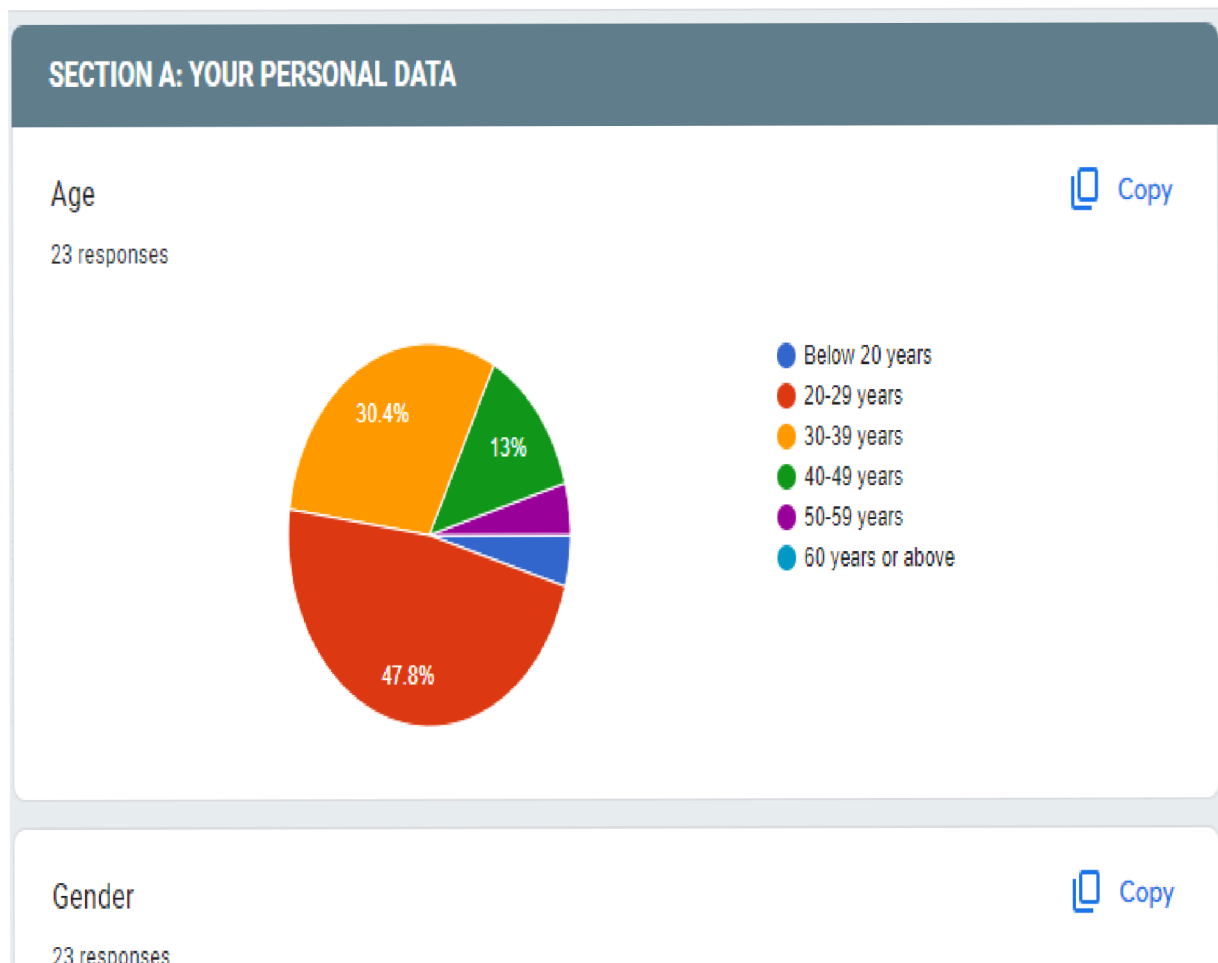
This category contains statements about the approaches used by the government and NGOs in the development, designing and implementation of biogas technology in-order to establish the causes of the system failure. Please indicate your level of agreement to the statements using the 5-point Likert scale below by ticking [√] the appropriate box:

**1= Strongly disagree 2= Disagree 3= Undecided 4= Agree 5 = Strongly agree**

S/N	Statement	1	2	3	4	5
1.	The central manhole cover lid or the expansion chamber would need to be opened for an inspection					
2.	Utilize a premium brick stacking standard when building					
3.	For the best biogas production, use feedstocks with the right C/N ratio					
4.	To make sure the biodigester is correctly fed, make sure it gets the right amount of feed each day and check the feeding logbook					
5.	To prevent digestion failure in the biogas plant, the operator should keep the ammonia content below 2000 ppm, or between 50 and 200 mg/L					
6.	To prevent harm to the biodigester system, volatile fatty acid concentrations should be fewer than 2000 parts per million (ppm)					
7.	Verify the flame's color at the waste gas burner					
8.	Ensure that the sodium concentration stays between 3500 and 5500 parts per million, according to the operator (ppm)					
9.	The operator must ensure that the soluble heavy metal content is kept to less than 0.5 mg/L					
10.	The operator should monitor any temperature changes that occur during the anaerobic digestion process					
11.	The operator should be aware of the digester's mixing, temperature changes, and uneven supply if there is foam					
12.	Struvite deposits in the digesters should be monitored by the operator because they are challenging to remove					

## APPENDIX B

### DATA COLLECTION PICTURES

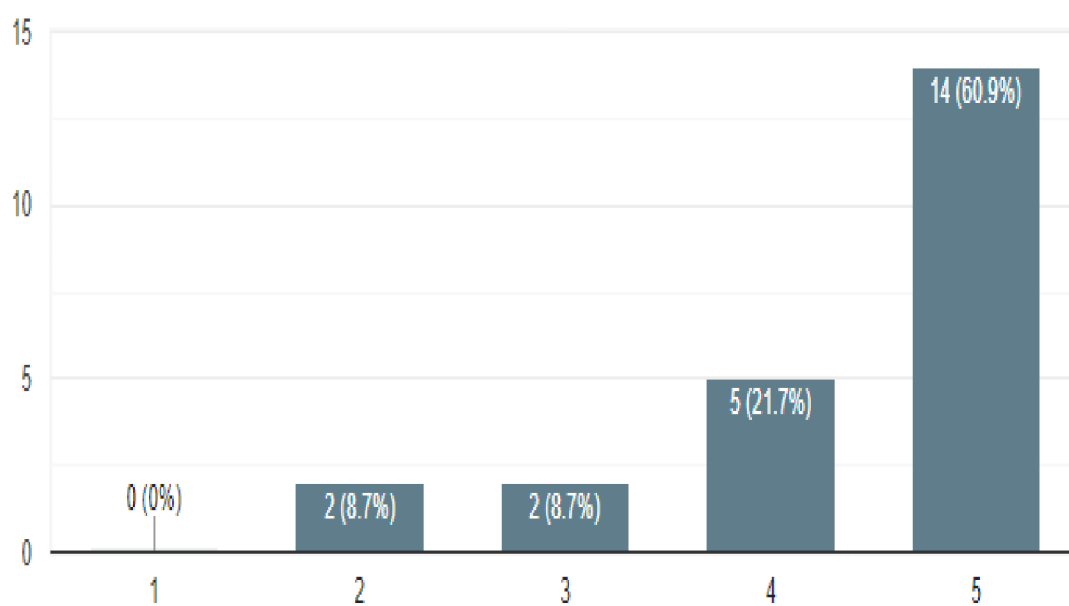


WHETHER INFLUENCING FACTORS FOR HOUSEHOLD DECISIONS ON ADOPTION AND USE OF BIOGAS TECHNOLOGY HAS ANY EFFECT ON THE SOCIO-ECONOMIC, HEALTH, ENVIRONMENT AND CLIMATE ASPECTS AND IDENTIFY THE MAJOR CHALLENGES HINDERING THE ADOPTION OF THE BIOGAS TECHNOLOGY

Adoption is still going slowly

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23 responses

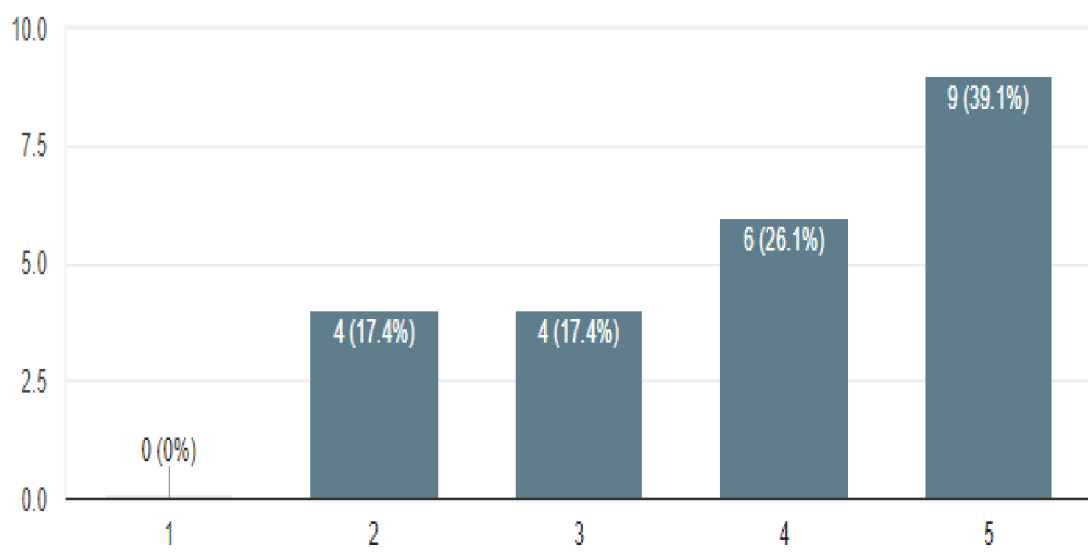


## THE LEVEL OF KNOWLEDGE AND PERCEPTION OF HOUSEHOLDS ON THE USE OF BIOGAS TECHNOLOGY

The advantages of biogas energy are not widely known



23 responses



## THE APPROACHES USED BY THE GOVERNMENT AND NGOS IN THE DEVELOPMENT, DESIGNING AND IMPLEMENTATION OF BIOGAS TECHNOLOGY IN-ORDER TO ESTABLISH THE CAUSES OF THE SYSTEM FAILURE

The central manhole cover lid or the expansion chamber would need to be opened for an inspection

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23 responses

