

## MOTIVATIONAL INITIATIVES NEEDED BY GRADUATES OF SCHOOLS OF AGRICULTURE FOR ENTRY AND SUSTAINABILITY IN BIOGAS PRODUCTION IN BENUE STATE, FOR NATIONAL DEVELOPMENT

BY

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### *Abstract*

*This study identified motivational initiatives needed by graduates of schools of agriculture for entry into biogas production in Benue State, for national development. The study was carried out in Benue state. Three research questions and three hypotheses guided the study. Survey research design was used for the study. The entire population of 215 was studied. A 35-item structured questionnaire named motivational initiatives of Biogas Production Questionnaire (MIBPQ) was used for data collection. The instrument was validated by three experts. Cronbach Alpha reliability method was used to determine the internal consistency of the instrument and a coefficient of 0.79 was obtained. All the administered copies of the questionnaire were retrieved and data collected were analyzed using mean, standard deviation and t – test. It was found out that graduates of schools of agriculture needed 8 motivational initiatives to enter into biogas production, encounter 17 challenges for entry into biogas production and require 10 initiatives for sustainability in biogas production. It was therefore recommended that the graduates should submit proposals on biogas production to the ministry of agriculture for approval for loan and subsidy to biogas producers, extension agents should regularly organize seminars and workshops for retraining of graduates to improve their technical efficiency, government should reduce taxes on production farms, government should implement policies that will encourage and support biogas production for maximum utilization of the benefits for national development.*

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**Keywords:** challenges, graduates of schools of agriculture, biogas production, national development.

### **Introduction**

Agriculture came into play as the quest by man to gather food for future generation. Agricultural education as defined by Egbule (2002) is the type of education that is employed in teaching learners in the improved agricultural production

processes, as well as in the techniques for the teaching of the subject. In the view of Umoh (2006), agricultural education is a systematic programme of instruction for public school leavers, out-of-school, post secondary youth, and established farmers, organized for the purpose of improving

methods of production for better rural living. Osinem (2008) maintained that, Agricultural education is a process of imparting knowledge, skills and attitudes in agriculture to the learners. It is the totality of education and training given to individuals to prepare and develop their abilities for effective and efficient production, marketing, processing and storage. Agricultural education covers the areas of teaching, research and public service outreach programmes in agriculture. These programmes, according to Osinem (2008) are designed to prepare students for employment in various occupations such as horticulture, agribusiness, agricultural mechanization, crop production, animal production, landscaping and natural resource management such as biogas production.

Biogas is a renewable source of energy that belongs to the category of biofuels. In the view of Ericsson and Nilsson (2006), it typically refers to a gas produced by the biological breakdown of organic matter in the absence of oxygen. The anaerobic digestion or fermentation of biodegradable materials such as biomass, manure, sewage, municipal waste, green waste, plant material and crops produces biogas. De-Wit, and Faaij (2008) defined biogas as the biological degradable fraction of products, wastes and residues from agriculture (including animal and vegetable materials), forestry and the biological degradable fraction of industrial and household wastes. In the same vein, Van-Loo, and Koppejan, (2008) defined biogas as a gas produced by the anaerobic digestion or fermentation of organic matter including manure, sewage sludge, municipal solid waste, biodegradable waste, or any other biodegradable

feedstock. The author explained that it embraces all organic matter produced by photosynthesis, existing on the earth's surface.

Biogas comprises primarily methane (CH<sub>4</sub>) and carbon IV oxide (CO<sub>2</sub>) and may have small amounts of hydrogen sulphide (H<sub>2</sub>S), moisture and siloxanes. The gases methane, hydrogen and carbon monoxide (CO) can be combusted or oxidised with oxygen (Van-Loo, & Koppejan, 2008). This release energy allows biogas to be used as a fuel for any heating purpose, such as cooking. It can also be used in anaerobic digesters in a gas engine to convert the energy in the gas into electricity and heat. Biogas can be compressed, much like natural gas, and used to power motor vehicles. The biogas or anaerobic digestion process leaves a nutrient-rich digestive that can be used as fertilizer (Mahmudi and Flynn, 2006).

It contributes to reduction of animal wastes and odors. Digestion effectively eliminates environmental hazards. In addition it destroys disease-causing pathogens existing in waste materials (Ericsson & Nilsson, 2006). It is expected that graduates of schools of agriculture should be able to produce biogas effectively and efficiently.

A graduate of agriculture is an individual who has satisfactorily completed higher education (national diploma or higher national diploma) and now qualified to embark on a personal agricultural trade such as livestock rearing, crop production and agricultural processing

(Oketoobo, Lawal, and Onipede 2011). On graduation the students are expected to choose a trade or an occupation in agriculture where extension agents can help them succeed.

In the opinion of Asiabaka (2002), extension agents were explained from the roles which they seek to accomplish; which is to teach both the rural and urban clientele how to determine their agricultural problems and be able to offer solutions using their own resources. Ogunbameru, Undiandeye and Ani (2008) maintained that, extension agents are specialists who helps farmers to analyze their present and expected future situations, helps farmers to become aware of the problems, which can arise in such an analysis, increase knowledge and help to structure farmers' existing knowledge, help farmers to acquire specific knowledge related to certain problems, solutions and their consequences so that they can act on possible alternatives, helps farmers to evaluate and improve their own opinion-forming and decision-making skills. Extension agents also encourage farmers to be efficient in their occupations in spite of all challenges they may be faced with in agricultural production. In the opinion of Collins (2012), a challenge means a task or situation that tests someone's ability. It also refers to difficulty in a job or career which tests one's ability or resources in a demanding but stimulating undertaking. In this study, challenges are that difficult situation which graduates of schools of agriculture encounter in the course of producing biogas. However, in spite of the challenges encountered by these

graduates, they can be motivated through various ways to overcome the challenges encountered in producing biogas.

Motivation in the statement of Gottfried, Fleming, and Gottfried, (2001) refers to reasons that underlie behavior that is characterized by willingness and volition. Hidi, and Harackiewicz, (2000) broadly define motivation as the attribute that moves one to do or not to do something. In this context, motivation is any strategy that will make graduates of schools of agriculture to engage in biogas production. Strategy, in the statement of Ugweke, Onu, Agboege and Asogwa (2013) is a carefully devised plan of action to achieve a goal. It is also the art of developing or carrying out a plan to achieve a desired goal. Strategies, in the context of this study, are planned actions that will motivate graduates of schools of agriculture to enter and be sustained in biogas production.

Sustainability in the report of International Water Management Institute (2000) is the recovery from stress, shocks and asserts for both present and the future while not undermining the natural resource base. It is the act of ensuring continuity. It is noticed that, graduates of schools of agriculture after acquiring knowledge and skills, they do not engage in production. This is attributed to lack of motivation to enter in any production process especially biogas as it is believed that the graduates acquired the necessary knowledge and skills that could have enticed them into agricultural production. However, the graduates need to

be motivated to enter and be sustained in biogas production. Sustainability strategies are therefore developing or carrying out plans to achieve biogas production in a way that support its continuous production, that is ecological and ethically responsible manner that supports continuity for future generation. This includes aliening to agricultural practices that do not harm the environment, providing fair treatment to workers and supporting local communities. Agricultural education emphasizes knowledge and skills for its learners that can help them enter and succeed in a chosen career or occupation. It is unfortunate that the students after graduation go in search of white collar jobs which are not easy to find. In an interaction with some graduates of schools of agriculture in a conference held at the University of Agriculture Makurdi in October 2014, the graduates explained that they encounter so many challenges in trying to start an occupation or a trade. On the other hand, some graduates expressed challenges they face which made them to quite occupation such as biogas that they started. In the light of these situations, the researchers are concerned with the strategies that could motivate them to start production of biogas and strategies that could make them succeed and continue in biogas production. It is therefore, necessary that the strategies for entry into production of biogas be identified. It was also necessary to identify strategies for enhancing their sustainability in biogas production.

### **Research Questions**

1. What are the motivational initiatives for graduates of schools of agriculture to enter into biogas production?
2. What are the challenges encountered by graduates of schools of agriculture in entering into biogas production?
3. What are the motivational initiatives that could enhance sustainability of graduates of schools of agriculture in biogas production?

### **Hypotheses**

1. There is no significant difference in the mean rating of responses of graduates of schools of agriculture and extension agents on motivational initiatives for graduates of schools of agriculture to enter into biogas production
2. There is no significant difference in the mean rating of responses of graduates of schools of agriculture and extension agents on challenges encountered by graduates of schools of agriculture in entering into biogas production
3. There is no significant difference in the mean rating of responses of graduate of schools of agriculture and extension agents on motivational initiatives that could enhance sustainability of graduates of schools of agriculture in biogas production.

### **Methodology**

Three research questions were developed and answered by the study. Survey research design was adopted for this study and it was conducted in schools of agriculture in Benue State of Nigeria. The population of the study was 215 made up

of 73 extension agents in Benue State (Ministry of Agriculture Makurdi) and 142 graduates of Agriculture in schools of agriculture in Benue state. The entire population was involved in the study due to its manageable size, hence there was no sampling. An instrument titled: Motivational Initiatives for Biogas Production Questionnaire (MIBPQ) developed from literature reviewed and experience of the researchers was used for data collection. Each questionnaire item had four response options of Highly Needed (HN), Averagely Needed (AN), slightly Needed (SN) and Not Needed (NN) with a corresponding value of 4, 3, 2 and 1 respectively. Three experts validated the questionnaire items; two from the Department of Agricultural Engineering, Akperan Orshi College of Agriculture, Yandev and one from the Department of Agricultural Education, University of Agriculture Makurdi, Benue State. The corrections and suggestions of the experts were used to produce the final copy of the

### **Results**

The results of this study are based on questions answered and hypotheses tested and presented in table 1 to 3.

**Research question 1:** What are the motivational initiatives for gradates of schools of agriculture to enter into biogas production?

questionnaire. Cronbach Alpha reliability method was used to determine the internal consistency of the items and a coefficient of 0.79 was obtained. The data were collected by the researchers from the respondents with the help of three assistants who were familiar with the area of the study. A total of 215 copies of the questionnaire was administered and retrieved within 6 days. Data collected for the study were analyzed using mean to answer the research questions.

Real limit of numbers was used for decision-making. The items were regarded in this order: 0.00 to 1.49 Not Needed (NN), 1.50 to 2.49 slightly needed (SN), 2.50 to 3.49 averagely Needed (AN), 3.50 to 5.00 Highly Needed (HN). Any item with a mean rating of 1.50 or above was regarded as needed. T-test analysis was used to test the null hypothesis at  $\leq 0.05$  level of significance and at 213 degree of freedom.

**Hypothesis 1:** There is no significant difference in the mean rating of responses of graduates of schools of agriculture and extension agents on motivational initiatives for graduates of schools of agriculture to enter into biogas production. Data for answering research question one and testing the corresponding hypothesis are presented in table 1.

**Table 1:** Mean ratings and t-test analysis of responses of graduates and extension agents on motivational initiative for entering into biogas production.

SN	Motivational initiatives for entering	Mean	SD	t-test	Remark
1	Retraining of graduates by extension agents for competence	3.47	0.53	-1.74	NS
2	Provision of loan and subsidy to graduates	3.43	0.82	0.96	NS
3	Provision of adequate security	3.49	0.29	0.00	NS
4	Favorable policies by government	2.48	0.74	-0.96	NS
5	Appropriate taxation	3.30	0.91	1.43	NS
6	Provision of basic amenities	3.68	0.00	0.62	NS
7	Proper implementation of land use act to make land available for graduates	3.14	0.58	0.19	NS
8	Proper campaign to concertize the society by the government on the benefits and use of biogas	2.74	0.31	1.52	NS

X = mean, t-cal = t- calculated, t- table = 1.96, df =213, NS = Not significant.

Data in Table 1 revealed that all the 8 items had their mean values ranged from 2.48 to 3.68 which were above the real limit of numbers 0.00 to 1.49. This means that, all the eight items were motivational initiatives for entry into biogas production. The table also revealed that the standard deviations (SD) of the items ranged from 0.00 to 0.91 which indicated that the mean responses were not very far from one another. This showed that all the 8 items were needed by graduates of agriculture.

The hypothesis tested revealed further that all the 8 motivational items had their t-calculated values less than the t-table value of 1.96. This indicated that there was no significant difference in the mean rating of the two groups of respondents on motivational strategies required by graduates of schools of agriculture for entering into biogas production. Therefore, the null hypothesis of no significant difference was accepted for all the items.

**Research question 2:** What are the challenges encountered by graduates of schools of agriculture in entering into biogas production?

**Hypothesis 2:** There is no significant difference in the mean rating of responses of graduates of schools of agriculture and extension agents on challenges encountered by graduates of schools of agriculture in entering into biogas production

Data for answering research question two and testing the corresponding hypothesis are presented in table 2.

**Table 2:** Mean ratings and t-test analysis of responses of graduates and extension agents on challenges encountered in entering into biogas production.

SN	Challenges	Mean	SD	t-test	Remark
1	Inadequate start-up capital	3.65	0.53	1.16	NS
2	Preference of white collar jobs by graduates	3.43	0.29	0.50	NS
3	Poor patronage by the users	2.74	0.48	0.98	NS
4	High cost of facilities	3.92	0.19	1.67	NS
5	Inadequate tools and facilities	2.72	0.30	0.09	NS
6	inadequate agricultural extension education	3.32	0.62	0.48	NS
7	Lack of basic amenities	2.85	0.41	-1.42	NS
8	Unstable government policies	2.97	0.56	1.05	NS
9	Insecurity and theft of production materials	2.57	0.26	1.72	NS
10	Incompetence of the graduates	3.73	0.74	-6.41	NS
11	Inability to take risk in biogas production by graduates	3.51	0.20	0.87	NS
12	High cost of construction and maintenance of biogas chambers	3.16	0.61	0.51	NS
13	Phobia of system failure after construction	2.71	0.90	0.72	NS
14	Government imposture of high tax on production farms	3.14	0.11	0.75	NS
15	High patronage of alternative sources	3.31	0.84	0.76	NS
16	Lack of good marketing strategies	3.81	0.33	-0.61	NS
17	Inadequate public awareness	2.54	0.72	-5.41	NS

X = mean, t-cal = t- calculated, t- table = 1.96, df =213, NS = Not significant.

Data in Table 2 revealed that all the 17 items had their mean values ranged from 2.54 to 3.92 which were above the real limit of numbers 0.00 to 1.49. This means that, all the 17 items were challenges of biogas production. The table also revealed that the standard deviations (SD) of the items ranged from 0.11 to 0.90 which indicated that the mean responses were not

very far from one another. This showed that all the 17 items were challenges encountered by graduates of agriculture in entering into biogas production. The hypothesis tested revealed further that all the 17 items had their t-calculated values less than 0.05. This indicated that there was no significant difference in the mean rating of the two groups of respondents on

challenges encountered by graduates of schools of agriculture in biogas production. Therefore, the null hypothesis of no significant difference was accepted for all the items.

**Research question 3:** What are the motivational initiatives that could enhance sustainability of graduates of schools of agriculture in biogas production?

**Hypothesis 3:** There is no significant difference in the mean rating of responses of graduate of schools of agriculture and extension agents on motivational initiatives that could enhance sustainability of graduates of schools of agriculture in biogas production. Data for answering research question three and testing the corresponding hypothesis are presented in table 3.

**Table3:** Mean ratings and t-test analysis of responses of graduates and extension agents on motivational initiative for sustainability in biogas production.

SN	Motivational initiative for sustainability	Mean	SD	t-test	Remark
1	Regular organization of seminars and workshops for graduates by extension agents to improve their technical efficiency	3.61	0.21	0.89	NS
2	Provision of loans and subsidy to biogas producers by banks of agriculture	3.48	0.01	0.19	NS
3	Intensified advertisement for public awareness by the graduates	2.59	0.82	-1.98	NS
4	Continuous production of biogas to keep customers	3.41	0.41	0.74	NS
5	In-service training for graduates for capacity building for regular improvement	2.74	0.58	-1.96	NS
6	Provision of adequate security	2.93	0.32	-2.61	NS
7	Favourable policies by government	2.53	0.55	0.52	NS
8	Appropriate taxation	3.13	0.07	0.48	NS
9	provision of basic amenities	3.63	0.23	0.16	NS
10	Proper maintenance of biogas facilities for continuity	2.62	0.15	0.21	NS

X = mean, t-cal = t- calculated, t- table = 1.96, df =213, NS = Not significant.

Data in Table 3 revealed that all the 10 items had their mean values ranged from 2.59 to 3.63 which were above the real limit of numbers 0.00 to 1.49. This means that, all the 10 items were motivational initiatives for sustainability of graduates in biogas production. The table also revealed

that the standard deviations (SD) of the items ranged from 0.01 to 0.82 which indicated that the mean responses were not very far from one another. This showed that all the 10 items were required by graduates of agriculture. The hypothesis tested revealed further that all the 10 items

had their t-calculated values less than the t-table values. This indicated that there was no significant difference in the mean rating of the two groups of respondents on strategies that could sustain graduates of schools of agriculture in biogas production. Therefore, the null hypothesis of no significant difference was accepted for all the items.

### **Discussion of the findings**

The study identified 8 motivational initiatives for entry into biogas production, 17 challenges encountered in biogas production and 10 motivational initiatives that could sustain graduates in biogas production. The findings of this study are in line with the findings of Agomuo, and Enang (2013) in a study titled impact of government integrated financial management information system (GIFMIS) for decision making by federal ministry of education, headquarters Abuja that, challenges of government integrated financial management information system (GIFMIS) include: lack of capacity building causes delay in implementation of GIFMIS, change in skills responsibility and behavior among others. On the hypotheses tested, the study found out that there was no significant difference in the mean ratings of the responses of the extension agents and graduates of schools of agriculture on 8 motivational initiatives for entry into biogas production. The findings of the study conform to the submission of Amber (2010) that impediments to biogas include low patronage, lack of Government attention,

high cost of facilities among others. The findings of the study also agreed with that of Ideh (2013) in a study on students perception of strategies for improving delivery of industrial work experience in Delta State University where it was found that adequate monitoring exercise should be carried out by industrial training funds (ITF) officials, the period of students industrial work experience (SIWES) training be increased among others. On the hypotheses tested, the study found out that there was no significant difference in the mean ratings of the responses of the extension agents and graduates of schools of agriculture on 17 challenges encountered in biogas production. The findings also conforms with the study carried out by Asogwa and Nongugwa (2014) on strategies adopted by farmers for enhancing irrigation agriculture for sustainable livelihood in Benue State where it was found that farmers adopted 7 strategies in sourcing for water for irrigation, encountered 8 challenges during irrigation and employed 6 coping strategies to the challenges encountered during irrigation. On the hypotheses tested, the study found out that there was no significant difference in the mean ratings of the responses of the extension agents and graduates of schools of agriculture on 10 strategies that could sustain graduates of schools of agriculture in biogas production.

The implication of this finding is that the professional experience of the respondents did not influence their responses strategies required by graduates of schools of

agriculture for entry and sustainability into biogas production. The findings of the authors cited above help to add validity to the result of this study.

Therefore, the researchers added motivational initiatives to the existing body of knowledge in biogas production.

### **Conclusion**

It was observed by the researchers that the production of biogas in Benue State has not been given appropriate attention. Meanwhile, biogas production is very lucrative in the area due to its immense importance as the energy release allows biogas to be used as fuel for any heating purpose, such as cooking, it also contributes to reduction of animal wastes and odour, and in addition it destroys disease-causing pathogens existing in waste materials. Biogas production has various areas of occupational opportunities in which the graduates of schools of agriculture could embark on for national development. Therefore, there was a need to identify the strategies and challenges for entry and sustainability into biogas production.

The study identified 8 motivational strategies for entry into biogas production, 17 challenges encountered in biogas production and 10 strategies that could sustain graduates in biogas production. Based on the findings, the following recommendations were made:

1. The graduates should submit proposals on biogas production to the ministry of agriculture for

approval for loan and subsidy to biogas producers.

2. Extension agents should regularly organize seminars and workshops for retraining of graduates to improve their technical efficiency.
3. Government should reduce taxes on production farms.
4. Government should implement policies that will encourage and support biogas production for maximum utilization of the benefits for national development.

### **References**

- Agommuo, E.E. & Enang, C.E. (2013). Implimentation of government intergrated financial management information system for creative decision making by federal ministry of education, headquarters, Abuja. *Nigeria Vocational Association Journal* 18(2) 237-24
- Amber, N. N. (2010) Biogas: impediments and prospects. Biomass digest. Retrieved on [www.biomassdigest.com](http://www.biomassdigest.com). On 20/4/2015.
- Asogwa, V.C & Nongugwa, D.T (2014). Strategies Adopted by Farmers for Enhancing Irrigation Agriculture for Sustainable Livelihood in Benue State. *Journal of Vocation Education and Training Research* 1(1).1-6
- Collins, S. (2012). *Collins Cobuild English Dictionary for Advanced Learners*.

- 4th edition, Harper Collins Publishers.
- Nigeria Vocational Association Journal* 18(2) 237-242
- De-Wit, M.P. & Faaij A.P.C. (2008). Biomass Resources Potential and Related Costs: Assessment of the EU-27, Switzerland, Norway and Ukraine. REFUEL Work Package 3 final report
- Egbule, P.E. (2002). *Fundamentals and Practice of Agricultural Education*. Owerri: TOTAN Publishers Ltd.
- Ericsson, K & Nilsson, L (2006). Assessment of the potential biomass supply in Europe using a resource-focused approach. *Biomass and Bioenergy* 30 (2006), 1-15
- Gottfried, A. E., Fleming, J. S., & Gottfried, A. W. (2001). Continuity of academic intrinsic motivation from childhood through late adolescence: A longitudinal study. *Journal of Educational Psychology*, 93(1), 3–13.
- Hidi, S., & Harackiewicz, J. M. (2000). Motivating the academically unmotivated: A critical issue for the 21st century. *Review of Educational Research*, 70(2), 151–179.
- Ideh, V. (2013) Students perception of the strategies for improving delivery of industrial work experience in Delta State University, Abraka, Nigeria.
- International Water Management Institute (2000) *Water for food nature and rural livelihoods*. Colombo Sri Lanka. International Water Management Institute: 68,
- Mahmudi, H. & Flynn, P. C. (2006). Rail vs Truck Transport of Biomass. *Applied Biochemistry and Biotechnology*, retrieved from [www.google.com](http://www.google.com) on 28-05-2015
- Ogunbameru, B.O. UNdiandeye, U. C. & Ani (2008), *Agricultural Extension technologies*. Kaduna, Akani publishers.
- Oketoobo, E.A., Lawal, I.O., Onipede, O (2011) Entrepreneurial skills required by graduates of schools of agriculture for commercial cucumber production in southwest Nigeria. *Nigerian Vocational Association Journal* 16(1) 44-52
- Osinem, E. C. (2007). *Faces of Agricultural Education in Nigeria: Issues and Challenges*. A seminal paper presented to the Department of Agricultural Education, College of Agricultural and Science Education, University of Agriculture, Makurdi.
- Osinem, E. C. (2008). *Managing Agricultural Education and Training. Resources Principles and Methods*.

Enugu: Betony International  
Publishers.

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(4) 19-26

Ugweke, F. O., Onu F.M., Aboege, M.U.  
& Asogwa V.C (2013) Occupational  
competencies required by retirees in  
pawpaw production and marketing  
for sustainable livelihood in Enugu  
State, Nigeria, *IOSR Journal of*

Umuh-mac (2006). Hand book on youth  
organizations in agricultural  
education. Abuja: Hil-venture

Van-Loo, S. & Koppejan, J. (2008). The  
handbook of biomass combustion &  
co-firing. Earthscan, London, UK