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# Capacity Building Needs Of Lecturers For Teaching Organic And Inorganic Soil Fertility Management Practice In South-South Colleges Of Education, Nigeria

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**ABSTRACT**
The research examined the capacity building needs of lecturers in teaching organic and inorganic soil fertility management practice.Two research questions and two hypotheses were tested. A total of 201 agricultural education lecturers in Colleges of education in South-South, Nigeria served as respondents; hence an ex post facto designed was used. A structured questionnaire titled "Organic and Inorganic SoilFertility Management Practices Questionnaire (OISFMPQ)" was used to gather data. It was created after the researcher studied the literature on organic and inorganic fertilizer management and was found reliable and validated through experts. To obtain insights into the issues at hand, we analyzed the data at hand using descriptive statistics using mean and standard deviation. The t-test was used to determine whether or not the null hypothesis was correct. It was found that there was a significant difference in the mean ratings of male and female lecturers in teaching both organic and inorganic soil fertility management practices. The results of the study show that male agricultural lecturers require capacity building in teaching both organic and inorganic soil fertility management practices than their female counterparts. It was recommended that both State and Federal government should organize internal capacity building workshops in the Colleges of Education for re-training of the lecturers especially the male lecturers, making use of resource persons in soil fertility management from universities.

**Key Words:** Gender, Capacity Building, Physical, Biological, Soil Fertility Management

## I. INTRODUCTION:

Soil is an important medium for crop production. Production of crop plants and animals is carried out on the soil by man. Soil is, therefore, a natural resource that supports life. Olaitan and Omomia (2009) explained that soil is a thin layer of the earth's surface which is loose, non-solid in nature and serves as a medium for plant growth and development. Soil, according to Olaitan and Omomia (2009), is made up of inorganic particles (mineral matter), organic matter, living organism, water and air. In the context of this study, soil is the unconsolidated thin layer of the earth's surface which serves as a home and medium for plant growth and development. Ifeanyieze (2012) stated that soil with its components perform five functions which are: as a medium for plant growth; a system for storage, supply and purification of water; a recycling system for plant nutrients and organic matter; a habitat for organisms and as an engineering medium. As a medium for plant growth, soil holds the plant firmly. The soil particles that are together make the soil to be compact. When the plant grows, the meristem of the plant penetrates into the compact soil in such a way that the plant becomes anchored and stands firmly on the earth's surface without falling over (Ifeanyieze, 2012). However, the level of nutrient support given by the soil to a particular crop growing on it represents its fertility.

Fertility, in the view of Das (2012) is the state of richness of a soil in which it contains nutrients that support the growth and yield of crops. It is the ability of the soil to supply essential

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nutrients and soil water in adequate amounts and proportions for growth and reproduction of plants in the absence of toxic substances which could inhibit their growth and development. Fertilizer management is the process of combining human and material resources for the purpose of maintaining soil fertility using fertilizers to ensure maximum return of crop plants from the soil. And as such, this aspect of agricultural education need to be taught in colleges of education in other to impart the knowledge and skill of soil fertility management on future teachers in colleges of education requires capacity building.

Capacity building in soil fertility management refers to capabilities displayed by teachers while teaching tillage operation, soil testing and analysis, manure preparation and application, crop rotation, soil erosion prevention and control and irrigation as well as combining human and material resources for the purpose of maintaining soil fertility using fertilizers to ensure maximum return of crop plants from the soil (Starvrons, 2018). Onipede (2013), found out that lecturers of Agricultural Education in Colleges of Education have low capacity in teaching soil science courses to students especially on the area of organic and inorganic soil fertility management. Based on the above information about the teachers teaching soil science to students in Colleges of Education on their capacity which is low, it means that they need to build up their various capacity using the need assessment. Atouigba, Vershima, O'kwu and Ijenkeli (2012) postulates that there has been global concern about gender differences in Curriculum delivery. On the area of capacity building need of teachers of Agriculture in soil fertility management practices, there has not consensus agreement on gender differences. This study therefore examined the capacity building need of teachers of Agriculture in organic and inorganic soil fertility management practices in South-South Colleges of Education, Nigeria.

**Statement of the Problem**

Interaction of the researcher with some post NCE undergraduates of agricultural education in about their conception of soil science and its challenges, the students expressed phobia about passing soil science courses at the college education. Some of the students indicated that soil fertility and fertilizer management practices were their greatest challenges and hardly recorded good grade as students in colleges of education. The students associated their difficulties in understanding the course and low grade to teachers' poor handling of the course. Teachers, therefore, need improvement because any improvement on the capacity of these teachers of agricultural education in the colleges would help improve the quality of teachers of agriculture in basic schools in future. In determining the capacity needed, the teachers must be assessed on the skills they posses and what they need to posses; the difference between the two constitute the gap that this study is determine furthermore, there seems to be a non-consensus agreement on the area of gender difference in agricultural curriculum delivery especially on the are organic and inorganic soil fertility management practice. This constitute the gap for the study.

**Gender and the teaching of Organic Fertilizer Management Practice**

Organic fertilizer is composed mainly of waste and residue from plants and animals. It is a material mainly of plant and/or animals. They are materials introduced to the soil to meet the nutrient deficiency of a particular nutrient for plant use (Stephens and Kostewicz, 2012). Common types of organic fertilizer in Agriculture are compost, farmyard manure and green manure. Compost which is decomposed organic matter has its quality affected by certain factors. In the area of gender Sasakawa Africa Fund Extension Education (SAFE) found that the proportion of women hired as academic staff in their partner universities ranged from as low as 6.1% of academic staff for University of Addis Ababa in Ethiopia to 12% for University of Cheikh Anta Diop in Senegal. Nigeria's national data indicate only 12.4% of academic staff are women, although the University of Ibadan has 24.8% women academic staff, similar to that of the University of Ghana's 24% women academics (Bunyi, 2003).

Within the faculties, higher numbers of female staff tend to be found in departments teaching courses that have traditionally been dominated by women, such as food science and technology. A comparison of numbers of female staff in the faculties of Agriculture, Education, Health Sciences, Institute of Distance Learning (IDE) and Social Sciences in the University of Swaziland (UNISWA), show that Science (14%) and Agriculture (27%) faculties have the least representation of women compared to the Health Sciences (76%), and IDE (75%) faculties (Dhlamini, 2009). Within faculties and departments, women tend to hold more junior positions. There is a relatively higher proportion of female academic staff in the early and middle careers (Assistant lecturer and Lecturer) compared to the proportions of male staff. However, the

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situation is reversed for the senior lecturer, associate and full professor levels. With the exception of the SUA and Faculty of Agriculture UON where there are four female professors, there is not more than one female full professor in the other faculties captured in this study. There is no female professor at Haramaya, UNISWA, and Mekele College of Dry Land Agriculture. On average, 17% of PhD holders were women while 83% were men and three in every four academic staff with a master's degree were men.

**Gender and the teaching of Inorganic Soil Fertility Management Practice**

Inorganic fertilizers are artificial fertilizers. Asogwa (2014) defined inorganic fertilizer as chemical synthesized plant nutrients compounds which are usually applied to the soil to supplement its natural fertility. Asadu (2010) stated that inorganic fertilizers (also known as chemical or synthetic fertilizer) are artificially made in laboratories and contain one or more vital nutrient elements such as nitrogen, phosphorus and potassium. It is also referred to as inorganic manure. In comparing gender and the teaching of inorganic soil fertility management practice, Huyer (2016) observed that women's activities in agriculture are characterized by a global gender gap in vulnerabilities, access to resources, and productivity with substantial gender gaps in access and control continue to exist in regard to six key resources and inputs for agriculture: land, labor, credit, information, extension, and technology. However, Ekanem (2005) noted that men and women have equal ability and can attain the same height, given the same opportunity.

**Methods of the Study**

The study employed the ex-post facto sampling the opinion of 201 agriculture education in colleges of education in South-South, Nigeria. The data was gathered with the use of a questionnaire called the Organic and Inorganic SoilFertility Management Practices Questionnaire (OISFMPQ). The reliability of the OISFMPQ items was done using the Cronbach Alpha technique, and the resulting index was 0.77, indicating high levels of internal consistency.

**Data Analysis**

The data was analyzed using descriptive statistics of the mean and standard deviation. The t-test was used for statistics was used to test two hypotheses.

**Research Question 1:** What are the capacity building needs of lecturers in organic fertilizer management practices for effective teaching of students in colleges of education?

**Table 1: Gap Analysis of lecturers of Agricultural Education from Colleges of Education on organic fertilizer management practices where the lecturers need capacity building.** N =201

| S/N | Cluster Items | Xn | Xp | D (NG= Xn-Xp) | Remark |
|---|---|---|---|---|---|
| 1 | Define organic fertilizer | 3.76 | 2.74 | 1.02 | CBN |
| 2 | Mention types of organic fertilizer | 3.70 | 2.86 | 0.84 | CBN |
| 3 | State importance of organic fertilizer | 3.66 | 2.74 | 0.92 | CBN |
| 4 | Identify factors that affect organic fertilizer | 3.63 | 2.80 | 0.83 | CBN |
| 5 | Locate a compost pile/pit in a flat surface far from water channel or bodies | 3.51 | 2.76 | 0.75 | CBN |
| 6 | Source compost material of plant and animal origin removing undegradable | 3.42 | 2.63 | 0.79 | CBN |
| 7 | Make a pit/pile of one cubic meter (3.5 X3.5X3.5m) to achieve good composting | 3.62 | 2.92 | 0.70 | CBN |
| 8 | Monitor the pile temperature weekly to obtain a range of $55^0$C to $65^0$C | 3.34 | 2.74 | 0.60 | CBN |
| 9 | Apply appropriate fertilizer to obtain much bulk over the wet season | 3.63 | 2.61 | 1.01 | CBN |
| 10 | Apply appropriate fertilizer to obtain maximum yield | 3.70 | 2.86 | 0.84 | CBN |

CBN= Capacity Building Needed
Xn = Level of Need
Xp = Level of Performance
D = Difference in Xn-Xp
CBNN= Capacity Building Not Needed

Data in Table 1 showed that the 10 clusters on lecturers had their need gap value ranged from 0.60 to 1.06 and were positive. This indicated that lecturers of Agricultural Education in Colleges of Education need capacity building

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(CBN) in all clusters in organic fertilizer management practices for effective teaching of students in Colleges of Education in South-South, Nigeria.

**Hypotheses 1:** There is no significant difference in the mean ratings of male and female lecturers on fertilizer management (organic fertilizer) needed by teachers of Agricultural Education for effective teaching of students in colleges of education.

**Table 2: t-test analysis of male and female lecturers on fertilizer management (organic fertilizer) needed by teachers of Agricultural Education for effective teaching of students in colleges of education**

| Variable | N | Mean | SD | DF | t-cal | t-tab | p-value | Remark |
|---|---|---|---|---|---|---|---|---|
| **Male** | 143 | 3.61 | 0.08 | 199 | 1.965 | 1.654 | 0.064 | Reject Null Hypothesis |
| **Female** | 58 | 2.57 | 0.94 | | | | | |

Table 2 showed that the calculated t of 1.965 is greater than the tabulated t value of 1.654 at a p-value of 0.064. This led to the rejection of the null hypothesis that there is no significant difference in the mean ratings of male and female lecturers on fertilizer management (organic fertilizer) needed by teachers of Agricultural Education for effective teaching of students in colleges of education. This implies that male lecturers need capacity building on the area of organic fertilizer management for effective teaching more than their female counterpart.

**Research Question 2:** What are the capacity building needs of lecturers in inorganic fertilizer management practices for effective teaching of students in colleges of education?

**Table 3: Gap Analysis on the responses of lecturers in inorganic fertilizer management practices for effective teaching of students in colleges of education**N =201

| S/N | Cluster Items | Xn | Xp | D (NG= Xn-Xp) | Remark |
|---|---|---|---|---|---|
| 11 | Define and mention types inorganic fertilizer | 3.78 | 2.77 | 1.01 | CBN |
| 12 | State forms of inorganic fertilizer | 3.68 | 2.91 | 0.77 | CBN |
| 13 | State importance of inorganic fertilizer | 3.63 | 2.65 | 0.97 | CBN |
| 14 | Identify factors affecting the use of inorganic fertilizer. | 3.62 | 2.70 | 0.92 | CBN |
| 15 | Collect a sample of the farm soil | 3.63 | 2.65 | 0.97 | CBN |
| 16 | Submit the sample to a soil laboratory for nutrient testing | 3.63 | 2.80 | 0.83 | CBN |
| 17 | Interpret soil test result as indicated by the laboratory | 3.67 | 2.85 | 0.82 | CBN |
| 18 | Purchase fertilizer that best matches the fertilizer number recommended on soil | 3.67 | 2.74 | 0.93 | CBN |
| 19 | Collect a soil sample from the farm for nutrient testing and analysis | 3.63 | 2.61 | 1.01 | CBN |
| 20 | Carry out the soil nutrient testing and analysis of the soil sample | 3.63 | 2.65 | 0.97 | CBN |

CBN= Capacity Building Needed
Xn = Level of Need
Xp = Level of Performance
D = Difference in Xn-Xp
CBNN= Capacity Building Not Needed

Data in Table 3 revealed that the 10 clusters had their mean ratings and need and performance gap value ranged from 0.70 to 1.07 and were positive. This indicated that lecturers of Agricultural Education in Colleges of Education needed capacity building (CBN) on all clusters which are in the area of inorganic fertilizer management practices.

**Hypotheses 2:** There is no significant difference in the mean ratings of male and female lecturers on fertilizer management (inorganic fertilizer) needed by teachers of Agricultural Education for effective teaching of students in colleges of education.

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**Table 4: t-test analysis of male and female lecturers on fertilizer management (inorganic fertilizer) needed by teachers of Agricultural Education for effective teaching of students in colleges of education**

| Variable | N | Mean | SD | DF | t-cal | t-tab | p-value | Remark |
|---|---|---|---|---|---|---|---|---|
| **Male** | 143 | 3.67 | 0.08 | 198 | 1.973 | 1.686 | 0.068 | Reject Null Hypothesis |
| **Female** | 58 | 2.79 | 0.94 | | | | | |

Table 4 shows that the calculated t of 1.973 is greater than the tabulated t value of 1.686 at a p-value of 0.068. This led to the rejection of the null hypothesis that there is no significant difference in the mean ratings of male and female lecturers on fertilizer management (inorganic fertilizer) needed by teachers of Agricultural Education for effective teaching of students in colleges of education. This implies that male lecturers need capacity building on the area of inorganic fertilizer management for effective teaching more than their female counterpart.

## II. DISCUSSION OF FINDINGS

Table 1showed that the 10 clusters on lecturers had their need gap value ranged from 0.89 to 0.94 and were positive. This indicated that lecturers of Agricultural Education in Colleges of Education need capacity building (CBN) in all the 10 clusters in organic fertilizer management practices for effective teaching of students in Colleges of Education in South-South, Nigeria. The hypotheses tested in Table 15 shows that the calculated t of 1.965 is greater than the tabulated t value of 1.654 at a p-value of 0.064. This led to the rejection of the null hypothesis that there is no significant difference in the mean ratings of male and female lecturers on fertilizer management (organic fertilizer) needed by teachers of Agricultural Education for effective teaching of students in colleges of education. This implies that male lecturers need capacity building on the area of organic fertilizer management for effective teaching more than their female counterpart. This findings corroborates with assertions of Bunyi, (2003) who ascertain that women constitute a small minority of the staff in agricultural faculties in African universities especially in higher positions compared to men. The career progression for women is much slower than that of men.

Similarly, a study by Sasakawa Africa Fund Extension Education (SAFE) also found that the proportion of women hired as academic staff in their partner universities ranged from as low as 6.1% of academic staff for University of Addis Ababa in Ethiopia to 12% for University of Cheikh Anta Diop in Senegal. Nigeria's national data indicate only 12.4% of academic staff are women, although the University of Ibadan has 24.8% women academic staff, similar to that of the University of Ghana's 24% women academics (Bunyi, 2003). Within the faculties, higher numbers of female staff tend to be found in departments teaching courses that have traditionally been dominated by women, such as food science and technology. A comparison of numbers of female staff in the faculties of Agriculture, Education, Health Sciences, Institute of Distance Learning (IDE) and Social Sciences in the University of Swaziland (UNISWA), show that Science (14%) and Agriculture (27%) faculties have the least representation of women compared to the Health Sciences (76%), and IDE (75%) faculties (Dhlamini, 2009). Within faculties and departments, women tend to hold more junior positions. There is a relatively higher proportion of female academic staff in the early and middle careers (Assistant lecturer and Lecturer) compared to the proportions of male staff. However, the situation is reversed for the senior lecturer, associate and full professor levels. With the exception of the SUA and Faculty of Agriculture UON where there are four female professors, there is not more than one female full professor in the other faculties captured in this study. There is no female professor at Haramaya, UNISWA, and Mekele College of Dry Land Agriculture. On average, 17% of PhD holders were women while 83% were men and three in every four academic staff with a master's degree were men.

Data in Table 2 revealed that the 5 clusters had their mean ratings and need gap value ranged from 0.85 to 1.14 and were positive. This indicated that lecturers of Agricultural Education in Colleges of Education needed capacity building (CBN) on all the 5 clusters in inorganic fertilizer management practices for effective teaching in Colleges of Education in South-South, Nigeria. The hypotheses tested in Table 13 shows that the calculated t of 1.973 is greater than the tabulated t value of 1.686

at a p-value of 0.068. This led to the rejection of the null hypothesis that there is no significant difference in the mean ratings of male and female lecturers on fertilizer management (inorganic fertilizer) needed by teachers of Agricultural Education for effective teaching of students in colleges of education. This implies that male lecturers need capacity building on the area of inorganic fertilizer management for effective teaching more than their female counterpart.

This finding suggests that the extent to which male lecturers participate in capacity building programmes in the aspects of inorganic fertilizer management for effective teaching is not the same extent to which their female counterparts participate in them. It should also noted that the fact that these categories of lecturers differed in their mean (X) participation in these capacity building programmes, it was also tangible enough to warrant a significant impact. It therefore follows that gender is a factor in lecturers' participation in capacity building programmes in universities. A plausible explanation for this finding is that male and female lecturers work in the same university environment, exposed to the same working conditions and the same university administration. However, when it comes to the aspect of inorganic fertilizer management for effective teaching male lecturers seems to be more serious on the capacity to deliver effectively more than their female counterparts. Moreover, both categories of lecturers are given the same support by their respective university administrations regarding participation in capacity building programmes. This finding did not corresponds with the position of Plato in Ekanem (2005) that men and women have equal ability and can attain the same height, given the same opportunity. However, Huyer (2016) observed that women's activities in agriculture are characterized by a global gender gap in vulnerabilities, access to resources, and productivity with substantial gender gaps in access and control continue to exist in regard to six key resources and inputs for agriculture: land, labor, credit, information, extension, and technology.

## III. CONCLUSION/RECOMMENDATIONS

The results of this study indicate that agricultural education lecturers in colleges of education, varies in terms capacity development requirements based on their gender while teaching organic and inorganic soil fertility management practices. The conclusion reached is that, male agricultural lecturers require capacity building in teaching both organic and inorganic soil fertility management practices than their female counterparts. Gender is a strong factor in capacity needs of lecturers of agriculture as male lecturers female lecturers need more of the capacity to teach both organic and inorganic soil fertility management practices in South-South, Nigeria. At such, both State and Federal government should organize internal capacity building workshops in the Colleges of Education for re-training of the lecturers especially the male lecturers, making use of resource persons in soil fertility management from universities.

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