



Occupational Skills Required by Secondary School Graduates in Soil Sampling and Organic Fertilizer Application for Maize Production in Plateau State

¹DAMINA, U.A., ²EKELE, G.E. & ^{2*}AMONJENU, A

¹Department of Vocational Education, Abubakar Tafawa Balewa University, Bauchi State, Nigeria

²Department of Vocational Agriculture and Technology Education Federal University of Agriculture, Makurdi, Benue State-Nigeria

ekelegarba@gmail.com (08023961473)

*anthonyamonjenu@gmail.com

ABSTRACT

The study identified occupational skills required by secondary school graduates in soil sampling and organic fertilizer application for maize production in plateau state Nigeria. Two research questions and two hypotheses were formulated to guide the study. Survey research design was adopted for the study. The population for the study was 369 respondents. There was no sampling. The instrument used for study was 21-item questionnaire developed from literature reviewed. Three experts validated the instrument. Cronbach alpha method was used to determine the internal consistency of the questionnaire items. Reliability coefficient of 0.84 was obtained. The questionnaire were analyzed using weighted mean and standard deviation to answer the research questions while t-test was used to test the hypotheses at 0.05 level of significance. It was found out that 21 occupational skills in soil sampling and organic fertilizer application were required by secondary school graduates in Plateau State. It was therefore recommended that the identified occupational skills be packaged into a training programme for the graduates

Keywords: Occupational skills, soil sampling, organic fertilizer and maize production.

INTRODUCTION

Maize production in Nigeria is a highly profitable farming activity. Food and Agricultural Organization FAO (2007) reported that Africa as a whole imports 28 percent of the required maize from countries outside the continent and that most maize production in Africa is rain fed.

Maize otherwise called corn is one of the most important food grains in the world. Ibitoye (2011) stated that maize, botanically called-zea my is an important staple food as well as essential raw material for several agro-allied industries and a very rich source of animal feeds in Nigeria with annual production exceeding two million metric tones. About 20% of the global maize harvested is consumed directly as food and the remaining 80% is proceeded for secondary uses. However, traditional farming practices are no longer capable of meeting Nigeria's maize production requirements, hence, the need for fertilizer application.

In the explanation of Ekele (2013), fertilizers are chemically synthesized nutrient compounds which are usually applied to the soil to supplement its natural fertility. Zhan, Iran and Zhang (2007) viewed organic fertilizers as plants and animal substances that contain nitrogen, phosphorous and potassium compounds in a complex organic form but released as the plant or animal decays. The organic or commercial fertilizers are available in easily dissolved compounds that require no decay. According to Ouresh (2009), organic fertilizers are the decomposed plant and animal material and wastes that enriched the soil with

nutrient essential for plant growth and development. The author affirmed that the decomposed plant and animal deposits include green manure. Organic fertilizer is of many types, among which are farm yard manure (FYM), cow dung, poultry dropping green manure and cost recently bio-fertilizer.

Organic and inorganic fertilizer contains macro elements such as Nitrogen (N), phosphorus (P) and potassium (K), each of these elements are essential for growth. Nwabuisi and Ekele (2004) Submitted that Nitrogen helps plants to grow quickly, while phosphorus supports the formation of sugar and starch and encourages growth and development of roots and stalk. The author asserts that potassium promotes fruits and seed quality, building of protein and reduction of disease in plants as a supplement to the available nutrient in the soil. For effective use of organic and inorganic fertilizer, there is need for soil sampling to be carried out.

Soil sampling in the opinion of Abdulsalam (2008) is the collection of soil samples for testing and analysis to determine its composition and other characteristics such as acidity or PH level, it also measures fertility, indicates deficiencies that need to be remedied, determine potential toxicities from excessive fertilizer application. This can also be done through soil testing. Soil testing is a chemical method for estimating the nutrient supplying of a soil. Soil test measures a part of the total nutrient supply in the soil and to maintain such a measurement in predicting nutrients need of crop. Mills and Jones (1996) opined that it is advisable to take soil samples to the soil testing laboratories for analysis before crops are planted as this will help the prospective secondary school graduates farmers to select the right type and quantity of fertilizer for utilization on the farm.

According to Okafor and Onuoha (2010), Secondary school graduates, are individuals who have completed the senior secondary school level in Nigerian education system. These individuals have completed six years of secondary education could not secure admission in to any higher institution or employed on any job. The Federal Republic of Nigeria (2004), considered secondary school graduates as people who have finished the three (3) years junior secondary education and three years senior secondary school education, but could not proceed in tertiary institutions. The majority of our secondary school graduates roams the streets and has little or no employable skills.

Skills are specialized task that enable workers to use their knowledge of the tools, techniques and procedures that are specific to their particular field. In maize production, skills are required in fertilizer application. The implication here is that in possessing skills, there is the need to demonstrate the habit of acting, thinking and behaving in a specific activity to the extent that process becomes natural through constant repetition and practice (Ekele and Lan, 2012).

Plateau State is agrarian in nature and is faced with challenge of how to fully equip secondary school graduates to develop skills and abilities in maize production. The researchers observed that there is low nutrient status of the soil particularly the North central zone (Plateau State) which had been attributed to high mining activities that affected the area in the early part of the eighteenth and nineteenth centuries. Also, the graduates from secondary school in the state do not possess skill in maize production having interacted with them on several occasions. There is therefore the need to identify occupational skills required by secondary school graduates in soil sampling and organic fertilizer application for maize production in Plateau State. Specifically, the study sought to identify.

1. Skills required by secondary school graduates in soil sampling for maize production as perceived by teachers of Agricultural – Science and extension agents.
2. Skills required by secondary school graduates in organic fertilizer utilization for maize production as perceived by extension agents and agricultural science teachers.

Research Questions:

1. What are the skills required by secondary school graduates in soil sampling as perceived by agricultural science teachers and extension agents?
2. What are the skills required by secondary school graduates in organic fertilizer application for maize production as perceived by agricultural science teachers and extension agents?

Hypotheses:

Two null hypotheses were formulated to guide the study.

Ho₁: There is no significant difference in the mean ratings of the responses of extension agents and agricultural science teachers on soil sampling skills required for maize production.

Ho₂: There is no significant difference in the mean ratings of the responses of extension agents and Agricultural science teachers on skill required in organic fertilizer application for maize production.

METHODOLOGY

The study made use of survey research design and used structured questionnaire to elicit information from respondents. The study was carried out in Plateau State. The population of the study was 369 which comprised 228 agricultural science teachers and 141 extension agents. There was no sampling hence; the entire population was involved in the study. The instrument for data collection was a structured questionnaire known as soil sampling and organic fertilizer utilization questionnaire (SSOFUO) that contained questions with response options and values of highly required (HR) (4 points); required (R) (3 points), slightly required SR (2 points) and Not Required (NR) (1 point). The instrument was face validated by three experts. One from the Agricultural Education Department and two from Soil Science Department, all from the University of Agriculture Makurdi, Nigeria. Cronbach alpha reliability method was used to determine the internal consistency of the questionnaire. A reliability coefficient of 0.84 was obtained. Three hundred and sixty nine (369) copies of the questionnaire were administered with the help of three research assistance. All the copies of the questionnaire were collected after three weeks. This shows 100% return rate. A cut off point of 2.50 and above was used as required and below 2.50 was regarded as not required.

RESULTS

Table 1: Mean ratings and standard deviation of the responses of teachers of agricultural science and extension agents on skills required by graduates in soil sampling for maize production (N=369)

S/N	Skill items	Mean \bar{x}	STD	Remark
1	Identify soil testing and analysis of instrument	3.62	0.69	Required
2	Mark out the area of the farm for testing and analysis	3.52	0.78	Required
3	Obtain soil sampling instrument from the laboratory	3.55	0.72	Required
4	Divide the farm into-different plots	3.56	0.70	Required
5	Dig hole of about 10-18cm deep	3.56	0.73	Required
6	Take a tin slide of the soil from the hole into a container	2.95	0.91	Required
7	Put the sample collected in black polythene bag	3.28	0.68	Required
8	Mix the soil sample to blend	3.57	0.70	Required
9	Spread the sample so collected on polythene bag to dry or air	3.66	0.65	Required
10	Sieve the dried soil samples with 2mm sieve	2.99	0.92	Required
11	Pack the soil sample to laboratory for testing and analysis.	3.32	0.67	Required
12	Interpret results of soil testing and analysis	3.66	0.67	Required
13	Determine through the result the best type of fertilizer suitable on the farm	3.59	0.68	Required

The data presented in table 1 revealed that 13 skill items on soil sampling had their mean values ranged from 2.95 to 3.66. This shows that the mean value for each of the skill item was above the cutoff point of

2.50, which indicates that all the 13 items were required by secondary school graduates in soil sampling for maize production. The table also shows that the standard deviation of the skill items ranged from 0.65 to 0.78 which further indicates that the respondents were not very far from the mean and one another in their response.

Table 2: Mean ratings and standard deviation of the responses of teachers of Agricultural science and extension agents on skills required in organic fertilizer application for maize production (N=369)

S/N	Skill items	Mean \bar{x}	STD	Remark
1	Identify a good organic fertilizer such as FMY, poultry droppings and cow dung.	3.70	0.62	Required
2	Put on rain boots, hand gloves and nose covers	3.69	0.65	Required
3	Get a sieve of 5mm	3.68	0.65	Required
4	Dig FYM, using a garden folk, spade or shovels.	3.66	0.68	Required
5	Collect manure in one place	3.64	0.67	Required
6	Carry manure with wheel barrow or tractor in case of large scale farms	3.59	0.72	Required
7	Broadcast organic manure by hand before tillage at least 100kg bags per hectare	3.63	0.69	Required
8	Stir the broadcasted organic fertilizer using secondary tillage implement	3.59	0.64	Required

Key: \bar{x} = mean; STD = Standard Deviation.

The data presented in Table 2 revealed that the 8 skill items in organic fertilizer application had their mean values ranged from 3.59 to 3.70. this indicates that the mean values of each of the items was above the cutoff point of 2.50, indicating that all the skills were required by secondary school graduates in organic fertilizer application. The table also shows that the standard deviation (STD) of the items ranged from 0.62 to 0.72. This implies that the respondents were very close in their response.

Table 3: t-test analysis of the mean ratings of the responses of the two group of respondents in soil sampling skills required by secondary school graduate for maize production (N=369).

GROUP	N	\bar{x}	df	t-cal	t-crit	Remarks
Agric science teachers	228	3.69	367	1.23	1.69	NS
Extension agents	141	3.74				Accept

Key: df = Degree of freedom; t-cal = t-calculated; t-crit = t-critical.

Data presented in table 3 revealed that the t-test group analysis of the mean ratings of the respondents yielded a t-cal value of 1.23 which was less than the t-critical of 1.69 a $P \leq 0.05$ (one tailed test) at 367 degree of freedom (df). This shows that there was no statistical significant difference in the mean responses of the two groups of respondents in soil sampling skills required by graduates for maize production. Therefore, the null hypothesis of no significant difference was accepted.

Table 4: t-test analysis of the mean ratings of the response of agricultural science teachers and extension agents on the skills required in organic fertilizer application (N=369)

GROUP	N	\bar{x}	Df	t-cal	t-crit	Remarks
Agric science teachers	228	3.28	367	0.96	1.69	NS
Extension agents	141	3.25				Accept

Data presented in table 4 revealed that the t-test group analysis of the mean ratings of the respondents yield a t-cal value of 0.69 which was less than the t-critical of 1.69 at $P \leq 0.05$ (One tailed test) at 367 degree of freedom (df). This indicates that there was no statistical significant difference in the mean responses of the two groups of respondents in skills required by graduates in inorganic fertilizer application. Therefore the null hypothesis of no significant difference was accepted.

Findings of the Study:

The following findings emerged from the study based on the research questions answered and hypotheses tested.

1. It was found out that all the 13 skill items in soil sampling were required by secondary school graduates in maize production in the study area.
2. It was found out from the study that all the 8 skill items in organic fertilizer application were required by secondary school graduates in maize production.
3. It was found out from hypotheses tested that there was no significant difference in the mean ratings of the responses of the two groups of respondents (teachers of agricultural science and extension agents) on the 21 skill items required by secondary school graduates in maize production in Plateau State.

DISCUSSION OF FINDINGS

The findings of the study from Table 1 revealed that 13 skill items were required by secondary school graduates in soil sampling for maize production in Plateau State. The skill items include: identify soil testing and analysis instrument, mark out the area of the farm for testing and analysis, obtain soil sampling instrument from the laboratory, divide the farm into different plots, dig hole of about 10-18cm deep, Take a tin-slide of the soil into a container, put the sample collected in black polythene bag mix the soil sample to blend, spread the sample to dry, sieve the dried soil and pack the soil sample to the laboratory. These findings are in line with the submission of Ekele (2013) and Abdulsallam (2008). The authors found out that skills in soil sampling are essential for maize production in north central zone of Nigeria. The findings were also in agreement with study by Nwankwo (2007) who found out that requisite skills in soil sampling is needed as part of soil conservation for profitable crop production.

The findings from Table 2 revealed that 8 skills were required in organic fertilizer application for maize production. These skills are: identify a suitable organic fertilizer (FYM, poultry dropping/cow dung), wear rain boots, hand gloves and nose covers, get a sieve of 5mm, dig FYM using a garden fork, spade or shovel, collect manure in one place, carry manure with wheel barrow, broadcast organic manure by hand and stir using secondary tillage implement. These findings were in consonance with the findings of Ouresh (2009) who states that cow-dung and poultry droppings are appropriate organic fertilizers applied in maize production. The findings were also in line with the work of Trivedi (2009) who identified collection of manure, sieving all the undecomposed debris and broad casting organic manure as part of the skills required for organic fertilizer application. The submission, opinion and reports of the authors cited above helped to justify the findings of the study from table 1 and 2.

CONCLUSIONS

The study focused on identification of occupational skills required by secondary school graduates in soil sampling and organic fertilizer application for maize production. The study therefore found out that the occupational skill items in soils sampling and organic fertilizer application were required by secondary school graduates for maize production in order to reduce the army of unemployed graduates in plateau slate.

RECOMMENDATIONS

The following recommendations were made based on the findings of the study.

1. The identified soil sampling skills should be packaged into training modules for unemployed secondary school graduates in order to enhance skill acquisition.
2. Skills in organic fertilizer application should be taught to students by teachers of agricultural science and should be integrated into the agricultural science curriculum at the secondary school level in Plateau State.

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