

UTILIZATION OF EQUIPMENT FOR TEACHING PRACTICAL AGRICULTURE IN FEDERAL COLLEGES OF EDUCATION IN NORTH EAST ZONE OF NIGERIA FOR NATIONAL DEVELOPMENT

BY

¹Egunsola, A. O. E. & ²Abdulummini Umar

¹ Department of Vocational Education Modibbo Adama University of Technology Yola

² Department of Agricultural Education F.C.E. (T), Gombe

Correspondence: umwakil@gmail.com. 08060643402

Abstract

This study was carried out to determine the utilization of equipment for teaching practical Agriculture in Federal Colleges of Education in the North East Zone of Nigeria for national development. Two research questions were formulated to guide the study, survey research design was adopted for the study, the population of the study comprised of 1, 038 NCE I and II agricultural education students and their teachers in three Federal Colleges of Education in the North East Zone of Nigeria. A sample size of 363 respondents (72 teachers and 150 NCE 1 students as well as 141 NCE 11 students making the sample size of 291 students) was used for the study. The instrument used for data collection was structured questionnaire titled Utilization of Practical Equipment Questionnaire (UPEQ) designed by the researchers, the instrument was subjected to face validity by three experts and the reliability of the instrument was established by trial testing and reliability coefficient of 0.81 was obtained using Spearman Brown Step up (Prophecy) formula. Data collected were analyzed using mean. The findings revealed that 34 out of 52 equipment for teaching practical Agriculture in COE were functional while 18 were not functional also 25 out of 52 equipment for teaching practical Agriculture in COE were utilized while 27 were not utilized. The study recommended that departments offering Agricultural education programs should look beyond funds from the proprietors and authorities of Colleges of Education through sponsorship and partnership with industries, non-governmental organizations, philanthropists and international donors for assistance in terms of adequacy of practical equipment.

Keywords: Utilization, Equipment, Agriculture, Practical

Introduction

Agriculture is a practical and vocational subject requires sufficient instructional material for imparting knowledge and practical skills to the learners. Agricultural Education (AE) aims at promoting acquisition of knowledge, skills and attitude required to mobilize resources for sustainable food security and national development (Yusuf 2012). Agricultural Education make use of equipment and materials to assist teachers in their effort of imparting the necessary

knowledge, skills and attitude to students. Acquisition of this knowledge can only be possible if the students are able to manipulate the necessary Agricultural equipment and materials successfully.

Equipment refers to all the potable or heavy instrument and mechanical devices for performing special operations in vocational and technical education teaching and learning situation (Raghu, 2009. Agricultural equipment facilitates effective teaching and

farming operation, the nature of Agriculture calls for practical demonstration of skills and knowledge. Therefore, Agricultural education teacher ought to use this equipment to impact knowledge and demonstrate skills to the learner; it was based on this that the Federal Ministry of Education (FME) (2004) stipulated that materials and equipment are necessary for effective teaching of practical Agriculture. NCCE (2012) classified equipment for teaching practical Agriculture at Colleges of Education level to include meteorological, survey, fishing, food processing, animal equipment, nursery equipment and farm machineries.

In Nigerian higher education system, Agricultural education is offered in the Faculties of Education in Universities and Colleges of Education. Agricultural education, either in the University or College of Education affords its recipients teaching mastery in Agricultural subjects, necessary competencies in professional Teacher Education, functional general education for life, skills to undertake research and additional learning experiences (Ndinechi, 2012).

College of Education is one of the post-secondary education institutions in Nigeria that is designed specifically to train and prepare students for the teaching industry. However, Colleges of Education provide exposure and learning for prospective teachers at the level of the Nigerian Certificate in Education (NCE) in instructional pedagogy and theories of instruction and curriculum. Similarly, apart from the professional and general education courses, students of the Colleges of Education are also exposed to their chosen subject areas such as Agricultural education. Also, the Federal Republic of Nigeria (FRN, 2012) stipulated that the minimum entry qualification into the teaching profession shall be the National Certificate in Education (NCE). In NCE Agricultural

Education students are exposed to real practical agriculture involving the use of practical equipment.

Equipment for carrying out practical skill operation in Agricultural education teaching and skill demonstration practice include equipment for nursery operation, harvesting, processing, storage as well as livestock husbandry, Agricultural survey and soil science. Manipulation of these equipment facilitate the acquisition of practical skills for self-reliance and knowledge of Agricultural practices and enhance students' ability to establish and manage farm effectively. It is therefore the responsibility of school proprietors or government as the case may be to ensure the availability of equipment and facilities required for effective lesson delivery.

Utilization, according to Raghu (2009) is the primary method by which asset performance is measured and determined. It is the transformation of a set of input into goods or services (Shuaibu and Mari, 2008). It involves creation of value. Utilization, in this context, refers to the rate or how often equipment for Agricultural practical is put into use or services by teachers of Agriculture in colleges of education. Utilization of instructional materials depends on their availability in the school.

Utilization of Agricultural instructional equipment refers to manipulation of Agricultural equipment and materials in teaching and learning process. Olaitan et al (1999) stated that utilization of instructional materials involve teachers manipulating equipment, facilities and consumable to facilitate teaching and learning activities. This means that instructional equipment for teaching practical Agriculture must be properly utilized through selection based on the need and capability of students and also in accordance with the concept and skills to be

taught and learned. Describing the desirability of utilization of instructional equipment by teachers, Kalat (2008) stated that instructional equipment could either be under-utilized when they are not maximally used or over utilized when they are given much pressure.

Successful and effective utilization of Agricultural equipment require the teacher to make serious preparation to be able to present the equipment to the students through proper planning, and ensure that teaching of the course is based on doing, because almost all Agricultural topics require practical applicability/demonstration which involve manipulation of equipment and materials that require consumables such as fuels, oils, brushes *et cetera*. According to Emah (2000) consumable materials are needed for use on some equipment and machines for practical which are sometime lacking in some schools, there by denying students opportunity to learn how to use and manipulate the equipment.

Teaching of practical Agriculture in many schools is associated with many problems, including improper demonstration of necessary skills and knowledge of agricultural practices to students, lack of indoor and outdoor laboratories, and lack of live and non-living specimens for practical and so on. If these problems are allowed to continue, the nation will continue to produce poor graduate of Agricultural education that cannot be able to operate agricultural equipment for carrying out farm operations. Consequently, the goal of Agricultural education, of producing graduates with sound knowledge and practical skills for self and national development may not be achieved. In view of this the researchers intended to carry out a study to determine the utilization of equipment for teaching practical agriculture in Federal Colleges of Education in the North East Zone of Nigeria to find if best delivery practices are used by teachers.

Decline in academic performance and lack of necessary skills and farming techniques among Agricultural education students and graduates may be attributed to inability of students to identify, operate, manipulate and maintain agricultural equipment for practical (Yusuf, 2012). This means that Agricultural education students are not receiving proper attention as regard to practical Agriculture for the acquisition of competency in practical agriculture. It is also observed that graduate of NCE Agricultural education lack the needed skills to operate simple farm equipment such as sprayer for insect control, incubator for hatching of eggs, castrator for castration of farm animal. Similarly Audu (2010) stated that many of the NCE graduates do not have the opportunity to make use of equipment and tools for agricultural practical especially when they were in school, they graduate without required practical experience. It was observed that the major teaching approaches used by teachers to teach the students are theoretical instead of being pragmatic. Therefore, if this situation is allowed to continue the NCCE objectives of equipping the students with adequate knowledge, attitude and skills to establish and manage farm would not be achieved

The main purpose of this study was to determine the utilization of equipment for teaching practical agriculture in Colleges of Education in North East Zone of Nigeria for national development. The specific objectives are to determine the:

- 1- functionality of equipment for teaching practical Agriculture in Colleges of Education
- 2- frequency of utilization of equipment for teaching Practical Agriculture in Colleges of Education

To achieve the objectives of the study, the following research questions were formulated

1. How functional are equipment for teaching practical agriculture in Colleges of Education?
2. How frequently are agricultural equipments used for teaching practical agriculture in Colleges of Education?

Methodology

The study adopted a descriptive survey research. The research design deals with gathering information about a larger number of people or object by studying a representative sample of the entire group (Yalams & Ndomi, 2000). The area of research study was North East zone of Nigeria. The target population for this study was made up 480 NCE 1, 487 NCE 11 students' as well as 72 teachers in the Department of Agricultural Education in the three Federal Colleges of Education in north eastern Nigeria. The colleges include FCE (T) Gombe having a total number of 611 students, FCE (T) Potiskum 280 students and FCE Yola with 148 students, making a population size of 1039 students; and there were 72 agricultural education teachers in all the colleges for 2015/16 academic session. The total population is 1,111 respondents. The reason for the use of NCE I and II is because it is at that level students offer practical courses namely: AGE 218 and AGE 117.

A sample size of 363 respondents made up 72 teachers and 291 students was used for the study. The sample was obtained through proportionate stratified random sampling technique. All the 72 Agricultural education teachers were included due to the fact that the whole population of teachers is manageable. For students, a sample size of 291 students was randomly selected using proportionate stratified random sampling. The sample size was determined using percentage, where 30%

of the population for each stratum was calculated and used as sample size.

The instrument for collecting data for the study was structured questionnaire titled Utilization of Practical Equipment Questionnaire (UPEQ) which was developed by the researchers. The Instrument was subjected to face validity by three experts. Reliability of the instrument was established by trial testing using twenty NCE I and II Agricultural education students of Federal College of Education Zaria, Kaduna State. Split halves method of determining reliability was employed, the group was divided in to odd number and even number groups and the scores obtained from each group was correlated using Spearman Rank Order Correlation Coefficient; and obtained the reliability coefficient of the halve test (which is the r - value), the reliability of the whole test was then computed using Spearman Brown Step up (prophecy) formula which yielded reliability coefficient of 0.81. The instrument was administered to the respondents by the researcher with the help of two assistants. The respondents were given some time (two hours) to fill the questionnaire which were collected immediately for analysis.

Data collected was analyzed using mean to answer research questions 1 and 2, decision rule of 2.50 was used, this means that mean value above 2.50 the decision was functional or utilized and mean value of less than 2.50 the decision was not functional or not utilized

Results

Table 1: Mean Responses of Agricultural Education Teachers and Students on Functionality of Equipment for Teaching Practical Agriculture (n = 363)

S/N	Equipment for teaching Remark	X	X	X
	practical Agriculture	for Teachers	for Students	Average
1	Water pumping machine	1.22	1.46	1.34 NF
2	Seed sower	1.38	1.62	1.50 MF
3	Root pruner	1.32	1.48	1.40 NF
4	Plant lifter	1.37	1.53	1.45 NF
5	Sprayer	3.90	3.98	3.94 HF
6	Flame weeder	2.28	2.52	2.40 MF
7	Water spraying machine	1.38	1.62	1.50 MF
8	Water spraying sprinkler	1.55	1.59	1.57 MF
9	Stevenson screen	1.25	1.45	1.35 NF
10	Thermo hydrograph	1.44	1.64	1.54 MF
11	Max and min thermometer	3.20	3.40	3.30 F
12	Rain gauge	3.38	3.62	3.50 HF
13	Anemometer	2.44	2.68	2.56 F
14	Evaporimeter	2.36	2.60	2.48 MF
15	Barometer	2.24	2.48	2.36 MF
16	Hygrometer	2.38	2.62	2.50 F
17	Prismatic compass	2.14	2.34	2.24 MF
18	Theodolite	3.40	3.60	3.50 HF
19	Planimeter	1.30	1.50	1.40 NF
20	Stereoscope	1.27	1.43	1.36 NF
21	Functional Tractor (one)	3.38	3.62	3.50 HF
22	Discplough	3.30	3.56	3.43 F
23	Disc harrow	3.40	3.60	3.50 HF
24	Disc ridger	3.19	3.41	3.30 F
25	4 wheeled trailer	3.23	3.47	3.35 F
26	Fertilizer sprayer	1.18	1.38	1.28 NF
27	Mould board ridger	1.88	2.12	2.00 MF
28	Mould board plough	2.23	2.45	2.34 MF
29	Tractor pulley	1.38	1.62	1.50 MF
30	Seed cleaner	1.19	1.41	1.30 NF
31	Seed grader	1.46	1.62	1.59 MF
32	Cereal thresher	1.90	2.10	2.00 MF
33	Incubator and hatcher	3.86	3.94	3.90 HF
34	Egg handler	3.70	3.98	3.84 HF
35	De-beaker	3.39	3.61	3.50 HF
36	Vaccinator	1.35	1.51	1.43 NF
37	Weighing scale	3.47	3.67	3.57 HF
38	Inter row weedier	1.30	1.50	1.40 NF
39	Fishing boat	1.40	1.60	1.50 MF
40	Sinker	1.37	1.47	1.42 NF
41	Gari Making Machine	1.34	1.50	1.42 NF
42	Cassava pelleting machine	1.16	1.32	1.23 NF
43	Milling machine	1.13	1.31	1.12 NF
44	Maize Sheller	3.30	3.50	3.40 F
45	Oil screw press	1.36	1.54	1.45 NF
46	Honey extractor	0.92	1.12	1.02 NF
47	Surgical kit	0.95	1.13	1.04 NF
48	Cattle hoof trimming set	2.94	3.14	3.04 F
49	Castrator	3.15	3.31	3.23 F
50	Sterilizer	1.40	1.60	1.50 MF
51	Candler	3.37	3.61	3.49 F
52	Bee Keeping Equipment	0.98	1.18	1.08 NF

Grand mean 2.13 2.33 2.23 NF

n= Number of observation, X= Mean, HF= Highly Functional, F= Functional, MF = Moderately Functional, NF= Not Functional

Table 1 clearly revealed that about nine (17%) out of the fifty-two equipment for teaching practical Agriculture in COE are highly functional, ten (19%) were functional, fifteen (29%) were moderately functional, and

eighteen (35%) were not functional. Table 1 with a Grand mean average of 2.23 revealed that equipment for teaching practical Agriculture in COE were not functional.

Table 2: Mean Responses of Agricultural Education Teachers and Students on Frequency of Utilization of Equipment for Teaching Practical Agriculture (n = 363)

S/N	Equipment for teaching practical Agriculture	X for Teachers	X for Students	X Average	Remark
1	Water pumping machine	1.30	1.50	1.40	NU
2	Seed sower	1.33	1.53	1.43	NU
3	Root pruner	1.20	1.40	1.30	NU
4	Plant lifter	1.35	1.53	1.43	NU
5	Sprayer	1.45	1.65	1.55	MU
6	Flame weeder	1.30	2.50	2.40	MU
7	Water spraying machine	1.35	1.55	1.45	NU
8	Water spraying sprinkler	1.39	2.59	1.49	NU
9	Stevenson screen	1.20	1.40	1.30	NU
10	Thermo hydrograph	1.35	1.55	1.45	NU
11	Max and min thermometer	2.30	3.50	3.40	U
12	Rain gauge	1.40	2.60	2.50	U
13	Anemometer	1.28	1.44	1.34	NU
14	Evaporimeter	1.38	1.58	1.48	NU
15	Barometer	1.50	1.70	1.60	MU
16	Hygrometer	1.90	2.10	2.00	MU
17	Prismatic compass	1.95	2.15	2.05	MU
18	Theodolite	1.39	2.59	2.49	MU
19	Planimeter	1.30	1.50	1.40	NU
20	Stereoscope	1.38	1.58	1.48	NU
21	Functional Tractor (one)	3.50	3.70	3.60	HU
22	Discplough	3.30	3.50	3.40	U
23	Disc harrow	2.90	3.10	3.00	U
24	Disc ridger	2.95	3.15	3.05	U
25	4 wheeled trailer	2.40	2.60	2.50	U
26	Fertilizer sprayer	1.30	1.50	1.40	NU
27	Mould board ridger	1.40	1.60	1.50	MU
28	Mould board plough	1.46	1.66	1.56	MU
29	Tractor pulley	1.39	1.59	1.49	NU
30	Seed cleaner	1.20	1.40	1.30	NU
31	Seed grader	1.26	1.46	1.36	NU
32	Cereal thresher	1.90	2.10	2.00	MU
33	Incubator and hatcher	2.90	3.10	3.00	U
34	Egg handler	3.23	3.43	3.33	U
35	De-beaker	3.13	3.33	3.23	U
36	Vaccinator	2.02	2.22	2.12	MU
37	Weighing scale	3.06	3.26	3.16	U

38	Inter row weedier	1.25	1.45	1.35	NU	
39	Fishing boat	1.39	1.59	1.49	NU	
40	Sinker	1.26	1.46	1.36	NU	
41	Gari Making Machine	1.27	1.47	1.37	NU	
42	Cassava pelleting machine	1.10	1.30	1.20	NU	
43	Milling machine	1.25	1.45	1.35	NU	
44	Maize Sheller	1.30	1.50	1.40	NU	
45	Oil screw press	1.24	1.42	1.34	NU	
46	Honey extractor	1.10	1.10	1.20	NU	
47	Surgical kit	1.22	1.22	1.32	NU	
48	Cattle hoof trimming set	1.38	1.38	2.48	MU	
49	Castrator	1.24	1.24	2.34	MU	
50	Sterilizer	1.90	1.90	2.00	MU	
51	Candler	1.40	1.40	3.50	HU	
52	Bee Keeping Equipment	1.16	1.16	1.26	NU	
Grand mean		3.97	1.96	2.97	U	

n= Number of observation, X= Mean, HF= Highly Utilized, U= Utilized, MF = Moderately Utilized, NF= Not Utilized

Table 2 clearly revealed that about two (4%) of the equipment for teaching practical Agriculture in COE are highly utilized, ten (19%) are utilized, 13 (25%) are moderately utilized, and 27 (52%) are not utilized. Table 2 with a Grand mean of 2.97 revealed that equipment for teaching practical Agriculture in COE were utilized by Agricultural Education teachers

Findings of the Study

1. 34 out of 52 equipment for teaching practical Agriculture in COE were functional while 18 were not functional
2. 25 out of 52 equipment for teaching practical Agriculture in COE were utilized while 27 were not utilized

Discussion of Findings

This study revealed that about 34 of the equipment for teaching practical agriculture in COE are functional, while 18 are not functional as indicated in Table 1. This means that majority of the available equipments for teaching practical agriculture in COE in the north east zone of Nigeria were totally not functional and it is when these equipment are

functional that they will be utilized by teachers in the process of teaching. Therefore schools and colleges should always ensure and maintain all required equipment to make them available for teaching practical Agriculture. Ukwetura (2012) also stated that teachers should be encourage to use and maintain instructional materials for teaching Agricultural science through incentives, motivation and all the necessary support that will enable teachers utilized such instructional materials. Also departments should regularly appraise and review the statuses of their instructional resources vis-a-vis the students' enrolment to enable them adjust where needed (Moses & Chimezie 2013)

The finding of the study on the frequency of utilization of equipment for teaching practical Agriculture revealed that about 2 of the equipment for teaching practical Agriculture in COE are highly utilized these include candles and sprayer; the reason for this is probably due to their availability in the study area. The findings of the study also showed that ten (19%) of the equipment for teaching practical Agriculture were utilized these include minimum and maximum thermometer, rain gauge, disc plough, disc harrow, disc

ridger, 4 wheeled tractor, incubator, egg handler, de beaker and weighing scale while thirteen (25%) of the equipment for teaching practical Agriculture are moderately utilized, these include sterilizer, cattle hoof trimming set, castrator, vaccinator, cereals thresher, mould board ridger, mould board plough, plain meter, theodolite, prismatic compass, barometer, flame weeder and sprayer while twenty seven (52%) of the equipment for teaching practical Agriculture are not utilized these include water pumping machine, seed sower among others in table 4.

Contrary to the findings of Ukwetura (2012), who reported that six of the identified instructional materials for teaching crop production were utilized, 15 items were moderately utilized and only 1 item was slightly utilized. Meanwhile, instructional materials for teaching Animal production indicate that 6 of the identified materials were utilized, 13 were moderately utilized and 1 item was slightly utilized. The reason for the higher rate of non utilization in this study may be as a result of lack of encouragement for use instructional equipment for teaching practical Agriculture as a result of inadequate incentives, motivation and necessary support that will enable teachers utilized such equipment.

Meanwhile in a study conducted by Asogwa, Onu, and Egbo (2013) revealed that out of all the instructional materials recommended by the National Educational Research and Development Council (NERDC, 2009) for teaching fish production to students only 8 are often utilized by teachers in senior secondary schools. It implies that teachers probably improvise the use of others. The non utilization of the equipment might be due to lack of incentives to Agricultural education teachers in the colleges. Oketura (2012) reported that 92% of his respondent supported the view that lack of incentives and

motivations for teachers were some of the problems experience by teachers in the selection and utilization of instructional equipments. Meanwhile, Murphy (1988) reported that lack of administrative support to teachers is one of the obstacles to the utilization of instructional equipments in Agricultural education.

Conclusion

Many of the equipment for teaching practical Agriculture in Colleges of Education in the North east zone of Nigeria are not functional and are not frequently utilized by Agricultural education teachers to teach students the required knowledge, skills and attitudes. The best delivery practice in view of this study is a combination of theory and practical lessons which should involve utilization of functional equipment to teach agricultural education students the salable skills to help them get employed on graduation or become self-reliant creating and managing their own agricultural businesses and even employ other people. Anything short of this is not a good delivery practice of agricultural education.

Recommendations

1. The NCCE should enforce and ensure that Agricultural education teachers are using Agricultural equipment and materials in conducting practical
2. Departments offering Agricultural education programs should look beyond funds from the proprietors and authorities of Colleges of Education through sponsorship and partnership with industries, non-governmental organizations, philanthropists and international donors for assistance in terms of adequacy of practical equipment.
3. Agricultural education departments should regularly appraise and review the statuses of their instructional equipment vis-a-vis the students'

enrolment in their programme to enable them adjust where needed.

NCCE Standard for Colleges of Education in Nigeria. *Journal of Education and learning*, 2 (2) 165-178

References

- Asogwa V. C, Onu D. O & Egbo B.N (2013). Availability and utilization of instructional materials for effective teaching of Fish production to students in senior secondary school in Benue State, Nigeria, *African Journal of Agricultural Research* 8(49) 60-68
- Audu, H. (2010). Challenges and way forward for the achievement of technical education Students. *New Nigeria* 20th January, 2010 p.26
- Emah I. E. (2000). The Funding need of vocational and technical education programme in Nigeria School System. *Journal of Nigerian Teacher Technology* 5(1)18-21
- Federal Republic of Nigeria (2012). *National policy on education* 6th Edition, Federal Ministry of Education, Nigeria
- Federal Ministry of Education (2004). Agricultural science curriculum for senior secondary school. National Education Research and Development Council Abuja
- Kalat I. K. (2008). Technical and vocational education. instructional facilities as a means of national development toward the realization of vision 2020 *proceeding of the 21st annual national conference of Nigeria association of teachers of technology Held in Plateau state* 269-273
- Moses, O. & Chimezie, C. O (2013). Assessment of the adequacy of instructional resource in business education programme: Relative to
- Murphy H. (1988). Opportunities and obstacles for distance education in agricultural education. *Journal of Agricultural Education* 39 (10), 28-36
- National Commission for College of Education (2012). National commission for colleges of education, Nigeria Certificate in Education Minimum Standards for Vocational and Technical Education. NCCE Abuja
- National Educational Research and Development Council, (2009). *Instructional Materials for Teaching Agriculture*, Nigerian Education Research and Development Council. Lagos. NERDC Press
- Ndinechi, F. (2012). A Study of Factors Influencing the Expansion of Agriculture in Secondary Schools in Mbale District. B.Ed research report, Makerere University, Kampala
- Olaitan S. O, Nwachukwu .E. Igbo C.A. Anyemachi G. A. and Ekong A. O (1999) Curriculum development and management in vocational technical education. Onisha Cape Publishers International Ltd.
- Raghu U (2009). *Utilization of economic resources*. Retrieved from www.google.com on 6/5/13.
- Shaibu, A.M & Mari J.S (2008). Enriching laboratory activities in school: Implication for the chemistry teachers: *41st STAN Annual Conference Proceedings* 146-148

- Ukwetura J. A. (2012). Utilization of identified instructional material in teaching of agricultural science in secondary school in Taraba State. M. Tech Thesis M.Tech, Yola
- Yalams S. M. & Ndomi B. M. (2000). *Research report writing and supervision*, A guide to supervisor and students in Education, Engineering, Science and Technology (League of Researchers in Nigeria) Bauchi, Nigeria
- Yusuf J. J (2012). Evaluation of agricultural science laboratory in government secondary schools in Kaduna state MTech Thesis MAUTECH, Yola (unpublish material)