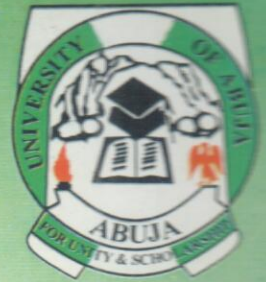


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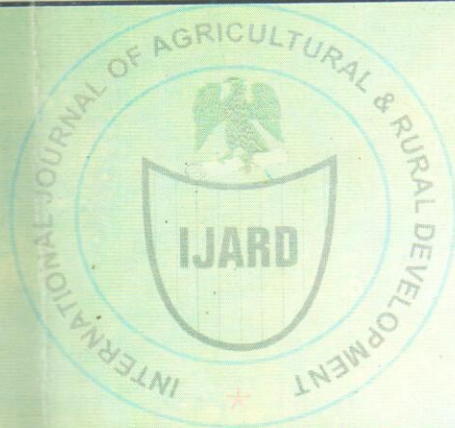


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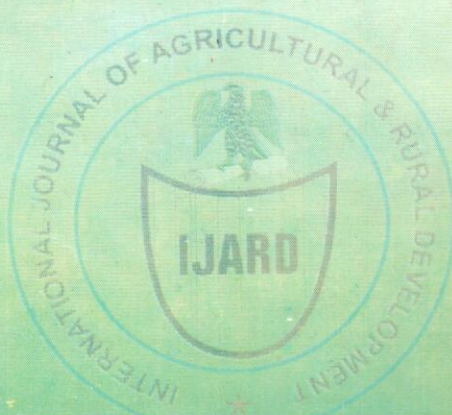
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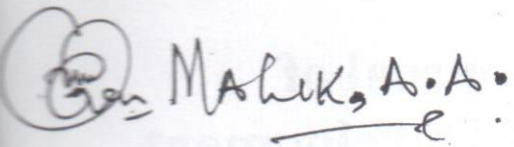


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AGRICULTURAL DEVELOPMENT IN NIGERIA: THE NEED FOR A PARADIGM SHIFT IN THE TEACHING OF AGRICULTURAL SCIENCE IN SECONDARY SCHOOLS

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ABSTRACT

Some secondary schools in Kuje Area Council of FCT (53%) were used to determine the adequacy of the present Agricultural Science Curriculum in meeting the needs of sustainable food security in Nigeria. Statistical tools of mean, standard deviation and percentages were used to compare responses from both Public and Private schools, as well as from both rural and urban schools. Using the Likert Scale of 1-4 for ranking, the major problems facing the teaching of Agricultural Science in Secondary Schools in Kuje Area Council were determined (in order of magnitude) as follows: Lack of farm machines for use in the schools; problem of poor funding of the agricultural sector by the government thereby seriously hampering the teaching of the subject in the schools; lack of fish ponds in the schools; lack of school orchards and problem of low level allocation of fund for execution of agriculture and agriculture-related projects in the schools. The present agricultural science curriculum encourages rote learning and places more emphasis on theoretical knowledge display, with less emphasis on practical skill acquisition. Hence, there is the urgent need to provide secondary schools in Nigeria with adequate infrastructural and learning facilities for the effective teaching of the Agricultural Science Curriculum so as to facilitate a paradigm shift from the present classroom rote learning to practical skill acquisition for sustainable food security.

Keywords: Sustainable food security, infrastructural facilities, curriculum, skill acquisition

INTRODUCTION

The world population today is estimated to be 7 billion. Human population is continuously increasing with an average of 5 children born every second. These children and the rest of the human race need to be fed, clothed and sheltered – with produce from agriculture (Theodore, 2008).

Many nations of the world, especially in Africa, suffer from famine as food production and distribution fail to meet the demands of the ever increasing human population. Hence, there is the need for increased food production through agriculture in order to meet the demand of an ever-growing world population (NRC, 1996). And today, at the dawn of the 21st century, agriculture has grown in leaps and bounds into specialized sciences such that agricultural science education now deals with “instruction in agriculture emphasizing the principles, concepts and laws of science and their mathematical relationships; as well as supporting, describing and explaining agriculture with a foundation in biological and physical sciences” (Buriak, 1992).

The secondary schools are designed to provide basic and fundamental training in agriculture to students, through acquisition of theoretical knowledge and practical skills, which will serve as springboards for choice of future careers in agriculture. The Agricultural Science Curriculum as stipulated in the Federal Ministry of Education's National Curriculum on

Agricultural Science for Secondary Schools (latest edition) emphasizes the following:

- To promote an appreciation of Agriculture as an applied science;
- To promote an understanding of the basic concepts in agriculture;
- To stimulate an interest in, and create an awareness of, the existing problems and opportunities in agricultural and rural development;
- To promote the acquisition of practical skills and competencies in agriculture; and
- To encourage students to take up future careers in agriculture.

These are lofty goals and ideals which, ordinarily, should be achieved if the Agricultural Science Curriculum is properly taught in our secondary schools in Nigeria, backed by conducive and enabling school learning environments. But is this really the case in our secondary schools in Nigeria today?

Statement of the Problem

The mission of secondary agricultural education is to prepare “students for successful careers in agriculture, with a life time of informed choice in the global agriculture, food, fibre and natural resources systems” (Crowder *et al.*, 1999). But according to Atsumbe (1996), “the teaching of agricultural science in Nigerian schools and colleges is limited to class room theoretical instruments with little or no emphasis on practical and ‘hands-on’ experience in agro-based establishments. Work experience programmes in which the students are occasionally involved have not been successful in preparing the students properly for entry and advancement into the occupations of their choice in agriculture.” What this implies is that the present Agricultural Science Curriculum as taught in the secondary schools in Nigeria does not seem to be meeting the need of sustainable food security in the country. So, the focus of this Study is to provide answers to the following research questions:

1. Is the teaching of Agricultural Science, as presently taught in our secondary schools in Nigeria, really meeting the needs of sustainable food security in Nigeria?
2. Do the secondary schools in Nigeria (both Private and Public) have the required conducive and enabling learning environments necessary for the teaching of the subject (such as sufficient number of trained and experienced teachers for teaching the subject; possession of standard and recommended quality textbooks by both staff and students; and adequate motivation of both staff and students for teaching and learning of the subject)?
3. Do the secondary schools have the required laboratory and infrastructural facilities (such as functional school farms, school orchards, fish ponds and modern farm tools and farm machines, etc) necessary for the adequate teaching of the subject?

Objectives of the Study

The general objective of this Study is to critically assess the adequacy of the present Agricultural Science Curriculum in meeting the needs of sustainable food security in Nigeria, using Kuje Area Council as a case study. The specific objectives include:

To obtain relevant facts and statistics on the nature of the problems facing the teaching of agricultural science in secondary schools in Kuje Area Council of FCT.

To study the practicalities and circumstances surrounding the teaching of agricultural science as a subject in secondary schools in Kuje Area Council of FCT.

To make recommendations based on findings. These can then be used by educational planners and policy makers as tools for social and economic change in Nigeria's march towards overall agricultural growth and development.

MATERIALS AND METHODS

Study Location

Kuje Area Council constitutes one of the six Area Councils that make up the Federal Capital Territory (FCT) of Nigeria; the others being Gwagwalada, Kwali, Abuja Municipal, Abaji, and Bwari. It is located in the North Central region of FCT, lying between longitude 8° - 9° east and Latitude 7° north. It is bounded on the Northeastern side by Abuja Municipal Area Council, on the West by Gwagwalada Area Council and on the Southwest by Abaji Area Council. The Area Council covers a total land area of 1800km^2 , forming about 22.5% of the FCT, and with an estimated population of $\frac{1}{4}$ of a million (NPC, 1991).

The mean annual rainfall varies from 1000 mm – 1500 mm, and spreads from late April to late October; while the dry season starts from November to March. The mean maximum daily temperature varies between 27°C - 30°C , depending on the weather condition, while the period of dry cool weather (harmattan) is between November to January (Balogun, 2001).

Kuje is regarded as the food basket of Abuja, as more than 50% of the food being consumed in Abuja is estimated to come from this agriculturally-endowed Area Council. It is an area that is chiefly populated by people of the Gwari tribe, who are known for their prowess in yam production.

Kuje Area Council has a large expanse of fertile farmlands, with numerous individually-owned commercial farms dotting the length and breadth of the Area Council. This intense agricultural activity is the main reason for its choice as the study area.

Data Collection and Analysis

The instrument used for data collection consisted of structured questionnaires. Data were collected, using these questionnaires, from agricultural science teachers in selected secondary schools through the use of the Stratified Sampling Technique (SST). The selected secondary schools for this study represented all the categories of secondary schools in Kuje Area Council of FCT - including Government-owned, Mission-owned, Privately-owned or Community-owned schools. Also, the secondary schools covered were evenly spread across all the major geographical zones of the Kuje Area Council of FCT - including both the rural and urban areas.

Statistical tools such as frequency counts, percentages, measures of central tendency (mean) and measures of dispersion (standard deviation) were used to analyze the collected data.

RESULTS AND DISCUSSION

Analysis of Returned Questionnaires

A total of 14 questionnaires were issued to agricultural science teachers in 8 out of the identified 15 senior secondary schools in Kuje Area Council of FCT (being 53.33%); 13 of the questionnaires were returned duly filled (about 93%), and were used for data analysis.

Demographic Characteristics of Respondents

Table 1 below summarizes the demographic characteristics of all the agricultural science teachers who participated in the Research Study. From the table, it is very clear that all the agricultural science teachers in secondary schools in Kuje Area Council are university graduates; with 84.6% having their first degree in Agriculture and the remaining 15% having their Masters degree. There is no agricultural science teacher in Kuje secondary schools that has only Certificate or Diploma in Agriculture as his/her only educational qualification. Also, over 90% (92.3%) of the agricultural science teachers have professional teaching qualifications, with less than 10% yet to professionalize in teaching. This shows that all the agricultural science teachers in Kuje Area Council secondary schools used for this study are fully qualified and capable of teaching the subject. They have teaching experiences ranging from 1-5 years (15.4%), 6-10 years (23.0%), 11-15 years (46.2%), 16-20 years (7.7%) and above 20 years (7.7%). These positive qualities may be due to the Policy of the Ministry of Education of FCT in ensuring that only qualified teachers are allowed to teach in all the secondary schools in FCT.

Number of Students per Class

Table 2 below summarizes the average number of students per class for all the categories of schools in Kuje Area Council of FCT. The Nigerian National Policy on Education (1977) stipulates 20 students per class in pre-primary class, 30 in primary and a maximum of 40 in secondary school. From the table, it is clear that there is problem of overpopulation in Government-owned schools, with a population of between 50 – 121 students per class. Privately-owned schools, on the other hand, have the ideal and manageable number of students per class. Mission-owned schools have class population that is intermediate between Government-owned and Private schools.

Teacher's experience have shown that overcrowded classes pose a lot of problems in teaching and assessment, and this problem could affect the quality of education in secondary schools. With large classes, there is tendency for students to develop negative attitudes towards learning new things; there is discipline problems; students using the mother tongue when asked to work in pairs or groups; noise making; lack of opportunity for developing individual communicative skills and problems of boredom in teaching and testing as well as teacher domination - leading to a teacher-centred instead of a student-centred learning (Osasona, 1996).

Due to these problems, many good teachers have either resigned or are frustrated. The frustration leads to some teachers not attending classes regularly or not giving written assignments. Constructing, marking and recording test scores in large classes entail detailed work; the amount of marking involved can dissuade even the most enthusiastic teacher from setting

the amount of written work that he feels would benefit the student. Hence, effective learning is hampered. Therefore, there is the need for Government to break up these large classes into smaller manageable classes, and then employ more teachers to manage these classes.

Problems Facing the Teaching of Agricultural Science in all the Secondary Schools in Kuje Area Council

Based on the analysis of filled questionnaires collected, the problems facing the teaching of agricultural science in all the secondary schools in Kuje Area Council are presented in Table 3 below. Based on the ranking of these problems from 1st - 21st, it is very clear that the teaching of agricultural science in Nigerian secondary schools is bedeviled by a whole lot of problems which are hampering the effective teaching of the subject. This result is similar to the result obtained from a research study carried out by Abolaji (1985) on 60 secondary schools in Kwara State. He found that the most serious problem was lack of agricultural laboratory (mean=4.9) while the least serious problem was curriculum does not meet students' needs (mean=2.1).

The results from various research findings show that the problems facing the teaching of agricultural science in Nigerian schools are fundamental and ramifying, indicating that the present agricultural science curriculum as taught in the secondary schools is not meeting the needs of sustainable food security in Nigeria. This is in conformity with the findings of Okorie (2001) that the agricultural science curriculum in Nigeria is primarily concerned with academic preparation for entry into university studies while neglecting vocational or occupational education, and that students lack the opportunity to apply classroom instruction.

According to Boone (1990), "the problem-solving approach to teaching has been widely accepted as the way to teach vocational agriculture (i.e. agricultural education). When students solve real problems, use the scientific method to reason through a problem solution, test potential problem solutions, and evaluate the results of that solution, retention of knowledge learned through this activity increases. Therefore, the problem-solving approach to teaching increases the level of student retention of agricultural knowledge learned during an instructional unit".

Dyer and Osborne (1996) also suggested that in teaching agricultural science, "the problem solving approach is more effective than the subject matter approach in increasing the problem solving ability of agriculture students". And these propositions are congruent with the prevailing philosophy of agricultural education: experienced-based learning rich in opportunities for problem solving that is delivered contextually through the agricultural, food, and natural resources system. That is why students should be exposed to both formal (in-school) and informal (out-of-school) settings through rigorous classroom and laboratory instructions as well as community-based Supervised Agricultural Experiences (SAEs).

Budke (1992) stated that, when properly taught, "agriculture provides a marvelous vehicle for teaching genetics, photosynthesis, pollution control, water quality, reproduction and food processing where real life examples can become part of the class room for experimentation and observation."

RECOMMENDATIONS

Based on the findings of this Study, the following recommendations are made:

For effective teaching and learning of Agricultural Science in our Secondary Schools in Kuje Area Council of FCT and by extension all the secondary schools in Nigeria, there is the need for Government to break up large classes (of between 50 to 120 students per class in the Public Schools) into smaller and more manageable classes (of not more than 40 students per class). And then, increased numbers of qualified and experienced teachers should be employed to manage these classes.

As private schools contribute a lot to the educational development of this country, farm machines and equipment should be made available to these Schools, at subsidized prices by the Government, for use on their farms. This will go a long way in enhancing practical commercialization of agriculture in Nigerian schools.

A form of Tractor Hiring Scheme should be instituted in Kuje Area Council, and by extension all the other Area Councils in FCT and the 774 local government areas in Nigeria; with a supporting farm machine Repair and Maintenance Workshop in each Area Council of FCT and in each Local Government Headquarter, to enhance efficiency of agricultural production.

The Federal Department of Fisheries as well as the Federal Ministry of Agriculture and Natural Resources should provide the Federal secondary schools with the necessary logistics and assistance, in establishing fish ponds and school orchards respectively. The States' Ministries of Agriculture and Departments of Fisheries should also do the same for their schools because these facilities are valuable learning resources for agricultural science students in the secondary schools.

Workshops, Seminars, Agricultural Shows and Excursions should be organized for students in order to demonstrate to them the practical importance of agriculture, and to accord agriculture its proper place and status in the society. In this way, a lot of youth will be encouraged to take up careers in agriculture.

Also, there should be increased co-operation between secondary schools and agricultural research institutes in Nigeria for students to be fully aware of the latest technologies in agriculture.

The remuneration of agricultural science teachers should be raised in both private and public schools.

Agricultural science teachers should be allowed to go on in-service training or study-leave-with-pay, from time to time, in order to upgrade their educational status and field experience.

Schools in Kuje Area of FCT should be well-equipped with modern agricultural laboratories. Also, both teachers and students should be provided with sufficient amount of standard and recommended agricultural science textbooks. The School Library should also be well-stocked with relevant textbooks, journals and encyclopedias on agriculture.

The FCT Agricultural Science Curriculum should be reviewed and geared towards practical agriculture and acquisition of practical field

experiences rather than classroom rote learning. The agricultural science syllabus in the secondary schools should align with the reality of attainment of sustainable food security in the country.

Lastly, the periods for teaching agricultural science in class should be increased to give room for more practical field-based experiences for students.

CONCLUSION

The mission of agricultural education is to prepare “students for successful careers in agriculture, with a life time of informed choice in the global agriculture, food, fibre and natural resources systems” (Crowder *et al.*, 1999). Therefore, the teaching of agricultural science needs to be standardized in all our secondary schools in Nigeria through the provision of adequate infrastructural and learning facilities. This is because *agriculture today has graduated from being a mere science to a technology*. Hence, we must not be seen to be *merely teaching agricultural science* in our secondary schools in Nigeria, but to be *actually practicing agricultural technology*. *That is the paradigm shift – the radical change – that we need to adopt in our secondary schools in Nigeria today!*

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APPENDIX

Table 1: Demographic Characteristics of Respondents

S/N	Demographic Characteristics		Frequency	Percentage
1.	Sex	Male	10	76.9
		Female	3	23.1
2.	Level of Education	'O'level/equivalent	-	0.0
		Certificate in Agric.	-	0.0
		Diploma Agric. Ed.	-	0.0
		B.Sc. Agric/Agric. Ed. or equivalent	11	84.6
		M.Sc. Agric. or Ed.	2	15.4
3.	Teaching Experience	1-5 years	2	15.4
		6-10 years	3	23.0
		11-15 years	6	46.2
		16-20 years	1	7.7
		21 years and above	1	7.7
4.	Marital Status	Single	2	15.4
		Married	11	84.6
5.	Age	20-30 years	-	0.0
		31-40 years	9	69.2
		41-50 years	4	30.8
		51 years and above	-	0.0
6.	Type of School	Government-owned	7	53.8
		Mission-owned	2	15.4
		Privately-owned	4	30.8
7.	Salary per month (Naira)	Less than N20,000	1	7.7
		N21,000- N30,000	3	23.0
		N31,000- N40,000	5	38.6
		N41,000- N50,000	3	23.0
		Over N50,000	1	7.7
8.	Professional teaching qualification	Yes	12	92.3
		No	1	7.7

Source: Field Survey data, 2007

Table 2: Average Number of Students per Class

Type of school	Mean (X)	Standard Deviation (SD)
1. Government-owned	86	34
2. Mission-owned	38	3
3. Privately-owned	21	3

Source: Computed from Survey data, 2007

Table 3: Mean, Standard Deviation and Ranking of the Problems Facing the Teaching of Agricultural Science in all the Secondary Schools in Kuje Area Council

S/No	Problems	Mean (X)	SD	Ranking
1.	No farm machines for use in the school	3.77	0.44	1 st
2.	Government's poor funding of the agricultural sector is seriously hampering the teaching of the subject	3.54	0.52	2 nd
3.	No fish pond	3.54	0.52	2 nd
4.	No School orchard	3.08	0.86	4 th
5.	Poor funding of agriculture and agriculture-related activities in the School	3.08	0.76	4 th
6.	Remuneration is low and there is poor motivation for agricultural science teachers	3.00	0.58	6 th
7.	No study leave or in-service training for agricultural science teachers	2.92	1.04	7 th
8.	Not enough farm tools and equipment for use during practical classes	2.85	0.69	8 th
9.	Agricultural science teachers are burdened with heavy teaching loads in the School	2.85	0.80	8 th
10.	Not enough agricultural science teachers in the School	2.69	0.95	10 th
11.	No well-equipped and functional agricultural laboratory	2.62	0.96	11 th
12.	Parents are discouraging their children from pursuing careers in agriculture	2.62	0.92	11 th
13.	Problem of students' indiscipline is affecting the teaching of the subject	2.54	1.05	13 th
14.	No poultry farm	2.46	1.13	14 th
15.	Overpopulation of students per class	2.38	1.45	15 th
16.	Not enough teaching class periods for the subject	2.23	0.73	16 th
17.	The present FCT agricultural science curriculum is not meeting the needs of students	2.23	0.73	16 th
18.	Not enough standard and recommended textbooks for use by students	2.31	1.11	18 th
19.	The students are not interested in agricultural science as a subject	2.00	0.71	19 th
20.	Not enough standard and recommended textbooks for use by teachers	1.92	0.86	20 th
21.	No functional School farm	1.54	0.52	21 st

SD = Standard deviation

Source: Computed from Survey data, 2007