

CONTRIBUTION OF UNIVERSITY FARMS TO TEACHING AND LEARNING OF AGRICULTURAL SCIENCE IN GHANA

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Abstract

The study was carried out to assess the extent to which university farms contribute to the teaching and learning of agricultural science in the five state universities of Ghana. The universities are the University of Ghana, Kwame Nkrumah University of Science and Technology, University of Cape Coast, University of Education and University for Development Studies. In the process, the study examined causes or reasons for graduate low interest in pursuing farming careers. Semi-structured questionnaires were prepared for undergraduates and lecturers. Snowball and random sampling techniques were used in this study. The study revealed that agricultural science is best learnt at both farm and lecture room. The study also indicated that university farms help in acquiring practical skills and it is necessary for teaching the principles of the course. However, the study revealed that a large number of undergraduates are not equipped with the needed practical skills and the confidence to go into farming on leaving the university. The main factors identified for this gap were the lack of supervision, lack of basic and modern facilities on the farms, lack of motivation, inadequate funds, and inadequate time allotted for practical on the farms. It is therefore recommended that university authorities should link with private and state farms that have modern and basic facilities/equipment so that these farms can serve as alternative sources for imparting practical skills to students. The universities could introduce income generating ventures to assist in the purchases of some facilities. It is also recommended that the time for practical work be increased and supervised practical work possibly instituted. This should enable lecturers to spend more time on the supervision of students' practical work on the university farms. Finally, well-trained farm staff should be employed to support fieldwork.

1. Introduction

Agriculture is the second oldest technology in the world, and only primitive food gathering, hunting and fishing are older. Agriculture is the bedrock of the economy of developing countries and its importance has not declined. Three out of four people living in developing countries work in agriculture, however, they produce less

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food per capita today than they did in the past, in spite of the green revolution (UN (ACC/SCN), 1987).

Historically, agricultural education in schools all over the world began with gardens in which students learned to work and appreciate the product of their efforts. Agricultural education and establishment of school farms were introduced into Ghana by the Basel Mission (McWilliam and Kwamena-Poh, 1975). The establishment of school farms culminated eventually in the establishment of the Aburi Botanical Garden in 1897 for the purpose of cultivating crops. According to Graham (1971), the early missionaries hoped that by approaching the teaching of agriculture in schools with emphasis on practical work done in school farms they could provide the African with a worthwhile occupation on leaving school. With such hope, Freeman of the Wesleyan Mission also established two model farms at Dominasi and Manso in the Central Region.

Unlike many other occupations, agriculture is intrinsically connected with the land and work in a rural surrounding. The agricultural teachers could therefore adopt the slogan: "The real classroom is outside". Simple experiments on school farms provide teachers with a unique opportunity to set up meaningful experiments and based on such experimental procedures the results have a high practical significance. The results can be used to train students in decision-making, and many biological principles can be practically applied, thus enhancing transfer of knowledge. The participation of students in practical activities on farms motivates them and the ultimate objective of learning is achieved. For example, Laogun (1984) stated that when a student participates in practical agricultural activities, knowledge acquired should give him the urge for more practical work.

Tertiary institution farms have always been used to give students the opportunity to study live plants and animals in various seasons and stages of development. Olaitan (1984) reported that school farms help students to study technical facts and related knowledge in agriculture when they are allowed to undertake field demonstrations to complement theoretical lessons in the classroom. Farms facilitate teaching because they serve as laboratories for demonstration and

enhance the teaching of practical activities. Farrant (1980) stated that a proportion of teaching should be devoted to practical work where students practice skills being taught.

Awuku et al., (1991) defined agriculture as the science, art and business of cultivating the soil, producing crops and raising of farm animals. The science aspect of agriculture is made up of all the knowledge concerning agricultural production that enables one to understand and solve problems in agricultural production. The art aspect of agriculture is the 'doing' part and consists of the skills acquired and used by those engaged in agricultural activities. Addo-Quaye et al., (1993) simplified agriculture as the sum of science and practice of farming. According to the FAO Report (1996) "experiential learning" approach which has been developed for teaching agricultural science views learning and farming environments as "soft systems" meaning systems that are not fixed. Presently, most graduates of agricultural science are not interested in going into farming after completing their programme. In cases where they are employed in establishments whose main organisational goal is the production of agricultural products, graduates often are found unable to translate scientific knowledge and even practical skills acquired in the university into field application. One may ask: Are these farms not contributing effectively to teaching and learning of agricultural science? Why are graduates not encouraged to go into practical farming? The main purpose of the study therefore is to assess the contribution of university farms to teaching and learning of agricultural science, and identify the causes or reasons for graduates not interested in going into farming.

2. Methodology

2.1 Target population

The study was carried out in the year 2000 at the five state universities, University of Ghana, Kwame Nkrumah University of Science and Technology, University of Cape Coast, University of Education, (Mampong Campus) and University for Development Studies (Nyankpala Campus).

The sampling frame consisted of lecturers and continuing undergraduates (those who had spent at least one year in the university) in Faculties/Departments of Agricultural Science. Sampling was restricted to continuing students because at the time of sampling, the first year undergraduates had not spent much time in the university and therefore had little knowledge of the university farms.

2.2 Sampling

Chain or snowball sampling was employed for undergraduates of University of Ghana, Kwame Nkrumah University of Science and Technology, and University of Cape Coast. The chain sampling was employed by making first contact with a member of the target population and then asking if he/she knows any other members. Random sampling was employed for undergraduates of University of Education, and University for Development Studies. The difference in sampling was due to the nature and location of the campuses of the target groups. Random sampling was employed for lecturers of the five universities.

2.3 Research instrument

Semi-structured questionnaires were prepared for undergraduates and lecturers. The lecturer's questionnaire was made up of 24 items which included academic rank, specialization, duration of practical work on the farm, supervision of students, facilities on the farm, necessity of farms for teaching and learning, problems on the farm, etc. Student's questionnaire was made up of 34 items which included facilities on the farm, time for practical work, group or individual work, activities undertaken on the farm, motivation, exposure to state and private farms, necessity of farms for teaching and learning, problems on the farm, etc.

2.4 Data collection procedure and analysis

Before administering the questionnaires to respondents, a pre-testing exercise was undertaken by administering drafted questionnaires to five undergraduates and five lecturers at the University for

Development Studies. This was to enable necessary corrections and removal of ambiguities in the questionnaires, before they were administered to the target population. Final questionnaires were then administered to 20 undergraduates and 10 lecturers in each state university giving a total of 150 respondents.

Respondents were given two weeks to answer and return the questionnaires. One hundred and thirty copies of the questionnaires were retrieved, representing a response rate of 87%.

The questionnaires were grouped into "students" and "lecturers" after retrieval and responses tallied item by item for 'Yes' or 'No' questions, and multiple choice questions. Open-ended questions were recorded and ranked based on frequency of occurrence. The responses were put together to determine total frequency or percentage of responses for students and lecturers.

3. Results

3.1 Teaching and learning

All the sampled undergraduates offering agricultural science in the five state universities agreed that agricultural science is best learnt both on the farm and in the lecture room. However, they expressed two divergent views on the issue of acquisition of practical skills from the university farms. One group, which forms 72% of the sample, is of the view that, university farms help students in acquiring practical skills (Table 1). Twenty-eight percent (28%) of the sample is of the view that owing to the present state of university farms they do not assist students in acquiring practical skills.

Despite the fact undergraduates expressed divergent views on acquisition of practical skills, they all agreed that (i) any university that offers agricultural science course should have a farm for practical work, (ii) theoretical lessons alone are not enough for acquisition of the principles and practices of agriculture, (iii) practical work on the university farm (s) as part of agricultural science programme is not time wasting.

Lecturers also agreed that the use of university farm(s) is a component of the agricultural science syllabus. They pointed out that the objectives are (i) to translate lecture room teaching to field activities, (ii) to train students on practical aspects of the agricultural

science programme, (iii) to teach and research, and (iv) encourage self-employment. They also pointed out that the use of university farm(s) is necessary for effective teaching of the principles of agriculture because it equips students with the requisite practical skills, it helps students to translate theory into realities, enables students not to easily forget what is taught in the lecture room, and help students in the acquisition of skills and techniques for agricultural production.

3.2 Farm activities and time spent

The results show that almost the same activities are undertaken at all university farms. The main activities are land preparation, planting, feed preparation, nursing of seeds, irrigation, feeding of animals and processing. Among these activities land preparation, planting and feeding of animals are undertaken more often. Little attention is paid to plant propagation, weed and pest control, harvesting, fertilizer application, instrumentation, soil testing, marketing and some routine animal husbandry activities.

Table 1. Respondents that expressed views on contribution of farms, practical skills and motivation.

Questionnaire item	No. of respondents with positive view	No. of respondents with negative view
Farms contribute to teaching and learning	130	0
Practical skills can be acquired from farms	61	24
Practical activities on farms can urge undergraduates to go into farming after completion	35	50
Undergraduates who were motivated by their supervisors to go into farming after completion	47	38
Undergraduates who were engaged in farming before entering the university	61	24

Result from the undergraduates pointed out that activities undertaken on university farms help in the study of agricultural science and are also necessary for effective teaching and learning. Reasons given for university farms contributing to effective teaching and learning are as follows:

- i). Students are exposed practically to what is taught in the lecture room
- ii). Activities undertaken on farms complement what is taught in the lecturer room
- iii). Learning process needs practice in the field
- iv). Activities undertaken on farms enhance understanding of what is taught in the lecture room
- v). One can easily forget what is taught in the lecture room, however, it is quite difficult to forget what is done on the farms
- vi). A difficult principle taught in the lecture room becomes easy to understand on the farm
- vii). First hand information can be obtained on the farms
- viii). Agricultural science is a practical oriented course
- ix). Combination of theoretical and practical knowledge enhances effective learning; and
- x). The university farm serves as a place for application of theories and/or principles taught in the lecture room.

Sixty-seven percent (67%) of undergraduates (Table 2) complained that time spent on farms for practical work is either inadequate or very inadequate. They spend 2-3 hours per visit and in some cases less than 1 hour. They also visit the farm once a week and in some cases 2 – 3 times a semester. The following time or duration has been suggested by the undergraduate: (i) once a week, (ii) 2 hours a day (iii) 6 – 8 hours a week.

Majority of lecturers also lamented on time spent on the farm and pointed out that the frequencies of using the farm as a teaching laboratory are as follows; (i) once a week, (ii) once a month (iii) three times a week. Twenty- three percent (23%) of the sample use the farm three times a week. Twenty-three (23%) of the lecturers (Table 2) indicated that their students are not involved in practical

work on the farm because their courses do not involve practical work on the farm. Lecturers whose students do practical work on the farm pointed out that they spend an average of 2 hours in a week.

3.3 Individual and group work

With the exception of final year students who do individual project work on the farm, practical work is organised in groups for the remaining undergraduates at all the universities. Such group work was acceptable to 55% of the undergraduates (Table 2) who are of the view that group work should continue. Reasons given for group work are as follows:

- (i). Working on the farm becomes easy
- (ii). Students share ideas
- (iii). Assistance is given to students who find it difficult to work individually
- (iv). Short comings can be corrected
- (v). There is efficient work and effective group discussions
- (vi). Group work on the farm enables students to cultivate the spirit of team work;
- (vii). There is division of labour during group work

The remaining students (45%) preferred individual work on the farm and gave following reasons.

- (i). Individual work enhances the ability of independent work
- (ii). Most students do not participate in group work
- (iii). Students gain much experience
- (iv). Individual work enables students to have much time for practical work
- (v). Every student participates in all stages of practical work
- (vi). Students are comfortable and there is no interference during work
- (vii). There is effective understanding of practical work
- (viii). There is confidence in practical work after graduation.

Even though lecturers agreed on students working individually on the farm, inadequate facilities and large student numbers make it impossible to organize individual work. Results have shown that students are supervised by (i) lecturers (ii) lecturers and farm

assistants (iii) lecturers and technicians (iv) lecturers and teaching assistants (v) farm assistants and (vi) farm and teaching assistants on university farms. Results also indicated that farm manager are not involved in the supervision of students during practical work on any of the university farms. Furthermore, the results shown that 67% of the lecturers need the assistance of teaching assistants, farm assistants and technicians for supervision of students' practical (Table 2).

3.4 Farm facilities

The results show that facilities on the university farms are inadequate for practical learning. Students pointed out the following:

- i) Student population far exceeds the facilities available, hence they do not have extensive practical experience.
- ii) Some facilities are not available and for that matter their functions are theoretically taught in the lecturer room.
- iii) Inadequate facilities and the large student population have resulted in some practical work having to be hurriedly demonstrated by farm technicians for students to observe without having a feel of the facility/equipment.
- iv) Most facilities are outmoded and do not function.
- v) Some facilities are engaged for commercial purpose.
- vi) Students struggle over available facilities during practical work.
- vii) Less time is spent by students on the use of facilities.
- viii) Some facilities are improvised.

Lecturers are of the view that University farms do not have the basic facilities needed for effective teaching and learning of agricultural science. Some of these facilities are weighing scales, animal handling facilities, tractors, irrigation equipment, storage facilities, weather station, farm laboratory, water storage facilities, greenhouse, and food processing machines.

Table 2: Respondents that expressed views on time spent on farms, individual/group work and exposure to state and private farms.

Questionnaire item	No. of respondents with positive view	No. of respondents with negative view
Undergraduates who agreed that time spent on farms was enough	28	57
Undergraduates who agreed that group work on farms was the best practice	47	38
Lecturers whose students worked on farms to acquire practical skill	30	15
Lecturers that needed technical assistance to teach practical on farms	30	15
Lecturers that expose their students to state and private farms	26	19

3.5 Field exposure

With exception of students of the University for Development Studies, 51% of students from the other universities are not exposed to private and state farms. These students gave the following reasons for not being exposed to private and state farm:

- i) Practical work is limited to university farms
- ii) Course work is so intensive that there is inadequate time to visit such farm.
- iii) Difficulty in organising trips to private and state farms.
- iv) Lack of funds for transport, accommodation and feeding
- v) Large numbers of students make it difficult to control students for such trips
- vi) Time table has not catered for visits to state and private farms.

The University for Development Studies agricultural science programme is structured into trimesters. The first and second trimesters are for course work and the third trimester is devoted for practical training where students are attached to communities in small groups. At the end of the practical training programme

students submit reports and a seminar is organised. The University of Cape Coast, University of Education, and Kwame Nkrumah University of Science and Technology organise field trips for the undergraduates during the long vacation after which students submit reports. In the case of University of Ghana, first year students are sent to the university's research stations for practical training during the long vacation and after which they also submit reports.

Forty-two percent (42%) of the lecturers (Table 2) pointed out that they do not expose their students to state and private farms where they can apply their practical knowledge because there is no link between such farms and the university and also there is lack of funds. The remaining lecturers (58%) were able to expose their students to state and private farms because it forms part of the long vacation programme. In the case of University for Development Studies, it forms part of the third trimester practical training programme.

Seventy-two percent (72%) of the sampled undergraduates (Table 1) had undertaken farming activity by themselves before entering university and they have improved upon their practical skills as a result of practical lessons on the university farms. However, 45% of the sample (Table 1) have pointed out that they were not motivated by their supervisors during practical activities on the university farms to go into practical farming after graduation. Besides, 59% of the students (Table 1) pointed out that the practical activities have not equipped them well with the needed practical skills and confidence to go into farming after completing the programme. Reasons given for the latter point of view are as follows:

- i) Little time is allotted for practical
- ii) Most of the practical periods are used for theory
- iii) Practical work on the farm is not continuous
- iv) Inadequate modern facilities
- v) Some of the practical works are not applicable

However, the 41% who reported that they have been equipped with the needed skills and confidence and can go into farming gave the following reasons; (i) new skills have been acquired, especially on non-traditional farming, (ii) they have the opportunity to perform

practical work on their own successfully (iii) basic and managerial skills needed for farming have been acquired, and (iv) they have acquired the knowledge of identifying problems in the field.

The lecturers agreed that exposure of students to practical work contribute to a very large extent to motivation in taking up farming as a career. However, 60% of the lecturers pointed out that agricultural science graduates are not able to set up their own farms mainly because of lack of capital. About 93% of the undergraduates responded that they would go into some kind of farming activity on their own after completion of the programme based on the following:

- (i) Interest
- (ii) Farming is lucrative
- (iii) To disseminate the knowledge acquired to subsistence farmers
- (iv) To supplement monthly salary
- (v) Motivation of farmers
- (vi) Self-employment
- (vii) Cut down cost on household food items
- (viii) To give assistance to other farmers and
- (ix) Contribute to food production on the country.

However, the remaining respondents (7%) point out that they would not go into farming because they want to divert into another sector since there is lack of capital for farming, and much practical knowledge have not been acquired.

3.6 Identified problem

Students have identified numerous problems encountered on the university farm during practical work. These problems are inadequate farm implement, obsolete equipment, inadequate teaching materials, infertile soil, and lack of supervision, lack of skilled technical assistants, and lack of transport. Others are lack of coordination among farm staff and lecturers, improper organisation of farm programmes, lack of proper records, inadequate funds and water. In the case of lecturers, the main problems encountered when teaching practical on the university farms are large student numbers,

inadequate trained farm personnel, lack of funds for the purchase of practical items, lack of transport and lack of equipped farm office.

3.7 Suggestions from lecturers and undergraduates

The lecturers have come out with the following suggestions for improving the practical component of teaching agricultural science; (i) every student should have an experimental plot, which should account for some mark, (ii) practical should be organized for small groups of students, (iii) universities should solicit funds from industrial stakeholders for practical activities, (iv) students should be assigned to state and private farms during vacation (v) handouts on practical component of the agricultural science course should be prepared for students (vi) incentives should be provided for farm staff handling practical (vii) students should be exposed to the various agro-ecological zones of the country and (viii) farm managers should be made part of the practical teaching on the university farms. Besides these, they also suggested that rural, non-governmental organisations and private farms, field trips and research institutes can serve as alternative place for imparting practical skills to students. The undergraduates suggested that Government should provide enough money for the purchase of modern equipment to replace the old and obsolete equipment. They are of the view that provision of enough money can solve transportation problem when it comes to field visits. They also suggested that good supervision, frequent visits to farms and well-organized farm programmes can contribute tremendously to teaching and learning of agricultural science.

4. Discussion

Results from the present study imply that university farms contribute to teaching and learning of agricultural science because the target population pointed out that agricultural science is best learnt at farms and lecture rooms. The sample is also of the view that the use of university farms is a component of the agricultural science syllabus and the objectives include translation of lecture room teaching to field activities, and training of students on practical aspect of the

course. Besides, the use of university farms is necessary for effective teaching of the principles because it help students to transfer theory into realities, it enables students to remember what is taught in the lecture room, and helps in the acquisition of skills and techniques for agricultural production. Furthermore, the activities of the farm enhance study of agricultural science and are necessary for effective teaching and learning because they enhance understanding of the principles and theories taught in the lecture room and they can easily be applied.

The views of the sample are in line with improvement of teaching and learning through establishment of university farm as McWilliam and Kwamena-poh (1975) indicated the introduction of farms in the school programmes by the early educators or missionaries was to improve upon teaching-learning process.

According to the FAO Report (1996), the best place for discovering learning of most agricultural issues is the field. However, the present study revealed that about three out of five undergraduates offering agricultural science are of the view that they are not equipped with the needed practical skills and confidence to go into farming after completing the programme. One of the reasons given is that practical activities on the university farms are inadequate. Laogun (1984) reported that when students participate in practical activities, knowledge acquired gives them the urge for more practical work. Spring (1998) also stated that few graduates of agricultural colleges return to faming when such colleges do not conduct research on farms and concentrate on teaching in the classroom. It is therefore clear that the inadequate farm activities adversely affected the urge within undergraduates to go into farming after completing the programme.

The undergraduates are also of the view that they are not equipped with the needed practical skills and confidence because they do no often visit the farms and the time allotted for practical is either inadequate or very inadequate. Besides, only 23% of the lecturers often utilize the university farms as a teaching laboratory and do not send their students to the farm for practical. Owing to the little time allotted for practical work, most students are not exposed

to private and state farms. These farms could serve as alternative place for imparting practical skills to students. Another reason pointed out by the undergraduate for not being equipped with the needed practical skills is that the university farms do not have the basic and modern facilities, and even when they are available they are inadequate for teaching and learning. There is therefore the need to lay emphasis on much practical through provision of adequate facilities so that undergraduates can be equipped with the needed practical skills because as Graham (1971) reported that the missionaries who introduced establishment of farms into school programmes hoped that by approaching the teaching of agriculture in schools with emphasis on practical work done in school farms, students could be provided with a worthwhile occupation on leaving school. Olaitan (1984) also reported that school farms provide opportunities for individual students to practice certain farming techniques on their own.

It has been identified that poor supervision could be one of the causes of 59% undergraduates not equipped with the needed practical skill because 67% of the lecturers needs the assistance of teaching and farm assistants, and technicians. Besides, the farm managers are not involved in either supervision or practical activities, and most of the farm assistants are not well trained. Most lecturers are not involved in supervision of practical work on the farm and the basic practical skills are not well taught by the technicians, teaching and farm assistants. According to Farrant (1980), teaching is a practical activity and much of the teacher's time is taken up in supervising the teaching of his students.

A large number of students have pointed out that they are not motivated. Lack of motivation could be another factor responsible for undergraduates not having the confidence and interest to go into farming on their own on leaving school. According to the FAO Report (1996), one of the issues that can help improve effective teaching and facilitate students learning agriculture science is enhancing motivation. This could attribute to the low number of graduates going into farming after completing the programme. In the developed countries the situation is different. For instance, Gasson

(1998) reported that at least one-third and possibly half of all UK farmers have pursued courses of further or higher education and obtained qualifications, largely in agriculture or related subjects before going into farming.

5. Conclusion

The present study revealed that even though university farms contribute to teaching and learning and are best places for teaching practical agriculture, they are faced with problems. Among the problems are lack of basic and modern facilities, lack of equipped offices and inadequate funds. Besides, lack of proper supervision, lack of student motivation and inadequate time allotted for practical work have caused the students not having the basic practical skills and confidence needed to go into farming on leaving school. It is therefore recommended that university authorities should link with private and state farms that have modern and basic facilities so that these farms can serve as alternative sources for imparting practical skills to students. It is also recommended that the universities could introduce income generation ventures to assist in the purchase of some of the facilities. It is also recommended that the time for practical work should be increased but if it is impossible, supervised practical work should be instituted. Finally, well-trained farm staff should be employed, and lecturers should spend much time on the supervision of student's practical on the university farms.

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