

## **THE ROLE OF SANDWICH IN-SERVICE PROGRAM IN DEVELOPING AGRICULTURAL SCIENCE TEACHERS IN DELTA STATE, NIGERIA**

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### **Abstract**

*This study examined the role of the sandwich in-service educational program of Delta State University, Abraka in developing agricultural science teachers in the state. Data were collected from 895 agricultural science teachers who completed the program between 1989-2004. However, response to the questionnaire was by 391 in-service agricultural science teachers who studied between 1998-2004. The study revealed that over 74% of the agricultural science teachers were from Delta State and teach in the state's school system. The Delta State University sandwich program has therefore played an important role in providing in-service education for agricultural science teachers in Delta State, Nigeria. However, there are still aspects of the sandwich program delivery that need urgent attention to maintain standards such as providing more practical teaching facilities and supplies; updating library and internet facilities, and expanding accommodation facilities for in-service student teachers.*

### **Introduction**

The importance of an in-service educational program has been acknowledged by many writers (Abolaji & Reneau, 1988; Agomuo, 1997; Fox, 1981; Ikeoji & Agwubike, 1999; Oranu, 1995). Agricultural education is a broad educational area that requires professional and technical competences for teachers to function effectively. Specifically, the agricultural science teacher requires adequate knowledge of subject matter (cognitive competences), attitudinal relevance (affective competences), and practical skills (psychomotor competences) to be able to teach agriculture to secondary school students. Such needs underlie the major reason for which in-service programs are provided for various categories of teachers in the secondary schools.

Further, Lindley (1975) said that teachers of agriculture need well planned and organized in-service training while Olaitan (1997) recommended periodic in-service training for serving teachers of agriculture to improve on their practical skills. This is because according to

Birkenholz and Harbstreit (1987), in-service providers should periodically monitor the needs of beginning teachers as they change over time and provide assistance based upon current needs.

Some reasons have been given for the rising need for in-service programs in agricultural education in Nigeria. They include:

- The need for agriculture education teachers to be current with agricultural development and technology (Abolaji & Reneau, 1988);
- Agricultural education teachers need to improve their knowledge and competency on the job beyond what was required for initial certification in order to become effective professionals (Abolaji & Reneau, 1988);
- Notable changes such as the 6-3-3-4 system, adoption of the continuous assessment mode in schools in Nigeria, and the need for higher level manpower to accomplish educational delivery (Federal

Republic of Nigeria, 1998; Ikeoji & Agwubike 1999).

In line with these reasons, Fox (1981) identified three areas of concern in organizing in-service education: stimulating professional development, improving school practice, and implementing social policy.

The Nigerian educational system has witnessed an unprecedented boom in secondary school enrollment in the area of agriculture in the last one and one-half decades. Yet the employment rate is slow to meet up with increased manpower needs even in the face of high graduate turnout. Thus, the Nigerian secondary schools have yet to develop to their full potential.

In Delta State of Nigeria, one bold step taken to improve the quality of teaching and improve manpower upgrading is the in-service courses (called sandwich long vacation program, or sandwich program) of Delta State University, Abraka, Nigeria. One of the courses offered is agricultural education for serving teachers in the state and environ.

At the completion of the sandwich program, the graduates are awarded the equivalent of a 4-year Bachelor's degree as obtainable in other parts of the world. The classification system of the Bachelor's degree includes first class (a cumulative grade point average of between 4.50 to 5.0 on a 5-point scale); second class honors (upper division) (3.50-4.49); second class honors (lower division) (2.40-3.49); third class (1.50-2.39); while a pass degree is any cumulative grade point average between 1-1.49. A student is deemed not to have satisfied the faculty's requirements if one or more core courses are yet to be passed.

The management of secondary schools in Delta State is broadly undertaken by the Ministry of Education, also called the Post Primary Education Board (PPEB). This board is in charge of recruitment of teachers, transfers, implementation of the National Policy on Education, as well as monitoring educational delivery. The PPEB also oversees teachers' welfare matters, including in-service educational needs.

The PPEB, Asaba, is primarily concerned with the management of the public secondary schools, numbering about

371 in Delta State, and partly monitors and regulates a large number of private secondary schools. Although there is a wide gap in remuneration between government-employed and privately employed teachers, they seem to have similar in-service educational needs.

A review of the related literature has shown similarity in in-service educational needs of agricultural science teachers in Nigeria (Okorie, 1975; Abolaji & Reneau, 1988; Ikeoji & Agwubike, 1999). These educational needs are consistent with those highlighted earlier in this paper.

### **Conceptual Framework**

One opportunity open to serving agricultural science teachers in Delta State to improve their professional competence and knowledge of subject matter is the sandwich long vacation program (sandwich program). This program is expected to offer degree-level knowledge for participants to enhance their competence as agricultural science teachers. There is a need, therefore, for follow-up studies to provide information on higher education, which can be utilized in improving the various aspects of a program. According to Mink and Moore (2005), such studies often seek to measure the relationship between the training students received at the institution and the expertise needed for their occupational placement. Reich (1973) suggested that this measurement is usually done by seeking judgments from the former students. Taylor (1977) stated that through the follow-up study of graduates, a department may learn its own successes, strengths, and weaknesses and possibly gain insight from these former students for curriculum improvements, as well as other needed information. Where feedback identifies areas where improvements are needed, then necessary innovations and program modifications could be developed. Peterson (1971), in agreement, stated that identifying possible deficiencies could greatly enhance the probability of succeeding in future years.

Over the years, sandwich programs have proved to be a viable option for learners, especially for in-service agricultural science teachers. Research on the program

implementation has focused on the perceptions of administrators of the program. There is a need to foster a better understanding of sandwich programs from the perception of students so that university administrators can make appropriate decisions regarding these in-service programs.

### **Purpose of Study**

The purpose of this study was to determine how well the Delta State University sandwich program has met the in-service educational needs of agricultural science teachers in Delta State, Nigeria.

### **Research Questions**

In investigating the problem underlying the purpose of this study, answers to the following research questions were sought:

1. What is the enrollment pattern of agricultural science teachers in the sandwich program of the Delta State University Abraka?
2. How have the teachers performed academically?
3. How do in-service agricultural science teachers of the Delta State University perceive the sandwich program in terms of meeting their educational needs?
4. What other areas of inadequacy still exist in the program delivery that need reform?

### **Methods and Procedures**

#### *Population*

The population for this study consisted of all agricultural science teachers enrolled in the Delta State University sandwich program from 1989 to 2004 ( $N = 895$ ). This number surveyed included those engaged in both public government secondary schools and private schools. All 895 teachers were involved in the study. However, responses to the questionnaire were obtained from agricultural science teachers between 1998 and 2004 ( $n = 391$ ).

#### *Instrumentation*

The study used a structured, three-part questionnaire to collect relevant data relating to personal background information and the teachers' perceptions of the program. More data on enrollment and performance were collected from the students' records located in the Examinations and Records office of Delta State University, Abraka.

Specifically, information on age, sex, state of origin, and present educational qualification were sought in section I of the questionnaire. Data were collected for section II by requesting the respondents to check 'yes' or 'no' regarding some suggested benefits that they derived by going through the sandwich program of Delta State University. They were, however, asked to leave any item blank if they were not certain of the response.

Section III consisted of an open-ended response category where the respondents were requested to suggest any areas of inadequacy in the sandwich program they had just completed.

The instrument was validated by administering it to ten serving agricultural science teachers in Delta State. The ten agricultural science teachers were not part of the population used because they had obtained bachelor's degree prior to 1989. Their comments were used to modify the items on the questionnaire, which was judged adequate to collect data from the in-service teachers.

Reliability for the instrument was determined by the test-retest method. The instrument was administered to ten serving agricultural science teachers around the university town two times at a 2-week interval. The teachers used for the reliability were not part of the respondents for the study. The two sets of responses were then correlated and a coefficient ( $r = 0.93$ ) was obtained. This was judged adequate for use in the study.

#### *Data Collection and Analysis*

The relevant university authorities (Faculty and Department) were written to notify them about the purpose of the study.

Thereafter, the teachers were reached during each long vacation contact (between August and October from 1998 to 2004) through the course coordinators. The coordinators were responsible for administering the questionnaire and the data collection. All completed questionnaires were assembled and returned to the researchers.

Also, the Examination and Records office was approached for the same purpose. Records of the students' enrollment and performance were extracted and used for further analysis in the study. Three hundred and ninety-one out of 417 copies of the instrument were properly filled and returned. This represented 93.8% return rate. Data were analyzed using frequencies and percentages.

## Results

### *Background Information*

The ages of the agricultural science teachers ranged from 22 to 55. Seven hundred and eight-three of the agricultural science teachers were married (87.49%), while 112 (12.51%) were unmarried. An

overwhelming majority ( $n = 671$ , 74.97%) were from Delta State where the university is situated; 98 (10.95%) were from Edo, a neighboring state; while 126 (14.09%) were from other states of Nigeria.

Eight hundred and eight (98.32%) of the respondents had the Nigerian Certificate in Education (NCE), (a qualification higher than a secondary school certificate, but lower than a bachelor's degree) or its equivalent as basic entry qualification, while 15 (1.68%) had the teachers' Grade II certificate or its equivalent.

### *Research Question One: What is the enrollment pattern of agricultural science teachers in the sandwich program of Delta State University, Abraka?*

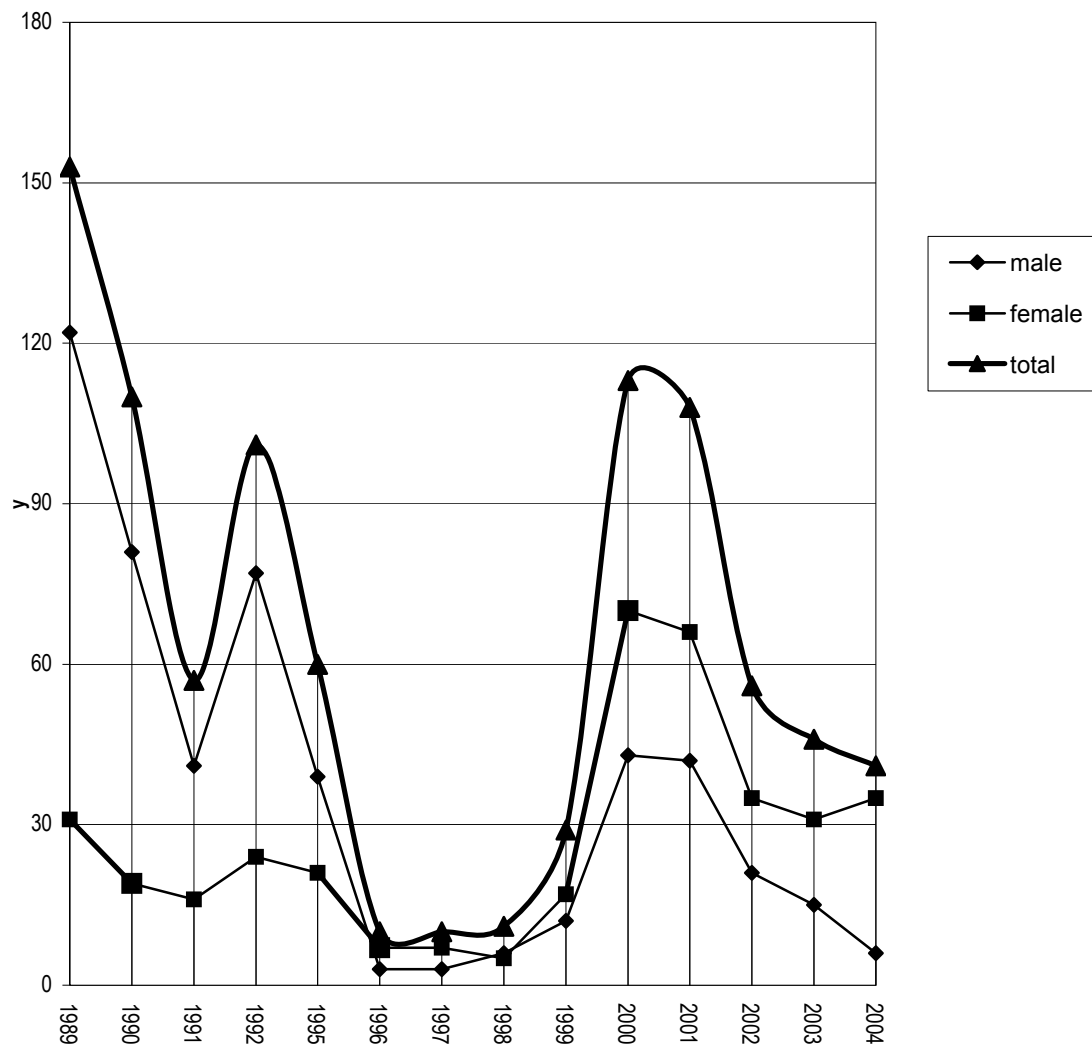
Out of a total enrollment of 895 teachers between 1989 and 2004, 511 (57.09%) were males, and 384 (42.91%) were females. Between 1989 and 1996, the number of males was consistently higher than females, while the number of females rose above males from 1997 to 2004 (Table 1 and Figure 1).

Table 1  
*Agricultural Science Teachers' Enrollment in In-service Education in Delta State University, Abraka, Nigeria from 1989-2004*

Year	Gender		Total*
	Male	Female	
1989	122	31	153
1990	81	19	110
1991	41	16	57
1992	77	24	101
1995	39	21	60
1996	3	7	10
1997	3	7	10
1998	6	5	11
1999	12	17	29
2000	43	70	113
2001	42	66	108
2002	21	35	56
2003	15	31	46
2004	6	35	41
Total	511	384	895

\*Median = 56.5

Note. There are no records from 1993-1994 because of a nationwide strike by the Academic Staff Union of Universities in Nigeria.



*Figure 1.* Enrollment trends of agricultural science teachers in in-service education in Delta State University, Abraka, Nigeria from 1989-2004.

*Note.* There are no records from 1993-1994 because of a nationwide strike by the Academic Staff Union of Universities in Nigeria.

*Research Question 2: How have the agricultural science teachers performed in the in-service program?*

To answer research question 2, students' records obtained from 1991 and 2003 were grouped according to the classes of degree. The pass percentage for each degree class was calculated for all the years.

Table 2  
*Academic Degree Performance of In-service Agricultural Science teachers in Delta State, Nigeria from 1991-2003 (n = 838)*

Year	Degree Classification												Total
	First Class		Second Class (upper division)		Second Class (lower division)		Third Class		Pass Degree		Incomplete		
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	
1991	0	0	40	26.1	74	48.4	4	2.6	0	0	35	22.9	153
1992	0	0	15	13.7	63	57.3	3	2.7	0	0	29	26.4	110
1995	0	0	14	13.0	48	44.4	3	2.8	0	0	43	39.8	108
1996	0	0	12	12.9	68	73.1	9	9.7	0	0	4	4.3	93
1997	0	0	3	3.4	34	40.5	1	1.2	0	0	46	54.8	84
1998	0	0	16	28.6	33	58.9	5	8.9	0	0	2	3.6	56
1999	0	0	12	13.7	60	68.2	7	8.0	0	0	9	10.2	88
2000	0	0	1	10.0	5	50.0	3	30.0	0	0	1	10.0	10
2001	0	0	3	27.3	4	36.4	2	18.2	0	0	2	18.2	11
2002	0	0	9	28.1	17	53.1	2	6.1	0	0	4	12.5	32
2003	0	0	17	18.3	50	53.8	11	11.8	1	1.1	14	15.1	93
Mean, all years	0.0%		17.7%		53.1%		9.3%		0.1%		19.8%		

*Note.* There are no records from 1993-1994 because of a nationwide strike by the Academic Staff Union of Universities in Nigeria.

Table 2 shows that for eleven years there was no first class degree, and only one pass degree was recorded in 2003. Second class honors (upper division) ranged from 3.4% in 1997 to as high as 28.6% in 1998 giving a mean percentage of 17.7% for all eleven years.

The majority of teachers (53.1%) achieved the degree classification of second class honors (lower division), with percentages ranging from 36.4% in 2001 to 73.1% in 1996. Third class performance ranged from 1.2% in 1997 to 30% in 2000, giving a mean of 9.3% for all years.

Teachers who did not meet the faculty requirement for graduating scored a mean percentage of 19.8% for all years and ranged from 3.6% in 1998 to 54.8% in 1997.

*Research Question Three: How do in-service agricultural science teachers perceive the sandwich program?*

Frequencies for the 'yes' and 'no' responses on the perceived benefits were compiled and percentages were calculated for each response (Table 3). Responses reported included only those that met 50% response.

Table 3  
*Perceptions of In-service Agricultural Science Teachers Regarding Benefits from the Sandwich Program, Delta State, Nigeria from 1998-2004 (n = 391)*

Perceived Benefits	<i>f</i>	%
Increased my knowledge of Agricultural Science.	391	100.0
Enhances my confidence as a teacher	288	73.7
Improved my public relations with other teachers	184	47.1
I hope it will diversify my employment opportunities	122	31.2
It will enhance my social status	341	87.2
It will make me more responsible in my place of work	217	55.5

One-hundred percent of the agricultural science teachers indicated that the sandwich program increased their knowledge of agricultural science. A large number stated that it will enhance their social status (87.2%) and enhance their confidence as teachers (73.7%). Some teachers felt that it will make them more responsible in their workplace (55.5%), while 47.1% said that it will improve their public relations with other teachers. Thirty-one percent indicated that the program will diversify their employment opportunities.

*Research Question Four: What areas of inadequacy still exist in the program delivery?*

In Table 4, an overwhelming majority (96.9%) expressed inadequacy in facilities for practical work, library, internet, classroom, and laboratory. Seventy-eight percent felt constrained by time to carry out routine activities, while poor accommodations during the program (57.0%) and project-writing problems (50.6%) were still expressed. Some agricultural science teachers felt there was a need for more field trips and excursions (37.1%), much workload for lecturers (30.2%), and that agricultural science teachers were not well integrated into the university system (20.1%).

Table 4  
*In-service Agricultural Science Teachers' Responses Regarding Areas of Inadequacy in the Sandwich Program, Delta State, Nigeria from 1998-2004 (n = 391)*

<i>Expressed inadequacy</i>	<i>f</i>	%
Facilities (practical, library, internet, classroom, laboratory) lacking	379	96.93
Time constraint to carry out needed activities	305	78.01
Research project writing still a problem	198	50.64
Poor accommodation for teachers during program	223	57.03
Requires more field trips/excursions	145	37.08
Work load much for lecturers	118	30.18
Teachers not well integrated into university system.	81	20.72

## Discussion

The results of this study showed that the agricultural science teachers recognized the need to improve themselves through in-service training. This is in line with the expectation of the National Policy on Education which stated: "NCE and university graduates teachers to teach at junior secondary level, while university graduates with professional qualifications in their disciplines to be at the senior secondary level" (National Education Research Council, 1980, p.33).

The trend in gender enrollment was also noteworthy. Male teachers out-numbered females from 1989 to 1996, while the trend changed from 1997 to 2004 when females out-numbered males. This may have resulted from the steady rise in female teacher production from the colleges of education in Nigeria from which the sandwich program gets the majority of its entrants.

The in-service agricultural science teachers have performed well over the years. Even though the program has not recorded a first class degree, 17.7% and 53.1% of the teachers from all years graduated with second class honors (upper division), and second class honors (lower division), respectively. This suggests a general improvement of staff quality across secondary schools in Delta State, Nigeria. However, the wide range in the percentage of teachers who did not meet the faculty requirements is a major concern that needs to be investigated further.

The respondents to this study perceived the sandwich program as having a positive impact on their overall well-being. The program, apart from increasing their knowledge in agriculture, has equally enhanced their social status and confidence as teachers. This finding supports Rader (1979), Miller (1980), Johnson (1987), and Olaitan (1997) who opined that experienced teachers need both pre-service and in-service education, and in-service education is meant to create and sustain change in educational practice.

However, the respondents felt that there were still areas of inadequacy, mainly in the availability of facilities for practical demonstrations, library, and internet

services. Also mentioned were accommodation problems, time constraints, and problems with project writing. The stress on the lecturers seems to have resulted from overcrowded classrooms. It was observed that the average student population for all years was 76 students per contact period. However, further research is needed to determine the actual lecturer/student ratio in the sandwich program. Similar problems were identified by Abolaji and Reneau (1988).

## Conclusions

From the results of this study, it was obvious that the Delta State sandwich program was perceived as being beneficial by over 50% of the agricultural science teachers in four of the six responses. The Delta State University sandwich program has therefore played an important role in providing in-service education for agricultural science teachers in the Delta State school system. The performance of the in-service agricultural science teachers showed that there is obvious improvement in the quality of teachers presently serving in the secondary schools with respect to their level of preparation, although it cannot be shown from this study that the increased level of preparation of teachers has resulted in better education of the students that they teach. That should be the basis for future research.

However, there are still aspects of the sandwich program delivery that need to be addressed to ensure that standards are maintained. Also, there is a need to improve facilities for teaching, practical demonstrations, library, internet, and accommodations. More lecturers need to be employed to handle high student enrollment.

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