Perceived Status and Direction of Agricultural Mechanization Training Programs by Instructors in Nigerian Schools of Agriculture

Christian C. Ede, Graduate Student
Agricultural Education
Texas A&M University

Accepted for Publication March 1987

Nigerians have witnessed since 1970 the unsuccessful implementation of several agricultural programs, such as the National Accelerated Food Program, Operational Feed the Nation, and Green Revolution, launched by the various governments in power to boost agricultural production. The ultimate aim of these programs was to make Nigeria self-sufficient in food production. Today, emphasis is shifting to mechanized agriculture, and farmers are being advised by the federal government to take advantage of tractor hiring services located in various states, to use fertilizers, and to use improved seeds to increase production (Ojiako, 1982). In spite of all these programs, Nigeria still imports much of her staple foods from other countries (Famoriyo & Barau, 1981; Igbozurike, 1977).

Several attempts by the government to increase food production through agricultural mechanization are steps in the right direction, but emphasis should be placed on how this can be achieved. To put it succinctly, "A prerequisite for the mechanization program is an adequate supply of intermediate level manpower in the specialized field of agricultural mechanics" (Henderson, 1979). One important question to be asked is: Does Nigeria have adequate skilled instructors in the field of agricultural mechanics to perform the necessary training and to handle the inevitable problem of maintenance associated with agricultural power and machinery programs? Consequently, this study was undertaken to examine agricultural power and machinery training programs in schools of agriculture in Nigeria.

Purposes and Objectives

The two purposes of this study were: (a) to determine the present status of agricultural power and machinery programs designed for personnel at the intermediate level (agricultural assistants) in the various schools of agriculture in Nigeria; and (b) to determine the possible future orientation of agricultural power and machinery programs designed for agricultural assistants by these institutions. As a means of achieving the purposes of this study, the following specific objectives were designated:

1. To determine the experience and educational level possessed by persons currently involved as instructors in the area of agricultural power and machinery.

2. To determine at what level skills in tractor-powered technology were taught at the time of this study and at what level they should be taught.

3. To identify training competencies and skills in terms of tasks necessary for instructors in the area of tractor-powered technology to perform more efficiently in their jobs.

4. To determine if there was any relationship between what is presently taught, what should be taught and the skills of the instructors in the area of tractor-powered technology.

Journal of the American Association of Teacher Educators in Agriculture
Volume 28, Number 3, pp.22-28
DOI: 10.5032/jaatea.1987.03022

A theoretical base was established, and research questions were developed to achieve the objectives.

Research Procedures

The population for this research was all instructors (24) who were teaching agricultural power and machinery courses in Nigerian schools of agriculture in the 1984-85 academic year. A literature review revealed the number of schools of agriculture in Nigeria had increased from 16 (Osuntogun & Fabiyi, 1979) to 22 by 1982 (Federal Department of Agriculture, 1982; Swanson, Nkajimeje, Sigman, Rassi, & Koehnen, 1981). Bendel, Borno, Gongola and Lagos states had no schools of agriculture that offered agricultural power and machinery programs. Twenty-two schools of agriculture (Table 1) from 15 of 19 states in Nigeria were

Table 1

Institutions and Instructors in Nigeria, 1985

	Institutions	Number of Instructors
1.	Federal School of Agriculture, Umudike, Imo State	3
2.	Agricultural Training Center, Ilorin, Kwara State	-[a]
3.	School of Agriculture, Obubra, Cross River State	1
4.	College of Agriculture, Kabba, Kwara State	1
5.	College of Agriculture, Bakura, Sokoto State	1
6.	College of Agriculture, Samaru, Kaduna State	1
7.	School of Agriculture, Moor Plantation, Ibadan, Oyo State	4
8.	College of Education (Department of Mechanical Agriculture), Ila, Oyo State	1
9.	School of Irrigation and Mechanical Agriculture, Katsina, Kaduna State	1
10.	School of Agriculture, Akure, Ondo State	1
11.	Ogun State College of Education, Ijebu-Ode, Ogun State	-[a]
12.	Soil and Water Conservation, Jos, Plateau State	1
13.	Institute of Agriculture, Research & Training, Onne, River State	1
14.	Imo State College of Agriculture, Ohaji, Imo State	1
15.	School of Agriculture and Animal Husbandry, Bauchi, Bauchi State	1
16.	School of Agriculture, Yandev, Gboko, Benue State	1
17.	Kaduna Polytechnic and Irrigation School, Kaduna State	1
18.	Niger State School of Agriculture, Mokwa, Niger State	3
19.	Audu Bako School of Agriculture, Danbatta, Kano State	1
20.	College of Agriculture and Animal Science, Kaduna, Kaduna State	-[a]
21.	School of Agriculture, Kontagora, Niger State	-[b]
22.	School of Agriculture, Abagana, Anambra State	-[b]
Total		24

[a]These institutions do not offer programs in agricultural power and machinery. [b]These institutions did not reply after the third follow-up letter.

contacted. Seventeen institutions that offered intermediate-level agricultural power and machinery programs were identified.

A questionnaire was developed to collect the data needed for this study. The selection of some items was influenced by the results of a special conference conducted cooperatively by the Texas Education Agency and representatives of the Texas Hardware and Implement Association and the National Farm and Power Equipment Dealers Association on June 22-23, 1965. The report entitled "Suggested Basic Course Outline for Agricultural Machinery Service and Repair" was published by the Vocational Division of the Texas Education Agency in August 1966. Items selected were compatible with those skills and competencies that are presently being taught at various schools of agriculture in Nigeria, as described in official catalogs obtained from these institutions. The instruments were developed with the help of experts in the fields of agricultural education and agricultural mechanization. The instruments were pilot tested at Texas A&M University using 10 Nigerian students with backgrounds similar to the population. There was a 100% response. Revisions were made to maximize the validity of the instruments before they were sent to the instructors of agricultural power and machinery in Nigeria.

Descriptive statistical techniques were used to analyze most of the responses pertaining to objectives one through three. Because the data were ordinal and grouped to represent true dichotomies, the phi-coefficient correlation was used to determine the association of the variables in Objective 4. Analyses were made of 24 instruments, a 100% return.

Summary of Findings

Table 2 shows that a majority (91.8%) of the instructors possessed higher qualifications (High National Diploma and above) than the level for which the trainees were being prepared (Ordinary National Diploma). However, these qualifications were mainly in general agriculture with little training in the area of agricultural power and machinery. Only one instructor possessed a "Higher Technicians Certificate of City and Guilds of London Institute" in agricultural engineering and mechanics.

Table 2

Educational Level of Instructors of Agricultural Power and Machinery, Nigeria, 1985

Level of Education	f	%
West African School Certificate/General Certificate of Education	1	4
Ordinary National Diploma (OND)	1	4
Higher National Diploma	10	42
Bachelor's Degree	4	17
Master's Degree and Above	7	29
Others	1	4
Total	24	100

Respondents indicated that all the selected 14 major units (Table 3) of manipulative skills pertaining to tractor-powered technology were presently not stressed (low level) and that all 14 units, except air conditioning, should be stressed (high level).

Table 3

Levels at Which Skills in Tractor-Powered Technology Should be Taught in Schools of Agriculture in Nigeria, 1985 (N = 24)

Skill Areas	Not Stressed		Stressed	
	f	%	f	%
Air Conditioning	16	66.7	8	33.3
Air and Exhaust System	7	29.2	17	70.8
Brake System	5	20.8	19	79.2
Cooling System	4	16.7	20	83.3
Clutch	7	29.2	17	70.8
Differential Final Drive and Axles	10	41.7	14	58.3
Power Take Off	11	45.8	13	54.2
Transmission	7	29.2	17	70.8
Engine Overhaul	6	25.0	18	75.0
Electrical System	8	33.3	16	66.7
Fuel System	5	20.8	19	79.2
Hydraulic System	11	45.8	13	54.2
Lubricating System	5	20.8	19	79.2
Wheels and Tires	3	12.5	21	87.5
Average Percentage		31.2		68.8

Note. A five-point level at which skills were taught was grouped into two major categories, as follows: not stressed = Not at all, Very low level, and Low level; stressed = High level and Very high level.

A majority of the instructors perceived that they possessed an inadequate level of skills and competence to perform 11 of the 15 major units of skills, namely, air conditioning (91.3%), engine overhaul (75%), final drive (75%), differential system (66.7%), electrical system (66.7%), brake system (58.3%), transmission (58.3%), air and exhaust system (54.2%), and power take-off (55.2%). All the instructors indicated a strong desire to undertake more training to upgrade their skills and competencies.

There was a positive correlation (Table 4) between what was presently taught and at what level it should be taught for all the selected 14 units of tractor-powered technology. For what was presently taught, and for the level of skills possessed by the instructors, data revealed a negative correlation (Table 5) for air conditioning and fuel system units, no correlation for transmission and wheels and tires, and positive correlations for the remaining 10 units of skills.

Table 4

Summary of the Phi-Coefficient Values and the Types of Correlation Between the Levels at Which Each of the 14 Selected Skills was Taught and at What Levels Each Skill Should be Taught, Nigerian Schools of Agriculture, 1985

Skill Areas	Phi-Coefficient Correlation
Air Conditioning System	.29
Air and Exhaust System	.45
Brake System	.33
Cooling System	.71
Clutch	.30
Differential Final Drive and Axles	.40
Engine Overhaul	.30
Electrical System	.41
Fuel System	.41
Hydraulic System	.32
Lubricating System	.30
Power Take Off (P.T.O.)	.40
Transmission	.32
Wheels and Tires	.30

Table 5

Summary of the Phi-Coefficient Values and the Types of Correlation Between the Levels at Which Each of the Fourteen Selected Skills was Taught and the Levels of Skills Possessed by the Instructors, Nigerian Schools of Agriculture, 1985

Skill Areas	Phi-Coefficient Correlation
Air Conditioning System	-.07
Air and Exhaust System	.41
Brake System	.02
Cooling System	.15
Clutch	.13
Differential Final Drive and Axles	.29
Engine Overhaul	.18
Electrical System	.20
Fuel System	-.20
Hydraulic System	.17
Lubricating System	.15
Power Take Off (P.T.O.)	.08
Transmission	.00
Wheels and Tires	.00

Conclusions

Since there was a positive correlation between the levels at which skills were presently taught and the levels at which the skills should be taught for all the selected 14 units of tractor-powered technologies, it was concluded that the instructors were teaching at their level of competence, even though that level was inadequate.

Since there was a positive correlation for 10 (71.4%) of the units of listed skills when the relationship between what was presently taught and the level of skills possessed by the instructors was determined, it was concluded that, generally, the instructors were teaching skills congruent with their own level of expertise, even though that level of skills was generally inadequate. It is recognized that other factors or forces may be at work that have not been examined in the study.

Implications

The implications drawn from the findings were as follows:

1. For the heads of the various schools of agriculture in Nigeria that offer agricultural power and machinery program, this study has great relevance for the development of a sound program that will equip the recipients with adequate skills and competencies they need, especially in the area of agricultural machinery service and repair. The skills identified in this study can be incorporated into training programs such as short courses and workshops for the agricultural instructors, students and farmers.

2. This study provides a guide for the instructors in the planning of their workshops and related instruction in the area of tractor-powered technology and provides a basis upon which they can progressively build their own course of study in accordance with training needs of their students and the local community, especially the farmers.

Recommendations

Based on the findings, the following recommendations were made:

1. Heads of various schools of agriculture in Nigeria should commence regular inservice training programs for instructors of agricultural power and machinery in their various institutions. Special emphasis should be placed on those eleven skills that the instructors felt most inadequate to perform.

2. Syllabi in agricultural mechanics should be revised to stress, at the appropriate level, the teaching of all selected 14 major units of skills and competencies relating to agricultural machinery service and repair.

3. More research should be conducted to compare the actual time spent in repair, the time in class/lab teaching, and the perceptions of the experts in the field of agricultural mechanics.

References

Famoriyo, S., & Barau, A. D. (1981). Role of agro-industries in increasing food production in Nigeria. Agricultural Administration Journal, 11(1), 67-76.

Federal Department of Agriculture. (1982). Directory of Nigerian Agricultural Organization. Ibadan: FDAP Communication Publication.

Henderson, H. D. (1979, June. Four year program for mechanization in Nigeria. Paper presented at the 1979 Summer Meeting of American Society of Agricultural Engineers and Canadian Society of Agricultural Engineers, Winnipeg, Canada.

Igbozurike, U. M. (Ed.). (1977, January 17-28). Report of the Proceedings of the Symposium on Operation Feed the Nation: Feedback on students' participation. Nsukka: University of Nigeria.

Ojiako, J. O. (Ed.). (1982). Nigeria year book. Apapa, Lagos: Time Press.

Osuntogun, A., & Fabiyi, Y. L. (1979). Training for agricultural and rural development in the economic community of West African states (ECOWAS). Agricultural Administration Journal, 8(1), 3-13.

Swanson, B. E. Nkajimeje, M., Sigman, V., Rassi, J., & Koehnen, T. (1981). International directory of agricultural education institutions (Vol. 1 Africa). Urbana-Champaign: University of Illinois at Urbana-Champaign, Bureau of Educational Research, College of Education.

Texas Education Agency, Vocational Division. (1966). Suggested basic course outline for agricultural machinery service and repair. Austin: Author.

* *