DEVELOPING A CURRICULUM FOR VOCATIONAL EDUCATION IN AGRICULTURE AND RELATED TRAINING FOR NIGERIAN SECONDARY SCHOOLS SYSTEM

by

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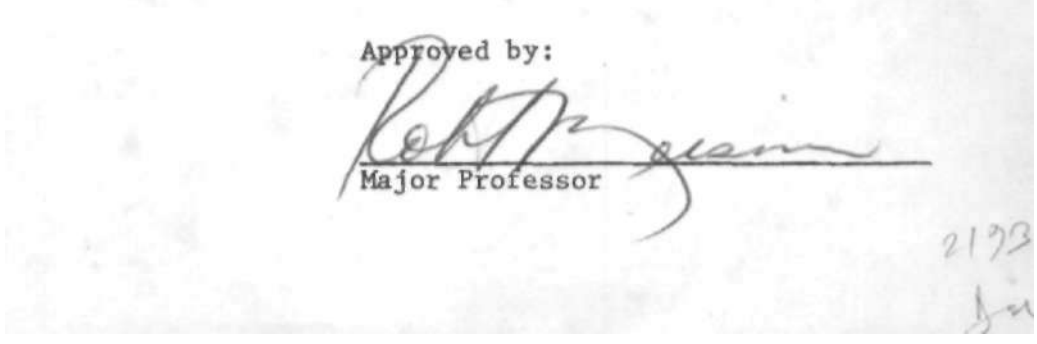
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Chapter I

INTRODUCTION

Background

Nigeria is located on the West Coast of Africa in the eastern-most corner of the Gulf of Guinea stretching from 4° to 14° latitude north of the equator. Her estimated population in July 1970 was 66 million people inhabiting an area 356,669 square miles.[1] The dominating importance of agriculture in the Nigerian economy and the urgent need for more trained persons to staff essential services in the field of agriculture and food had been widely recognized in the country.

Agricultural industry enabled Nigeria to feed herself and to earn a substantial amount of foreign exchange through the export of cotton, cocoa, palm oil, palm kernel, rubber, beniseed and groundnuts. In 1969, agricultural exports from Nigeria totaled $426 million accounting for 48 per cent of all exports of $895 million.[2]

Approximately 35% of Nigeria's population or about 21 million constituted the labor force. Fifty-six per cent of the labor force or

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[1] Population and Vital Statistics Report (New York: United Nations, Department of Economic and Social Affairs, Statistics Office, January 1, 1972), p. 8.

[2] U.S.D.A., The Agricultural Economy of Nigeria (Washington, D.C.: U.S. Department of Agriculture/Economic Research Service/ERS-Foreign 329, March 1972), p. 1.

approximately 12 million was engaged in farming.[3] Much of Nigerian agriculture was subsistence in nature. Producers were largely illiterate peasant farmers. They learned agriculture through the traditional apprenticeship or 'pick up' method.

By comparison about 5.4 per cent of the male working population of the United States were engaged in food production in 1969; the estimated figure for the United Kingdom was 11 per cent; the Federal Republic of Germany 11.4; Ireland 45; Greece 47 and Spain 50.[4] The farm size in Nigeria ranged from 1 to 5 acres. The United States farmer manages an average of 351.6 acres in 1969.

The average income of the Nigerian farmer approximated $180 per annum. A British farmer earned an average of $3000[5] while that of an average American farmer approximated $3,880 per annum.[6]

The above information inferred a comparatively low level of agricultural production in Nigeria. In both Britain and the United States of America science and technology had been fully integrated into farming operations. The Nigerian situation therefore called for a concerted effort at improving farming and agriculturally related fields. Attempts to solve this problem could be made by improving the

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[3] B. S. Oloruntoba, "Country Report Federal Republic of Nigeria," West African Agricultural Education Conference, Ahmadu Bello University, Zaria, Nigeria, December 13-18, 1971.

[4] V. A. Oyenuga, Agriculture in Nigeria, An Introduction (Rome: F.A.O., 1968), p. 29.

[5] Obafemi Awolowo, The People's Republic (Ibadan, Nigeria: Oxford University Press, 1968), p. 302.

[6] Selected statistical information about farming in the United States FEDS/FTD-1971, Revised 1969, p. 1.

fields of agricultural research, extension and agricultural education at all levels of the educational system.

Agricultural extension activities established by the ministries of agriculture of the country's twelve states operated as an informal adult education program with the older adult farmers as the clientele. The program was service-oriented in nature. The effectiveness was limited by the fact that the clientele had neither a previous formal general education nor any recognized pre-service training. A situation such as this demanded that attention be focused on the education and training of youth and young adults in farming and agriculturally related fields in Nigeria.

Significance of Agricultural Education and Training

The implications of the manpower situation in agriculture and the steps considered necessary to meet present and future needs of the country were discussed in a comprehensive Food and Agricultural Organization report presented to the Nigerian government by Rowat[7] in 1964.

From the standpoint of economic growth Nigeria was referred to as a developing nation. Staley[8] pointed out in his discussion on education that as a country developed more modern industry, the service

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[7]R. Rowat, "Report to the Federal and Regional Governments of Nigeria on the development of Education and Training in the Field of Agriculture and Related Subjects," Special Program of Agricultural Education and Training in Africa (Rome: F.A.O. of the United Nations, 1965).

[8]Eugene Staley, "Curriculum Design," Planning Occupational Education and Training for Development (New York: Washington: London: Praeger Publishers, 1971), p. 93.

functions become more complex. Agriculture, health services and other services required better qualified personnel, and the methods of work in these fields continued to become more specialized and sophisticated. A greater understanding of theory, and more managerial ability in planning and coordination was required. As a consequence the need arose for a better foundation in general education and more systematic training in combination with work experience.

The significance of agricultural education to a developing nation was also revealed in a publication by an agricultural production team sponsored by the Ford Foundation on India's food crisis and steps recommended to meet it.[9] The team indicated that success in agriculture depended on a nation's ability to attract talented youth to agriculture. Hence today's program of agricultural education would determine the quality of all work and progress in the agricultural sector of tomorrow. Therefore the progressive improvement in all branches of agricultural production would rest on the basic strength and quality in agricultural education programs.

In a forward to the publication Dr. K. C. Naik wrote that the effectiveness of future development of the country would depend upon the strength of agriculture. No education was of greater importance to a country than agricultural education for it provided the medium for

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[9] Ford Foundation--Agricultural Production Team, Report on Indian's Food Crisis and Steps to Meet it (New Delhi: Ministry of Food and Agriculture, Government of India, 1959), pp. 42-43.

achieving a high level of competence in the farmer, scientist, extension worker and administrator.[10]

The following statements by the director-general of the Food and Agriculture Organization, International Labor Organization and United Nations Educational Social and Cultural Organization during the 1970 world conference on agricultural education and training on the objectives of agricultural education, reinforced the ideas previously cited on the importance of agricultural education:[11]

The Director-General, FAO:

> The human element is of unique importance in agricultural change and progress. Suitably adapted to local needs and conditions, agricultural education and training are key factors in rural development and integral components of the whole development process.

The Director-General, ILO:

> Education and training are the human ingredients of productivity, the source and demand for, and enjoyment of, more equal distribution and the essential qualification for fuller participation. Agriculture remains the greatest and by nature the most fundamental of the world's industries.

The Director-General, UNESCO:

> Education can and must contribute greatly to this liberating change if it is faithful to its true vocation, that of emancipating man without violating his nature, and if it chooses the cause of renewal rather than of routine.

These statements recognized education and training as basic ingredients of agricultural productivity and the human element as a key factor in its organization.

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[10] K. C. Naik, Agriculture Education in India (New Delhi: Indian Council of Agricultural Research, 1961), p. 5.

[11] Report: World Conference on Agricultural Education and Training, Copenhagen, Denmark, Sponsored by FAO, ILO and UNESCO, July 28-August 8, 1970, Vol. 1, p. 45.

Characteristics of Vocational Education

Vocational education had been defined in a number of ways by many authors according to the concepts and limitations of purpose imposed by different programs.

The Kansas State Division of Vocational Education[12] defined it as follows:

> Vocational education is that part of education designed to assist individuals to identify, select and prepare for successful employment or advancement in a recognized occupation that requires less than a baccalaureate degree.

This implied that it was a form of education below a college degree which prepared an individual for a gainful employment.

The U.S. Office of Education[13] defined vocational education as:

> Any form of education, training or re-training designed to prepare persons to enter or continue in gainful employment in any recognized occupation.

This definition implied an emphasis on skill development and the knowledge required of a person in order to be employable and to perform specific tasks and advance within a given occupation. Certain authors contended that vocational education cannot be limited alone to skill development in a particular occupation. Evans et al.[14] explained that

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[12]"Forward," Vocational Education, A handbook for planning, developing and implementing vocational education in Kansas (Topeka, Kansas: Division of Vocational Education, 1972), p. ii.

[13]United States Department of Health, Education and Welfare, Office of Education, Organization and Operation of a Local Program of Vocational Education (Western New York School Study Council, State University of New York, Buffalo, 1968), p. 3.

[14]Rupert N. Evans, Garth L. Mangum and Otto Pragan, Education for Employment: The Background and Potential of the 1968 Vocational Education Amendments (Ann Arbor: The University of Michigan, May 1969), p. 63.

vocational education involved a broader concept consisting of

> all of the aspects of educational experience which help a person to discover his talents, to relate them to the world of work, to choose as occupation and use them successfully in employment.

The purpose of vocational education in its broadest and most fundamental terms was explained by Staley[15] as follows:

> To help both young people and adults acquire the knowledge, skills, attitudes and values which will enable them to initiate, accept and adjust constructively to changes which are both conditions and consequences of modernization.

This implied that a vocational education program in a country like Nigeria should be an all embracing one designed to develop the character and personality of an individual and should enable him to be adaptable to a variety of jobs and also to changes in the country's technological and socio-economic development.

Staley[16] also stated that any vocational education and training program should fit trainees to take part and contribute satisfactorily in all kinds of interpersonal and institutional relationships required by their culture.

Evans[17] gave the following three basic objectives required of every public school vocational education curriculum: (a) meet the manpower needs of the society, (b) increase the options available to each student and (c) serve as a motivating force to enhance all types of learning.

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[15] Staley, ibid., p. 3.

[16] Staley, ibid.

[17] Rupert N. Evans, Foundations of Vocational Education (Columbus, Ohio: Charles E. Merrill Publishing Co., 1971), p. 2.

The implications of these objectives were many. Meeting the needs of the society implied that the cultural and socio-economic status of the society should be reflected in the type and quality of the program. Curricula should be realistic in nature to reflect the unique employment picture within the locality. Increasing the options available to the students should imply that course offerings should be broad enough, incorporating both general and vocational subjects, and be sufficiently flexible to enable individuals to choose and pursue the curricula they wanted and complete the program to the best of their satisfaction. In other words programs should be pupil oriented.

Furthermore, a truly vocational educational program should have the following goals: (a) zero reject, (b) zero drop out, (c) 100 per cent placement at the termination of the program.[18] These ideas should not necessarily mean that every student could or should benefit from a particular program. It must be borne in mind that a good quality program could only be run successfully with good quality pupils who wanted, needed and could benefit from it.[19]

Existing Forms of Vocational Agricultural Education and Training Program in Nigeria

Existing vocational education programs offered in institutions

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[18] Dr. Robert Scott, Lecture given on course 410-702 Vocational Agriculture, Kansas State University, at Topeka, Fall Semester, 1972.

[19] Roy W. Roberts, Vocational and Practical Arts Education, 3rd Edition (New York, Evanston and London: Harper & Row, Publishers, 1971), p. 19.

were referred to as "The farm institutes" in the Northern States and "Farm Settlement Schemes" in the Southern States.[20]

The farm institute scheme of the six Northern States of Nigeria. These institutes were established for the purpose of providing self employment opportunities in farming for young primary school leavers. The program was of one year's duration and placed emphasis on the training of rural youth who will serve as innovators of improved farming methods in the rural areas. The instruction given was simple and direct and aimed at securing improvement in basic farming methods and skills. By 1967, 32 institutes were already established.[21]

Farm institute training in Western State of Nigeria. Three institutes were located one at Ilesha, Odeda and Ikorodu. Training was offered to the following categories of people: (a) young men who, after completion of training, were to settle on a farm settlement, (b) young men who wished to farm their family land, (c) adult farmers and extension personnel who received short duration courses. The young men who were potential farmers received two years of training with a practical orientation. Basic entry qualification required was primary seven.

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[20]"Report on the Seminar held at Ahmadu Bello University, Zaria, Northern Nigeria, June 28-July 7, 1965," Agricultural Education and Training in Africa (Rome: F.A.O., 1965), pp. 44-45.

[21]O. C. Onazi, "Vocational Education in Nigerian Public Schools," A report prepared as part requirement for Course Educ. 891, Kansas State University, Department of Adult and Occupational Education, December 1971, p. 5.

Farm settlements in Eastern Nigeria. Here settlers were given regular instruction on the job as well as at instructional centers. Handbooks and films were used as instructional materials. The art of keeping simple farm records was also taught.

All the above programs had suffered significant wastage. Wastage had occurred in two ways: (a) pre-mature termination of training by students during the training period, and (b) a large number of students failed to continue on the job after a few months or years of initial establishment.

The reasons for wastage were many and varied. Some of these, in the opinion of the writer, were: (1) the men were usually not sufficiently mature to take a firm decision on whether or not they wished to make farming a life occupation, (2) motivational factors such as curricular content, teaching methods and the qualities of the teachers running the programs were not conducive to the running of a program that was truly vocational in nature, (3) the low image of farming as an occupation was considered suitable only for the illiterates, peasants and laborers in the country, (4) improper selection criteria of candidates by the government policy makers including poor incentives to encourage the boys to remain on the job, (5) economic returns from farming were generally low compared with other occupations in the country, and (6) the students' levels of general education were too low to provide them a solid background on which they could assimilate a well structured vocational program. They consequently became discouraged when they compared their level of general and academic education with their contemporaries who pursued academic curricula in

secondary schools. The situation invariably placed the latter group in a better economic position to secure a more prestigious job at the termination of their secondary school education. These factors hence called for an integrated system of education with a bias for both general and vocational programs.

Statement of the Problem

The objectives of this study were:

(1) To establish a theoretical background for an appreciation of the need to introduce vocational education in agriculture and related training programs in the Nigerian secondary school system.

(2) To establish a basis for developing a desirable curriculum that emphasized course units, knowledge, skills, attitudes and values pertinent to the world of work that would be required of the graduates of such a program.

It was hoped that the introduction of such a program would attract and prepare more able young people for careers in the field of agriculture and, by so doing, place agriculture on a plane that would make it more attractive and worthwhile as a vocation for Nigerian secondary school leavers.

Need for the Study

There had been a need for developing a curriculum in vocational education in agriculture and related training in the Nigerian secondary schools for some time. The opinions expressed by the following served as a basis for the appreciation of the validity of this claim.

Ashby,[22] in the report of the commission on post-school certificate and higher education in Nigeria, said:

> One of the highly significant developments in American Agricultural education is the program in vocational agriculture conducted in nearly all high schools in the nation. This was made possible by cooperation between colleges of Agriculture and Education of the land grant colleges. The same program should be considered in Nigeria to involve the Nigerian Universities particularly in the teacher training programs. Many outside agencies, the United Nations Special Fund for example, are emphasizing the need for vocational training at the secondary school level in developing countries.

Onazi,[23] in his paper on vocational education in the Nigerian public schools, said that

> Vocational agriculture in particular should be introduced into the Nigerian secondary schools because of the over-riding importance of Agriculture.

Katsina[24] stressed the importance of agriculture by saying,

> The only way by which interest in farming can be generated among our young men is by making agriculture compulsory in all schools.

Hess et al.[25] proposed in 1969

> . . . that a system of five pilot departments of vocational agriculture should be established in an equal number of selected secondary schools in the six Northern States of Nigeria.

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[22] Erick Ashby, Investment in Education: A Report of the Commission on Post-School Certificate and Higher Education in Nigeria (Lagos: Federal Ministry of Education, 1960), p. 107.

[23] Onazi, ibid.

[24] Imrana Katsina, "Science and Education in relation to Agriculture," Nigerian Journal of Science, Vol. 3, No. 2, November 1969, p. 219.

[25] Carroll V. Hess, Frank R. Carpenter, Vernon C. Larson, Curtis Trent, Warren L. Prawl and Raymond J. Agan, A Pilot Program in Vocational Agricultural Education Proposed for the Six Northern States of Nigeria, April 1969.

Awolowo,[26] former Vice President of the Nigerian Executive Council, proposed that secondary vocational schools that would absorb all primary school leavers should be established. The schools would offer a three year vocational course to produce semi-skilled manpower for the basic industries and agriculture as well as in different trades.

The number of school drop outs and the unemployment of school leavers, particularly those of the primary and secondary schools in Nigeria were critical cases reflecting the inadequacy of the present school system to cope with the country's educational and sociological problem.

It was estimated in 1967 that approximately 930 pupils out of every 1000 who started primary school in Nigeria terminated their education prior to entering the secondary schools. Only 6 or 7 of the 70 who went to the secondary schools continued their study in the University.[27]

Figures released from the Federal Ministry of Education in 1965 showed that of the total number of people who entered the labor force from the educational system, 88.5 per cent were from the primary school. Fifty-seven and six tenths per cent of these were drop outs. The secondary school system contributed 10.7 per cent, 2.9 per cent of whom were drop outs. The Universities contributed the lowest figure

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[26]Obafemi Awolowo, The Strategy and Tactics of the Peoples' Republic of Nigeria (Macmillan and Co. [Nigeria] Ltd., 1970), pp. 102-103.

[27]Arthur J. Lewis, "AID and Secondary School Education in Nigeria," Education and World Affairs, February 1966, p. 38.

of 0.4 per cent.[28] These figures indicated the low quality of the Nigerian labor force. It was significant to note that all entrants to the labor force from the primary and secondary schools system had no occupational training of any kind.

Definition of Terms[29]

In order to have a clear understanding of the study, some of the important concepts used would be defined as follows:

Curriculum: A general over-all plan of the content or specific materials of instruction that the school should offer the student by way of qualifying him for graduation or certification or for entrance into a professional or vocational field.

Curriculum design: The way in which the component parts of the curriculum have been arranged in order to facilitate teaching and to enable schools to formulate feasible daily and weekly schedules.

Vocational education: A program of education below college grade organized to prepare the learner for entrance into a particular chosen vocation or to upgrade employed workers; includes such divisions as trade and industrial education, technical education, agricultural education, distributive education, and home economics education.

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[28] Nigerian Human Resource Development and Utilization," Education and World Affairs, December 1967, p. 45.

[29] Definitions adapted from: Carter V. Good, Dictionary of Education, 2nd Edition (New York, Toronto, London: McGraw-Hill Book Company, 1959).

Vocational agriculture: Education in agriculture for persons engaged in or expecting to engage in farming as a vocation.

Secondary agricultural education: Agricultural education in high schools or in other agricultural schools of lower than college grade and higher than elementary grade.

Occupation: The economic activity that is the life work of an individual.

School farm: A farm owned or leased by a school for use for instructional purposes.

Improvement project: A project conducted by a student in vocational agriculture, not primarily for the purpose of an immediate or direct financial return, but to improve the farm, the farm business, the farm home, the farm equipment, the farm livestock, etc.

Production project: An agricultural project designed to provide a cash return within the year in which it is undertaken and involving partial or entire ownership by the student.

Supplementary farm practice: A phase of supervised practice in vocational agriculture concerned principally with the introduction of new farming practices and the acquisition of new farming skills, providing experience on the home farm in addition to that afforded by agricultural production and improvement projects.

Knowledge: The outcome of specified, rigorous inquiry which originated within the framework of human experience and functions in human experience.

Skill: Anything that the individual has learned to do with ease and precision; may be either a physical or mental performance.

Attitude: A readiness to react toward or against some situation, person or thing, in a particular manner, for example, with love or hate or fear or resentment, to a particular degree or intensity.

Teaching: The act of providing activities, materials, and guidance that facilitate learning, in either formal or informal situations.

Behavioral objective: An objective stated in terms that indicate a specific desirable change in skills, attitudes or knowledge.

Lesson plan: A teaching outline of the important points of a lesson arranged in the order in which they are to be presented.

Evaluation: The process of ascertaining or judging the value or amount of something by careful appraisal.

Limitations

This study was meant to be essentially exploratory. In view of a complete lack of information on any previous study made in Nigeria and the limited time the writer had, no attempt could be made to propose an all embracing curriculum. The writer attempted to establish certain guide lines for the training of young men for farming and agriculturally related occupations in the country's secondary schools basing his judgment on his previous experience in the administration of the Farm Institute leavers' program in Northern Nigeria and the information he had gathered on the curriculum patterns of vocational agriculture in some United States high schools. An attempt would be

made to apply some concepts used in the curriculum design for vocational agriculture in the United States as they related to similar situations in Nigeria. This report would be based on a theoretical framework. A more specific study of curriculum development based on pertinent data analysis would make it possible to directly correlate some of the ideas developed in this report to the actual situation in Nigeria.

Chapter II

REVIEW OF LITERATURE

Discussed in the previous chapter were: the significance of agriculture to the economy of Nigeria; the significance of vocational education in Agriculture; existing forms of vocational education in agriculture; characteristics of vocational education; the need for a program of vocational education in agriculture and related training for the Nigerian secondary school system; objectives of the study; definition of important terms and limitations.

This chapter deals with the nature of 'curriculum' and carried a review of selected literature on guidelines for developing vocational education curriculum laying emphasis on 'need' of the pupils, the society and the nature of instruction. The scope of the chapter was limited by meagre reference sources on similar or related studies on Nigerian or African situations available at the time of the study. Those available were of restricted nature. However, opinions of various authors and theorists cited in the review were synthesized and presented under the following headings: definition, theory and design, evaluation and change.

Definition of Curriculum

A variety of definitions were given to the term 'curriculum' by various authors based on certain concepts and principles considered

pertinent to specific situations. Neagley and Evans[1] and Kearney and Cook[2] defined curriculum as:

> all the planned experiences provided by the school to assist pupils in attaining the designated learning outcomes to the best of their abilities.

Scheffer[3] defined curriculum as

> all activities intended to extend the school's responsibility hitherto limited to its so called formal course of study in such a way as to embrace the social and psychological development of its pupils.

Macdonald[4] applied a 'systems analysis' to the definition of the curriculum as follows:

> The system of planned actions for instruction, and instruction as the system of putting the plan into action.

This definition was an attempt to provide a framework for identifying the elements of educational practice and a way of dealing with relationships among the elements. The foregoing definitions had implications for formal education in schools only. Staley[5] expressed that our concern for occupational preparation must have a much broader

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[1]Ross L. Neagley and N. Dean Evans, Handbook for Effective Curriculum Development (Englewood Cliffs, N. J.: Prentice Hall, Inc., 1967), p. 2.

[2]N. C. Kearney and Walter W. Cook, "Curriculum," Encyclopedia of Educational Research, ed. Chester W. Harris (3rd ed.; New York: Macmillan Co., 1960), pp. 358-365.

[3]Israel Scheffer, The Language of Education (Thomas, 1960), p. 113.

[4]James B. Macdonald, "Educational Models for Instruction--Introduction," In Theories of Instruction (National Education Association, 1965), pp. 1-7.

[5]Eugene Staley, "Curriculum Design," Planning Occupational Education and Training for Development (New York, Washington, London: Praeger Publishers, 1971), pp. 54-55.

scope. He argued that occupational education and training should move forward by not only embracing planned activities within the school system but also in extra-school instructional and learning situations.

> The extra-school occupational and training activities represent in the aggregate very large totals of investment and of learning hours in countries where OET is most effective and should not be neglected in designing a curriculum.

Based on the foregoing definitions it could be inferred that a curriculum builder should be someone who sought to design appropriate learning experiences for pupils based on both in and out of school situations to give particular knowledge, skills and attitudes that would be of greatest benefit in satisfying their needs academically, socially and psychologically.

Curriculum Theory and Design

Curriculum development demanded that the builder make decisions based on certain assumptions about the learning process, the needs of individuals and those of the society. These assumptions might vary according to the geographical location, biological inheritance and the cultural heritage transmitted to the target population.[6] The significance of a society-oriented curriculum was revealed in the following excerpt taken from an F.A.O. report on agricultural education and training in Africa:[7]

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[6] A Guide for Vocational Education Curriculum Development, Cooperative Project by Oregon State University and U.S. Office of Education, p. 3.

[7] Training young people for farming and non-agricultural occupations, Special Program of Agricultural Education and Training in Africa, A report of a Seminar held at the Ahmadu Bello University, Zaria, Northern Nigeria, 28 June-7 July, 1965 (Rome: F.A.O., 1965), pp. 6-7.

> Recognising that the primary purpose of education was preparation for life and that in most African countries, rural life and agriculture will continue for a very long time to be the lot of a very vast majority of the population, a great contribution could be made by a more realistic and enlightened educational system in creating an awareness of the importance of Agriculture, the need for better and more productive systems of farming and the general development of the rural economy. In order to achieve this, the teaching of the more formal school subjects should be much more closely related to the life of the people and to the social and economic environment.

Mends[8] discussing the views of Wheeler[9] on social needs and values in curriculum orientation contended:

> . . . that the curriculum in a society with a long tradition of formal schooling was closely related to and derived from the cultural past. The purposes, whether stated or implicit, would most certainly reflect the universals present in the cultural core. The subject matter would be that which was believed to encompass the most valuable knowledge, skills and the significant ideas and values of the society. The methods of dealing with the subject matter should largely be conditioned by the educational history of the society and the extent to which it had been affected by social and technical innovation and discovery.

The ideas expressed in this citation called for an integrated effort demanding intimate and continuing interaction between instructors, specialists, pupils and informed members of the society in building the subject matter aspect of the curriculum to reflect societal norms, and changing technology.

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[8]Horatio Mends, A Proposed Curriculum for Agricultural Training in Ghana's Agricultural Colleges (M.S. Report, Kansas State University, Manhattan, Kansas, 1971), pp. 51-52.

[9]D. K. Wheeler, Curriculum Process (London: University of London Press, 1967), p. 13.

Rowat[10] also identified the importance of designing an agricultural education curriculum to meet the needs of the Nigerian society with the following recommendation:

> The educational system and its teaching programs must evolve in accordance with the needs of Nigerian Agriculture, and not necessarily in accordance with what has been found appropriate elsewhere. This does not imply any lowering of standards, academic or otherwise. It does imply that in the educators there must be a continual searching out of what is needed and a readiness to adapt and modify methods to meet these needs at all times.

In addition to emphasizing that the curriculum meet the need of the society he also pointed to the need for an evolving curriculum, the modification of which should be based on continuous research by the educators. Transporting curricular designs from one country to another was also considered improper.

In order that a curriculum fulfill its aim it must be comprehensive in nature, balanced and articulated horizontally and vertically to provide for needs of the students and the society.[11] Foshay and Beilin[12] discussing the ideas of curriculum theorists--Taba and Goodlad--expressed that a curriculum should be built up from elementary grades as, in their view, every change at the secondary school level

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[10] R. Rowat, "Conclusions and principal recommendations," Special Program of Agricultural Education and Training in Africa, A Report to the Federal and Regional Governments of the Federal Republic of Nigeria on the development of education and training in the field of Agriculture and related subjects (Rome: F.A.O., 1965), p. 98.

[11] A Guide for Vocational Education Development, ibid., p. 5.

[12] Arthur W. Foshay and Lois A. Beilin, "Curriculum," Encyclopedia of Educational Research, ed. Robert L. Ebel (4th ed.; London: Macmillan Co., 1969), p. 277.

presumed some state of affairs at the elementary level. Staley[13] endorsed the concepts of articulation and integration of a curriculum by establishing a four phase model for occupational education and training for development as follows:

> Phase i. General education in childhood and youth to stress basic knowledge, skills and personality traits with some elementary orientation to occupations. Phase ii. General plus pre-occupational education given near the termination of formal schooling to consist of individual aptitude analysis and occupational guidance. Phase iii. Job entry training plus further education comprising: a combination of learning opportunities in classroom, workshop and on the job to acquire specific training and real work experience to be given at or near the start of a first regular job. Phase iv. Career-long further training and re-training plus further education for occupational advancement, renewal and transfers throughout the working career.

Staley's idea of the model therefore presupposed that planning an occupational education curriculum for the primary, secondary and University levels ought to be conceived as an integrated whole. F.A.O.[14] supported the idea with the following statement:

> The planning of agricultural education and training has to be undertaken within the overall structure of the national education systems. There must be close cooperation between the different levels of education and training. A national plan for education should therefore involve representatives of all agencies, departments and ministries who have an interest and competence in planning and administering certain sections of the total plan.

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[13] Staley, ibid., p. 19 (insert).

[14] "Planning the Development of Agricultural Education and Training--National and Regional," Special Program of Agricultural Education and Training in Africa, ibid., p. 28.

Tyler[15] based the rationale of curriculum development and the plan of instruction on the identification of and provision of answers to the following questions:

(a) What educational purposes should the school seek to attain?
(b) What educational experiences can be provided that are likely to attain these purposes?
(c) How can these educational experiences be effectively organized?
(d) How can we determine whether these purposes are being attained?

Albracht[16] discussed the relationship between an appropriate curriculum and effective instruction with the following statement:

> Effective instruction pre-supposed the development of an appropriate curriculum. An effective curriculum was one which was developed by the use of the systems approach[17] based upon behavioral objectives and included the development of efficient plans for the accomplishment of the objectives. It also included testing and evaluation instruments which adequately measured the accomplishment of the behavioral objectives by the students. For effective instructional program three major dimensions must be considered as follows: the teacher, the pupil and the instructional material.

A complete description of the curriculum, according to Phenix,[18] should have at least three components:

(1) What was studied--the 'content' or 'subject matter.'
(2) How the teaching and learning were to be done--teacher objectives; students objectives; students approach, problem

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[15]Ralph W. Tyler, "Introduction," Basic Principles of Curriculum and Instruction, thirtieth impression (Chicago and London: The University of Chicago Press, 1970), pp. 1-2.

[16]James J. Albracht, "The Improvement of Instruction," Reprint from Improving College and University Teaching (International Quarterly Journal, Published by the Graduate School of Oregon State University, Corvallis, Oregon, Summer 1971), pp. 202-203.

[17]See Appendix I for the model.

[18]Philip H. Phenix, "Curriculum," Philosophy of Education (New York: Holt, Rinehart & Winston, Inc., 1958), pp. 57-75.

solving and class activities. (3) The order of instruction. ' The 'content' included the whole range of matters in which the student was expected to gain competence.

Taba[19] defined curriculum design as

a statement which identifies the element of the curriculum, states what their relationships are to each other, and indicates the principles of organization and the requirements of that organization for the administrative conditions under which it is to operate.

An effective curriculum design must give equal weight to scope of content, that of intellectual powers, habits of mind, skills and attitudes to be acquired by the students. Taba[20] also classified curriculum designs as follows:

(1) Subject centered curriculum: Main concern was the subject matter organization. It did not provide enough room for new ideas, knowledge or additional subject matter. Hence it did not provide a sufficiently adequate basis for developing a scope of a well rounded education as it tended to discourage the pursuit of multiple educational objectives. (2) Broad field (comprehensive) curriculum: Had the main advantage of a broad field organization as it permitted a greater integration of subject matter areas. It facilitated a more functional organization of knowledge. It was however prone to a passive over-view of generalizations thus offering little opportunity for active learning. (3) Curriculum based on social processes and life functions: Provided a patterned relationship between curriculum content and life. (4) Activity or experience curriculum: Had as its main purpose a gain of knowledge by the students for pursuing their needs and interests. The rationale was based on the premise that "Pupils learned only what they experienced and those things which were related to active purposes and rooted in experience could translate themselves into behavioral changes. Children learned best those things that were attached to solving actual problems that helped them in meeting real needs or connected with some active interests." Its essential characteristic was the planning of activities cooperatively by students and teachers.

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[19] Hilda Taba, "Current Patterns of Curriculum Organization," Curriculum Development, Theory and Practice (New York and Burlingame: Harcourt, Brace & World, Inc., 1962), pp. 382-412.

[20] Taba, ibid.

> (5) Core curriculum: Comprised selected learning experiences in certain subjects or fields of knowledge. Needs of the student and the society constituted its main purpose. Activities were concerned with present day needs of the country and the world. Distinct emphasis was placed on a core of social values. Its structure was fixed by broad social problems and themes of social living.

Marshall and Goetz[21] pointed out the usefulness of a curriculum based on social processes and life functions with the following statement:

> It permitted the use of experimental background which facilitated learning, an overview of the data of social living and a dependable basis for value orientation.

The merit of the core curriculum according to Mends[22] lay in the fact that: "It was adaptable and flexible in arrangements of time, contents, scheduling and grouping of students."

Vocational education, being an occupationally directed activity required that the curriculum be based upon both the qualitative--(desired personnel training qualities); and quantitative--(the number of personnel required for specific jobs) employment needs and trends. Occupational information should be used to devise programs and as a basis for necessary changes and updating that would keep programs current, dynamic and interesting.[23] Staley[24] supported this idea with the following statement on its implications as these related to developing nations:

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[21] L. C. Marshall and R. M. Goetz, Curriculum Making in Social Studies: A Social Process Approach (Scribner, 1936), pp. 176, 398.

[22] Mends, ibid., p. 49.

[23] A Guide for Vocational Education Curriculum Development, ibid., pp. 14-15.

[24] Staley, ibid., p. 27.

> The need for quick and continual feed back from employment system to the occupational education and training system; the training of reasonably versatile persons able to learn new skills quickly and transfer with some retraining from one specific job to another thus minimizing training wastage from wrong anticipation of future needs while facilitating quick adjustment to occupational changes sure to come with changing technology.

He further asserted that programs should not only provide for initial preparation of persons to meet present job requirements but also for continual opportunities for retraining, further education throughout a working life time and job mobility within and between occupations. He also advocated a strong community linkage particularly between the schools, the public and the employment system in the formation of an occupational education curriculum to meet demands of the labor market. The practice would obviate unnecessary duplication of facilities and make an effective use of available resources.

Curriculum Evaluation

Curriculum evaluation problems usually involved questions about educational objectives. Tyler[25] noted that one of the problems of designing an educational program was that the educational result desired was not in the teacher but in the student who must learn by developing a pattern of behavior which in some respects was new to him. Heath[26] felt that curriculum reform in recent years had grown out of attempts:

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[25]Dr. Ralph W. Tyler, Director, Center for the Advanced Study in the Behavioral Sciences, Talk given at Extension Curriculum Development Conference, Washington, D.C., December 8-12, 1963, p. 1.

[26]Robert W. Heath, "Curriculum Evaluation," Encyclopedia of Educational Research, ed., Robert L. Ebel (4th ed.; London: The Macmillan Co., 1969), p. 280.

> . . . to bring modern conceptual and methodological status of subject matter fields into the experience of students; apply current pedagogical and psychological thinking to classroom instruction and use the educational process to achieve social-ideological goals.

He gave the following as curriculum evaluation functions:

> (1) To identify specific strengths and weaknesses of trial versions of the curriculum thus enabling the objectives as well as the substance of the curriculum be clarified and refined. (2) Evaluation of the curriculum must be geared to the needs of those who must select from among competing programs.

The following instruments could be used for an effective evaluation of the curriculum: conferences with (1) the employers to see how the graduates had performed on the job and (2) the graduates of the program to indicate how successful they thought the program was and to estimate the degree of their job satisfaction. Through these procedures obvious weaknesses which might exist in the instructional program could be pointed out. Other considerations for curriculum evaluation should include an analysis of the cultural and societal changes that might have affected the students and the bodies involved in the educational program over a given range of time.

Curriculum Change

As a country became advanced technologically changes in the curricula for vocational education and training programs became inevitable. Foshay and Beilin,[27] basing their judgments on the opinions of curriculum theorists like Miles, Caswell and others, outlined the following procedures for effecting a curriculum change.

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[27] Foshay and Beilin, ibid., p. 278.

> (1) The use of school system curriculum committees and commissions: The bodies were expected to write courses of study; distribute them for criticism and adapt the revised versions that resulted. (2) The instructors' workshop: This was often referred to as the democratic approach and it involved the teachers engaged in the total program. (3) The political approach: This considered a public school as a political entity and indicated the importance of assaying the political forces (public opinion) relevant to a proposed educational change. (4) The comprehensive strategy: Specifically included provisions for a careful design of the innovations, the development of the local awareness, interest, evaluation and trial. This could also involve continuous research into the curriculum problem areas. They contended that the "democratic approach" was the most widespread approach to curriculum development at the local level.

It had been recognized that instructors were key persons in curriculum construction and change and that curriculum study was one of the most profitable means of professional improvement of the instructors. Since a good curriculum usually contained a common body of suggestions and aids for the teacher the curriculum planner could find the experience of specialists (consultants) in curriculum development quite helpful.[28]

Summary

Definitions given in the review indicated that the term 'curriculum' was a concept embracing both in-school and out-of-school educational activities. An occupationally directed curriculum must be comprehensive, balanced, articulated horizontally and vertically to meet the ever-changing needs of the pupils academically, socially, psychologically, the social values and culture of the society. This demanded that a vocational education curriculum for primary, secondary

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[28] J. Tanzman, School Management Journal, October 1972, Vol. 16, p. 48.

and the University levels should be conceived as an integrated whole and should develop within the overall structure of the national education systems. A systems approach to curriculum development considered three major dimensions, (1) the teacher, (2) the pupil and (3) the instructional material. An effective curriculum should comprise at least the following components: (1) content or subject matter, (2) behavioral objectives expected of the pupils and (3) appropriate testing and evaluation instruments.

A curriculum design must give equal weight to scope of contents, habits of intellectual powers, habits of mind, skills and attitudes relevant to the world of work. Following curriculum designs were identified in the review: (1) subject centered design, (2) comprehensive, (3) curriculum based on social processes and life functions, (4) activity or experience curriculum and (5) core curriculum. It was noted that a vocational education program required a curriculum based on (1) population census, (2) qualitative and quantitative employment needs and trends and (3) occupational information to ensure that program was flexible, current, dynamic and interesting. The aim of the program should be to produce retrainable and versatile individuals able to move easily from one job to another. The learner was identified as a key factor in curriculum evaluation problems. An important evaluation instrument noted in the review was holding conferences with employers and graduates of the program. By doing so obvious weaknesses of the curriculum and instructional method would be revealed. The necessity for a curriculum change was recognized in view of inevitable technological changes in various countries. The following instruments were

noted (1) teachers workshop (a democratic approach), (2) political approach, (3) school system curriculum committees and (4) comprehensive strategy. It was also recognized that instructors' efforts in curriculum construction and change would be a profitable means in enhancing their professional competence. Experience of specialists was also considered very useful in curriculum development.

Chapter III

METHODOLOGY

The necessity to develop a curriculum to serve specific and general needs of the clientele was explicitly pointed out in the previous chapter. The curriculum being proposed in this study must be sufficiently flexible and adaptable to meet current and future changes in culture and social values and the changing pattern of the agricultural technology of Nigeria.

This chapter would deal with the method used for developing the curriculum in this study. Albracht[1] suggested the following key steps in curriculum development, modification and improvement:

> (1) Preliminary operations to identify needs for trained people, students' needs and feasibility for operating a program. (2) Program planning comprising: developing advisory and consultative groups, creating instructional staff, developing student selection program, determining required facilities and developing an evaluation system. (3) Curriculum material development which essentially deals with "the instructional content." (4) Curriculum operation to utilize course of instruction and (5) Curriculum modification to maintain curriculum currency.

In view of a lack of the appropriate instruments, no attempt would be made in this study to develop a comprehensive curriculum as outlined above. Hence the writer felt that the study be narrowed down

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[1] James J. Albracht, Suggested Steps in Curriculum Development, Modification, and Improvement, A handout on course 410-824, Curriculum in Agriculture Instruction, Kansas State University, Summer 1972.

to developing a curriculum using concept of 'curriculum materials development' which emphasized the "instructional contents."

Clayton[2] referred to learning both as a process and a product. He defined learning as follows:

> As a process: learning refers to the experiences the learner goes through, his internal and external activity and his reactions to the situation in which he finds himself; as a product: learning refers to changes that occur, the way the learner is different or the actual changes of his behavior whether temporary or permanent.

He characterized learning as follows:

> (1) learning is a process that involves behavior, sequences of events and outcomes, (2) learning results from experiencing (3) learning depends on what the learner does. This involves how he perceives, thinks, feels and acts, (4) the end result of the learning process is some change in the learner demonstrable by a change in potential or actual change in his behavior, (5) the change in the learner tends to be fixed by the consequences of his behavior in terms of his own motivational systems.

Therefore basing our judgment on the foregoing ideas learning could be construed as identifying outcomes of knowledge, skills and attitudes in the learner, which required interaction of the individual with his physical environment. A learning situation hence called for learner's interaction with the teacher and instructional material.[3]

The writer felt that a curriculum for the proposed vocational education in agriculture and related training for the Nigerian secondary schools to be useful should be built on the above theory of learning.

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[2]Thomas E. Clayton, "What is Learning," Teaching and Learning, A Psychological Perspective, Habert W. Burns, ed. (Prentice Hall: Foundation of Education Series, 1965), pp. 35-45.

[3]Lecture by Dr. J. Jorns on Course 410-752, Methods of Teaching Adults in Extension, Kansas State University, Manhattan, Kansas, Spring Semester, 1973.

The systems approach[4] for curriculum development was used in this study. The writer considered it as an effective method to use based on the following criteria: (1) it was based upon the observable performance which would be required for gainful employment in an occupation, (2) the curriculum developed usually included the hypothesis that it was the best curriculum which could be developed at that particular stage in time, (3) the curriculum was tried and tested and evaluation instruments adequately measured the accomplishments of behavioral objectives by the student, (4) it assumed that careful consideration was given to the societal and cultural needs of pupils and (5) the suggestions by representatives of the occupation in which the students will be employed were significant in the planning of the curriculum.[5]

The curriculum design suggested in the study was the 'core' type, the merits of which lay in its flexibility and adaptability to meet pupils' needs. It was also considered relevant to increasing pupils' options in the school system thereby reducing school drop out rate which was a unique characteristic of a truly vocational education program. As the curriculum being developed in this study would be a completely new program in Nigeria, the significance of a core curriculum could not be over emphasized.

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[4] Ibid.

[5] James J. Albracht, "The Improvement of Instruction," Reprint from Improving College and University Teaching (International Quarterly Journal, Published by the Graduate School of Oregon State University, Corvallis, Oregon, Summer 1971), pp. 202-203.

The adoption of the core curriculum and the use of the systems approach to curriculum development required a huge amount of instructor's input which was the most important single contribution in the instructional process. The instructor must be competent professionally and technically. He must have a sincere and dedicated effort to provide the best instructional program possible.

The writer suggested that an instructor for the program under study should possess the following qualifications: either (1) a bachelor's degree in agriculture plus a teaching certificate or (2) a Nigerian certificate of education with a major in agricultural science. In addition, a farming background or agricultural work experience would be desirable. Before an instructor used the curriculum he should first of all engage in preliminary planning which according to Phipps[6] was:

> an attempt to use what is known to anticipate what will need to be taught so that the instructor can prepare himself for his teaching and be better able to help the pupils select the abilities they need.

He based instructor's preliminary activities on the following criteria:

> (1) educational objectives of both the department and the overall objectives of the school, (2) needs of the pupils and the community, (3) a survey of important farm enterprises in the community, (4) agricultural production problems unique to the community, (5) pupils' supervised agriculture experience programs should be based on nature of farm enterprises and agricultural businesses of the community, (6) learning experiences needed by the pupils to meet program objectives, (7) approved farm practices in the community.

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[6]Lloyd J. Phipps, "How to Develop Courses of Study," Handbook on Agricultural Education in Public Schools, 3rd edition (Illinois: The Interstate Danville, 1972), p. 167.

Course Organization

After the preliminary planning had been made, the instructor required a course organization which provided him a guideline on the type of courses that need to be taught and how these were distributed throughout the duration of the total program. This gave him the minimum hours to be spent on each unit so he could arrange his scheduling to fit into the overall school program. Phipps[7] outlined three general plans of course organization in vocational agriculture as follows:

> (1) the traditional type in which each year is devoted to a different phase of instruction, (2) a cross-sectional plan in which instruction is broken down into problem areas and are distributed throughout two or more years of instruction, (3) a modified cross-sectional plan in which a certain phase or phases of instruction receive central emphasis in each course.

The merits of the cross-sectional plan according to him were as follows:

> (1) flexibility in meeting specific needs and interests of pupils, (2) course contents can be distributed according to the developing level of understanding and abilities of the pupils, (3) organization of course contents on problem basis is facilitated, (4) it enables the instruction to grow out of the supervised agriculture experience programs.

Summary

The review attempted to identify the method used in developing the curriculum in this study. It was clearly noted that curriculum development methodology required that close attention be paid to the learning theory. An effective curriculum presupposed that instructors be fully qualified. A core curriculum design and a systems approach to curriculum development would be adopted. The writer used a

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[7] Phipps, ibid., p. 174.

cross-sectional plan of course organization based on the characteristics it had in common with the curriculum design and approach used. Moreover, it made course units to be categorized under specific headings and problem areas which were distributed throughout the duration of the program on year-to-year basis.

Chapter IV

THE CURRICULUM

It had been recognized from the work previously cited that the cooperative efforts of the instructors, the pupils, specialists, the industries and all the government agencies engaged in providing agricultural services to the society would be highly desirable in building the curriculum suitable for the training of future persons for farming and agriculturally related industries in Nigeria. The curriculum subject matter contents developed in this chapter was based on problem-solving concept since most agricultural enterprises usually involved a lot of problem-solving activities. Interrelated problems were grouped under problem areas or enterprises. Each problem area was analyzed into overt behaviors or competencies expected of the pupils at the termination of each course. The analysis given in this chapter was not meant to be all inclusive but merely to serve as a guide. Since the systems approach to curriculum development was considered most suitable for this study and in view of the commitment expected of the instructor in its use, a more comprehensive analysis based on a survey of the important farm enterprises and production problems of the local area would be required before he could establish a rational instructional program adaptable to pupils' needs.

At the present time, the Nigerian secondary schools system operated a five-year program of general education. It was the view of

the writer that an integrated five-year program of vocational education in agriculture and related training be introduced in the secondary schools based on the following premises:

> (1) the first year would be devoted to a pre-vocational course and made compulsory for all male students while the remaining four years would be devoted to the vocational program which could be made optional, (2) the enrollees must have had introductory basic agricultural science at the primary school level, (3) enrollment should be based on a keen interest in agriculture, (4) the curriculum was meant to serve as a core of courses for pupils preparing to farm and those for non-farm jobs requiring knowledge and skills in agriculture.

Towards the end of this chapter a suggested grouping of problem areas for each year of instruction with an approximate time allocation would be given based on the cross-sectional model of course organization.

Significant Problem Areas

Since many problems associated with the operation and management of a farm were closely related, it would be necessary to consider them together here in a definite sequence. Instructors would find the following sources extremely useful in determining significant problem areas to include in the instructional program:

> research publications by the agricultural experiment stations, agricultural extension journals, publications of the colleges of agriculture, farm surveys of locality and articles published by agricultural industries.

The problem areas cited in this study were grouped under three main headings based on: (1) the degree of interrelationship among the constituent parts, (2) the ease of nomenclature, (3) relationship of subject matter areas in vocational agriculture with other subject matter areas within the overall secondary school curriculum.

Classification of Problem Areas[1]

I. Biological and Physical Science

Problem areas:

1. Orientation in vocational agriculture
2. Animal science
   (a) Animal selection, classification and management systems
   (b) Caring for young animals at birth
   (c) Feeds and feeding--livestock and poultry
   (d) Breeding and improving herds and flocks
   (e) Controlling diseases of farm animals
   (f) Controlling parasites of farm animals
3. Plant and soil science
   (a) Crop botany
   (b) Crop production
   (c) Crop pests and diseases
   (d) Horticulture
   (e) Soil science
   (f) Soil conservation
   (g) Soil fertility and fertilizers

II. Social Science

Problem areas:

1. Agricultural economics
2. Farm management
3. Additional problem areas
   (a) Participating in future farmers of Nigeria organization
   (b) Supervised agriculture experience programs
   (c) Opportunity in agricultural occupations
   (d) Communication skills in agriculture
   (e) Community development
   (f) Farm records and accounts

III. Agricultural Mechanics

Problem areas:

1. Shop competencies in agricultural mechanics
2. Selecting, operating, servicing and maintaining farm machinery
3. Construction and maintenance of farm buildings
4. Use and maintenance of electrical equipment

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[1]Adapted from Vocational Education in Agriculture in Oklahoma, Agricultural Education Bulletin No. 5, published jointly by the Division of Vocational Education and the Department of Agricultural Education, Oklahoma State University, Stillwater, Oklahoma, August 1964, pp. 3-9.

Analysis of Important Problem Areas into Desired Behavioral Changes

The analysis was meant to be an integral part of the instructor's preparation for the instructional program. Its importance to the instructor was:

> (1) he would gain a more complete concept of the problem areas under consideration, (2) he could recognize the basic understandings, skills and attitudes that the pupils need so they might attain desired vocational competencies in solving the farm problem, (3) he could make a desirable selection of sequence in his teaching of facts and skills.[2]

I. Biological and Physical Science

Problem area I: Orientation in vocational agriculture

A. Knowledge and understanding of:
   1. Characteristics of agriculture
   2. Meaning of vocational education in agriculture
   3. Need for vocational education in agriculture
   4. Need for exploring
   5. Agriculture in the economy of my division, state and country
   6. Farming systems in Nigeria
   7. Land use and tenure systems in my division, state and the country
   8. Farming enterprises in my village
      a. Major and minor crops
      b. Animals raised
      c. Problems farmers in the area have in animal production, crop production, soil management and marketing
   9. Characteristics of farming as a business
   10. Agriculturally related industries and other agricultural occupations in my division and state
   11. Supplies needed in vocational agriculture
   12. Requirements for supervised farm practice and work experience in agriculture
   13. Objectives of course of study in vocational agriculture I, II, III, IV and V

B. Skills and ability to:
   1. Categorize the farm enterprises in the village and the division

C. Attitudes

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[2] Vocational Education in Agriculture in Oklahoma, ibid., p. 7.

1. An appreciation of the importance of agriculture as the backbone of the economy of the division, state and the country
2. To relate farming to the highest ideals in the society

Problem area II. Animal Science

A. Knowledge and understanding of:
   1. Classification of farm animals
   2. Housing of farm animals
   3. Animal feeds and feeding
      a. Constituents of feeding stuff including fats, proteins, carbohydrates, vitamins, minerals and additives (antibiotics)
      b. Pasture and forages
         i. Hay
         ii. Pasture and silage
         iii. Establishment and maintenance
         iv. Processing
         v. Nutritive values
      c. Concentrates
      d. Mash
      e. Ration formulation
      f. Sources and costs
      g. Feed handling and storage
      h. Factors affecting value of feeding stuffs
   4. Beef and dairy cattle production systems
      a. Judging and selection
      b. Management
         i. Feeder calves
         ii. Creep fed calves
         iii. Dehorning
         iv. Restraining and weighing
         v. Castration
         vi. Milk and milking
   5. Poultry production
      a. Management
         i. Deep litter
         ii. Battery cage
         iii. Semi intensive
      b. Culling poultry
      c. Egg grading
      d. Incubation
      e. Sexing
      f. Broiler production
   6. Hog production
   7. Sheep production
   8. Goat production
   9. Rabbit production
   10. Basic principles of livestock production
      a. Reproduction
         i. Heat and gestation period
         ii. Mating

11. Water requirements of farm animals
12. Diagnosis of common livestock disease symptoms
13. Livestock marketing
    a. Meat dressing
    b. Carcass quality

B. Skills and ability to:
1. Plan feeding programs for farm animals
2. Assist local leaders or farmers in promoting the use of specific feeds
3. Recognize abnormal and detrimental livestock management practices
4. Recognize animal health conditions
5. Recognize the types of breeds of farm animals adaptable to local conditions
6. Keep accurate livestock production and management records
7. Assist other farmers on livestock selection, management, feeding and sanitation

Problem area III: Crop botany

A. Knowledge and understanding of:
1. Elementary botany
    a. Crop morphology
    b. Function of roots, stems, leaves, flowers and fruits
2. Elementary crop physiology
    a. Requirements for seed germination
        i. Moisture
        ii. Light
        iii. Temperature
    b. Crop nutrient requirements and utilization
    c. Crop growth and development characteristics
    d. Identification of crop nutrient deficiencies
    e. Effect of day length on crops

B. Skills and ability to:
1. Determine and correct nutrient deficiencies in plants
2. Interpret and relate crop performance to physiological data

Problem area IV: Crop production

A. Knowledge and understanding of:
1. Recommended practices concerning
    a. Land clearing
    b. Seed-bed preparation
    c. Seed quality, selection and multiplication of adapted varieties
    d. Pre-planting seed treatment
    e. Planting dates for specific crops
    f. Fertilizer requirements of crops
        i. Types
        ii. Rates
        iii. Methods of application
    g. Weeds, pests and disease control
    h. Harvesting

i. Crop processing
j. Marketing

2. Husbandry of major annual crops
   a. Maize (Zea mays)
   b. Groundnut (Arachis hypogaea)
   c. Tobacco (Nicotiana tabacum)
   d. Sesame (Sesamum indicum)
   e. Cotton (Gossypium herbaceum)
   f. Wheat (Triticum vulgare)
   g. Sugarcane (Saccharum officinarum)
   h. Yam (Dioscorea alata)
   i. Cowpea (Vigna sinensis)
   j. Rice (Oryza sativa)
   k. Soybean (Glycine hispida)
   l. Millet (Panicum sp.)
   m. Guinea corn (Sorghum vulgare)
3. Mixed cropping versus sole cropping
4. Principles of crop rotation
5. Irrigation farming
6. Mixed farming

B. Skills and ability to:
1. Select the best type of adapted crop varieties for a given location
2. Identify and describe crop plants
3. Determine yield potentials of crops
4. Detect, identify and control plant diseases, insect pests and weeds
5. Conduct a farm sanitation program
6. Store farm products effectively
7. Process farm products efficiently

C. Attitude:
Demonstration of an admirable ability to adopt improved practices of crop production timely and profitably

Problem area V: Crop Pests and Diseases

A. Knowledge and understanding of:
1. Identification of common insects and diseases associated with
   a. Economic crops within the community
   b. Crops raised in the supervised farming program
2. Significance of insect pests and diseases in a crop production program
3. Parts of an insect
4. Life cycle of an insect
5. Methods of collection, mounting, preservation and labeling of insects
6. Types of crop diseases
   a. Virus
   b. Bacterial
   c. Fungal
7. Insects as a vector of a plant disease
8. Preservation methods of crop disease specimens

9. Pest and disease control methods
    a. Cultural
        i. Farm sanitation
        ii. Crop rotation
        iii. Cultivation activities
    b. Physical
        i. Hand picking of insects
        ii. Light trapping
        iii. Net trapping
    c. Chemical
        i. Insecticides, uses and limitations
        ii. Operation of sprayers, care and maintenance
    d. Biological control
        i. Parasites and predators
        ii. Chemical sterility
10. Pests of stored products
    a. Common pests
    b. Control methods
    c. Storage techniques of various crops

B. Skills and ability to:
    1. Recognize important pests and diseases associated with important crops within the locality and those raised in the supervised farming program
    2. Organize a crop protection program
    3. Maintain an insect pest collection box

C. Attitude:
    An appreciation of the significance of crop pests and diseases in a farming program

Problem area VI: Horticulture

A. Knowledge and understanding of:
    1. Husbandry of major vegetable crops raised in the locality
    2. Tree crops production
        a. Cocoa (Theobroma cacao)
        b. Oil palm (Eleas guiniensis)
        c. Rubber (Hevea braziliensis)
        d. Mangoes (Mangifera indica)
        e. Citrus (citrus sinensis)
        f. Coconut palm (cocos nicifera)
        g. Cashew nuts (anacardium occidentale)
        h. Cola nut (cola nitida)
        i. Pawpaw (carica papaya)
        j. Bananas (musa scipientum)
        k. Coffee (coffea arabica)
    3. Processing of tree crops products
    4. Gardening
    5. Floriculture
    6. Landscaping

B. Skills and ability to:
    1. Prepare potting mixtures
    2. Pot plant seedling
    3. Provide required amount of water and nutrients for vegetable production

4. Set up and regulate irrigation practices for vegetable production
5. Prepare vegetable seedbed
6. Sterilize soil
7. Transplant seedlings at the appropriate time
8. Train plants by using crop supports
9. Prune plants
10. Detect, identify and control vegetable pests and diseases

Problem area VII: Soil Science

A. Knowledge and understanding of:
   1. Soil composition
   2. Soil formation
   3. Soil physical properties
   4. Chemical properties
   5. Soil micro-organisms
   6. Water logging
   7. Drainage
   8. Soil acidity and alkalinity
   9. Liming of soils
   10. Mulching
   11. Soil nutrients
   12. Soil testing
   13. Soil pH
B. Skills and ability to:
   1. Take accurate soil sample
   2. Interpret a soil test report
   3. Determine a soil type suitable for specific crops

Problem area VIII: Soil Conservation

A. Knowledge and understanding of:
   1. Conservation of soil moisture and nutrients by means of
      a. Contour farming
      b. Strip cropping
      c. Tie ridging
      d. Effective drainage system
   2. Dry land farming
B. Skills and ability to:
   1. Carry out soil conservation practices

Problem area IX: Soil Fertility and Fertilizers

A. Knowledge and understanding of:
   1. Characteristics of a fertile soil
   2. Plant fertilizer requirements
   3. Soil organic matter
   4. Green manures, compost, barnyard manure
      a. Preparation
      b. Uses
   5. Soil microorganisms
   6. Nitrogen cycle
   7. Types of commercial fertilizers
      a. Phosphatic

b. Nitrogenous
c. Potassic
d. Compound fertilizers
e. Sources and costs
f. Handling and uses

B. Skills and ability to:
1. Determine and correct nutrient deficiencies in soils and plants
2. Apply fertilizers of correct types and analysis accurately based on soil testing results
3. Evaluate fertilizer uses
4. Make accurate recommendations regarding proper use of fertilizers
5. Recognize and adopt new fertilizer application practices
6. Develop a fertilizer promotion and marketing program

II. Social Science

Problem area I: Agricultural economics

A. Knowledge and understanding of:
1. Principles of supply and demand
2. Money
3. Capital involvement in farm enterprises
4. Marketing of farm products
5. Farm credit
a. Sources
b. Utility
6. Banking

B. Skill and ability to:
1. Apply principles of supply and demand to market situations
2. Handle the financial aspects of farm enterprise efficiently and take corrective actions when necessary
3. Analyze a farmers credit potential

Problem area II: Farm Management

A. Knowledge and understanding of:
1. Farm planning and layout techniques
2. Farm management terms
a. Farm enterprise
b. Principle of comparative advantage
c. Gross farm income
d. Net farm income
e. Farm profit
3. Farm management decisions
a. What, when and how to produce
4. Nature of farming as a business
5. Labor management and analysis

B. Skill and ability to:
1. Organize an efficient and profitable farm business enterprise
2. Identify and anticipate appropriate production factors in the locality

C. Attitude:
   1. A quick and realistic appreciation of risks and problems involved in farm business management
   2. An ability to use problem solving approach in farming and take prompt decisions
   3. Make a beginning and advance in farming

Problem area III: Participating in Future Farmers of Nigeria organization

A. Knowledge and understanding of:
   1. Parliamentary procedure
   2. Democratic leadership and group behavior
   3. Planning and conducting meetings
   4. Effective participation in judging contests, awards and prizes
   5. Cooperation and loyalty within the group
   6. Good citizenship

B. Skills and ability to:
   1. Work effectively within a group
   2. Develop good human relations
   3. Conduct meetings

C. Attitudes:
   1. To demonstrate a sense of belonging and loyalty to a group to whom he belongs
   2. To demonstrate good and effective leadership abilities

Problem area IV: Opportunities in Agricultural Occupations

A. Knowledge and understanding of:
   1. Agricultural career opportunities in the fields of:
      a. Agriculturally related industries and commerce
      b. Farming
      c. Agricultural extension work
      d. Agricultural education at the
         i. Intermediate level
         ii. University level
      e. Agricultural research
      f. Salesmanship in farm supplies
         i. Agricultural chemicals
         ii. Fertilizers
         iii. Livestock feeds
         iv. Crops and animal products
         v. Machinery and farm implements
   2. Preferences, salary structure and educational requirements of the occupations

B. Skills and ability to:
   Make a wise choice of a career in the fields of agriculture

Problem area V: Communication Skills in Agriculture

A. Knowledge and understanding of:
   1. The role of communication
   2. The communication process
   3. Essential elements of preparing and making speeches

4. Writing a good newspaper article
5. Writing farm reports
6. Writing a good radio script
7. Problems of communication within a social group
8. Analysis and interpretation of technical data to a rural community

B. Skills and ability to:
1. Deliver a good public speech
2. Present information by radio
3. Write articles for newspapers, magazines and farm journals
4. Participate in group discussions intelligently
5. Think logically
6. Interpret technical farm data or report
7. Evaluate the efficiency of communication methods and techniques

C. Attitude:
1. To appreciate and value the need for reliability and accuracy in communication
2. To appreciate the importance of keeping content and method of communication within the social and cultural code of the audience

Problem area VI: Community Development

A. Knowledge and understanding of:
1. Rural sociology including
   a. Value orientation between urban and rural people
   b. Cultural and social organization of rural communities
   c. The role of family unit in rural communities
   d. Traditions and social customs affecting farming in rural communities such as--religions
2. Land tenure systems in the community
3. Agricultural extension services and the farming community
4. Other agriculturally related community needs
   a. Infrastructure
      i. Roads
      ii. Efficient communication systems
      iii. Water supply
   b. Markets for farm products

B. Skills and ability to:
1. Appraise and interpret desirable cultural values in rural people
2. Cooperate with government agencies and groups of rural people in initiating action programs for rural development
3. Develop skills in democratic processes and procedures among rural people

C. Attitude
1. To appreciate the values and social set up of the rural community
2. To demonstrate the use of cooperative efforts in
   a. Solving community problems and
   b. Securing an effective bargaining for the help and cooperation of government agencies

3. To demonstrate a sense of belonging to the farming community of which he is a member and the nation at large

Problem area VII: Supervised Agriculture Experience Programs

A. Knowledge and understanding of:
   1. The place of supervised farming experience program in the Vocational Agricultural education and training program

B. Skills and ability to
   1. Select a suitable site for a farm location
   2. Plan and organize a typical farming program
   3. Plan a calendar of activities for crops and livestock programs
   4. Evaluate crop progress and forecast yield prospects
   5. Keep adequate and valid records for a farming program
   6. Identify and control pests and diseases

C. Attitude:
   1. To demonstrate through the analysis and interpretation of farm records that farming could be a profitable business
   2. Choice of farming as a future occupation or vocation
   3. Make a beginning and advance in farming

Problem area VIII: Farm Records and Accounts

A. Knowledge and understanding of:
   1. Annual records of farm enterprises
   2. Farm budgeting
   3. Farm accounts giving list of expenditure and receipts on daily, weekly, monthly and yearly basis
   4. Personal finance to include bank transactions
   5. Preparation of balance sheet--Profit and loss account

B. Skills and ability to
   1. Keep farm accounts efficiently
   2. Appraise profit and loss account of farm business

C. Attitudes:
   1. To appreciate the significance of keeping accurate records in farming enterprises
   2. To demonstrate an ability to manage personal accounts and transact business with the bank

III. Agricultural Mechanics

Problem area I: Shop Competencies in Agricultural Mechanics

A. Knowledge and understanding of:
   1. Shop orientation
      a. Standard safety practices and procedures
      b. Rules of orderly conduct
      c. Orderly use of tools and equipment
      d. First aid procedures
   2. Sketching and drawing
   3. Care of shop machinery

4. Cold metal work
5. Hot metal work
6. Bolt selection, cutting and threading
7. Farm carpentry
8. Painting
9. Arc welding
10. Oxyacetylene welding

B. Skills and ability to:
1. Identify, select and use hand tools
2. Use power equipment in the school shop safely
3. Identify and use hot and cold metal work tools
4. Identify bolts, screws and nails
5. Figure bills of materials for wood and metal projects
6. Get acquainted with welding machines and accessories
7. Recognize and use safety precautions
8. Weld in different positions
   a. Flat welding
   b. Horizontal
   c. Vertical
   d. Overhead
9. Weld various metals--sheet metal, castiron welding
10. Become acquainted with oxyacetylene welding

Problem area II: Selecting, Operating, Servicing and Maintaining Farm Machinery

A. Knowledge and understanding of:
1. Kinds of machinery required for farm operations in the locality
2. Factors to consider when new or additional machinery is to be purchased based on
   a. Cash available
   b. Advisability of buying new or second hand machines
3. Determining need for additional machinery for profitable farming operations
4. Determining cost of owning and operating a tractor
   a. Initial cost
   b. Hours of work to be done
   c. Depreciation
      i. Hours of use
      ii. Obselesence
      iii. Care of operation
      iv. Quality of servicing
      v. Average service life
      vi. Fuel cost
      vii. Lubricating cost
      viii. Cost of repair and parts
      ix. Calculating cost per hour
5. Power development and transmission
6. Relationship of lubricants to working parts of machines
7. Principles of operation of a two cycle and four cycle engine

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B. Skills and ability to:
   1. Read and understand manufacturer's manuals for the operation and adjustment of farm machines
   2. Adapt machine types to type and size of farm operations
   3. Make an accurate decision on whether or not to buy farm machines
   4. Take an inventory of farm machines
   5. Make adjustment on farm machines
   6. Evaluate depreciation of farm machines
   7. Locate failures and make repairs quickly and efficiently
   8. Follow factory instructions in machine assembly and operations
   9. Associate parts with machines
   10. Determine when machine parts need replacement
   11. Detect incorrect assembly or adjustment
   12. Operate farm machines including ox-drawn implements to do farm operations
   13. Service a tractor, tillage and planting machines
   14. Operate and maintain gas engines
   15. Operate and maintain power equipments like
      a. Water pumps
      b. Sprayers

C. Attitudes:
   1. To demonstrate the use of appropriate farm mechanic skills to
      a. Cope with farm size
      b. Increase productivity per man and per acre
      c. Increase farm profit

Problem area III: Construction and Maintenance of Farm Buildings

A. Knowledge and understanding of:
   1. Comparative values of different types of building materials
   2. Construction of buildings used for different purposes
      a. Beef cattle
      b. Dairying
      c. Swine
      d. Sheep
      e. Poultry
      f. Machinery
   3. Estimates of materials used for construction of farm structures
   4. Concrete structures

B. Skills and ability to:
   1. Choose building materials for farm structures
   2. Determine type and design of structure needed to meet specific needs
   3. Read building plans and blueprints
   4. Estimate building costs
   5. Determine building needs for farming or ranching

Problem area IV: Use and Maintenance of Electrical Equipment

A. Knowledge and understanding of:
   1. Electrical terms that describe electrical equipment: ohm, volt, amperes, watts, kilowatt hours, conductor, circuit, fuse, circuit breaker, switch, horsepower, direct current, alternating current
   2. Electric meter reading and figuring operating cost
   3. Servicing and maintaining minor electrical equipment
      a. Safety practices
      b. Repairing service cords
      c. Replacing attachment bulbs and lamp sockets
   4. Wiring systems
      a. Replacing fuses and resetting circuit breakers
      b. Replacing switches
      c. Splicing wires
      d. Replacing lighting fixtures
   5. Use of electricity for home and farm use

B. Skills and ability to develop competencies necessary
   1. For the safe use of electrical equipment
   2. To service electrical equipment
   3. To do minor wiring

C. Attitude: Awareness of electrical safety procedures

Problem Areas to be Taught Each Year of the Program

The arrangement of the problems in this study was based on the following premises:

> (1) Problems of value as general education experiences were taught in the first and second years. (2) More advanced and specialized problems were included in the upper division classes; for example: livestock, marketing, soil management and farm mechanics problems were to be taught in the third, fourth and fifth years. It was assumed that the basic science courses students took in their upper classes would contribute to more thorough understanding of the solution of problems in these areas.

Problems in plant and soil science, animal science, agricultural mechanics and individual supervised farming program were included in each year of instruction. Such organization would afford a wide range of activities for the pupils' needs. The estimated number of class periods required for teaching each problem area were based on the following factors:

> (1) the relative importance of the problems to the pupils, (2) the number of class periods required to do effective teaching, (3) the degree of competency desired, (4) the previous instruction the pupils might have had that may have transfer value to the problems under consideration, (5) the previous practical experience of the pupils and (6) the teaching material available.[3]

The writer felt that the approximate number of periods per year allowed for teaching problem areas developed in this study should be considered a minimum starting point for making a more careful estimate based on local conditions.

Vocational Agriculture I

Educational objective: To develop competencies and understandings that are of value to general education.

Problem Areas	Approximate Number of periods
Orientation in vocational agriculture	20
Introductory animal, plant and soil science	30
Introductory agricultural mechanics	20
Field trips	20
Practicals (laboratory)	30
Supervised agricultural training program at the school	50
Reviews and examinations	10
Total	180

Vocational Agriculture II

Educational objective: Exploration of new ideas of learning in the development of competencies and understandings that contribute to vocational competency in agricultural occupations

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[3]Vocational Education in Agriculture in Oklahoma, ibid., p. 60.

Problem Areas	Approximate Number of periods
Orientation to vocational agriculture	16
Future farmers of Nigeria organization	20
Supervised agriculture experience programs	50
Animal selection (cattle, pigs, poultry, rabbits)	40
Identification of seeds and plants	30
Selecting crop varieties	40
Planting crops	20
Feeding animals	14
Caring for young animals at birth	10
Recognizing characteristics of soils	20
Developing shop competencies	20
Solving mathematical problems related to agriculture occupations	20
Insect and disease identification	20
Reviews and examinations	20
Total	360

Vocational Agriculture III

Educational objective: This is similar to that of the second year but more emphasis is given to vocational objectives.

Problem Areas	Approximate Number of periods
Orientation in vocational agriculture	10
Future farmers of Nigeria activities	16
Planning supervised practice and work experience in agriculture	40
Feeding livestock and poultry	70
Controlling diseases of animals	20
Controlling parasites of animals	20
Controlling plant insects pests	20
Controlling diseases of plants	20
Weeds control	16
Problems in agricultural mechanics	60
Vegetable production	20
Nursery practices	4
Plantation management	20
Plant budding	4
Examination and reviews	20
Total	360

Vocational Agriculture IV

Educational objective: To develop competencies that will enable the learner to make a beginning and progress in agricultural occupations.

Problem Areas	Approximate Number of periods
Orientation and occupational information	20
Future farmers of Nigeria organization	10
Supervised agriculture work experience	40
Livestock judging	20
Marketing livestock	10
Inspection and marketing animal products	10
Harvesting crops	10
Marketing crops	10
Storage of crops	10
Soil management	40
Tillage practices with crops	30
Pasture management	10
Keeping and interpreting farm records and accounts	40
Problems in agricultural mechanics	60
Farm management	18
Legislation affecting agriculture	2
Reviews and examinations	20
Total	360

Vocational Agriculture V

Educational objective: This is similar to the fourth year.

Problem Areas	Approximate Number of periods
Orientation and occupational information	20
Future farmers of Nigeria	10
Supervised farm practice and work experience in agriculture	30
Breeding and improving herds and flocks	20
Understanding the functions of management in agriculture	20
Community development	8
Farm credit	4
Analyzing production and marketing practices	16
Farm planning, budgeting and layout	60

Problem Areas	Approximate Number of periods
Determining building needs for total farming programs	6
Problems in agriculture mechanics	100
Farm records analysis	20
Sources, marketing and handling farm supplies-- (fertilizers, seed dressing, insecticides and fungicides)	26
Reviews and examinations	20
Total	360

Summary and Remarks

The curriculum developed was meant for an integrated five year program. The first year courses would be pre-vocational while those offered in the remaining four years would be vocational. The subject matter contents were based on the problem solving concept since most agricultural enterprises usually involved a lot of problem-solving activities. Each problem area was analyzed into behavioral objectives which outlined the various competencies in knowledge, skill and attitude expected of the pupils at the end of each course. Analysis of problem areas was identified as an integral part of the instructor's preparation for the instructional program. The distribution of problem areas to be taught each year of the program was made to suit the levels of understanding and experiences of the pupils. The problem areas were not conclusive and the teacher had to make a survey of the locality to insure that programs meet pupils' needs. The periods of instruction given for each problem area was meant to be a guide. Since instructions were meant to grow out of the supervised agriculture experience programs of the pupils two farming projects would be suggested: (1) a

short term production project for individual pupils on the school farm, (2) a long term production, improvement or supplementary project on the pupil's home farms. Since most pupils attended school far away from their homes, the cooperation of the parents in the long term projects would be highly desirable. Agricultural career experience programs with the agricultural industries could be arranged for pupils with inclination for agricultural business preferably during the long vacations.

Chapter V

SUMMARY

Objectives of the study were: (1) to establish a theoretical background for a need for a vocational education in agriculture and related training program for the Nigerian Secondary School system; and (2) to draw up a desirable curriculum for such a program laying emphasis on course units, knowledge, skills and attitudes pertinent to the world of work.

The program was expected to interest and prepare young people for careers in the following fields of agriculture: farming, agricultural education, research, extension and agribusiness. Agriculture could hence be placed on a plane that would make it more attractive and a worthwhile occupation or vocation to the Nigerian secondary school leavers.

A need for the study was considered timely because of: (1) a complete lack of vocational education in agriculture and related training program in the Nigerian secondary school system at the moment; (2) consensus of opinions expressed by informed specialists on the Nigerian educational system that the present system needs to be revised to incorporate vocational education in agriculture at the secondary school level; (3) problems of school drop outs in the Nigerian school system right from the primary through the secondary to the university level; and (4) the present low quality of manpower resources at the

junior and intermediate levels in all occupations including agriculture below the Bachelor degree level.

The study was limited by a complete lack of any information on previous work on the problem in the country. Hence findings in the study were not based on the analysis of any data. Some of the concepts used in vocational agricultural education in some United States high schools were used in the study where these related to similar situations in Nigeria.

An occupational education curriculum design was expected to offer appropriate learning experiences to all students in a program laying emphasis on knowledge, skills and attitudes. All learning experiences should satisfy their needs academically, socially and psychologically. The design was expected to be based on the following assumptions: (1) students' needs, (2) needs of the society, (3) opinions of informed subject matter specialists, and (4) the philosophy of the teaching-learning process. These assumptions would vary according to the geographical location and cultural heritage of the target population the program should serve. The curriculum was also based on the following rationale: (1) educational objectives to be attained; (2) educational experiences to be provided to attain the objectives; (3) effective organization of the educational experiences; and (4) evaluation procedures to determine the validity of the program.

A systems approach to curriculum development was considered useful in order to ensure a valid relationship between an appropriate curriculum and effective instruction.

From the review of literature the following curriculum designs were noted: (1) subject centered curriculum, (2) comprehensive curriculum, (3) curriculum based on social processes and life functions, (4) experience curriculum, and (5) core curriculum. It was noted that the core curriculum was suitable for an occupationally directed program such as the one under study. It was also noted that occupational information based on projected manpower needs would be a prerequisite for any vocational education curriculum development. This would enable changes and updating necessary to keep programs current, dynamic and interesting. Moreover these would ensure that versatile persons be trained thereby reducing wastage from poor career choices. This was considered necessary in view of frequent changes in requirements for various occupations with changes in technology.

Curriculum evaluation was considered necessary as the exercise would enable specific strengths and weaknesses of a program to be revealed. The following evaluation criteria were identified: (1) conferences with employers of graduates; (2) conferences with the graduates of the program; and (3) an analysis of the cultural and societal changes over a given period of time.

A sound curriculum must be flexible and adaptable enough to enable necessary changes to be made. The following criteria for a curriculum change to take place were noted: (1) school curriculum committees; (2) teachers' workshop; (3) political approach--assaying public opinions relevant to a proposed curriculum change; (4) a comprehensive strategy to develop a local awareness, interest, evaluation and trial; also research into specific curriculum problem

areas; and (5) involving curriculum specialists. Curriculum development and changes were noted as an important part of staff improvement program.

In anticipating what should be taught a vocational agricultural instructor was supposed to consider the following factors: (1) objectives of the program; (2) needs of pupils; (3) problems of agricultural production unique in the locality; (4) a survey of important farm enterprises; (5) supervised agriculture experience programs; (6) farm power needs for effective supervised farm projects; (7) learning experiences needed to meet program objectives; and (8) approved farm practices in the locality. Instructors were supposed to use a variety of teaching methods. Human and non-human resources could be usefully employed in teaching activities. Instructors should make and use lesson plans for effective instruction. All teaching activities should be farm oriented.

It was noted that an effective instructional program should be accompanied with a comprehensive evaluation of the program from beginning to end.

A cross-sectional plan of course organization was proposed for the program in view of the need for flexibility in scheduling and meeting the needs and interest of the pupils.

The proposed curriculum was meant for an integrated five year program as follows:

Vocational Agriculture I	Secondary I
Vocational Agriculture II	Secondary II
Vocational Agriculture III	Secondary III

Vocational Agriculture IV	Secondary IV
Vocational Agriculture V	Secondary V

The following problem areas were proposed in the curriculum: (1) Orientation in Agriculture; (2) Farm Records and Accounts; (3) Communication Skills in Agriculture; (4) Future Farmers of Nigeria Organization; (5) Opportunities in Agricultural Occupations; (6) Plant Science; (7) Crop Protection; (8) Animal Production; (9) Soils; (10) Crop Production; (11) Soil Fertility and Fertilizers; (12) Soil Conservation; (13) Horticulture; (14) Community Development; (15) Agricultural Economics; (16) Farm Management; (17) Supervised Farming Program; and (18) Farm Mechanics.

Implications

The study did not attempt to propose an all inclusive curriculum for vocational education in agriculture and related training for the Nigerian secondary schools. An attempt was made to provide a background and the rationale for a need to establish the program. The theoretical framework of curriculum development and the curriculum proposed in this study would serve as a basis to direct further efforts in the establishment of the program. Further research would be highly beneficial to determine specific needs of the pupils, locality, and the states to be served by the program. This should be done against the background of current developmental programs, socio-economic and cultural trends in the country. A delivery system approach to determining occupational needs would be a desirable tool in planning a valid program.

This implied that: (1) vocational education in agriculture should be made an integral part of a total occupational education program throughout the country to involve other areas like health, home economics, technical, business and office, distributive and trade and industrial occupations; (2) graduates of the program would be trained to acquire desirable knowledge, skills and attitudes relevant to the world of work; (3) training would enable them to be adaptable individuals equipped to move from one job to another easily and be able to cope given further training; (4) the cost of occupational training and training wastage that might occur due to wrong anticipation of manpower needs would be reduced; and (5) manpower resource problems of the country would be realistically tackled.

The study also had implication for the training of young men for farming and related occupations and hence the creation of a desirable atmosphere whereby the results of scientific research in agriculture and modern extension activities would be profitably utilized by the society.

Suggestions for Further Study

Prior to the implementation of the program, special studies would be desirable in the following areas: (1) the scope and effectiveness of the existing forms of vocational training in agriculture in the country; (2) a review of existing general education curricula in the Nigerian secondary schools; (3) inclusion of agricultural science education as a practical arts subject in the primary schools system; (4) inclusion of vocational agriculture in the West African school certificate examinations; (5) the present and future

requirements in various fields of agricultural occupations; (6) the diverse nature of the Nigerian social systems as they relate to tribes, history, culture and religion; (7) the administrative machinery and funding of the program which in the opinion of the writer should involve the business and industries, the divisions, State and federal governments; (8) the establishment of a vocational agriculture teacher education program in Nigerian universities; and (9) incentive systems for agricultural occupations such as (i) agricultural credit facilities for present and prospective farmers, (ii) review of the existing land tenure systems, (iii) improvement of infrastructure especially communications and transport systems, (iv) expansion of agricultural extension and research services to support the efforts of present and prospective farmers, (v) efficient marketing systems for agricultural products, (vi) adequate and cheap sources of farm supplies including fertilizers, chemicals and livestock feeds.

In conclusion, the writer felt that further investigation would be required to establish a rational strategy for implementing the program. Technical assistance could be sought from multinational organizations like the Food and Agricultural Organization, United Nations Educational Scientific and Cultural Organization and International Labor Organization for aid in making preliminary surveys, planning and implementation of the program.

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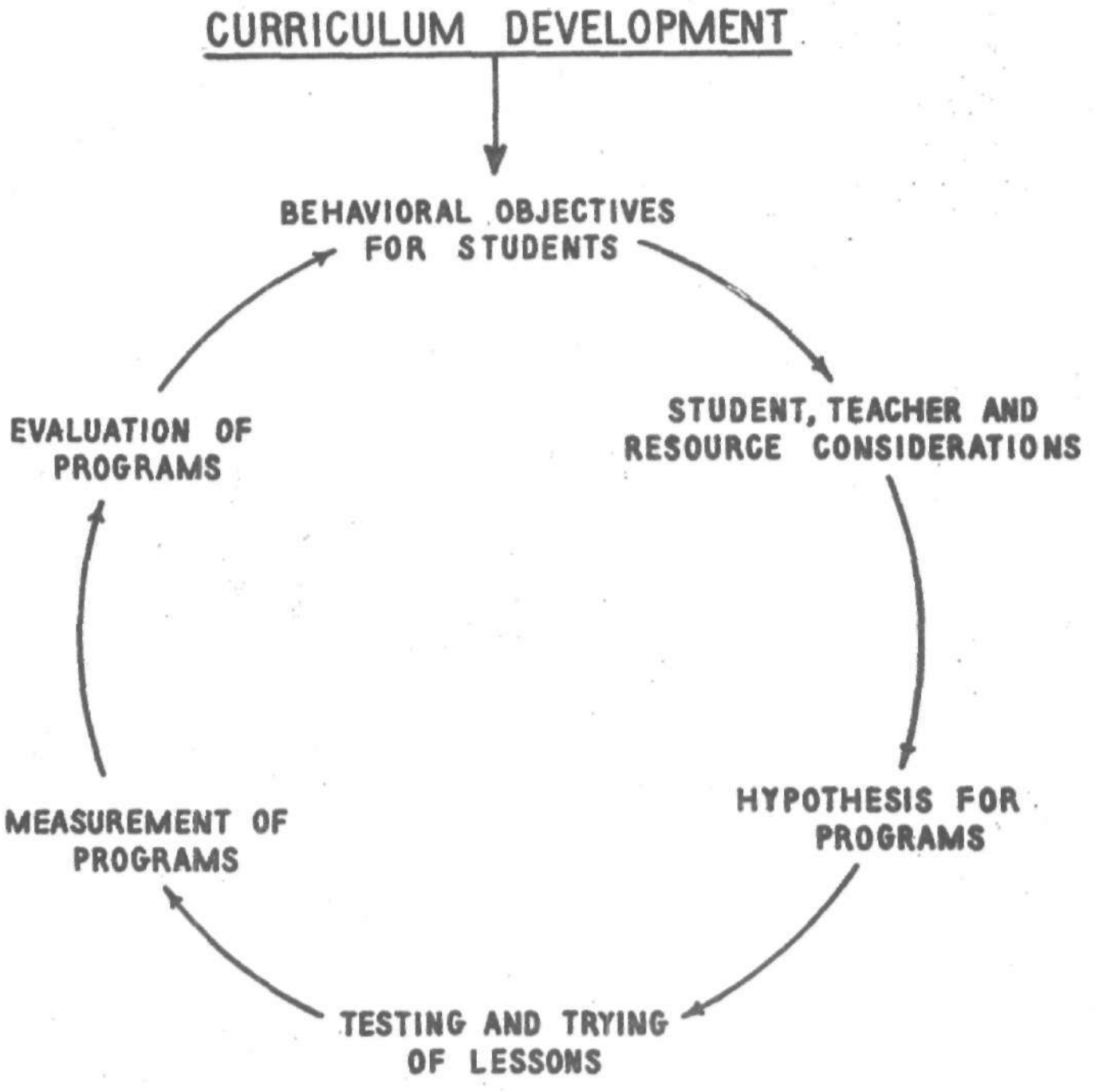
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APPENDIX I



A SYSTEMS APPROACH MODEL

APPENDIX II

SUGGESTED FORMAT FOR A LESSON PLAN

1. Enterprise or problem area

2. Problem

3. Objectives

4. Motivation

5. Teaching aids

6. Teaching procedure

7. Summary

8. Evaluation methods

9. References

APPENDIX III

SUGGESTED FARM SURVEY FORMAT

YEAR _____

1. Name of farmer _____ Age _____ 2. Village _____ 3. Married or single _____

4. Number of children _____ Male _____ Female _____ 5. Number of farms _____ 6. Major soil type _____

7. Major Crops Grown

	Yield last year/acre	Fertilizer Applied		
		Kind	Amount	When Applied
a.				
b.				
c.				
d.				
e.				
f.				
g.				
h.				
i.				
j.				

8. Major Livestock Raised
   a. _____ Number _____
   b. _____ Number _____
   c. _____ Number _____
   d. _____ Number _____

9. Has a soil map of the farm been made? _____ 10. Is the farm terraced? _____

11. Is contour farming practiced? _____ 12. Tillage practices _____

13. Weed control practices
   a. _____
   b. _____
   c. _____
   d. _____

14. Crop rotation program
   1st year _____
   2nd year _____
   3rd year _____
   4th year _____
   5th year _____

15. Crops he markets

	Types	Volume
a.		
b.		
c.		
d.		
e.		

16. Miscellaneous farm practices _____

DEVELOPING A CURRICULUM FOR VOCATIONAL EDUCATION IN AGRICULTURE AND RELATED TRAINING FOR NIGERIAN SECONDARY SCHOOLS SYSTEM

by

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B. Sc. (Agric.), Ahmadu Bello University, 1965

AN ABSTRACT OF A MASTER'S REPORT

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The purpose of this study was to establish a rational basis for understanding a theoretical framework for developing a curriculum for a proposed program of vocational education in agriculture and related training for the Nigerian secondary school system. An attempt was made to provide a background and justification for a need to establish the program. The study was not based on any data analysis but rather on concepts discussed in the review of literature and the author's personal experience. Certain applicable concepts from existing programs of vocational agriculture in some United States high schools were adapted when considered relevant to similar situations in Nigeria.

The following characteristics of the proposed curriculum for Nigeria were noted: (1) to offer appropriate learning experiences to all pupils emphasizing knowledge, skills and attitudes relevant to the world of work, (2) to serve the needs of the pupils academically, socially and psychologically, (3) to increase options available to pupils so they could make prudent career choices, (4) to serve the needs of the society taking into account the diverse nature of the culture and socio-economic status of the country, (5) it should be based on the analysis of occupational information of the country's projected manpower needs, (6) it should be comprehensive, balanced and articulated vertically and horizontally. This would ensure that programs were current, dynamic and interesting.

The program would produce versatile persons and hence reduce training wastage from poor career choices. This had merit for a

developing country like Nigeria in view of frequent changes in the requirements for various occupations, including agriculture, because of rapid changes in technology.

Included in the study were discussions on curriculum theory, designs, evaluation and change. A 'core' curriculum was developed to meet both pupils' and society's needs. A systems approach to curriculum development was preferred in the study because the writer felt it would afford more realistic opportunities for profitable instructor-pupil involvement in the proposed educational activities.

An integrated five year program was proposed. The first year courses were designed as pre-vocational in context to provide exploratory experiences and help pupils develop competencies and understandings that are part of a broad, general education. The vocational courses to be offered during the second to the fifth year would provide desirable competencies to enable pupils to gain employment and advance in agricultural occupations.

The subject matter content of the curriculum was arranged on a problem basis using a cross sectional model of organization to suit the developing levels of understanding of the pupils. The problem areas were categorized into the following main areas: (1) Biological and physical science, (2) Social science and (3) Agricultural mechanics. Instructor's input in the identification and analysis of problem areas to be taught was considered a vital factor. This would enable him to adapt instructional programs to pupils' needs based on local situations. Curriculum development and revision was noted as an important teacher improvement program.

A delivery systems approach to determining occupational needs was recognized as a desirable method for planning an occupational program for Nigeria. This meant that vocational education in agriculture should be an integral part of a total occupational education program comprising areas like health, home economics, technical, business and office, distributive and trade, and industrial occupations. The approach would not only ensure a wise commitment of public funds into occupational education, but manpower resource problems of the country would be objectively tackled.

Suggestions for further investigations into the strategies for implementing the program were also given in the study.