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Inaugural Lecture Series 13

A ROLE FOR THE UNIVERSITY OF IFE IN INCREASING AGRICULTURAL PRODUCTION

by E. R. Duncan

UNIVERSITY OF IFE PRESS

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A ROLE FOR THE UNIVERSITY OF IFE IN INCREASING AGRICULTURAL PRODUCTION

by

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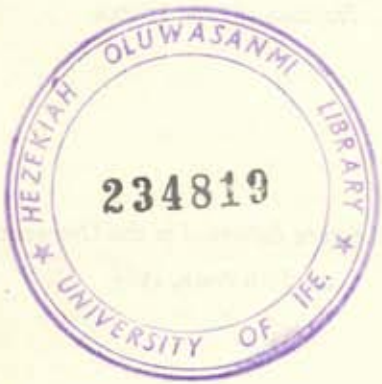
An Inaugural Lecture delivered at the University of Ife
on 30th April, 1974

Inaugural Lecture Series, 13

UNIVERSITY OF IFE PRESS . ILE-IFE . NIGERIA



Printed in Nigeria by
The Caxton Press (West Africa) Ltd., Ibadan

THE history of man is essentially a story of his attempt to feed himself. For those who accept the Bible literally, man has been stalked by hunger since leaving the Garden of Eden. For those who prefer to follow man and his struggles by other routes, it is obvious that he has been faced with the spectre of hunger since his very beginning. Most of the great and small wars have been fought to gain or assure territory so that man could eat and live with some degree of assurance of security. Michener's[1] fascinating novel, *The Source*, traces a single family through thousands of years and shows its civilization beginning with a domesticated food supply. Sabloff,[2] in *The Patient Earth*, attributes the fall of the classic Maya civilization to the pressures of over-population on available food supplies. The great potato famine in Ireland in the 1800s resulted in millions of the Irish emigrating to the United States. Periodic famines in India, China and more recently in the sub-Sahara have claimed millions of lives. Ironically, in man's efforts to assure himself food he produces large families which mitigate against the very solution he seeks. A relatively minor deviation in weather today may result in widespread hunger, starvation and be a severe drain on the economies of the nations concerned.

World leaders are concerned about food and population. These concerns are expressed in various, but to this time, ineffective ways. Headlines in Nigeria's newspapers indicate the concerns in this country. "Population Outgrows Food Production in Africa"—from the *Daily Times* of 27 November 1973—referred to comments made by the Deputy Vice-Chancellor of the University of Ibadan; "World Faces Risk of Famine"—the headline in the *Daily Times* of 21 January 1974—dealt with the comments made by Dr. Addeke Boerma, Director General of the United Nations Food and Agriculture Organization (FAO) in a recent talk; "Feeding our Teeming Population"—an editorial in the *Daily Times* of 19 January 1974; and in December 1973 General Gowon reported that Nigeria imported ₦40 million of wheat annually.

In addition to newspaper headlines, hundreds of learned papers and books have been written, and numerous organizations have been formed. Millions of naira have been given by individuals and organizations to alleviate hunger. Nations have contributed hundreds of millions of naira directly and indirectly to combat hunger. Relatively little has been done within the troubled countries to attack the root cause of the problem, i.e., that of too many people for the available food production resources. Nigeria is certainly no exception.

My purpose in presenting this paper is to voice concerns about the production of food in relation to existing and expected needs, about present population trends, and to suggest that the University of Ife can play a significant role in this drama. My qualifications to

discuss this segment of agricultural and economic development may not qualify me as an authority in Nigeria, but hopefully may justify an expression of my concern.

Need for Expanded Food Production in Nigeria

It is quite apparent from limited published information that the population in Nigeria is expanding at a more rapid rate (over 3% per year) than food production (less than 3% per year). Numerous articles have been written about, and personal knowledge verifies, increasing food prices in Nigeria during the past two years. We also know of temporary food shortages which were especially serious in the North in 1973 and 1974. These problems are indicators of pressures on available food supplies.

There is no reason to question the food production and population trends since they are similar to those in most developing, and in some developed, nations. Perhaps as great a problem as "filling bellies" is providing a diet of such quality that there is a minimum of impairment to mental and physical health of young children and to the work capacity of adults.

We shall soon have a better idea of Nigeria's population count. Different sources presently use figures ranging from 50 to 65 million, based on the mid-1960 estimates. The present population is relatively unimportant, but the growth rate is important and generally conceded to be grouped with the world's highest. Authoritative estimates range from 2.8 percent to well over 3.0 percent for Nigeria's population growth rate. With such a growth rate the nation's population doubling time is between 20 and 30 years. If we assume 55 million people in 1965, there would be approximately 110 million in 1995, a year that many in this audience will see. Unless something is done to slow the growth rate, by the year 2025 Nigeria can expect at least 225 million people, which is about the same population that the United States had in 1973. Some of you, and most of your children will see the year 2025.

Dr. Adeniyi-Jones of this University has frequently spoken out on the seriousness of the population problem. The ability to provide even minimum health care for the existing population is impossible with the present allocation of resources. I share his concerns for somewhat different reasons. With existing technology, and more particularly with present attitudes, it is unlikely that Nigeria can adequately feed additional people. Nigeria and most of the Third World nations must now import some food, and dependable world food supplies are approaching their upper limits. This makes the world food supply critical. It is much more critical for low *per capita* income nations than for those with higher incomes, simply

because nations with higher *per capita* incomes can pay higher prices for scarce supplies. Due to less favourable weather in certain parts of the world in 1972 and 1973, prices of wheat, rice, and soybeans rose sharply. Prices of other food and feed products in general also increased markedly. Prices of oil and other energy supplies have risen sharply recently because of increasing world demands for a finitely limited product. The cost of producing food is increasing with these limitations of energy supplies and of course further increases are due to inflation. Primental *et al.*[3] have calculated that the cost of producing 1000 plant source kilogramme-calories in India is approximately 25 percent of what the cost is in the United States. The reason is that crop production in the United States is a low labour but high energy (fuel, fertilizers, machinery, chemicals, etc.) system of production. Cost of production of food crops in Nigeria should be significantly lower than in the present exporting nations, so there are good and sufficient reasons for Nigeria to attempt to increase food production. The frightening aspect of the food-population problem in Nigeria is that there are no apparent viable plans, nor even serious concerns about coming to grips with the problem.

Academicians, businessmen, civil servants, land owners and labourers all appear oblivious to the situation since the number of children per family is quite similar. Wealthy people argue that they can care for large families, and this may be true. The logic breaks down, however, because as the wealthy man buys more of a limited supply of food, there is less available for the poorer people even at higher prices.

The Nigerian Government's lack of concern for increasing food supplies is clearly shown by its relatively large support for export crops such as cocoa, oil palm and groundnuts, as compared with support for cassava, yam, maize, sorghum, cowpeas, tomatoes, and soybeans. Similarly, universities have shown little interest in supporting significant research on food crop production.

Requirements for Successful Food Production

A brief review and suggested modifications of the basic *factors of production* are in order to build a case for the need to increase food stuffs in Nigeria. It will also bring into focus certain of the production constraints peculiar to Nigeria.

The standard factors of production are considered to be land, labour and capital. The subsistence farmer generally recognizes land and labour as essential, and since he must frequently borrow either seeds or the money to purchase them, capital is also a consideration. In a more technical sense one must add to land, labour and

capital, the equally important factors of environment and education.

Land in this context refers to soil of such texture and structure, position on the landscape, and with such an environment that, given the supervision of a knowledgeable farmer, it will allow plants to approach their genetic potential. Land is an essential factor of crop production simply because there is at present no possible alternative.

Labour for successful crop production consists of people who are physically and mentally able, not only to do an assigned task in a workmanlike manner, but who understand the reasons for doing a specific job so that errors are minimized. Labour in this sense is an essential factor of production and not simply a pair of hands and a strong back.

Capital is the third essential factor of production; capital at the time, and in amount needed, to purchase the many essential imputs required for successful crop production. Virtually all farmers find it necessary to borrow money for production purposes and it is not unusual for individual farmers in some countries to borrow from ₦20,000 to ₦200,000 to finance one year's operations.

Education, formal or acquired, is a fourth essential factor of production. It is entirely possible that education or knowledge is even more important to the subsistence farmer than capital, and for production beyond subsistence level, education is essential to properly deploy capital. Dr. F. F. Hill, an international agricultural consultant, has aptly pointed out that "just because a man can't read is no sign that he can't figure." Education in the context of this discussion goes beyond ability to "figure", it implies knowledgeable labour and management, for we are looking for expanded food production which includes growing, harvesting and marketing.

Environment refers to suitable weather conditions and accessibility to markets which are commonly associated with the land resource. Throughout the developing countries weather and market accessibility assume roles that require separate consideration. Weather, more specifically rainfall time and pattern, completely dominates agricultural production. Temperature and particularly humidity influence the ability to harvest, store and market products. Insect and disease infestations are also closely associated with weather conditions. Many agricultural scientists argue that the land resources of tropical South America, Africa, India and some of the islands offer an untapped opportunity for production of food. The land area may be there, but the predators and diseases in the Amazon region of South America, the poor water-holding capacity of the soils in Africa and the soil fertility problems of India are serious limitations.

In a recent article in *Fortune* magazine, Tom Hamilton attempted to summarize some of the apparent emerging weather patterns. A warming trend in the northern hemisphere started about 1890 and

peaked some 50 years later. Temperatures have been dropping sharply in the past 25 years, a total of 2.5 to 3.0 degrees Farhenheit. This may not seem like a large decrease, but in the delicately balanced weather system major changes have resulted. For example, navigation in the North Atlantic is troubled with increased drifting ice, in Iceland, the yield of hay per acre has been reduced 25 percent and in England the growing season has been reduced by two weeks. Because of these temperature changes the implications for Africa and the northern monsoon-influenced regions are believed serious. Recent droughts in the sub-Sahara region have brought forth some very disturbing weather studies. Ross and Bryson[4] of the Institute of Environmental Studies at Wisconsin see serious problems due to this temperature change for the Sahelian zone in Africa, the drought-prone regions of India, Bangladesh, Ceylon and parts of China. The problem arises when the lowered temperatures cause the expected rainfall to stop well short of its previously expected targets.

The specific implication for Northern Nigeria is the result of a halting of the advancing edge of the moist monsoon air stream which is called the Intertropical Discontinuity (ITD). A calculated displacement of one degree of latitude of the ITD results in a change of nearly 175 mm (7 inches) of precipitation in Northern Nigeria. When the total rainfall is already marginal for food production, such a reduction is catastrophic. This change apparently has caused the decreased rainfall across Sahelia for the past 6 years. If this weather pattern persists, a modified pattern of food production must be devised in Nigeria.

Dr. L. M. Thompson, a Dean at Iowa State University and a weather student, has written that "Barring calamitous drought the world's farmers can meet the food needs of the 1970s, but their ability to do so in the decades beyond that depends largely on man's willingness to control his population growth." This note of pessimism from a man normally optimistic about food production is worth noting.

Solving the logistics problem of supplying production inputs and moving produce to markets will be difficult and costly, Nigeria's present infrastructure, i.e., roads, communications, available energy supplies, responsive and responsible markets, cannot cope with the existing situation, much less with an increased production.

Salisbury[5] performed a bit of arithmetic in considering moving an estimated 36 million tons of foodstuffs to urban markets from the production areas in India. He reported that "if this produce was in bags it would amount to 360 million of them and if laid end to end would girdle the earth eight times at the equator." Similar calculations could be made for Nigeria's apparent potential production to show the magnitude of the job of simply moving a product to

market. When infrastructure limits harvesting, storage and transport, losses may be intolerable.

Development of Agriculture in Some Developed Nations

In considering agricultural production in the tropics, and in Nigeria particularly, it may be useful to look at the historical development of agriculture elsewhere.

Agricultural production on the modern commercial scale is relatively new to the world. Growth of cities became possible as the farmer produced a surplus beyond his own needs, and a marketing system became available to move these products. A few hundred years covers this period in most of the world and less than 200 years in North and South America. Modern agricultural production as we know it today is not yet 50 years old in the United States, but the 100 years prior to the 1930s laid the groundwork for these rapid changes.

Early settlers who became farmers in Canada and the northern half of the United States came to a most inhospitable land. The winters were long and cold and the summers hot and often too dry for effective crop production. Storms occasionally destroyed the entire year's production. There were essentially no roads, markets, credit, or ready source of supplies. The land, however, was relatively fertile and a wide range of crops which were familiar to these European emigrants could be produced. Most of the settlers who became farmers in Canada and the northern United States came to escape what they considered intolerable oppression, lack of economic opportunity, near starvation and debtors' prisons. As farmers they did not have much to recommend them. They did, however, have certain qualities that may be essential to a viable and successful agriculture. They wanted something better than they had previously known for themselves and their families. They wanted religious freedom, and they wanted and sacrificed for educational opportunities. They had an amazing capacity for work and self-sacrifice, and they had mechanical aptitude. Quite possibly their unwillingness to accept the *status quo* was a motivating force. Early settlers in Australia and New Zealand had many of these same qualities.

I choose to differentiate between these areas and those in the southern United States, Argentina, Brazil, and South Africa, because these were, and in many cases still are, countries of large land holdings. Slaves were used or indigenous people worked the land on a demanding share or low-wage basis. In relatively recent years the pattern of agriculture has changed with the developing economies and/or social reforms. Share croppers no longer work the land, that system was too inefficient. Taxes were increased, which in turn

required increased productivity. Sophisticated large machinery, skilled operators, available capital, and improved management skills, along with favourable product prices combined to make large-scale modern farming possible and, in some cases, essential.

In general the nations considered agriculturally developed today originally had a small indigenous population which was both uneducated and had little interest in improving its lot. The people saw no opportunities and therefore had no reason for changing their mode of living. As agressive foreigners moved in, the indigenous people were forced to less desirable regions or were killed or died from imported diseases. There was little if any attempt to assimilate these people. Development of these countries might have proceeded in a less ruthless manner but it did not.

The problems of the developing nations are quite different and possibly more difficult. There is, however, history for guidance and there is also more technical knowledge available now.

Nigeria's Factors of Production

Any assessment of Nigeria's factors of production as related to increased production of food, fibre and edible oils is at best an educated guess and at worst incorrect. Food production statistics are not available, credit is difficult to obtain, literacy is low, mechanical skills are lacking, weather information has not been converted to useful climatological data, infrastructure is very weak and, perhaps most importantly, there is no way to assess the desire or willingness of Nigerians to respond to an increased crop production effort. These things represent existing shortcomings, some of which are similar to those existing in agriculturally developed nations less than 100 years ago. None of these constraints is insurmountable and some could be changed quite rapidly.

The following assessment of Nigeria's factors of production will indicate the problems and possibilities as I view them.

Nigeria has a large land resource much of which is presently underused. Of the 356,000 square miles[6] (over 103 million hectares) nearly 90 percent is considered to be in the savannah region. Most of the soils have relatively long, gentle slopes, a fair share has undesirable subsoil characteristics, and virtually all soils range in texture from sands through sandy loams to sandy clay loams. A reasonable estimate might be that with suitable protective measures, 30 percent of the savannah regions could be cropped annually. Even with modest yields thirty million hectares of farmable land could supply Nigeria with a great amount of food. I do not, however, see major successful food production efforts with the existing internal constraints.

The soils are quite low in phosphorus, somewhat low in potassium,

seriously deficient in sulphur, and occasionally low in zinc. Organic matter content is generally low so that relatively high rates of nitrogen fertilizer will be required. Fertilizer requirements will likely be quite specific and split applications of nitrogen necessary. Crop production costs for reasonable yield levels will not be low by today's standards.

Due to the sandy texture of the soils and, therefore, low water-holding capacity, crops will be essentially dependent on regular and frequent rains for creditable yields. A cursory look at the available weather data[7] suggests that yields would be low to near failure one to three years out of ten between 8 degrees and 11 degrees north latitude (roughly a line east and west from Oyo to a line east and west from Kaduna). North of 11 degrees north latitude, up to four years out of ten can be expected to have poor yields.

Rainfall in this large savannah region ranges from a high of 1,250 mm (50 inches) in the southern portion to less than 500 mm (20 inches) in the north. When rainfall ranges on the low side of "normal", traditional farming systems simply produce poor yields of grains and groundnuts, or no yields at all. In a recent seminar M. N. Harrison, principal maize breeder at the International Institute for Tropical Agriculture, confidently reported that maize is a more productive and reliable crop than the sorghum now grown in the north. Careful analysis of the weather records could verify such a statement. There can be no question that the amounts and patterns of precipitation are the final determiners of levels of both crop and animal production in much of Nigeria. Cropping systems must be adapted to the environment in such a way that risks are not excessive and opportunities for gain are increased. If the probability estimates stated earlier are valid, farm lands must be in the hands of financially responsible owners to handle the risks. Also grain storage facilities must be made available to have both a continuous food supply for people of the north and a reserve feed supply for their livestock.

A controlled grazing type of agriculture can and must supplement grain, tuber, groundnut, cowpea and vegetable production. Livestock production cannot be considered a low risk enterprise because of the variation in feed supplies, unreliable water supplies, and the insects and diseases not yet under control.

Labour supply for crop production in terms of numbers of people should be no problem. Industrial activity in the foreseeable future probably will not even require the present surplus labour supply. There is presently, and will continue to be, a problem of labour distribution to meet the seasonal demand. Incentives to move labour to places where it is needed will require immediate attention. A suitable wage structure, a change in attitude toward labour, and a

provision for amenities will influence people to move to labour-deficient areas. Higher wages could be justified by increased labour productivity resulting from education, training and retraining.

Capital availability for a phased-in increase in agricultural production should present no problem. Properly supervised government-supplied credit has proven effective in other nations and it can be effective here. Existing banks are not interested in agricultural production loans. Private capital demands unusually high rates of return compared to those in developed nations. In the near term it is not reasonable to expect either private capital or existing banks to provide significant capital for increasing agricultural production. Regardless of the eventual source of funding, business and banking procedures would require substantial revisions.

From the point of view of cost, attitudes, and the magnitude of the task, education in Nigeria could prove to be the most difficult problem facing the nation. The government has announced its intentions to make minimum education available to all children. There is, however, a substantial difference between making educational facilities available and having mandatory education for all children. The educational problem in Nigeria is further compounded by the need for training and retraining teachers, and, I believe, by the determination of how and what will be taught.

W. A. Lewis[8] has stated that "the quickest way to increase agricultural productivity is to train adults already on the job. A serious misconception in less developed nations is that diplomas or degrees mean that a man has arrived and can do any job; his education must be a lifelong process." With this comment in mind, there is a substantial training and retraining job to be done for civil servants, teachers, and at a different level, labourers. In-service training must be considered an essential part of the educational needs.

A Role for the University of Ife

Up to this point the comments have been of a general nature with a cursory look at Nigeria's potential for increasing agricultural food production.

Now I would like to be a bit more specific and attempt to describe possible roles for the University of Ife. In doing this I am assuming that population pressures on food supplies are already something of a problem and may become critical in the foreseeable future. I am also assuming that the University of Ife is an imaginative, forward-looking institution, both willing and able to respond to the needs of a developing nation and its people.

I am mindful that my thoughts may be biased by my background and by the thought expressed on one of the murals in the library of my

home University, "when tillage begins the arts will follow." I recognize full well that man does not live by bread alone, but would add that neither does he live without bread, and therein lies my concern.

I will comment briefly on six points, recognizing that omissions may be as important as the points to be considered.

1. Government, Federal and State, must recognize that food production is a major priority item, and that it must develop a clear-cut policy and an adequately supported programme to deal with it.
2. The land resource for agricultural production must be identified and be made available for production purposes. This inventory should begin immediately.
3. An educated and trained labour supply must be made available.
4. Effective and supervised capital must be available when justified and as needed.
5. Education, re-education, and re-training of civil servants and teachers will be required for any significant improvements.
6. A reliable research base must be developed so that realistic recommendations can be made and more effective teaching can be accomplished at all levels.

In considering these six points, I believe the University of Ife can assume both direct and indirect leadership roles in alleviating the potentially critical problem of food production in Nigeria.

Any attack on the problem must be multidisciplinary in nature. The package to be developed will be more complex and more difficult to put together than has been true for most developed nations. Agricultural technology is an essential component, but only one. Political, legal, economic, social, and health components must also be integral parts of the package. Field or practical knowledge will be essential for all contributors.

I would visualize the following disciplines at this University in the leadership roles: Agriculture, including Engineering, Economics, Animal Science, Plant Science, Soil Science, and Rural Sociology and Extension; Food Technology; Health Science; Law; and Political Science. Assistance and co-operation will of course be needed from other disciplines. Major changes in objectives, emphasis, research and attitudes may be required as the leadership role is assumed. Administrative support is of course a major prerequisite.

The task of creating an understanding among political leaders of the critical nature of the problem is a natural role for this University. A vast amount of work has already been done in assessing world food needs and recognized authorities from international organizations and foundations are available for assistance. The

problems specific to Nigeria must be handled primarily by Nigerians and be clearly stated.

I can visualize an *international seminar* at the University of Ife setting the stage and providing the background information for the political leaders. From such a seminar would come the assistance needed for the statement of government policy and re-ordering of priorities. Research needed to prepare for such a seminar would be the first difficult hurdle. It would be at this point that the several disciplines in the University would have to make their rather long-term commitments, and the University would decide if it would be willing to assume its potential leadership role as an agent of change. It is not easy, especially in Nigeria, for a university to provide academic resources for practical agricultural development of a nation, and it is not without its danger. It could be considered meddling in political affairs. The University of Ife has the staff expertise, the question is whether it views the problem as worth the efforts and whether the staff will accept the challenge of assisting Nigeria to solve the apparently critical problem of *too many people* and *too little food.*

The problem of land ownership and tenure is most difficult and involved. The existing ownership and tenure patterns mitigate against easy and rapid transfer of land into economic farm units. There is no evidence that the present subsistence farmers can do more than double present levels of production and they could be expected to consume a reasonable percentage of any increase. There is no favourable evidence that state-controlled farms can be significantly more successful than subsistence farmers are in producing more total food, and there is mounting evidence to the contrary.

The Faculty of Law has already done some work on land ownership and tenure and it seems possible that, working in conjunction with rural sociologists, acceptable methods of land transfers could be drafted, discussed, and eventually developed into laws of the nation. Eventually Nigeria must face up to changing the existing system of land holdings, someone must take the initiative, and have the proposals based on sound research and judgement. Why not the University of Ife?

It is possible that through individual family and village efforts co-operative ventures could develop economically viable units as an interim move.

A reconnaissance survey of the soils of Nigeria must commence immediately to provide an inventory of suitable cropland areas. A detailed soil survey of the most feasible areas can begin at an early date so that land use, erosion control measures, fertilizer requirements and the most useful cropping systems can be identified. The University of Ife and the Institute of Agricultural Research and

Training are capable and able to train men to do this job and to direct their activities.

Farm labour presents an interesting and difficult problem in Nigeria, just as it has and does in many countries. Existing attitudes toward labour, and particularly farm labour, must be changed if the movement from rural to urban areas is to be checked. There are several limitations to developing and keeping a suitable rural labour supply:

1. The jobs at best are part-time, and so small a part that there is virtually no opportunity to earn a living wage for the entire year.
2. The general attitude of the landowner toward farming is that it is a part-time occupation.
3. People who form the farm labour supply are usually uneducated. The younger people think they will be no worse off without any job in the urban centres. There, at least, they can dream of something better because they see opportunities around them.
4. The village and small-town amenities are meagre, and the generally accepted family and cultural values seem to be eroding.

What, then, can be done to provide a rural labour supply? I believe there is an effective solution, provided there is government action and significant tangible support. A plausible mechanism might be a modification of that developed in the United States during the depression years of the 1930s, namely, the Civilian Conservation Corps. A scheme could be developed for promising farming areas whereby government would provide employment for interested local labour, regardless of age, to work on government-sponsored projects. Farmers would hire their needed labour for a pre-arranged number of months. I would further suggest that one day each week, while they are working on government projects, the participants would be required to attend technical classes oriented toward needed skills.

The University of Ife could train the cadre of teachers to be the work supervisors on the government-sponsored projects as well as technical advisers to the farmers. The result of such a scheme could be employment of graduates who are willing to work, and who have leadership capacity. They would direct construction of "farm to market" roads; development of school, health, water and sanitary facilities; establishment of model villages; and most important of all, education for marketable skills.

Government-sponsored Production Credit Banks could provide needed capital, a portion of the funds now directed toward production of export-oriented crops could serve as a base for food production credit needs. All government-sponsored credit could be channelled through one system. Money is not necessarily effective

capital in Nigeria. Production inputs must be available when needed and must be of an acceptable quality. Farm equipment must have an enforceable service warranty. At this time service does not appear to be a concern of the vendor. Neither simple nor sophisticated equipment has any effective use when it does not function and cannot be readily serviced.

The system of supervised credit such as was instituted in the central and southern states of Brazil in the 1950s has a great deal to recommend it and could be established in Nigeria. There, a government-sponsored Agricultural Credit Bank was established and funded, and a primarily private extension service was established in several agricultural states. University graduates, trained in agriculture, were hired by the extension service to handle loan applications, develop agricultural production plans, and supervise the plans and the loans. A Home Economist, to assist with family planning, health, nutrition and literacy problems, was teamed with each loan supervisor. The team idea was very suspect from the beginning because the man was usually married and the woman single. Interestingly enough after the first year the team idea was accepted. They were supplied with a jeep, a small office, and a reliable office assistant. One of the staff was always available.

For this supervisory service Federal and State funds were contracted and paid to the private extension service in advance. All staff members received suitable and rigorous in-service training to prepare them for their assignments. Since loans were granted on the basis of improved practices and supervisors provided, repayment was no problem.

The University of Ife could supply people to handle such assignments and provide them with the necessary training. Capable and interested staff members of the present extension services could be retrained by the University as well. A knowledgeable and dedicated staff would be essential.

A recent article by David Mathews[9] briefly comments on two major recent reports on higher education in the United States. "The common and strong suggestion of the two reports is that the United States is drifting in a direction that will serve neither education nor public interest well." Quite possibly it would be appropriate for such a review to be made in Nigeria with the focus on education for a developing nation. The scholastic preparation of agriculturally trained University of Ife graduates at my own University is impressive. One might be less impressed with the ability and sense of dedication of the majority who do not move into graduate studies. Dean S. K. T. Williams has a study in progress which will relate directly to the matter of needed changes in university-level training.

Several departments in the University of Ife have unusually well-trained Nigerian staff members. These staff members could be mobilized to teach "vacation school" short courses for teachers, civil servants and others who may become involved in increasing agricultural production, improving rural health services and providing adult education. This challenge must be accepted by some university, and the University of Ife is the most logical to provide the needed expertise for Nigeria's needs in the years ahead.

What, then, is the type of education that will be most useful to Nigeria in the years ahead? I would suggest that Nigeria might consider the approach used by the Land Grant Colleges in the United States when it was going through its development period. The elementary school system of the same period might also be studied. I refer here, not necessarily to the subject matter, but rather to the objectives and the system developed to meet the objectives. Certainly the educational needs of a developing nation are quite different from those of developed nations. This does not imply that some of the needs are not the same, and that similar facilities should not be available on a limited scale. It may be, however, that the principal thrust should be toward educating and drilling young people in the technical specialities especially needed in any developing nation. This reference is not directed to service personnel who are needed, but to education for a basic understanding of sanitation and nutrition, effects of insects and disease on humans, livestock and plants, erosion control, simple mechanics, and a dedication to serve one's fellow man. This could be interpreted as a vocationally oriented education, and an education for service to the nation. Is that inappropriate?

The last point concerns the need for building an agricultural research base for Nigeria which will be essential to provide an increased food supply and continued effective teaching, particularly in the Faculty of Agriculture. In many disciplines, technology developed in other parts of the world will transfer quite well to Nigeria. It could be argued that in the basic sciences, where technology transfers most readily, developmental research should be done where the resources are most available. It is in the applied and adaptive sciences where technology transfers less well that Nigeria and the University of Ife stand to gain most from the use of their limited resources. Such areas include health care, law concerned with land and customs, rural sociology, food technology, aspects of botany and zoology, plant and animal breeding, crop production and protection, land use, and agricultural engineering. It is in these areas that the tropics in general and Nigeria in particular must find its own way.

Applied and adaptive research is being conducted in the tropics but support is meagre, scattered and not well co-ordinated. Funds

from Federal sources, and agencies as well, have been directed largely toward export crops. States have tended to invest in large farms that are often concerned with export crops. Universities have not significantly supported adaptive food production research. The International Institute for Tropical Agriculture, funded largely from outside sources, is the first serious attempt in Africa to study plant source food production problems. Interesting information is appearing. The question remains whether the information being generated has widespread adaptation or will be used by Nigerian farmers.

I believe food production research must be developed for two groups, namely, the small farmer and the large-scale commercial farmer. The small farmers need improved technology that is useful for them, because they can and probably will continue to feed the rural and village populations in the foreseeable future. A modern commercial agriculture must be developed in Nigeria to feed the urban population. This segment of agriculture will likely grow quite slowly, and the technological needs will be quite different. The University of Ife can and must do research in many areas common to both needs, but the primary thrust might well be toward the small farmer. Pilot-scale operations applicable to large-scale commercial food producers will be a natural byproduct. Research that generates new technology can be immediately incorporated into classroom lectures and practicals. This new, and substantiated older technology, can be immediately used in in-service training efforts directed toward teachers, civil servants and farmers. I see no reason why the University of Ife should be different from many successful universities and institutes in other countries in the respect that as new, useful technology is generated, governments, agencies and private businesses find it increasingly desirable to support still more research. It is in this way that many university reputations have been built.

Details of the types of research needed are well known to qualified research men and there is no need to pursue the details here. What should be recognized, however, is that "hard money" is essential to any research effort so that long-range co-ordinated research can be initiated. A research base is needed so that Nigeria will be able to feed its expanding population while a method is devised to control it.

The University of Ife can play a significant role in this life or death drama, which will be written, directed and acted by Nigerians.

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