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FOOD PRODUCTION PROBLEMS OF SMALL FARMERS IN LOW-TECHNOLOGY NATIONS:  
SOME EVIDENCE FROM NIGERIA

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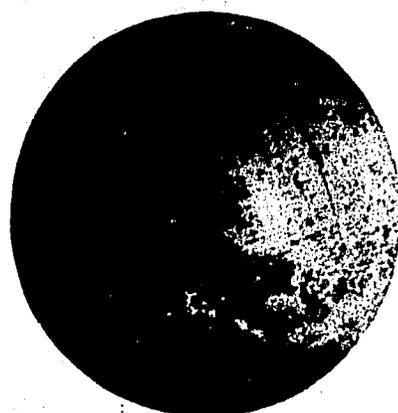
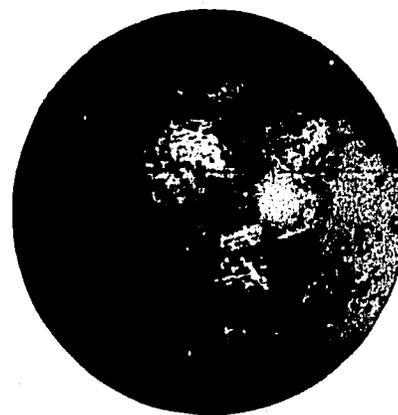
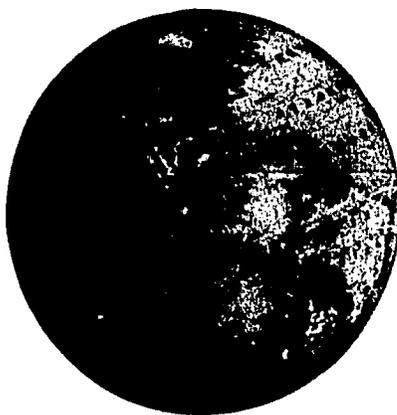
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**FOOD PRODUCTION PROBLEMS OF SMALL  
FARMERS IN LOW-TECHNOLOGY NATIONS:  
SOME EVIDENCE FROM NIGERIA**

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## TABLE OF CONTENTS

Historical Overview . . . . .	1
CASE STUDY: EASTERN NIGERIA. . . . .	5
Ecological Zones. . . . .	5
People. . . . .	5
The Data. . . . .	7
Types of Data . . . . .	7
RESULTS. . . . .	8
Respondents Demographic Characteristics. . . . .	8
Production Credit. . . . .	8
Lack of Agricultural Infrastructure. . . . .	11
Marketing Farm Produce. . . . .	12
DISCUSSION. . . . .	13
SUMMARY. . . . .	14
Bibliography. . . . .	15

FOOD PRODUCTION PROBLEMS OF SMALL FARMERS IN  
LOW-TECHNOLOGY NATIONS: SOME EVIDENCE FROM NIGERIA\*

Historical Overview

In 1974, the United Nations World Food Conference, meeting in Rome, estimated that by the mid-1980s over 460 million people around the world would be perpetually undernourished. This estimate was based on national statistics, which are sometimes doctored or manipulated for political reasons, so the figure is probably conservative.

In examining production trends for the twenty years preceding 1972, the Conference identified a number of deeply rooted problems. Notable among these was that low-technology nations, unable to meet the consumption needs of their populations, were growing increasingly dependent upon industrialized or high-technology nations. Yet, evidence from existing research indicated that most of the low-technology nations had raised their production of food significantly between 1950 and 1970. Thus, as the USDA bulletin, Is the World Facing Starvation? (1975) notes, "total food production...increased faster in the less developed countries than in the developed countries" during the period 1954-1973. Such an increase, however, seems less impressive when placed in the context of population growth: during the same period, population in low-technology nations grew by 2.5 percent, while industrialized countries grew at an annual rate of less than 1 percent. Furthermore, in the 20 years under consideration (1954-1973), food production per person climbed 8 percent in Third World countries and 33 percent in high-technology nations, thus rendering the former increasingly dependent upon the latter.

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\*Funds for this study were provided by Cornell University's International Agriculture Program and the Center for International Development. Their assistance is gratefully acknowledged.

The success of this inquiry rests on the guidance of Professors A.E. Okorafor and O. Okereke of the University of Nigeria, Nsukka, and on the practical contribution of Mr. Obed C. Menakaya, erstwhile Director of Agricultural Extension, East Central State, Nigeria, to the execution of the study.

Table 1: Percentage of Increase in Population, Food Supply, and Demand in Some High-Technology Nations, 1974-79.

Country	Population Growth	Food Production*	Domestic Demand for Food
...percentage rate of growth per year...			
Australia	0.8	3.7	2.4
Bulgaria	0.5	4.3	2.8
France	0.4	3.0	2.0
Hungary	0.4	3.0	1.9
Netherlands	0.5	3.0	1.7
Sweden	0.1	0.9	1.0
United States	0.6	2.0	1.6
Yugoslavia	0.9	4.5	2.4

SOURCES: adapted from U.N. World Food Conference: Assessment of the World Food Situation, E/CONF. 65/3, 1974, p. 51; and from "World Food System Data Sheet", World Resources Inventory Division of the World Game, Philadelphia, PA (1979).

Table 2: Percentage of Increase in Population, Food Supply, and Demand in Some Low-Technology Nations, 1974-79.

Country	Population Growth	Food Production*	Domestic Demand for Food
...percentage rate of growth per year...			
Algeria	3.3	-0.8	3.4
Ethiopia	2.5	2.3	3.0
Guyana	2.0	2.5	3.6
Iran	3.0	3.3	5.4
Kenya	3.8	2.6	4.7
Mali	2.7	1.6	4.3
Nigeria	3.2	2.0	3.1
Togo**	3.0	5.4	2.4

SOURCES: adapted from U.N. World Food Conference..., E/CONF. 65/3, 1974, pp. 52-3; and from "World Food System Data Sheet", World Resources Inventory Division of the World Game, Philadelphia, PA (1979)

\*Includes food component of crops & livestock production only.

\*\*Togo is among eleven low-technology nations with a food production growth rate averaging 5.0 percent or more during the period 1952-1972.

As Table 1 shows, high-technology nations have achieved a balance between the annual increase in their food supply and the increase in demand, while low-technology nations (Table 2) are faced with an ever more serious imbalance. So the problem lies, not simply in population growth per se, but in the interplay between food supply and demand.

To balance food production and domestic demand for food, a low-technology nation must adopt a stringent population control policy or vastly expand its food production, or both. Unfortunately, population control measures have encountered resistance in countries where their assumptions have been judged repugnant to religious values or where they have breached cultural taboos (Rogers 1973). Moreover, family planning is hard to implement among illiterate adults who are unable to see the significance of their behavior in the larger context of their country's economic and social well-being.

In the absence of relevant education therefore, the propagation of pro-family planning attitudes in these countries will continue to face cultural and similar barriers in the foreseeable future. Thus, as Rogers (1973:2) notes, after a review of linguistic and socio-cultural obstacles to family planning in these societies: "The overall picture for solving the population problem in Latin America, Africa, and Asia in the near future is bleak." The ideal path will be to continue the war against illiteracy so as to prepare small farmers for behavioral change in fertility control, while seeking immediate solutions to the deteriorating equation between food supply and demand.

In many a low-technology nation, attempts have been made to increase agricultural productivity significantly by setting national targets, and by introducing farm innovations such as chemical fertilizers, pesticides, new crop varieties, and the like. Such campaigns have not enjoyed uninterrupted success. Failures have been traced to personality characteristics of the farmers involved, and more specifically to traits of inherent conservatism, which is assumed to predispose farmers to reject innovations.

Studies of Nigerian farmers have produced little evidence of inherent conservatism; on the contrary, as Smock (1965:17), who studied Eastern Nigerian subsistence farmers noted:

The main reason prospects for development in Eastern Nigeria seem good is that many of those customs and habits which inhibit change in other parts of the developing world are not found in the communities of this Region. Two features of community life which constitute barriers to change in other parts of the world, but are not significant factors in most of Eastern Nigeria, are the following: hierarchical social organization and positioning by ascription.

Moreover, Hursh, et. al. (1968: 18-19), who conducted an experiment on the adoption behavior of Eastern Nigerian farmers, had written poignantly about the innovativeness of farmers in the Region:

Members of three of the four RDF (Radio Development Forum) villages planted NS-1 Maize. and used Aldrin Dust, and all four villages used fertilizer. Supplies, which the Diffusion Project had thought would meet the demands of the farmers in the treatment villages, were very rapidly used. Extra supplies had to be made available to keep up with the unexpectedly large demands by the farmers. [Even then], "neither the Ministry of Information nor the Ministry of Agriculture was prepared with sufficient personnel or resources to handle the deluge of requests stimulated by the [diffusion campaign]\*

In the face of such claims, inadequate increases in agricultural productivity in low-technology nations in general, and Nigeria in particular, cannot be explained away simply by claims about psychological constants in the traditional, rural mind. Consequently, the author obtained funds to undertake an inquiry into factors affecting food production in Eastern Nigeria. It is to this inquiry, a case study of Eastern Nigerian farmers and the prospects of improvement in their food production, that the rest of this paper is devoted. Although concentrating on one area, however, the results are likely to be applicable to the farmers of some other low-technology nations.

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\*During the Campaign/Field Experiment, the Ministry of Agriculture sold fertilizer at a subsidized price, using sales agents--shopkeepers, school teachers, local leaders, and the like--as distributors.

### CASE STUDY: EASTERN NIGERIA

This section summarizes some of the findings of a research project conducted in Nigeria between 1974 and 1976. This project considered the reactions of rural farmers to the Nigerian government's attempts to implement its "National Accelerated Food Production Project" started in 1974 and modified through its "Operation Feed the Nation" campaign. This attempt to increase food production was considered in two contexts: i) the availability of credit needed to introduce expensive innovations; and, ii) the economic infrastructure that determines access to urban markets, thereby limiting maximum profitability. The assumption of economic rationality implies the farmer's ability to recognize structural, objective constraints on increased productivity. The research thus concentrated on farmers' perceptions of objective constraints on their farming practices.

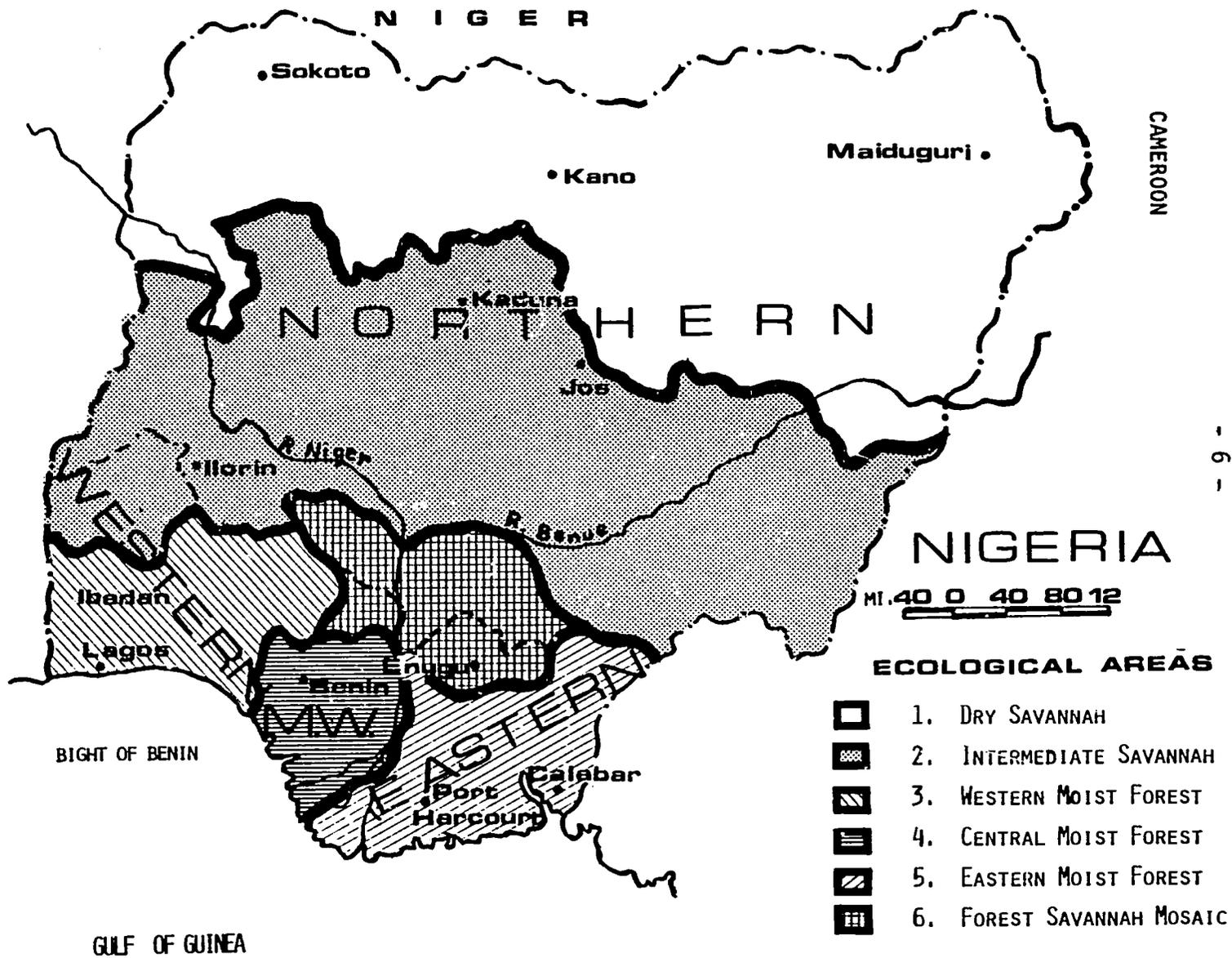
To give the reader some background information about Nigeria, a brief review of the country's ecological zones and people is presented below.

#### Ecological Zones

Nigeria has six ecological zones: the dry savanna, the intermediate savanna, and the forest savanna mosaic in the North; and the western, eastern, and central moist forests in the South. The forest savanna mosaic area is thinly populated and heavily infested with tsetse. It has diversified agriculture and few valuable cash or export crops. The country's export crops, grown primarily by large-scale and commercial farming enterprises, vary by zone. In the dry and intermediate savanna areas, groundnuts and cotton are the principal export crops. The moist forest areas of the south are more suited to the production of rubber, cocoa, and palm oil and palm kernel.

#### People

Nigeria is the most populous country in Africa, south of the Sahara (population 79,758,969, according to the 1973 Census). It is estimated that "one in seven of all Africans is a Nigerian" (Church et al., 1977: 291).



With an area of 356,669 square miles (923,768 square kilometers), Nigeria is roughly four times the size of the United Kingdom, or more than twice the size of California.

Fewer than 10 percent of the population live in cities of more than 50,000 inhabitants. Farming is the country's chief occupation; most of the farmers have small and often fragmented holdings--one to two hectares.

Recently, there has emerged in Nigeria a small but powerful group of commercial farmers operating single-or multiple-crop plantations and in the most entrepreneurial of ways. Because their interest is in cash rather than food crop, commercial farmers were excluded from this study.

#### The Data

Data were collected from 172 randomly selected small farmers in the East Central and Southeast States of Nigeria (Eastern Nigeria). These states straddle the eastern segment of the moist forest area. Yams, cassava, cowpeas and rice are among the staples grown.

Data were gathered by three elementary-school teachers who worked in the language communities of their birth and socialization. The interview schedule they used was constructed at Cornell University with the assistance of Nigerian students experienced in Nigerian agriculture and in the agricultural extension system. The schedule was later reviewed and modified by investigators at the University of Nigeria, Nsukka. After review, it was subjected to extensive pretests in villages not selected for the main study. Not until these pretests had been reviewed and the schedule had again been amended was it finally administered in the selected communities.

#### Types of Data

Respondents were asked to identify their sources of farm-related information, and the types of farm innovations they had adopted in the twelve months before the day they were interviewed. Several other types of data were gathered at the same time, among them:

- demographic and socio-economic characteristics of the farmers
- production incentives, such as credit availability and utilization
- estimate of amounts of family and hired labor used

--portion of production marketed locally or elsewhere

--investments in improved technology

--investments in new production techniques

Secondary data from the Ministry of Agricultural Extension in East Central State and interview with Extension personnel in the field in 1976 offered additional insight into the respondents' situation and the problems faced by small farmers in Nigeria.

## RESULTS

### Respondent's Demographic Characteristics

Sex: Nearly 95 percent of the respondents were males. Most family heads (the primary decision-makers) in Nigeria are male, and the sample concentrated entirely on family heads.

Age: Respondents fell into three broadly defined age categories: relatively young (under 40), 27.3 percent; middle aged (41-55), 48.3 percent; and relatively old (56 and over), 23.3 percent.\*

Literacy: Approximately one third (33.7 percent) of the respondents were functionally literate, the rest (65.1 percent) were illiterate.\*\*

Marital Status: Most of the farmers (85.5 percent) were married, with a mean family size of six children. Almost all respondents stated that their children lived with them. The predominance of large families in rural Nigeria with children residing at home until their late teens is consistent with the position of children as a significant source of labor. Family units constitute the basic labor force of the area.

### Production Credit

There are three major sources of production credit available in Nigeria.

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\* Percentages do not total 100 percent, due to the fact that two respondents gave no information on age and education.

\*\* Functional Literacy differs from "literacy" in the traditional sense in that it aims to provide participants with instruction that is situationally relevant to them; preoccupation with the rudiments of reading, writing, and arithmetic, though important, is of marginal utility in functional literacy programs.

For centuries, Nigerian farmers have borrowed money or cash equivalents from one another to meet familial and agricultural needs. Such arrangements have usually avoided written instruments, working rather through "gentlemen's agreements." The degree of intimacy between the lender and the borrower has determined whether interest would be charged.

A second source has emerged more recently. The rise of a class of professional moneylenders has caused a modification in credit practices. Their interest rates are high and their contracts rigid, making no allowance for delayed payment. Defaulters often forfeit title to inherited lands against which the loan has been secured, usually with the concurrence of their kin. Farmers are therefore generally reluctant to approach these professional moneylenders for agricultural credit.

The third and newest source of credit is the state government, which has institutionalized agricultural credit, ostensibly to stimulate production. However, because the bureaucracy is so rigidly structured, access to agricultural credit is effectively restricted to those commercial farmers knowledgeable in the ways of bureaucracy. Except for cases in which kinship or friendship ties mediate access to state credit, small farmers wishing to borrow from government sources can expect to spend over one-third of the borrowed sum on graft, simply to grease the bureaucratic wheels. Of 172 small farmers interviewed in the East Central and Southeast States of Nigeria, only 4 (2.3 percent) had procured agricultural credit from government sources.

Table 3 presents a summary of small farmers' perceptions of the "most critical" disincentives for seeking production credit from government sources. Respondents were asked to rank the variables as "most critical," "critical", and "not so critical." In order better to identify disincentives perceived by farmers as crucial, the data are presented in two categories: "most critical" and "critical/not so critical."

In Table 3, "no money" and "too risky" may be viewed as two sides of the same coin. Procuring credit from government sources is expensive, and money spent in efforts to have loans approved does not guarantee that the loans will be finalized. It follows that such expenditure is viewed by small farmers as highly speculative; the business tactics of such farmers necessarily involve risk minimization.

Table 3: "Most Critical" Constraints on Use of State Credit as seen by Farmers in the East Central and Southeast States of Nigeria, 1974-1975.

Constraint	% Ranking it as "Most Critical"	% Ranking it as "Critical/ Not So Critical"
No money*	68.6	31.4
Inadequate knowledge	42.4	57.6
Too risky**	30.8	69.2
Not used by neighbors	21.1	78.9
No knowledge of it	18.6	75.6***

\*No investment capital or collateral.

\*\*Refers to the financial risk in accepting a loan (graft).

\*\*\*No response, 6.8 percent.

Johnson et. al. (1969: 35), who studied Nigeria's agricultural credit agencies, discussed institutional barriers to agricultural development, especially structural constraints on procuring credit from the two government agencies in the East Central and Southeast States of Nigeria--the Fund for Agricultural and Industrial Development (FAID) and the Cooperative Bank of Eastern Nigeria (CBEN). They wrote:

As of 31 May 1966, after three years of operation, 119 loans totalling ₦162,000 had been approved but only 73, totalling ₦53,000 had been disbursed. At the same time 700 additional loans were under consideration. In terms of meeting the known demand for loans, FAID's performance has been extremely disappointing. This is thought to be due primarily to over-centralization and dependence upon two government ministries for the investigation and processing of loan applications.

Their study also identified a group of related constraints that still largely apply. Some arise from the inability of most farmers to fill in the long, cumbersome forms used by government credit agencies. These require estimates of current annual yields, and predictions of the quantitative increase that might be expected to result from the application of farm innovations procured with agricultural credit. As our demographic

data show, most subsistence farmers are illiterate; they are unable to furnish precise estimates of annual production. Furthermore, even farmers who are able to fill in the forms may have to wait for a long time before the agencies respond. Johnson et. al. (1969) reported that many of the loan applications in FAID's offices, submitted by farmers and small businessmen, "were more than one year old." Such delays are a major source of frustration for farmers, especially small farmers with no means of transportation or access to telephone.

#### Lack of Agricultural Infrastructure

Leagans (1971) discusses two kinds of behavioral forces, which relate to agricultural development: those forces that promote change (incentives) and those that inhibit change (disincentives). This opposition is universal, but societies vary in the ability to remove barriers to change. Basic change incentives include such infrastructural supports and facilities as good roads, public transport, clean water supplies, electricity, markets, and a steady supply of farm inputs or technology.

Most of these agri-support services and basic amenities were lacking in the rural communities of the area and their absence affected farmers' adoption behavior. Thus, when asked to name the factors responsible for their nonuse and underuse of farm technology (here meaning chemical fertilizers, pesticides, etc.) the farmers cited "lack of supply" (55.5 percent) and "inadequate information" (51.0 percent) as the dominant constraints. The next disincentive in order of magnitude was "lack of funds," cited by 20.0 percent. Of major importance in terms of theory about non-adoption two disincentives--"too risky" and "nonuse by the neighbors"--were not perceived as critical at all, having been judged by only 2.3 percent and 1.0 percent respectively as influencing respondents' decisions to use farm technology. This finding buttresses part of Smock's (1966) conclusions that in Eastern Nigeria, efforts at promotional campaigns are often more systematic than those designed to ensure supply, and that "farmers are understandably disappointed when they do not receive the seeds, or seedlings and other materials they have been led to expect" (Quoted in William F.

Whyte and Lawrence K. Williams, Toward an Integrated Theory of Development, ILR Paperback No. 5, 1963: 30)

#### Marketing Farm Produce

Respondents were asked to indicate whether they sold their surplus commodities in their village markets (where supply is high and demand is relatively low), or in distant town markets (where markets are larger and prices are generally higher.) Table 4 shows that farmers generally market surplus food locally, where commodities are sold at low cost, often to middlemen representing corporate interests.

Price levels in village markets are a disincentive to increased production. Higher prices are paid in distant and larger markets, but farmers are inhibited by poor roads and especially by lack of public transport, which often forces them to walk long distances to sell perishable goods under the heat of the sun and the threat of torrential rain. Elimination of these problems would not, of course, guarantee equitable prices for farm produce, but it would at least expand the market options available to the small farmer.

Table 4: Percentage of Farmers Selling Staple Crops in Village and in Town Markets in East Central and Southeast States of Nigeria, 1974-1975.

Crops	Percentage Selling in Village Market	Percentage Selling in Town Market	Percentage Selling None
Yams	79.7	1.0	19.3
Cassava	75.0	0.0	25.0
Maize	60.5	0.6	38.9
Cocoyams	45.9	0.6	53.5
Cowpeas	22.7	1.7	75.6
Rice	13.9	--*	---*

\*No response; many respondents said they did not produce rice.

### Discussion

The use of innovations such as chemical fertilizers and pesticides requires cash outlay. When government credit is perceived as "too risky" and private credit is expensive and involves harsh, inelastic default clauses, the only available source of cash for the initial outlay on innovations is the sale of surplus commodities. Local markets are generally incapable of offering price levels high enough to permit small farmers to adopt innovations to any significant extent. Infrastructural constraints, such as poor or nonexistent roads and inadequate transport, deny the option of selling in town markets where price levels are generally higher.

Also, these constraints render the attempt to increase production an irrational endeavor. There is no point in doubling yield when such an increase would merely glut local markets, lowering prices that are low already and bringing inadequate return on investment. Thus small farmers' disinclination to adopt the national government's policies on increasing production should not be viewed as prima facie evidence of inherent conservatism. Rather, their refusal to embrace such policies is a rational response to objective conditions. Whetham and Currie (1969: 43) have reflected upon this in their analysis of the economics of subsistence farming:

Economists need to appreciate just how complex the traditional patterns of farming are, how skilfully, in most cases, the African farmers manage their resources to obtain the greatest satisfaction of their wants; and how difficult it often is to devise improvements which, within the constraints of the available resources and techniques, will certainly improve the standard of life of the farm families.

The farmer's motivation to produce more or less is determined by a number of intrinsic demands (personal wants and goals) and extrinsic demands (environmental needs and pressures). In Nigeria, where food production lags behind population growth, the demand for food has risen dramatically since the early 70's, when the government banned the importation of some food items. The farmers' response to this demand, however, cannot be viewed outside the reward context--what a farmer receives for the sale of surplus food.

The setting of national production targets is in itself inadequate. It needs to be accompanied by a manipulation of the price structure and the provision of agri-support services and facilities in the rural sector. Such incentives, by making higher productivity profitable, will convert increased production into a rational, desirable choice for small farmers, thereby motivating them to produce at a higher level.

#### Summary

In low-technology nations, population growth has outstripped the supply and demand of food. Most rapid growth in population has been focused in cities. Urbanization has tended to destroy the adequacy of traditional agricultural practices, stripping labor and sometimes land from the farmers. Increased rural productivity and a complex, sophisticated economic infrastructure are required to deliver rural produce to the hungry cities. The stresses exerted on a national economy by such massive relocations have drawn national governments into large-scale agricultural planning, but little has been done to achieve a balance between population growth and food production.

Nigeria is typical of low-technology nations in facing a food crisis; the gap between the food supply and demand has grown ominously wider every year. Nigeria must therefore increase substantially its level of food production.

An investigation into the possibility of increased agricultural production in Nigeria shows that farmers, especially those who operate on a small scale, function under a variety of structural and infrastructural constraints that tend to hinder efforts at increased production. Chief among these are: (1) a discriminatory credit system and (2) an absence of infrastructural support system. These findings carry important policy considerations for low-technology nations, and parallel Mellor's (1976) findings on credit in India, Lele's (1971) findings on marketing, also in India, and Whyte and William's (1968) findings on lack of supply of farm inputs in Peru.

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