

DIFFUSION OF AGRICULTURAL INNOVATIONS IN  
EASTERN NIGERIA: INNOVATION AVAILABILITY, MOTIVATION, AND  
COMMUNICATION BOTTLENECKS

by

Everett M. Rogers and  
Arthur H. Niehoff

Paper presented at the conference on the Nigerian Economy and CSNRD, East Lansing, Michigan, May 1-2, 1967.

DIFFUSION OF AGRICULTURAL INNOVATIONS IN EASTERN NIGERIA:  
INNOVATION AVAILABILITY, MOTIVATION, AND  
COMMUNICATION BOTTLENECKS\*

by  
Everett M. Rogers and Arthur H. Niehoff\*\*

The purpose of this paper is to explore the relative importance of three possible bottlenecks in the diffusion of agricultural innovations in Eastern Nigeria. We shall attempt to bring our research evidence to bear on these problems:

1. The degree to which the agricultural innovations\*\*\* being diffused are compatible to Nigerian socio-cultural conditions as the result of adequate research and development.
2. The motivation of Eastern Nigerian villagers to adopt agricultural innovations and to generally engage in development activities.
3. The degree to which communication channels, such as agricultural extension service channels, function adequately to disseminate agricultural innovations to Eastern Nigerian villagers.

We propose that a first step in planning Nigerian rural development is to know what the problem is, where the most restrictive bottleneck exists in the communication system whereby economic and technological messages are transferred from their sources to Nigerian farmers.

---

\*This paper is the first publication of findings from the Nigerian portion of a research project, DIFFUSION OF INNOVATIONS IN RURAL SOCIETIES, supported by the U. S. Agency for International Development under contract dsd-735, and conducted by the Department of Communication at Michigan State University.

\*\*The authors are Associate Professor of Communication at Michigan State University and Director of the Diffusion Project; Visiting Professor of Communication and Anthropology at Michigan State University (formerly Nigeria Project Leader), and Senior Scientist, Human Resources Research Office, George Washington University, on leave. We wish to express our thanks to Dr. Gerald Hursh, Assistant Professor of Communication and Diffusion Project Leader in Nigeria, and the Project staff who gathered the data analyzed in this paper.

\*\*\* An innovation is an idea perceived as new by the individual (Everett M. Rogers, Diffusion of Innovations, New York, Free Press of Glencoe, 1962).

### THE DIFFUSION PROJECT IN NIGERIA

Our Project began in 1964, when the U. S. Agency for International Development commissioned us to study the diffusion of agricultural, health, and family planning innovations in three important developing nations, Brazil, Nigeria, and India. The Project is headquartered in the Department of Communication at Michigan State University where central planning, data-analysis, and graduate training activities are concentrated. In each of the three countries of study, institutional affiliations were established with a research institute and the major rural change agency. In Nigeria, the Diffusion Project has official affiliation with the Economic Development Institute, University of Nigeria, Enugu.\* Primary change agency affiliation in Eastern Nigeria is with the Ministry of Agriculture, although secondary institutional relationships have recently been developed with the ministries of Education, Health, Rural Development, and Information.

Our Project data-gathering activities are concentrated in Eastern Nigeria\*\* and the present paper is solely concerned with this region. Furthermore, while our Project consists of three phases,\*\*\* we will only report Phase I data in this paper. The purpose of Phase I is to explain the relative success or failure of programs of agricultural change at village level. Eighty-seven extension workers and 948 leaders\*\*\*\* in 71 Eastern

---

\*A Project Advisory Committee guides the Project staff in certain of their planning activities; it is composed of representatives from the Ministry of Agriculture, the Colorado State University Extension Advisory Group, The Ford Foundation, and the EDI and the Psychology Department at the University of Nigeria.

\*\*We also have gathered some data from villagers in the Western and Mid-Western Region, but it is not yet analyzed.

\*\*\*Phase II is designed to determine the role of innovators and opinion leaders in diffusing new ideas. Personal interviews were completed with about 1,350 respondents in 18 villages from November, 1966, to February, 1967. We shall describe Phase III later in this paper.

\*\*\*\*These leaders were selected via sociometric techniques in each village.

Nigeria villages\* were interviewed from April to August, 1966. The 10 interviewers were carefully selected (from more than 400 applicants), trained, and supervised. They were secondary school graduates, over 25 years of age, and all had had previous experience in the villages as teachers, government employees, etc. The interviewers were given six weeks of study in survey techniques, and then assigned to live in the villages of study. Each interviewer was visited by a Project supervisor at least once a week, who edited his completed interview schedules, and provided reinforcement and encouragement as well as instruction on daily research problems. Each interviewer was generally assigned to study villages near his birthplace, so that he had knowledge of the local dialect, but he was not assigned to his home village. The interview data that we obtained appear valid and of high quality.

The 71 villages were selected to represent both the locales in which Extension Service local employees had been most successful and least successful in introducing agricultural innovations. No villages are included in our sample in which no extension service activities were underway; we wanted to study agricultural change, so we concentrated our data-gathering where it was occurring.

Further, Phase I villages were selected only from the Igbo and Ibibio-speaking areas, which represent about 80 to 85 per cent of the population of Eastern Nigeria. This limitation was necessary for the convenience of interviewer language competencies. All our interviews were conducted in Igbo or Ibibr, even though both respondent and interviewer might be able to converse in English.

Data were coded at EDI, and IBM card codesheets were sent to Michigan State University for punching and verifying, error checking, and final card cleaning and frequency print-outs. This paper contains a portion of our findings; full details will be provided in a

---

\*The village unit of study was defined as "the smallest unit that is two or more kinds for which people inside and outside recognize a common name."

report to AID that is expected to be available in summer, 1967.\*

At this time, we are able to provide data only of a gross nature regarding the process of innovation adoption in Eastern Nigeria because of incomplete data-processing. However, we believe we can provide some general indications which may be more fully documented when the data are fully analyzed and reported. It might be well, in this regard, to inform you about the current state of data-analysis. All personal interview data for Phase I and II have been collected, coded, and punched. We are now constructing a master community deck for Phase I, combining responses to various questions to make composite indices of the variables studied. This task will be completed in about two months. Phase II data are presently being punched on IBM cards and error-checked, prior to determination of the variables correlated with innovativeness and opinion leadership among our villagers.

So far as the present paper is concerned, we are able to provide frequency counts and percentages for Phase I variables.\*\* In the need for helping infuse information into development plans for Nigeria, we believe the present information is worthy of consideration.

We must emphasize the limitations that must be made in generalizing from our data.

1. It must be remembered that our conclusions apply only to Eastern Nigeria.

Many observers have stressed the strong propensity for change of the Igbo and Ibibio, and this characteristic probably affects motivation to change and the rate of adoption of innovations.

---

\*This report by Gerald Hursh and others, Innovation in Eastern Nigeria, will be available from EDI. It will be followed by reports from Phase II and III in Nigeria, and by a book reporting our methodological conclusions from the three country studies, which will be entitled, Survey Research in Developing Countries, and will be available after September, 1967. A preliminary report from Phase I is now available from the Diffusion Project staff at EDI entitled Preliminary Report of Selected Descriptive Findings for Leaders and Progressive Farmers in 71 Eastern Nigeria Villages. The results presented in the present paper are generally but not entirely consistent with the latter report due to relatively small differences between IBM machine and (cruder) hand tabulations.

\*\*There were a very small number of coding errors extant in the data we used in this report, which have since been removed. Nevertheless, these errors do not alter our conclusions.

2. Secondly, it must be emphasized that we are speaking only of Ibo-Ibibio areas, since the sample does not include other tribal groups in Eastern Nigeria. So we are probably dealing with the portion of the Eastern Region most prone to change.
3. Our respondents are village leaders and innovators. They are the progressive part of the population.
4. Finally, the nature of the Diffusion Project required that we study only villages in which programs of agricultural change were underway. Thus, we do not know how applicable our findings are to those villages which have not had change agency contact. But since our purpose was study of planned agricultural development, we were not concerned with those villages that were not contacted. We can think of no reason why they would not react in a similar manner if they were contacted by change agents.

In the following, we wish to devote our attention to three questions which we believe to be significant, as follows:

1. What are the quality of the innovations being presented to the farmer and how does this quality affect the adoption rate?
- 2, What are the primary motivations which cause the farmer to adopt new ideas or practices?
3. How is information transmitted and what is the influence of the channels of communication used?

#### INNOVATION AVAILABILITY

There are at least three points of view of the development process by those concerned with the planning and implementation of such change programs.

1. First is the traditional economic approach in which attempts to discern, mainly through aggregate analysis, the means of production, distribution, and consumption of goods in a given country or area, and then attempts to improve these systems by allocating resources to those areas and sectors which are deemed necessary to spark economic growth.

2. The second approach to development is that of the technician who views the development process as depending on provision of the proper technical know-how to those being assisted.
3. Third is the point of view of the behavioral scientist specializing in the process of innovation.

We argue that all three of these points of view, and perhaps others, can contribute to understanding and implementing economic development. But it should be recognized that given innovations will be viewed differently in accordance with the particular viewpoint of each type of development specialist. The economist will usually tend to view the practice in terms of its general economic potential if broadly adopted. The technician will see it in terms of its technical superiority over existing practices that it might replace. The diffusion researcher will tend to view the innovation from the point of view of the potential adopter or receiver, since his perceptions of the new idea determine whether he adopts it. In our jargon, the diffusion specialist will attempt to empathize -- to take the point of view of the person who hopefully is being influenced -- so as to understand why he adopts or rejects.

We wish to present a classification of agricultural innovation types in Eastern Nigeria from the adopter's point of view. The classification depends on three characteristics which we believe are used by the local farmer in his decision to adopt or not to adopt: (1) complexity, (2) perceived practicality, and (3) compatibility. Complexity is defined as the amount of new or different behavior necessary for the farmer to adopt a new practice. Perceived practicality is the relative advantage that is expected by the farmer to result from such adoption. The advantage may be profitability if the resulting product is primarily for cash sale, although the innovation's advantage may be noneconomic if the product is merely grown for consumption. Compatibility is the degree to which the innovation is consistent with existing beliefs, attitudes, and cultural patterns.\*

---

\*It is likely that complexity and compatibility are interrelated; that is, innovations with high compatibility are usually low on the complexity scale, since presumably there would be a minimum of behavior change necessary in both instances.

In order to obtain an assessment of the level on each of these dimensions of the agricultural innovations in the Phase I study, we asked three judges familiar with agriculture in the Eastern Provinces to independently rate each on a seven point scale.

The different ratings were generally similar, and were combined to form a rank order of innovations into three general categories of "high", "middle," and "low" for a composite of all three dimensions of innovations (Table 1).

Perhaps the significance of the ratings can be better understood by discussing the characteristics of several examples. Two innovations in the high level category are the oil palm rehabilitation scheme and improved cassava varieties. Neither is very complex for the adopter since they are merely improvements on existing crops, which are already known by Eastern Nigerian farmers; these two innovations are also compatible with existing practice. Their profitability is not in doubt. Eicher\* indicated that improved palm varieties will yield 500 to 550 percent more production than the existing varieties they replace. We do not know whether villagers perceive such an increase, but we infer that they recognize the new varieties will be considerably more productive. Improved cassava varieties are believed to produce at least 100 percent more than older varieties, and farmers are even most likely to perceive this profitability since cassava is a one-season crop, which demonstrates its effect much earlier than do oil palm trees.

Now consider the characteristics of two innovations in the low group: poultry and the Stork oil press. The new poultry-raising techniques are low in compatibility and high in complexity. Much new behavior is necessary to raise chickens under the "American system" in contrast to the free flock conditions traditionally used in local villages to raise bush chicks. Moreover, profitability of the "Agric. chicks" is marginal, when it exists at all, for the Nigerian producer. Poultry farmers reported that after paying for the chickens, the feed, and the transport costs to get the eggs to urban markets, they were lucky to break even. When an epidemic strikes

---

\*Carl K. Eicher, "Nigerian Agricultural Development," Nsukka, University of Nigeria, General Studies Division, Mimeo Paper, 1967.

Table 1. Rank Order of Agricultural Innovations in Eastern Nigeria According to Composite Characteristics of the Innovations

Composite Characteristics	Raters of Innovations			Pooled Classification of Agric. Innovation (for Three Raters combined)
	Rater A*	Rater B	Rater C	
High	1. Cassava Variety**	1. Aldrin	1. Palm	Palm
	2. Palm Oil rehabilitation	2. Palm	2. Cassava	Cassava
	3. Cocoa Variety	3. Cassava	3. Cocoa	Aldrin
	4. Maize Variety	4. Rubber	4. Aldrin	Cocoa
	5. Rice Growing	5. Rice	5. Rice	Maize
Middle	6. Stork Oil Press	6. Cocoa	6. Rubber	Rice
	7. Fertilizer Use	7. Fertilizer	7. Maize	Fertilizer
	8. Improved Livestock	8. Livestock	8. Fertilizer	Rubber
	9. Vegetables	9. Maize	9. Vegetables	Poultry
Low	10. Rubber Production	10. Poultry	10. Oil Press	Oil Press
	11. Poultry Growing	11. Oil Press	11. Livestock	Vegetables
		12. Vegetables	12. Poultry	Livestock

\*Judge A could not rate Aldrin.

\*\*The brackets indicate equal ranking.

as it did among many producers, there is considerable loss\*.

The Stork oil press is considerably different to operate from the old press, and thus requires considerable amounts of new behavior. Moreover, it is quite expensive and in order to be used profitably, must process much larger amounts of nuts than is customary and are available. Thus, it can hardly be said to be simple, compatible, or profitable from the farmer's point of view.

#### Knowledge, Adoption, and Discontinuance of Innovations

In order to understand the diffusion process we must consider if farmers knew about the innovations. Not even the best of innovations will be adopted if information about them does not get to the farmers. Table 2 shows for the 12 innovations ranked according to the same criterion as in Table 1, how many farmers indicated having knowledge about them (with and any probing for recall), how many farmers adopted them initially, and how many discontinued them, that is, rejected the innovations after having used them. Table 3 presents the same data in rank order form.

What can we learn from the order in which these innovations fall? First, we can see that there is a considerable difference in levels of knowledge and adoption among these innovations. The tree crops (palm, cocoa, and rubber) are most widely known. This is reassuring since these are the innovations now receiving most emphasis by the Ministry of Agriculture in Eastern Nigeria and are among the earliest innovations that were promoted. Lowest levels of knowledge are generally associated with lower priority, recent introduction, or limited potential significance (an example is aldrin dust to kill yam beetles, whose adoption is localized to the area of beetle infestation).

The first three innovations (fertilizer, palm, and maize) in the highly adopted category are all regarded as important so far as extension service efforts are concerned and are either in the high or middle levels of knowledge (unaided recall). However, two of these high-adoption innovations, fertilizer and N.S. 1 maize, are also high in discontinuance. Farmers are sometimes convinced to adopt innovations which after trial, proved to be less effective than expected, and they are continued.

---

\*Fortunately, an EDI study of poultry production is presently underway in the Eastern Region which will presumably provide accurate details on the profitability of the new manner of chicken and egg production.

Table 2. Percentage of Village Leaders (N=948) in Eastern Nigeria Who Know About, Have Adopted, and Discontinued Twelve Agricultural Innovations by Ranked Characteristics of Innovations

Types of Innovations	Percent Who Know About*		Percent who Have Adopted	Percent Who Have Discontinued
	Aided Recall	Unaided Recall		
<b>I. High Level</b>				
Palm	75%	81%	20%	1%
Cassava	34%	24%	2%	0
Aldrin	42%	8%	12%	1%
Cocoa	42%	49%	4%	1%
<b>II. Middle Level</b>				
Maize	54%	17%	16%	2%
Rice	33%	17%	6%	1%
Fertilizer	81%	24%	22%	3%
Rubber	47%	42%	5%	0
<b>III. Low Level</b>				
Poultry	33%	26%	6%	3%
Oil Press	17%	1%	0	0
Vegetables	33%	9%	5%	0
Livestock	42%	13%	1%	1%

\*"Unaided" recall (of knowledge) of innovations was determined by asking the respondents what agricultural innovations they could think of that were sponsored by government. "Aided recall" was determined by asking the respondents what they knew about each of the 12 innovations, which was then judged as to its correctness by the interviewers, who were trained at length in the technical aspects of each innovation. Naturally, aided recall is usually reported by a high percentage of our respondents than was unaided recall.

Table 3. Agricultural Innovations in Eastern Nigeria (Ranked by Their Characteristics) by Knowledge, Adoption, and Non-Discontinuance

Types of Innovations	Know About* (Rank Order)	Adopted (Rank Order)	Not Discontinued (Rank Order)
I. High Level			
<ul style="list-style-type: none"> <li>- Palm</li> <li>- Cassava</li> <li>- Aldrin</li> <li>- Cocoa</li> </ul>	<ul style="list-style-type: none"> <li>- Palm</li> <li>- Cocoa</li> <li>- Rubber</li> <li>- Poultry</li> </ul>	<ul style="list-style-type: none"> <li>- Fertilizer</li> <li>- Palm</li> <li>- Maize</li> <li>- Aldrin</li> </ul>	<ul style="list-style-type: none"> <li>- Vegetables**</li> <li>- Oil Press</li> <li>- Rubber</li> <li>- Cassava</li> </ul>
II. Middle Level			
<ul style="list-style-type: none"> <li>- Maize</li> <li>- Rice</li> <li>- Fertilizer</li> <li>- Rubber</li> </ul>	<ul style="list-style-type: none"> <li>- Fertilizer</li> <li>- Cassava</li> <li>- Maize</li> <li>- Rice</li> </ul>	<ul style="list-style-type: none"> <li>- Poultry</li> <li>- Rice</li> <li>- Vegetables</li> <li>- Rubber</li> </ul>	<ul style="list-style-type: none"> <li>- Livestock</li> <li>- Cocoa</li> <li>- Aldrin</li> <li>- Rice</li> </ul>
III. Low Level			
<ul style="list-style-type: none"> <li>- Poultry</li> <li>- Oil Press</li> <li>- Vegetables</li> <li>- Livestock</li> </ul>	<ul style="list-style-type: none"> <li>- Livestock</li> <li>- Vegetables</li> <li>- Aldrin</li> <li>- Oil Press</li> </ul>	<ul style="list-style-type: none"> <li>- Cocoa</li> <li>- Cassava</li> <li>- Livestock</li> <li>- Oil Press</li> </ul>	<ul style="list-style-type: none"> <li>- Palm</li> <li>- Maize</li> <li>- Fertilizer</li> <li>- Poultry</li> </ul>

\* Determined by unaided recall.

\*\* Less than one percent have discontinued these innovations.

Fertilizer has been used by many farmers without adequate knowledge as to how much and with what crops it was to be applied, and results have often been either non-convincing or even negative. These negative demonstrations in the farmers' fields caused them to discontinue the new practice. In the case of N.S. 1 maize, we believe the adoption and discontinuance of the crop has often not been in accordance with government plans, causing a negative demonstrator effect. Although the corn variety was introduced as a means of producing local chicken feed, many farmers who started growing it were unable to sell it to the government or elsewhere for the intended purpose. They then tried to use it in the traditional manner -- for their own consumption -- for which it was not suited. It was too hard to eat. It is interesting to note that an identical occurrence has been reported in the diffusion field 15 years ago.\*

Aldrin dust was introduced in Eastern Nigeria more recently than many of the other innovations in Tables 2 and 3, but it is already off to a relatively high level of adoption. It is low in cost, compatible with cultural patterns (since it kills the beetles on the prestige root crop, yams) and it is relatively simple to apply. Twelve percent of the village leaders reported having adopted it, and only 1 percent discontinued.

Cocoa variety adoption is localized by climatic conditions, being mainly adopted only in the southern part of the Eastern provinces. Furthermore, the conditions surrounding cocoa variety adoption are fairly complex. Although many of our respondents did not live where the innovation could be adopted, they had heard about it. Improved livestock and the Stork oil press are at a relatively low knowledge level and a low level of adoption.

Poultry raising was rated low by the judges in terms of its characteristics, fairly high in knowledge among village leaders, 6 percent in level of adoption, and highest (3 percent) discontinuance. This means that much information was disseminated about poultry raising and a moderate amount of adoption took place, and negative experiences resulted once the innovation had initially been accepted. It might be mentioned that

---

\*Anacleto Apodaca, "Corn and Custom," in Edward W. Spicer (ed.), Human Problems in Technological Change, New York, Russell Sage Foundation, 1952.

similar results regarding Western poultry projects have been reported by diffusion literature in various countries.\*

So what do we generally conclude about the relative importance of the availability of innovations as a bottleneck in Eastern Nigerian rural development? The case is clearly not the extreme illustration provided by the Niger Agricultural Project (Mokwa), whose administrators concluded that they had virtually nothing to demonstrate to their groundnut settlers.\*\* There are a few agricultural innovations among those presently available in Eastern Nigeria that have a relatively high potential for adoption. They are relatively simple to understand and compatible within the socio-cultural setting. There are already modest levels of knowledge about these innovations, like palm oil rehab, cocoa varieties, etc. But none of these innovations have reached a level of even 25 percent adoption, even among village leaders in Eastern Nigeria. Clearly, the entire bottleneck in agricultural development is not the innovations.

#### MOTIVATION

It is our impression that a lack of motivation is not the bottleneck either. The general impression one gains from various anthropological and sociological writings\*\*\* on the Igbo's and Ibibios of Eastern Nigeria is that they are eager to take on new development ideas, that social change is welcomed. We tend to agree with Smock\*\*\*\* who states, "A desire for greater wealth is ...certainly an important factor in Eastern Nigeria."

---

\*Thomas M. Fraser, Jr., "Sociocultural Parameters in Directed Change," Human Organization, 95-104, 1963.

\*\*K.D.S. Baldwin, The Niger Agricultural Project: An Experiment in African Development, Oxford, Basil Blackwell, 1957, p. 150.

\*\*\*Such as Victor Uchendu, The Igbo-Speaking People of Eastern Nigeria, Evanston, Northwestern University Press, 1965.

\*\*\*\*David R. Smock, Rural Development in Eastern Nigeria, Lagos, Nigeria, Ford Foundation, Mimeo Report, 1966.

We asked our sample of 940 village leaders why they adopted agricultural innovations. The results, shown in Table 4, generally indicate a strong economic motive, which is not especially surprising to any careful observer of Eastern Nigerian village life. We must point out that economic motives for adoption, like raising income, are probably more socially acceptable to admit than a social prestige motive, like "to improve my social status."

Among most peasant audiences in the Third World, most change and development occurs as a result of the promotional activities of professional change agents like extension workers, teachers, community development workers. The peasant in these settings is a passive participant in the process. But in Eastern Nigeria, among our village leader respondents, we learned of many examples of where the villagers pressured government change agents for assistance. We conclude that lack of motivation is not a limiting factor in agricultural development.

#### COMMUNICATION CHANNELS

This point leads us to consideration of the third possible bottleneck, adequacy of communication channels.

Table 5 shows the relative importance of various communication channels in creating first knowledge or awareness about the 12 agricultural innovations. One can observe that ...

1. The mass media channels are relatively unimportant; they are reported by only 2 to 8 percent of our respondents, which is in stark contrast to the United States, where mass media channels (especially farm magazines) are the most important channel of communication about agricultural innovations.\* However, the unimportance of mass media channels in Eastern Nigeria is entirely consistent with results from Colombian, Indian, and Pakistan peasants\*\* where only 4 or 5 percent of respondents report first knowledge of innovation via mass media.

---

\*For detail, see Rogers, 1962, op. cit.

\*\*Everett M. Rogers and Wicky L. Meynen, "Communication Sources for 2, 4-D Weed Spray among Colombian Peasants," Rural Sociology, 30:213-219, 1965.

Table 4. Motives for Adoption of Agricultural Innovations  
by Eastern Nigerian Leaders

Reported Motives	Percent
1. To raise total income	51%
2. In order to receive subsidy	16%
3. To improve social status	5%
4. To help the government	5%
5. To improve village conditions	5%
6. To make progress	4%
7. To help relatives	2%
8. To help friends	2%
9. Don't know	8%
TOTAL	100%

\*Two percent gave no responses.

Table 5. Communication Channels for First Knowledge about Agricultural Innovations

Innovation	Interpersonal (Relatives, Friends, Neighbors in Village)	Localite (Government Extension Personal)	Interpersonal Technical (Newspaper, Radio, Others)	Have Never Heard or Do Not Recall Channel	Total Respondents (N=948)
1. Palm	33%	49%	5%	3%	100%
2. Cassava	16%	27%	3%	49%	100%
3. Aldrin	15%	30%	2%	54%	100%
4. Cocoa	46%	29%	8%	17%	100%
5. Maize	22%	40%	2%	33%	100%
6. Rice	26%	24%	7%	43%	100%
7. Fertilizer	24%	56%	5%	15%	100%
8. Rubber	39%	30%	6%	25%	100%
9. Poultry	38%	37%	7%	18%	100%
10. Stork	11%	9%	3%	77%	100%
11. Vegetables	16%	25%	4%	55%	100%
12. Livestock	24%	28%	7%	41%	100%

2. For most of the 12 innovations shown in Table 5, interpersonal technical channels were most frequently reported. Change agents, especially extension agents from the Ministry of Agriculture, play a central role in diffusing new technology in Eastern Nigeria.
3. Lack of knowledge is an important barrier to agricultural diffusion among these village leaders in Eastern Nigeria. About 35 percent of the respondents were not aware of the average innovation in Table 5. Even for the four innovations rated most "adaptable" on the basis of their characteristics (complexity, comparability, and profit ability), about 30 percent of our respondents were unaware. Obviously, for the villagers in general (in our Phase II), this percent of unawareness will be much greater. We would estimate off-hand that it might at least double, which would mean that about 60-70 percent of the farmers have not adopted these innovations because they did not know about them.

#### CONCLUSIONS

As was mentioned in the beginning of this paper, any recommendations presented here should be considered as tentative.

1. First, we believe that motivation is not an important bottleneck to agricultural development in Eastern Nigeria. Villagers seem stimulated to adopt innovations primarily by economic motivations. Innovations which provide real demonstrable benefits will be adopted, often even if they conflict somewhat with local cultural patterns.
2. However, those innovations most compatible and least complex will be adopted more rapidly. Thus, it is suggested that improvements in existing farming practices will be adopted most quickly, thus providing the greatest economic benefit and creating the most positive attitudes toward change which can be utilized for latter less compatible, and less complex innovations. The best examples are the palm oil rehab scheme, improved varieties of cassava and cocoa,

aldrin dust, and possibly fertilizer. This last innovation has potential for adoption only if it is really profitable and farmers understand its use fairly well.

3. Finally, we wish to comment on the adequacy of communication channels in diffusing innovations in Eastern Nigeria. Obviously, no matter how profitable an innovation, it cannot be adopted if the farmer does not know about it. It is suggested, therefore, that increased or improved efforts in extension service activities be made.\* While the mass media are not at present important in diffusing innovations, their potential role should not be underestimated. Phase III of the Diffusion Project in Nigeria, currently underway, is experimenting with the use of radio development forums, and (2) print materials plus an opinion leadership approach by extension service workers. Essentially, we are trying to field test prototypic communication channels that will reach the most farmers for the least cost. We feel the greatest potential lies in communication systems that combine the advantages of mass media (radio or print) plus interpersonal localite interaction among villagers.

The conclusion of the present paper is that we are thus attacking the most significant bottleneck to agricultural development in Eastern Nigeria, to correct the inadequacy of communication channels.\*\*

---

\*Eicher pointed out that only 23 percent of government allocations to agriculture in the current plan are specified for extension work, while 34.4 percent will go to farm settlements, 13.3 percent to credit, and 10 percent to research. Carl K. Eicher, "Transforming Traditional Agriculture in Southern Nigeria: The Contemporary Experience," Paper presented at the African Studies Association, Bloomington, Indiana, October, 1966.

\*\*A conclusion also supported by Nichoff's analyses of case study materials on the cross-cultural introduction of innovations throughout the Third World. Aruthur H. Nichoff, A Casebook of Social Change, Chicago, Aldine, 1966.