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PATTERNS OF DIFFUSION IN RURAL EASTERN NIGERIA

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Diffusion of Innovations Research Report 11

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The diffusion project in Eastern Nigeria, like its sister projects in India and Brazil, carries with it the flavor of an international undertaking. The four authors of the present report, for example, each represent a different country; namely Malawi, Holland, the United Kingdom and the United States. In addition, members of the staff in Nigeria and the United States include citizens of the Philippines, Nigeria, Germany, Canada and India. Moreover, represented among this group of international scholars are a variety of disciplinary backgrounds which include anthropology, communication, sociology, agriculture, market research and political science.

There are many individuals and institutions to whom we could extend our gratitude for having in some special way contributed to the final production of the present report. Several years have transpired from the planning of the present study to its completion, and our debts of gratitude are too numerous to recall and mention here. In singling out the principal contributors for acknowledgement, therefore, we may be unwittingly slighting the efforts of many others without the help of whom, this report may not have been made possible.

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Omasi-Agu
Eka Uruk Eshiet
Udo Offiong
Nsukara
Umuoke/Uga
Ulli/Umuaku
Umubiakwe
Owutu
Ogboji
Oduma/Amankanu
Obolo-Eke
Nung Ikot-Ikot
Utit Uruan
Umuduru
Okwudo/Umoseke
Obigbo
Uwana
Ihiala/Umuezeawala
Itu Ezinihite/Amaova

PREFACE

This report features data gathered in Phase II of the Diffusion Project in Eastern Nigeria. The Diffusion Project was sponsored by the U. S. Agency for International Development, and conducted by the Department of Communication at Michigan State University. In Nigeria, the Project was carried out with the cooperation of the Economic Development Institute at the University of Nigeria, Enugu.

Phase II was designed to gather data from a large sample of villagers. The present report reports the variables correlated with the five dependent variables: (1) agricultural innovativeness, (2) agricultural innovation awareness knowledge, (3) health adoption, (4) health knowledge, (5) opinion leadership. Implications of these findings for change agents are also detailed.

The present study constitutes one of the largest field surveys of villagers yet attempted in a Sub-Saharan Africa country. For this reason, as well as its conceptual depth, it has import. But further, it deals with the introduction of social change to villagers, an especially significant topic in all less developed nations.

The authors, and their research colleagues on the Diffusion Project, are to be commended for their ingeniousness in adapting survey research methods to Nigerian conditons, where they have been little used in the past. The results of this inquiry, in the pages that follow, are the best evidence that can be offered of the success with which the survey research methodologies were properly adjusted to the locale of study.

Everett M. Rogers
Professor of Communication
and Director
Diffusion Project

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CHAPTER I

INTRODUCTION

A major portion of the activities of an agricultural extension worker is devoted to the diffusion of new and more productive farming ideas and practices to farmers. If, for instance, it is demonstrably more productive to cultivate NS-I maize than any other traditional variety of maize, then it becomes the extension workers' job not only to apprise farmers of this information but also to attempt to persuade them to adopt the cultivation of NS-I maize.

Adoption of a new seed variety, however, is only a beginning step in the process of achieving higher agricultural productivity. The seed, by itself, does not guarantee higher yields unless the farmer also abandons certain of his traditional methods of cultivation. It may be that a robust yield is realized only when the new seed variety is planted in rows, spaced at regular intervals, and is fertilized and weeded regularly. All these additional practices may be alien to the farmer who, therefore, perceives them as being just as new as the NS-I maize seed itself. What would have appeared at first glance, therefore, to have been the adoption of a single innovation in effect becomes the adoption of a family of new and interdependent practices. Indeed, the farmer who adopts the use of NS-I maize, then randomly scatters it upon his land and sits back hoping for the best, is likely to do himself more harm than good.

Thus, we would expect that the agricultural agent who is charged with the job of introducing NS-I maize seed would have to become an

expert in the cultivation of the new seed variety. We would expect him to urge, not only the adoption of NS-I maize, but also the concomitant adoption of all those associated cultivation practices which are instrumental to the maximization of the advantages of the new seed variety.

It is, however, one thing for our extension worker to have acquired the relevant expertise necessary for the successful cultivation of an improved seed variety and quite another for him to communicate the desirability of its adoption to farmers with the same degree of success. In a sense, we could conceive of the agricultural extension agent as having two new seed varieties that he is hopeful of being adopted. One can be identified readily enough as the physical NS-I maize seed itself. The other is somewhat more difficult to pinpoint. Suppose, however, we called it the <u>idea</u> of adopting the new seed variety; i.e., a kind of "psychical" new seed variety. Now, the extension agent knows, from his training, what to do with the physical seed. He has a list of carefully researched instructions which state that if he plants NS-I maize in rows, spaces it, weeds it and fertilizes it in certain specific ways, enhanced crop yields will occur. But what of the psychical new seed variety? What is the parallel list of instructions for successfully implanting and cultivating the idea of adopting NS-I maize in the minds of men? Certainly, a farmer cannot be expected to adopt the physical seed unless the idea of its adoption has taken root in his mind. But how, precisely, does he set about disseminating the new idea? Does he randomly scatter the idea among his clients, then sit back hoping for the best? If the

successful cultivation of new ideas in the minds of men is analogous to the successful cultivation of the physical NS-I maize seed in the soil, is it, therefore, not likely that the extension agent who scatters his new ideas may run the risk of doing his clientele more harm than good?

It is perhaps in searching for answers to such questions as those raised above that the multi-phased study of the diffusion of innovations in Brazil, Nigeria, and India was conceived. The three nation study therefore, represents a systematic effort to explore the field of communicating new ideas to peasant farmers with a view to making less haphazard and more predictable recommendations to change agents.

In addressing ourselves to the problem of communicating new ideas to farmers, we have delineated three major interrelated components which are needful of careful research. These are identified as the agricultural extension agents, the peasant farmers and the ideas which are transacted between them. These three components correspond to the three phases of the study conducted in each of the three countries. Phase I concerns itself with determining characteristics of the extension agent, his communi-ation methods, and his contact with village leaders and peasant farmers with a view to establishing the correlatesof change agent* success. Phase II is focussed primarily upon determining personal and behavioral characteristics of the peasant

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*In the present report, the terms "extension agent" and "change agent" will be used interchangeably.

farmer with a view mainly to explaining his behavior in adopting or failing to adopt innovations. Phase III attempts to manipulate, to some extent, the messages exchanged between the extension worker and the peasant farmer with a view to determining effective strategies of communicating new ideas to farmers. The social situation or context in which the three phases have been conducted is a village unit, the characteristics of which were examined during the conduct of Phase I.

The present report describes the findings from the second phase of the Eastern Nigeria study. It is a systematic and focussed search for the main correlates of the adoption of new ideas in much the same way that the agricultural scientist presumably searched for those main correlates which conduced to the successful cultivation of NS-I maize seed in the soil.

OBJECTIVES OF THE PHASE II STUDY IN NIGERIA

The primary objectives of the Nigeria Phase II study is expressed as the explanation of innovativeness and informal leadership among peasant farmers, with a view to developing useful strategies of communicating new ideas for change agents. An innovation is define as "an idea, practice or object perceived as new by the individual" (Rogers 1962, p. 13). Thus, the term innovation includes the notion of adopting a new physical practice as well as the notion of adopting an antecedent new psychical idea about that practice. Two types of innovations will be studied in the present report: (1) new agricultural practices and (2) new health practices.

Innovativeness is "the degree to which an individual is relatively earlier to adopt new ideas [and practices] than other members of his social system" (Rogers, 1962, p. 19). Like the term innovations, innovativeness is viewed as having two components: (1) an essentially behavioral component which focussed primarily upon those directly observable behaviors which indicate whether or not an individual has indeed physically adopted a new practice; and (2) an essentially cognitive component which refers to whether or not an individual has become aware and knowledgeable of the existance of the new practice, thereby indicating that he has psychically adopted a new idea. However, to avoid confusion of terms, innovativeness, in the context in wich it shall be used in the present report, will refer to the behavioral component whereas knowledge of innovations will refer to the cognitive component.

By explanation of innovativeness, we mean the search for answers to such questions as: why do some individuals learn of and adopt innovations relatively earlier than others? What are the antecedent conditions, factors or situations which determine innovative behavior among peasant farmers? In other words, we shall seek to determine, as precisely as possible, all those factors situations, and conditions which both precede and eventuate in the adoption of innovations by peasant farmers.

Informal leadership is defined as "the degree to which an individual is able to informally influence other individuals' attitudes or overt behaviors in a desired way with relative frequency" (Rogers and Shoemaker, 1968). The identification and description of

village informal leaders is predicated upon the notion that they are likely to serve a useful instrumental function by aiding change agents to secure the cooperation of other members of their social systems with a view to accelerating the diffusion of innovations.

Thus, by knowing what went ahead of innovative behavior, by knowing what potential role informal leaders could play, and by subjecting this information to careful analysis, it is hoped that we shall be enabled to formulate communication strategies which change agents could be recommended to follow in the process of diffusing new ideas among their clientele.

With a view in this direction, therefore, we have gathered, during the Phase II survey of Eastern Nigerian peasant farmers, a formidable array of data on a large number of potential correlates of innovative behavior and informal leadership. We have allowed ourselves to be guided in this search for correlates by previous research conducted in similar, albeit culturally different environments, by hunches and intuition regarding possible relevant factors to take into account, and by doing preliminary "pilot" studies in the field prior to conducting the main survey. Every effort has been made, in selecting concepts, to ensure not only their relevance to the problem under study, but also their applicability and operationalizability in the Eastern Nigeria context.

Of course, we do not expect that all of the information we have gathered will prove to be useful. Indeed, we would expect that the agricultural scientist, in the process of determining the optimal conditions under which NS-1 maize thrived in greatest

abundance, tried many different conditions of cultivation in carefully controlled experiments before being eventually able to specify that concepts such as row-cropping, spacing, weeding, and fertilizing made the biggest difference in the efficient cultivation of NS-I maize than all the other concepts he had taken into account during his experimentation. Similarly, we have taken as many factors into account as we thought were relevant to the problem at hand in the hope that among these, would be discovered the most relevant few which make the biggest difference in explaining why some farmers adopt new ideas and practices relatively earlier than other farmers in the same social system.

It follows, therefore, that a major task in the analysis of the data gathered during Phase II is the reduction of the mass of information gathered to manageable, useful proportions. Indeed, much of the more sophisticated statistical techniques we shall be using will be employed expressly with the methodological objective of searching through and sorting out our data into a few intellectually manageable and practically useful units of crucial information. For the most part, we shall restrict our discussion of findings to that information which we have found to be most useful in explaining behavioral innovativeness. We shall, therefore, not go into any great detail in presenting findings which are either irrelevant or bear only marginal or dubious utility to the explanation of such behavior.

The emphasis in our conduct of Phase II data gathering and analysis, therefore, is strongly exploratory to the extent that we have not and

shall continue not to allow specific hypothesis* to restrict our view of the phenomenon we are seeking to explain. We do, of course, have broadly defined hunches which have guided us in the selection of concepts for inclusion in the present study. We are aware that the crucial elements in the diffusion of new ideas are (1) the innovation which is (2) communicated through certain channels (3) over time (4) among the members of a social system (Rogers, 1962, p. 12). Given our disciplinary bias, it is not unusual that we should expect to find that the concepts which are likely to feature prominently as important predictors of innovative behavior will be those having to do with communication among farmers and between farmers and change agents.

JUSTIFICATION FOR THE STUDY

There are several aspects regarding our approach which are novel in the study of the diffusion of innovations. First, it is not restricted, as is the case with most research conducted in developing countries, to a study of diffusion in just one single village. The phase II studies in Brazil, Nigeria**and India represent the first large-scale efforts in developing countries to gain comparative information across many different village systems, using approximately

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*However, before (1) leaving the United States and (2) beginning data gathering in Nigeria, we developed two operational plans listing all independent variables to be studied. In essence, this listing represents a statement of hypotheses insofar as we expected that the listed variables had the highest potential of payoff in explaining our dependent variables.

**Of the five continents, the fewest number of known diffusion studies were conducted in Africa. Records in the Diffusion Documents Center at Michigan State University show a total of 18 studies conducted in Africa (as of 1968) with only 9 shown as having been conducted in Nigeria.

the same measuring instruments. Second, the sample sizes in each village enable us to utilize the most sophisticated methods of multivariable statistical analysis. An especially novel feature of the statistical approach in the present report is to use the more sophisticated statistics such as factor analysis and multiple correlation and regression not as a culmination of data analysis but rather as an initial step for purposes of data reduction prior to proceeding to simpler statistics such as averages and percentages as a means of explaining phenomena. Thirdly, the phase II study has attempted not to copy too closely the U.S. diffusion model to the extent of using the same variables as were used in U.S. studies without proper adaptation to the distinctive conditions found in the new settings. Indeed, many new variables, such as the concept "sons abroad", were included in the present study and which have never been previously encountered in any other study.

Finally, and most importantly, Phase II in Nigeria is part of a larger three nation study which, for the first time, makes feasible the direct comparison of cross-national data on four separate levels: on the level of village characteristics, on the level of change agent characteristics, on the level of individual peasant farmer characteristics and on the level of message treatment and manipulation. Thus, where previous research has tended to focus its attention either primarily upon the change agent or primarily upon the individual farmer, the cross-national diffusion study has directed its attention to a study of both parties <u>and</u> to a study of the communication transactions between them which bring them into functional relationship with each other. The present study, of course, is focussed

primarily on the level of the individual peasant farmer characteristics. However, a final three-nation comparative report is currently in production. One of the major objectives of this report is to bring the four levels described above into relationship with each other.

CHAPTER II

THE EASTERN REGION, METHODOLOGY AND CHARACTERISTICS OF THE SAMPLE

THE REGIONAL SETTING*

Nigeria, located in West Africa, is one of the largest and most important independent nations in tropical Africa. At the time of Phase II it was a federation composed of four regions. Eastern Nigeria was one of these regions. It was situated in the south-east part of the federation, bounded on the south side by the Bight of Biafra. The Region occupied 30,000 square miles, making it slightly larger than the Republic of Ireland, in Europe, and a little smaller than the State of Main, of the United States.

The Region's proximity to the equator, the prevailing winds, and terrain features combine to produce a hot humid tropical climate. Average annual rainfall varies from more than 140 inches in some coastal areas, to about 65 inches along the northern boundry. A dry season lasts from November to March in the northern area and gradually decreases to one month in the south on the coast.

The rainfall of the region is sufficient to maintain a tropical rain forest throughout the region. The combined effects, however, of a high population density, slash and burn agriculture, and poor soils have depleted the forests, and in the north they have been replaced by tall grasses and fire-tolerant trees of the savannah. On the southern coastal plain, trees have been replaced by oil-palm bush, because the farmers cut the trees but not the oil-palms when they cultivate the land.

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*For a more detailed introduction to the region, see Hursh, G.D. et al, (1968); Hershfield, A. F. (1968); and Karmon, Y. (1966).

There are many distinct ethnic groups in Eastern Nigeria. Seventeen major languages and about 300 minor ones are spoken by the peoples of the region. Accurate population figures are difficult to obtain; the 1963 census is still not accepted by all regional governments, so population figures are quoted from the 1952 census.

Figure II/1. POPULATION AND PROVINCES OF MAJOR ETHNIC GROUPS IN EASTERN NIGERIA

Ethnic Groups		Population In '000's	Provinces of Residence
Ibo		4,900	Enugu, Onitsha, Abakaliki, Owerri, Port Harcourt, Umuahia
Ibibio	Ibibio Speakers	737	Annang, Uyo
Annang	Ibibio Speakers	435	Annang, Uyo
Oron	Ibibio Speakers	123	Uyo
Efik	Ibibio Speakers	72	Calabar
Other Ibibio Speakers		72	Annang, Uyo, Calabar
Ijaw		258	Yenegoa, Degema
Ekoi-Jukun		98	Abakaliki, Ogoja
Ogoni		156	Port Harcourt
Other Major Groups		273	Abakaliki, Ogoja, Calabar

The regional population was 7.2 million in 1952 and 12.4 million in 1963. The two largest ethnic groups are the Ibo and the Ibibio, comprising about 80 percent of the regional population and they are the people studied in the present Phase of the Project.

There are five major urban centers in the region; Aba, Enugu, (the capital), Port Harcourt, Onitsha and Calabar. All except Calabar are interconnected by tarred highways. Calabar is connected to the rest of thr region by a ferry. There is a railway that connects Port Harcourt, Aba, and Enugu to the remainder of the Nigerian Federation.

Prior to the advent of oil exploitation, agriculture was the major export earner, and it still is the most important employer. Agriculture supplies all the staple foods for the indigenous people, the manpower for industries, and in 1965 accounted for 64 percent of the Nigerian Federal Gross Domestic Product.* Palm products are the most important agricultural export earner of the Eastern Region.

The Rural Setting

The Village: Dwellings and Settlement Patterns

More than 90% of the population of Eastern Nigeria live in villages. Their houses generally are rectangular, with one or more rooms. In the north, the walls are made of solid mud, while in the south a wattle and dawb structure is used. Round houses are found, especially, in the north and east of the region. Roofs are made of palm leaf mats or grass thatch. The more prosperous farmers now roof their houses with corrugated iron, and rich farmers and "sons abroad"**use concrete blocks for walls, and iron roofs.

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*Nigeria Year Book 1967. Lagos, Times Press.

** "Sons abroad" are members of the village community who are usually educated and live in towns outside the village, but build houses in their own villages to contribute to their development.

The houses are built in compounds, which consist of the house of the head of the family, additional houses for his wife, or wives, and their children and small buildings for strangers. Houses for other relatives are sometimes included. Compounds may be surrounded by an earth wall or fence. The average size of a compound disperses the houses with 20 yds to 100 yds between them. Compounds are clustered into hamlets each containing a localized lineage, which may be known as a ward. Hamlets contain 6-20 compounds and 200 plus inhabitants.

A village consists of a number of such hamlets grouped along major paths radiating from a common center, where the church, school, and market are situated. A rural town may consist of many villages strung together in an area of 4-30 square miles.

Among the Afikpo Ibo the compounds are more compact and contain many more people. In fact, a single compound may contain a whole localized lineage of about 2-300 people.

The relative compactness of a village depends upon its topography. In hilly areas, the villages tend to cluster on the flat tops of the ridges and the growth of the village may be restricted to a small area. In areas with rolling or level land, villages spread over larger areas, except in the most densely populated areas where there is no land between villages and hamlets.

The building of roads, which has replaced a system of pathways, has led to the development of the street or strip village. People have moved their houses close to the roads to benefit from the ease of communication.

Community Organization

In most villages there are organized age-grades for men. Among the Ibo a new age set is organized every 3 years and there are 5-9 such sets of young men prior to their entrance into the tribe system of senior age-grades. Among the Ibibio a new age set is formed every year. The age-grades function in community work, such as clearing forests and cutting pathways. The middle aged men act as market police and executors to the village elders. The community functions of the age-grades are in the decline and are being assumed more by village and clan unions, which unite the village with their "sons-abroad". The "sons-abroad" are obligated to contribute money and effort to community self-help projects in the village. This persuasive self-help phenomenon among the Ibo, and to a lesser extent among the Ibibio, is one of the social characteristics of the region.

Local Government

Authority in the community is exercised by a council of elders composed of heads of lineages, with the head of the senior lineage acting as president. Among the Ibo, there is ordinarily no single headman, though in the Onitsha area some towns have "kings" with councillors and titled officials. Ibibio villages are led by a headman and his council of elders.

Farming: The Rural Economy

The vegetation of Eastern Nigeria changes from mangrove swamp to derived guinea savannah. Farming within this area also varies a great deal. The following is a description of "typical" farms so that the reader will have a better impression of the environment in which innovation is taking place.

Throughout the Region the bush fallow system of farming is practiced. A farmer will clear small plots of land each year, cultivate them for two or three years and then allow them to return to their natural vegetation for a number of years. During this fallow period, which is usually between five and ten years the fertility of the soil is replensihed.

Oluwasamni (1966) says that about five years of fallow are needed before the fertility of the soil is fully restored. However, in some parts of the Region population pressure on the land is so high and the area available for each farmer to cultivate so small, that farmers are not able to leave the land fallow for five years. Consequently, the fertility of the soil is being steadily depleted and crop yields are dropping.

Land Tenure

There are three major types of land holdings:

(1) Lineage lands, owned by the lineage and controlled by the lineage head who apportions land to members on an annual basis.

(2) Community land, owned by the community and administered by the council of elders, who divide it among the lineages.

(3) Private holdings, which is the only type that can be sold. Ownership of private land may be obtained by purchase, clearing forests or reclaiming marsh land.

Most farmers hold land with usufruct rights, (owned by the farmer as long as he is occupying and using it) but the pressure of population and the money economy is forcing them to occupy land permanently, so that private ownership is growing, especially in the neighborhood of towns.

Farm Size

The Agricultural Sample Survey of 1963-64* indicated that over 85% of Eastern Nigerian farmers cultivate less than 2.5 acres annually. Assuming that the farmers cultivate the land for 2 years and that the average fallow period for the whole country is 6 years, the total acreage that the farmer needs to complete his cultivation - fallow cycle is less than ten acres.

Upton (Oluwasamni, 1966, p. 84) found, in Uboma, near Umuahia, that the average size of farms was 7.83 acres, made up as follows:

	Acres	Plots
Total under crops	2.91	14.70
Fallow area	4.76	14.82
Tree crops	0.16	0.85
	7.83	30.37

This detailed study of farming in the tropical rain forest belt on the coastal plain, shows quite clearly that excessive fragmentation

*Agricultural Sample Survey 1963-64. Federal Office of Statistics, Lagos, 1965.

of farms is another problem which the farmer faces. The farmers of Uboma cultivate an average of 14 plots in any one year. They must spend a sizeable amount of time walking between their plots.

Food Crops

A farmer will clear new plots, during the dry season, by cutting all the undergrowth and stripping the trees of their foliage with a matchet. The debris is collected into piles on the plot and burnt. Only oil-palm trees are left untouched during the clearing, because they are economic assets. After clearing, the ground is prepared for the planting of yams. In the Northern parts of the region, earthern heaps, about 2'6" high and 3' in diameter are made by the farmers, using a curved-handled hoe. One seed yam is planted in each heap. Occasionally, in swampy areas much bigger heaps are made (5-6' high and 10' in diameter) and many more yams are put into each heap. In the South, on the costal plain where the soils are softer and sandy, cylindrical holes are made at six foot intervals, by the men, who use a hoe mounted on a long pliable handle weighted at the top. The seed yam is dropped into the hole and covered with the top-soil of the surrounding area which forms a small heap over the yam.

Yam planting is completed by April or May and the major task of the men is completed. Their only responsibility is to find stakes for the yam vines and to see that the vines are twisted around the stakes. The women and children, traditionally, were responsible for the other farm crops, such as, cassava, maize, and vegetables. Now, that many of the older children are away at school, and these secondary crops are becoming important cash crops, for sale in the towns, the men are taking greater interest in their cultivation.

Yams, cocoyams and cassava are the most important staple food crops. Cocoyams are planted after the yams and are grown in the plots close to the compound. These plots are cultivated every year and their fertility is maintained by depositing the household wastes upon them. This appears to be the only form of deliberate manuring practiced in the traditional farming cycle.

Cassava, which is the most important food crop in terms of the quantities grown and consumed, is planted throughout the rainy season. On the newly cleared plots, stem cuttings, about one foot long, are interplanted on the sides of the yam heaps. Planting is intensified towards the end of the rains during September to November, in land where maize and yam have been intercropped. The cuttings can survive the dry season and will mature in 12-18 months. Cassava is sometimes planted as a sole crop in less fertile land, distant from the compound.

Maize is planted on the sides of the yam heaps immediately after yam planting has been completed. It is harvested from June to August and is then replaced by a second maize crop or a cassava crop. Vegetables are also interplanted among the staple crops by the women.

Farms are usually weeded twice during the rains by the women. The men are responsible for twining the vines of the yams.

Harvesting

Yam harvesting starts in August. The large yams are harvested twice. During the first harvest the heap is carefully opened and the major part of the tuber is cut off from the yam head and

removed from the mound. The mound is then remade. Towards the end of the year the second harvest takes place and this smaller tuber is used as seed yam for the next planting season.

Cassava is harvested all the year round, about 12-18 months after planting. When the tubers are removed from the mound a few cuttings are placed in the mound and they will form the last crop before the land reverts to fallow bush.

Storage

Yams are tied to wooden poles with raffia cord. The poles are placed in lines and are supported by sticks so that they form a vertical wooden rack. The racks are enclosed by a fence and the entire structure is known as a barn. Traditionally the success of a farmer was measured by the number of poles in his yam barn Cocoyams are stored in a covered heap in the same barn.

Cassava rots very quickly when it is removed from the ground. Thus, it is stored in the ground and harvested as required for food or for sale in the market.

Tree Crops

The main tree crops which a farmer may have are oil palm, banana, coconut, citrus, cocoa, and rubber. Until the past decade, these were not systematically planted and cultivated. Most of the trees were probably self-seeded and the farmer harvested them if they happened to grow upon his land. Generally the fruit trees grew upon the land around the compound, and were harvested by the women and children for immediate consumption or for sale in small quantities.

The oil palm is the most important cash crop in Eastern Nigeria. Before the exploitation of petroleum oil, palm produce accounted for 80% of the exports of Eastern Nigeria. It is still the most important earner for the farmers.

Palms grow densely in the tropical rain forest on the costal plain. Sometimes there may be over 100 trees per acre. In the northern aavannah, the palms are confined to river valleys and the compound lands around the houses. In this open land, the palm density may be lower than 10 per acre.

Wild palms begin to produce fruit when 6-7 years old, come into maximum yield at 11 years and continue to bear for 50 years. The fruits are harvested throughout the year, with a period of high production in March and April. Fruits dropping to the ground and the red colour of the bunches warns the farmer that they are ready. He climbs the tree using a rope, looped around himself and the tree. He cuts off the old fronds supporting the bunches, with a sharp matchet, then cuts the fruit bunches and lets them fall to the ground. The bunches are carried home by the women who help the farmer to process the fruit into oil and kernels. Some of the richer farmers have hand presses which are replacing the pestle and mortar method of squeezing out the palm oil from the fruits.

The palm tree also provides the farmer with an alcholic drink and roofing materials for his house. The palm fronds are cut and made into mats which are tied to a roofing frame over his house. Palm wine, the drink, is produced by cutting a small hole into the

trunk of the tree and tapping the sap into a calabash hung on the tree. Farmers collect their wine every morning and evening.

Cocoa and rubber are newer crops to the Eastern Nigerian farmer, and are not as widespread as the palm tree. Cocoa is concentrated in the Ikom and Bende areas. Rubber is found in Calabar province, where it is being grown on three large plantations.

Livestock

Eastern Nigeria lies in the area inhabited by the tsetse fly, which carries trypanosomiasis (sleeping sickness) so, only animals resistant to or tolerant of the disease can be kept by farmers. The most important are chickens, goats and sheep. Generally the animals are reared free range, but occasionally, sheep and goats may be tethered within the compounds. Most animals are kept for sale in the market and some may be eaten in the farmers' houses on festive occasions.

Tools

The tools used by the ordinary Eastern Nigerian farmer are very simple. The matchet is a single blade about 18" in length and is used for clearing bush, pruning trees and weeding. The curved-handled hoe is used for making heaps and weeding. Some farmers in the northern areas have flat wooden blades, two feet long, pointed at one end and ten inches wide at the other, which they use to plant yams in the heaps. In the south, farmers use

a hoe blade, attached to a long straight handle to dig the holes in which they plant their yams. Farmers will also have a climbing rope if they harvest their own palm fruits. Cocoa and rubber farmers will have other smaller knives needed for their specific crops. Farmers usually transport their produce in baskets on their wives heads or on bicycles.

Division of Labor

Traditionally the men look after the yam crop and the oil palm harvesting, and the women grow all other crops and process the products. However as more crops become commercially important, the men are taking interest in cultivating such crops, particularly maize and cassava.

METHODOLOGY

Chapter II of the report of the first phase of the Diffusion Project contains an extended discussion of the survey methods that were utilized to collect data. Here we will describe those aspects of the methods which are necessary for the data to be clearly understood, and which differ from the Phase I methods. Thus, details of interviewer selection, training and supervision will not be described here because they differed very little from Phase I.

Sampling

Selection of Eastern Region of Nigeria

Nigeria was selected as a site for location of the Diffusion Project in Africa because the local USAID Mission was interested in obtaining the kinds of the data that the project would provide. They planned to use it to improve their technical assistance programs for the Nigeria government. Originally it had been hoped to carry out the project in all three Regions of the Federation. Unfortunately it was not possible to obtain support from a local institution in the Northern Region, and, though institutional support was forthcoming in the Western Region, a break-down in law and order at the end of 1965 made the conduct of research in rural areas dangerous. Thus, the project was confined to the Eastern Region where support was readily provided by the Economic Development Institute of the University of Nigeria. The Institute is situated in Enugu and the project headquarters were located there.

Selection of Counties

Ideally, in Phase I, we would have liked to select villages randomly from a listing of the Region's villages. Due to the inadequacy of the census figures and the fact that no complete listing of the villages existed, it was not possible to select villages directly. The smallest geographically defined unit is the county and this was used as the basic unit for a random sample.

Because of the language problems, it had been decided to study only the Ibos and Ibibios, who consituted 80 percent of the Region's population. Among the Ibo, there are four main cultural groups. We wanted to have each group represented in the sample. Counties in which the Ibos and Ibibios live were listed and grouped according to cultural area. The populations of each cultural group were determined, using estimates based upon the 1952 regional census. A random probability sample of counties was selected, each cultural group contributing to the final sample according to the relative size of its population.

Selection of Villages

In each county the extension supervisor and his staff were approached and asked to designate the village in which they had most success with their programs (that is, the <u>success</u> village) and also the village where they had had the least success (that is, the <u>failure</u> village). All the Phase II villages were selected from the success villages of Phase I because one of the major objectives of Phase II was to study the correlates of individual innovativeness, and the success villages were the only villages that contained a reasonable number of innovators that could be studied.

Each of the 34 success villages was scored on two criteria:

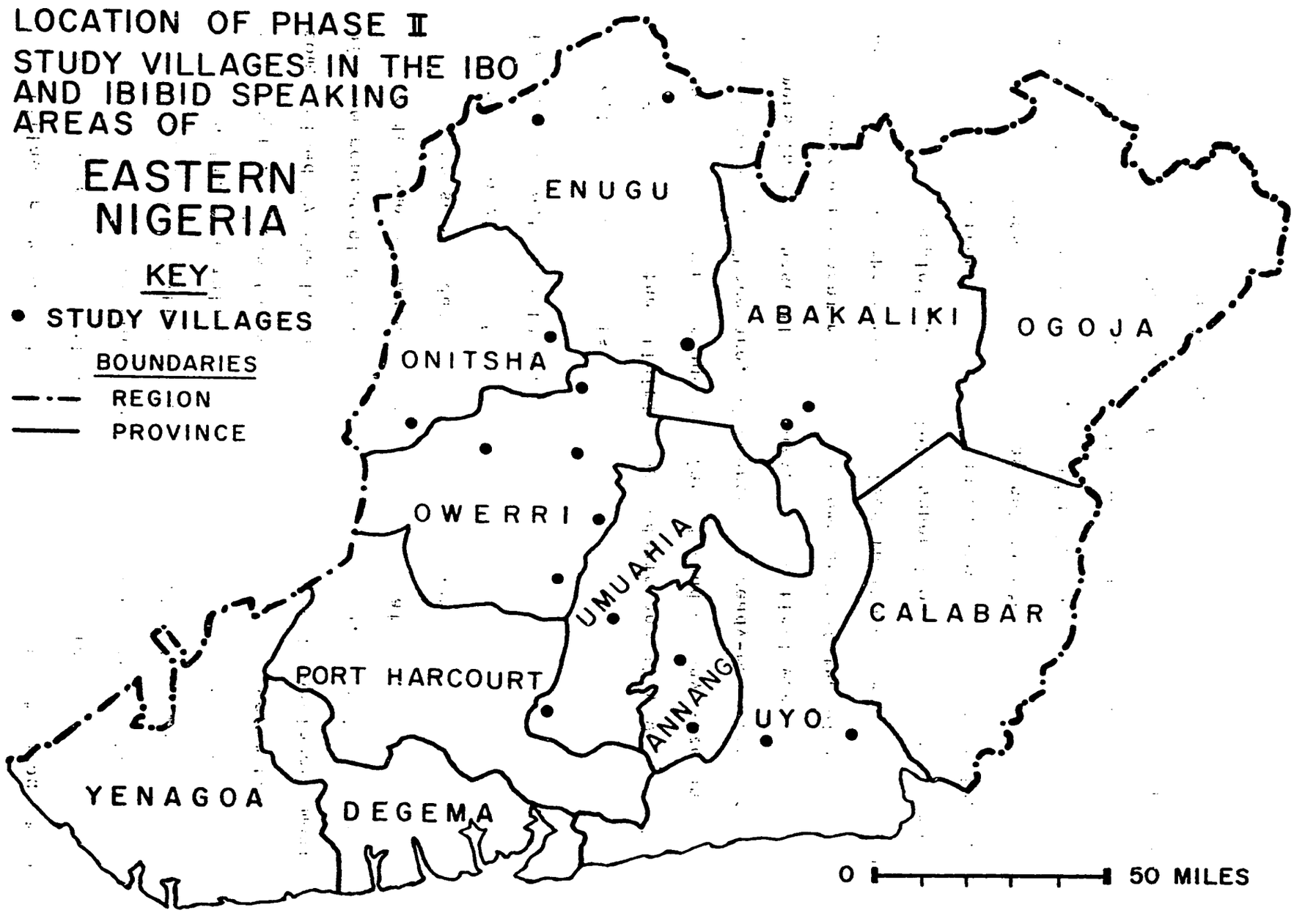
1. access to outside world.
2. institutional development.

External access was defined as the degree to which the village had contact with the outside world in terms of potential access to communication. Access variables, taken from the Phase I village schedules, were the presence or absence in the village of:

1. Newspaper vendors
2. Newspaper agents
3. Postal agencies or offices
4. Permanent strangers
5. Lorries once a week
6. Taxies once a week
7. Advertising vans once a week
8. Students at the University
9. Distance to tarred roads
10. Distance to railways
11. Distance to first and second class townships
12. Distance to County Headquarters

Institutional development was defined as the degree to which developmental institutions and practices vital to the process of modernization and change are present in the village . Institutional development variables, from the Phase I village schedule, were the presence or absence in the village of:

1. Primary schools
2. Secondary schools/TTC
3. Adult education schools
4. Churches
5. Daily markets
6. Weekly markets
7. Patent medicine shops
8. Beer shops
9. Food and goods shops
10. Tailors' shops
11. Carpenters
12. Blacksmiths
13. Photographers
14. Bicycle repair shops
15. Other repair shops
16. Sign-boards
17. Maternities/dispensry/health center
18. Police post
19. Cooperative Society Building
20. Two storey building
21. Lorry park
22. Water wells/pipe born water
23. Motorable roads.
24. Organizations for village improvement


LOCATION OF PHASE II
STUDY VILLAGES IN THE IBO AND IBIBID SPEAKING AREAS OF
EASTERN NIGERIA
KEY
STUDY VILLAGES
BOUNDARIES
REGION
PROVINCE
ENUGU
ABAKALIKI
OGOJA
ONITSHA
OWERRI
UMUAHIA
CALABAR
PORT HARCOURT
ANNANG
UYO
YENAGOA
DEGEMA
0
50 MILES

Village ranks on both criteria were tabulated to produce an external access/institutional development continuum.

The actual selection of pretest and main study villages was based upon variation in access and institutional development, ensuring that the full range of each variable was represented in the sample. These formal selection criteria, however were compromised by the language capacities of the interviewer, most of whom represented a particular dialect area. Difficulty or access to some villages during inclement weather of the rainy season (the season during which Phase II was completed) also excluded two villages from the sample. Nine villages were selected for the pretest, and 18 for the main Phase II study purposively.

Selection of Respondents

Farmers were the eligible respondents and they were defined as men over 20 years of age who farmed land of any size under any tenure system. There are, of course, no ready-made lists of farmers in the Phase II villages, so the first weeks of the field work were spent mapping the compounds of the villages and listing all the farmers who lived in those compounds. When the list was completed, the field supervisors selected a sample of 65 farmers from the list, using random sampling techniques. Ten more farmers were selected as substitutes, to replace any of the original 65 farmers who, could not, for one reason or another, be interviewed. In villages of less than 65, eligible respondents a census (i.e., all eligible respondents) of the village was interviewed.

Figure II-2 SUMMARY OF THE PHASE II SAMPLING PRODEDURES

Sampling Unit	Method of Sampling
Country and Region	Purposive Selection
County	Random: probability-proportionate-to size
Villages for Phase I	Purposive Selection by Extension Agent
Villages for Phase II	Purposive Selection from Phase I Success Villages
Respondents	Simple Random Sample

INTERVIEW SCHEDULE CONSTRUCTION

Modernization concepts were selected from the following sources: previous diffusion studies gathered in the Diffusion Documents Center at Michigan State University, expertise from government sources, pilot studies conducted in Western Nigeria by two members of the headquarters staff* and our own intuition and experience gained during Phase I.

This draft schedule was given to two Nigerian graduate social scientists who spent several weeks in one village discussing the questions with farmers and trying to tease out new variables that might help to explain farmers' innovativeness. A draft of the interview schedule was prepared as a result of this intensive field work.

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* The studies were:

1. Ilewo Farmers Survey, a study investigating the innovativeness of 364 farmers living in a village near Abeokuta, Western Nigeria (Graham Kerr, 19[illegible]
2. Ekiti Cocoa Survey, a study investigating the adoption of a new cocoa variety and related practices by 150 farmers living in 5 villages in Ekiti division, Western Nigeria (Niels Roling, 1965).

A five-week pretest of the interview schedule was conducted in the nine Phase II pretest villages. Techniques for mapping the village compounds and enumerating the population of farmers were developed. Items were selected for the final interview schedule on the basis of their discriminatory power, their ease of comprehension and the ease with which they could be administered by the interviewers.

The interview schedule consisted of several types of questions:

1. Structured response items (multiple choice questions)
2. Unstructured items (open-ended questions)
3. Interviewer ratings.

INTERVIEWERS SELECTION AND TRAINING*

Nine senior interviewers from Phase I were employed. These nine had at least a teacher-training certificate, were twenty five years old or more, had rural experience and were culturally and linguistically suitable for the Phase II study areas. In addition to the nine senior interviewers, nine junior interviewers were selected from lists of candidates that had been submitted by the senior interviewers. The junior interviewers had somewhat less education and were younger. Each interviewing team consisted of an experienced Phase I interviewer with a new junior interviewer.

Techniques of rapport building, field behavior and familiarity with the Ministry of Agriculture extension programs were some facets of the interviewers' training. One week was spent on training in the methods of respondent-selection and rapport

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* More detail in Phase I report.

building. One week was spent on the problems of translation and administration of the schedule. Three weeks were spent in the field where interviewers received weekly supervision. A final week was spent on taking care of certain translation and interview administration problems.

DATA COLLECTION

Interviewers were given a travel allowance and were responsible for their own transport. They travelled between villages on local transport and within villages on their own bicycles. Each interviewing team spent six weeks in each of two villages, and during that time completed the selection and interviewing of about 65 respondents. The first weeks in each village were spent mapping the compounds and listing the eligible respondents. The last four weeks were spent interviewing the selected respondents. Administration of each interview schedule averaged one and one half hours. Interviewers usually completed two or three per day.

Phase II interviewing began in September 1966, and was completed by December 1966.

All interviewing teams were supervised by the headquarters staff regularly once a week, in the same way that is described in detail in Chapter II of the Phase I report.

CHARACTERISTICS OF THE SAMPLE*

The present chapter describes the 1,142 farmers interviewed in the 18 different villages during Phase II of the Eastern Nigerian study.

The reader is cautioned against making generalizations from the descriptive material presented in this chapter to the Ibo/Ibibio farmers in general. When making any generalizations, the reader should remember that (a) the sample only includes male farmers, and that (b) the villages, within which farmers were randomly sampled, are, themselves, not a random sample, but 18 of the "success" villages in Phase I. In the Phase I report, clear evidence is provided to show that the Phase I "success" villages are different from the "failure" villages in many respects, especially in their contact with the agricultural extension agency.

Personal Characteristics

All the people in the study were males. Nearly four-fifths (78%) said that farming was their primary occupation--the job at which they spent most time and/or earned most money. An additional four percent gave wine tapping or palm-fruit cutting as their primary occupation, making the total of those employed primarily in agriculture 82 percent. Nearly all those not primarily employed in agriculture gave farming as their second occupation. It seems, then, that we were successful in

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* See Appendices for amore detailed breakdown of the data presented in this chapter.

selecting a sample of farmers. One tenth of the sample mentioned petty trading or produce-buying and selling as their second occupation. Slightly over half (52%) of the sample was between 30 and 49 years of age,* the average age was 43.4 years. Over half (58%) of the people interviewed did not have any formal education, while another one-third (33%) had not completed primary school. That leaves only about ten percent with a completed primary or any high school education.

All respondents professed to adhere to some religion. Nearly one-fourth (23%) belonged to some major protestant denomination, slightly over one-fourth (28%) was Catholic, while nearly two-fifths (38%) of the remainder professed to belong to an indigenous religion.

Fully nine-tenths (92%) of the farmers interviewed were born in the village in which they now lived. Two-thirds (66%) said they were not literate in the native language, while more than three-fourths (78%) professed an inability to read English,

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* Many farmers did not know their age, simply because their parents had not recorded their birth or were not familiar with the Christian year system. To get around this problem, the interviewer collected the ages of 10 well-known individuals in the village, each representing a different age range. Due to the age-grade system, most farmers did not find it difficult to say which of the ten was closest to them in age.

the lingua franca of the area. The 22 percent that claimed to be literate performed rather well on an English-language literacy test containing 35 words. They were able to read an average of 32 of the 35 words.

To get some knowledge of the farmers' level of living in a culture where personal income and wealth are treated with some secrecy and where questions on that subject are feared for their possible bearing on tax assessment, we asked the farmers whether they owned a radio, a watch, arm chair, laced shoes, a cupboard, an iron bed, a clock, a bicycle, framed photographs or a 1966 calendar. A level of living score was based on the sum of possessions from among those mentioned. Fully one-fourth (28%) did not own any of the mentioned goods, while another one-fourth (21%) owned only one, and another fourth (23%) two or three. The average number owned was 2.6 out of ten possible possessions.

Another measure of the level of living of the farmer was thought to be the type of house he lived in. Over four-fifths (83%) lived in a traditional mud walled house with a thatched roof. Seven percent had either a house with a zinc roof and mud walls, or a house with concrete walls and a thatched roof. Ten percent owned a house with concrete walls and a zinc roof.

The average respondent belonged to 2.7 groups in the village, and held one position in them. Although only nine percent did not belong to any group at all, more than half (54%) did not hold any group position, which indicates that many of the respondents held more than one position.

Family Characteristics

Eighty five percent of the farmers in the sample were married, while more than one-fourth (28%) had more than one wife. Two-fifths of the respondents had lost wives either through death or divorce.

Only less than one-fifth of the farmers in our sample had no dependent children, while slightly more than half (52%) had between two and five dependent children. The average for all farmers was 3.4 dependent children. More than two-thirds (68%) had no non-dependent children. The average total number of children of farmers in our sample was, therefore, 4.3.

Slightly more than one-fourth (27%) had no children of school-going age or older but only slightly more than one-third (34%) did not send or had not sent children to school. It seems, then, that only seven percent of those farmers with children of school-going age did not send their children to school. It should be remembered, in this respect, that nearly 60% of the farmers had not received any formal education themselves.

Farm Characteristics

Food Crops

More than nine-tenths (94%) of the farmers have harvested yam, the traditional and most popular staple-crop. Most farmers have also harvested cassava (90%), maize (81%) and coco-yam (71%). These crops represent the more generally grown staples. Only slightly more than one-tenth (12%) had harvested rice last season.

In a society that is still, to a large extent, characterized by a subsistance economy, it is, of course, of some interest to see to what extent farmers participate in the money-exchange economy by selling their crops. Since the farmers in our sample kept no records of their farming activities, we approached the problem by asking the respondents whether they sold any of the harvest at all, and, if so, whether they kept more than half or sold more than half.

Nearly three-fifths (59%) did not sell any yams, and only four percent sold more than half. Fifty-five percent did not sell any cassava, and only fifteen percent sold more than half. Much the same thing can be said for maize, (55% and 18% respectively). Seventy percent did not sell cocoa yam , and only nine percent sold more than half of the cocoa yam harvest. Of the twelve percent of the farmers who grew rice, eight percent sell more than half. Rice is generally grown as a cash crop, while the farmers themselves prefer the tuber or root crops as staples. A food crop commercialization index, combining the data on selling or keeping of the four main food crops, shows that more than one-third (35%) never sells or grows food crops, while another thirteen percent only sells less than one half of one of the crops. Nearly half (48%) of the farmers can, therefore, be said not to have commercialized their food-crop production at all.

Tree Crops

The oil palm is the most important cash earner for Ibo and Ibibio farmers. Nearly half of them harvest palm kernels (47%) and palm oil (48%). Nearly one-third (32%) also harvest palm wine. In comparison with the oil palm, other tree crops like cocoa and rubber are of little importance, with only four and one percent respectively harvesting them at all.

More than two-fifths (42%) of the farmers sell palm kernel and nearly all of them (39%) sell more than half of their harvest. The same can be said for palm oil (41% and 37% respectively). More than one-fourth (28%) sells palm wine, and over one-fifth (22%) sells more than half of the wine tapped. A commercialization index for palm products shows that more than half (56%) the farmers have not commercialized palm production at all. In interpreting these figures, one should remember that the different ecological conditions prevailing in the area do not allow all farmers to grow oil palms. One can assume that, in places where farmers have an opportunity to grow many palms, they will do so and sell most of their produce.

Fruits and Vegetables

Bananas and plantains are harvested by more than one-third (36% and 35% respectively) of the farmers. Much smaller numbers harvest pineapple, citrus, and native fruits (16%, 19% and 17% respectively). Roughly half of the farmers harvesting each also sell more than half of the harvest, which would indicate that fruits are often grown for the market.

Vegetables are grown mainly for home consumption. Notable are okra, harvested by nearly three-fifths (58%) of the farmers, peppers harvested by more than two-fifths (46%) and mellons, harvested by over one-third (34%) of the respondents. Around one-tenth of the farmers sells more than half of each of these crops.

Farm Size

Due to the fragmentation of farmland and the non-existence of records kept by farmers, it is virtually impossible, short of measuring fields, to obtain data on farm size. We approached the problem by asking for the number of laborers the farmer employed on an average day in the growing season and by asking him the number of yam poles he had in his yam barn.

More than two-fifths (41%) did not employ labourers at all, while another one-third (33%) employed between two and four labourers. The average was 2.7 labourers, with one man employing 40.

Nearly half (47%) had less than ten yam poles and nearly one-fifth (18%) had between ten and twenty. The average number was 21 yam poles, with about three percent having more than 100.

Capital

We were, naturally, interested in what farmers perceived to be the main factors keeping them from further expansion of their farming activities. We asked them, therefore, why they had not planted more crops. About two-thirds (65%) gave as their first answer that they did not have enough money. Only seven percent

mentioned land, while one-tenth gave old age, poor health, etc., as their reason.

The respondents were then asked how they would use money to plant more crops. More than two-fifths (42%) gave as their first answer that they would buy more crops, another fifth (22%) would buy more land, while about one-third (31%) would hire labourers. Only very few people spoke of fertilizer, insecticides and the like (4%).

Asked how they would raise money to improve their farm, more than one-fourth (28%) gave as their first answer that they would borrow it from people in the village, friends or relatives. Others would sell more farm products (22%), work harder (15%), or take another job (14%). Only a few mentioned borrowing from a co-operative (3%), from the government (6%) or from a voluntary credit association (Esusu) (2%). These answers probably reflect the availability of capital sources for farmers.

Attitudes

The Ibo are often said to be "clannish". This manifestation may partly be explained by the extended family system, which requires members to help each other in time of need. To test this proposition, we asked our respondents on what they would spend their money if they had the choice: on a house with a tin roof

or on school fees for a brilliant but poor relative. Nearly all (95%) of the respondents chose the relative.

This loyalty to the in-group is also extended to the village or the village-group. Members are expected to contribute money towards the welfare of the village or village group. We therefore asked our respondents on what they would spend their money, if they had the choice: on contributing towards winning a land-dispute with another village or on starting a trade. More than two-thirds (68%) of the sample said they would help in the land dispute.

However, when asked: "If you had all the money you needed, what would you do with it?", more than two-fifths (42%) gave as their first answer that they would spend it on their immediate (nuclear) family, primarily the care and education of their children. More than one-third (35%) said they would spend it for themselves: buy bicycles, cars, wives, titles and the like.

Only about one-tenth (12%) would invest in their farm, while negligible numbers mentioned helping the extended family (3%), or the larger community (6%). The inconsistency between the altruism mentioned before and the answers to the last question is only apparent. The first two questions clearly establish a situation in which altruism is indicated. Farmers respond according to the norms of their society. They are no saints, however, and would rather spend the money on themselves or their children unless a situation arises that asks them to do otherwise.

To test whether farmers tended to set high levels of high aspirations for themselves, we asked them about the level of education they would have set out to achieve if they were young again. More than half (51%) mentioned university education, one third (33%) secondary education and only slightly more than one-tenth (13%) primary education.

That the respondents have no clear idea of the relationship between formal education and occupational requirements is demonstrated when they were asked about the occupation they would have wanted to have if they were young again. Only slightly more than one-fourth (27%) mentioned a job that required a university degree, especially doctor (13%) and lawyer (6%). More than one-tenth mentioned teacher (17%), and clerk (12%), less than one-tenth (8%) wanted to become traders, while relatively few mentioned farmer (14%) or extension agent (8%). There were the inevitable six people who wanted to be Minister of State or Prime-Minister.

Questions on attitudes towards work confirmed the popular impressions about Ibo and Ibibio people. More than eight-tenths agreed that work should come first (82%), that one should judge a man by his success in his occupation (81%) and that the most important qualities of a real man are his determination and ambition (88%).

Development can only come about when people have an accurate knowledge of the means by which development can be achieved. Asked how newspapers could help farmers to prosper, only slightly more than one-fifth (21%) were able to mention specific and

realistic improvements. Asked a similar question about electricity, about two-fifths (43%) mentioned advantages like "light in every room" or unrealistic improvements like "I won't have to spend money on kerosene any more". Only about one-fifth (22%) could mention specific and realistic ways in which cinema could "civilize" the village.

The degree to which farmers are "progressive" has been measured in some studies by asking the respondents which criteria they would use in selecting the best farmer in the village. About one-third (31%) of the respondents gave as their first answer the size of the harvest, slightly more than one-tenth mentioned size of farm (12%), hard worker or much experience (11%), or did not know what to say (12%). Less than one-tenth mentioned size of income (7%), use of innovations (4%), commercialization (3%), size of labor force (7%), or crop diversification (7%).

Communication Characteristics

Development can only come about through the spread of (1) new criteria for what would constitute a good life, (2) new ideas on how these criteria could be met, and (3) knowledge of how to realize the new ideas. Criteria, ideas and knowledge spread through communication: communication between city-dweller and village, communication between professional change agents and villagers and communication between and among villagers. The degree to which channels for such communication exist, and the degree to which such channels are used should bear directly on the degree of development achieved.

Communication between City-dweller and Villager

The farmers were asked whether they had ever lived outside their village for more than one year, and, if so, where. Nearly half (49%) of the sample had never lived outside their village, but nearly one-fifth (17%) had lived in a town within the Region, while nearly one in every four (24%) had lived in a place outside the Region.

The respondents were also asked which places they had traveled to in 1966. Only about one-third (30%) had not traveled outside their village in the past year. About one-tenth (11%) had traveled to a town within the Region, nearly a fifth (18%) had traveled to a city in the Region, while nearly two-fifths (41%) had traveled to a place outside the Region.

Nearly three-fifths (59%) had not listened to the radio any day in the past two weeks. But more than one in every four (27%) had listened to radio from one to seven days, while more than one-seventh (15%) had listened from eight to fourteen days, most of whom (10%) had listened every day during the past two weeks.

Four-fifths (80%) had not read a newspaper (or had one read to them) in the past month. Of those exposed to a newspaper, nine percent had one read to them while 12 percent read one themselves. More than one-seventh (14%) had read between one and four papers in the past month, while nearly one-tenth (7%) had read five or more, including nine people who read a paper every day and one who read two a day.

About two-thirds (65%) had not seen a film in the past year, and only about one-tenth (11%) of the respondents had seen two or more films.

The respondents were also asked about the channels of communication through which they heard about things happening in the nearest township. About one-third (31%) gave, as their first answer, sons abroad,* and one-tenth (10%) mentioned people in the village who read papers or listened to the radio. Slightly less than a third (29%) mentioned radio or newspapers and about one-tenth mentioned strangers traveling by (such as taxi-drivers) (11%).

To a similar question about things happening in Enugu, the Regional capital, more than two in five (44%) gave radio as their first answer, nearly one-fifth (18%) mentioned people in the village who read papers or listened to the radio, while 15% mentioned sons abroad.

Communication with the Change Agents

Only one out of every three farmers said he knew the name(s) of agricultural agents working in the village (31%), but more than one-third (37%) had seen an agricultural demonstration in the past year, or heard agricultural programs on the radio (38%). Only 14 percent had, however, read the agricultural Newsletter, while about one out of every five said he had seen an agricultural film (23%), heard a lecture on an agricultural topic (20%), or talked with an extension agent during the past year (22%). Giving

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* Sons abroad are villagers who live outside the village, often working in a city. Sons abroad often keep in frequent contact with the village and lead and finance its development.

one point for exposure to each of these agricultural media and adding the total for each farmer, about two out of five (38%) farmers in the sample can be said not to have been exposed to any of the agricultural media in the past year while about one-fifth was exposed to one (22%).

Although 38 percent had listened to agricultural programs on the radio, only 17 percent claimed to have made improvements on their farms on the basis of having been exposed to such radio programs. An overview of the percent of people exposed to, and claiming to have made improvements on their farm on the basis of such exposure is given in Chapter IV of the present report.

Communication between Villagers

The city and the extension agent are, of course, very important sources for new ideas. However, the new ideas must spread within the village and its people must be organized to make them a reality. It has been found in nearly all studies on this topic, that communication within the village is as important for change as are messages from the outside world. Thus, some villagers may be exposed more often than others to more of the sources of new ideas outside the village. They may perform the function of spreading the new ideas, received during that exposure, to other people in the village. Some people may be especially trusted because of their experience, knowledge or wisdom. They often perform the function of advising people on the new ideas or

blessing them with their approval. Some people may help other villagers implement the new ideas. Of course, the same people may perform all three functions, which seems to be the case in Eastern Nigeria, as the reader will learn in Chapter IV of the present report. Here we will present a description of the extent to which people talk about new ideas they obtained from being exposed to agricultural media.

About one out of every three farmers said they told somebody about what they heard on the radio (30%) or saw at a demonstration (29%). About one out of five told somebody about what they saw on a film (19%), heard at a lecture (18%) or learned from an Extension Agent (17%). About one-tenth told others about what they read in the newspaper.

To explore the special function some people have in the communication network within the village, we asked the respondents to give the name of the best farmer in the village, the people who would help the agent initiate a program, the people who would legitimize the agent's program and the people who would help the agent implement his programs.

Four out of five (80%) of the respondents were not mentioned once as best farmer, while four percent of them were mentioned by most of the respondents. Thus, there exists a small group of people who everybody recognizes as very good farmers; people who, no doubt, are looked upon for advice in matters of farming. Similar information regarding initiators, legitimizers and implementers is presented in detail in Chapter IV.

The people who are perceived to be in different opinion leadership roles seem indeed to be high communicators. When asked how many days in the past month they had talked with the person they mentioned first as either initiator, legitimizer or implementer, only about one-fourth of the farmers claimed not to have spoken to the man they named as initiator (24%), legitimizer, (23%) or implementer (23%).

Communication with Cities, Agents and Other Villagers

To compare different sources of communication on their perceived trustworthiness, farmers were asked: "If you heard about a new crop that was said to improve your income, would you be more likely to try it if you learn it from ..... or from .....? Thus they were asked to compare each of radio, sons abroad, neighbors, and the extension agent, with each other. Table II/I presents the evidence in parsimonious form.

Table II/I. PAIRED COMPARISONS OF COMMUNICATION SOURCES IN TERMS OF TRUSTWORTHINESS

Preferred Source		Non Preferred Source	Percent Preferring Source*
Neighbors	over	Radio	50%
Radio	over	Neighbor	48%
Extension Agent	over	Sons Abroad	80%
Sons Abroad	over	Extension Agent	17%
Sons Abroad	over	Neighbors	61%
Neighbors	over	Sons Abroad	35%
Extension Agent	over	Radio	86%
Radio	over	Extension Agent	11%
Sons Abroad	over	Radio	58%
Radio	over	Sons Abroad	38%
Extension Agent	over	Neighbors	82%
Neighbors	over	Extension Agent	16%

* The totals do not add up to 100% because some respondents were unable to state a preference.

The majority of respondents clearly prefers the extension agent over all three other sources, with sons abroad second, neighbors third, and radio last.

Another comparison between sources of communication received by the farmer can be made by examining the sources from which he received his first awareness about four of the fourteen agricultural innovations studied in Phase II. These four, selected because more than half of the farmers were aware of them, were oil palm rehabilitation, chickens and fertilizer, and NS-1 Maize. Table II/2 shows the personal source from whom the respondents became first aware of the four different innovations.

Table II/2. PERSONAL SOURCES FOR FIRST AWARENESS ABOUT FOUR SELECTED INNOVATIONS

Personal Source	Oil Palm Rehabilitation	Chickens	Fertilizer	NS-1 Maize
Not aware, Don't know	17%	18%	21%	27%
Immediate Family	13%	13%	12%	15%
Relatives	21%	12%	14%	11%
Villagers	20%	20%	14%	13%
Strangers (including Extension Staff)	29%	37%	39%	34%
	100%	100%	100%	100%
Base N =	1,142	1,142	1,142	1,142

Table II/3 gives the position of the first source of awareness for the same four innovations.

Table II/3. POSITION OF SOURCES FOR FIRST AWARENESS ABOUT FOUR SELECTED INNOVATIONS

Position of Source	Oil Palm Rehabilitation	Chickens	Fertilizer	NS-I Maize
Not aware, Don't know	17%	18%	21%	28%
Farmer/Refugee	22%	25%	19%	23%
Innovator	26%	13%	12%	9%
Extension Worker	19%	19%	29%	23%
Teacher/Priest/Student	5%	12%	8%	7%
Miscellaneous	11%	13%	11%	10%
	100%	100%	100%	100%
Base N =	1,142	1,142	1,142	1,142

Table II/4 shows the media through which first awareness of the same four programs was achieved.

Table II/4. MEDIA OF FIRST AWARENESS ABOUT FOUR SELECTED INNOVATIONS

Medium	Oil Palm Rehabilitation	Chickens	Fertilizer	NS-I Maize
Not aware, Don't know	14%	14%	18%	25%
Mass Media	2%	2%	1%	2%
Demonstration/Lecture	6%	5%	12%	6%
Personal Conversation	62%	53%	58%	52%
Saw on market/Neighbors' farms, etc.	16%	26%	11%	15%
	100%	100%	100%	100%
Base N =	1,142	1,142	1,142	1,142

Although in western countries the mass media are often found to be a first source of awareness, not only of news, but also of agricultural programs, the absence of a similar role in Eastern Nigeria is striking. The role of personal conversation, on the other hand, is very great, indicating the importance of word-of-mouth communication in a society which is not yet media-saturated.

Knowledge Characteristics

One of the consequences of the communication processes described in the section above is an increase in knowledge of various kinds. In Phase II, we were particularly interested in knowledge about health and agricultural innovations.

Health Knowledge

Slightly less than half (48%) of the respondents in the sample knew what caused worms to be in the stomach of children, i.e. bad food, bad water or dirt. However, more than nine out of ten (92%) did not know that mosquitos carry malaria. Malaria is the main cause of the high infant mortality (estimated at 40% of the children less than one year of age), which characterizes the area. About two-thirds (65%) knew that people boil their drinking water because it kills germs.

Agricultural Knowledge

The respondents were first asked whether they knew anything about any of the innovations studied in Phase II. If they gave any indication that they had heard of the innovation before,

they were credited with being aware of the existance of that innovation. If they gave information about relevant details pertinent to an innovation, they got credit for correct information. In Table II/5 the different innovations and the percentage of the sample aware of and having correct information about each of the innovations studied are shown.

Table II/5. PERCENT OF SAMPLE AWARE OF AND HAVING CORRECT INFORMATION ABOUT EACH OF 14 INNOVATIONS

Innovation	Aware	Correct Information	Percent of those aware who had correct information
Oil Palm Rehabilitation	86%	74%	86 (N=979)
Cocoa	43%	31%	72 (N=496)
Rubber	43%	32%	74 (N=485)
Rice	32%	23%	72 (N=362)
Cassava	38%	33%	87 (N=438)
Vegetable Seeds	17%	15%	88 (N=198)
Citrus	42%	38%	90 (N=481)
Cashews	14%	10%	71 (N=163)
Chickens	86%	83%	97 (N=980)
Community Plantation	34%	31%	91 (N=383)
FAID Credit	16%	10%	63 (N=180)
Fertilizer	82%	79%	96 (N=936
Aldrin Dust	38%	36%	95 (N=433)
NS-1 Maize	75%	72%	96 (N=852)
Base N=	1,142	1,142	

Giving a score of "1" for each innovation a farmer was aware of, we find that only two percent of the sample were not aware of any of the innovations while two-fifths (40%) were aware of between six and ten innovations and 12 percent of 11 or more innovations.

A similar correct information score was constructed. Three percent had no correct information about any of the innovations whereas nearly half (48%) had correct information about one to five innovations and slightly less than half (49%) had correct information about six or more innovations. The average number of innovations known correctly was 5.7.

Except for fertilizer, oil palm, chickens and cocoa, all of which the erstwhile Colonial Government promoted, the innovations were first heard about only by small fractions of the sample prior to 1960, the year of independence. This is understandable because it is only after independence that serious development plans were made by the Region and that improvements of agriculture were vigorously undertaken.

When asked specifically about disadvantages of fertilizer, Aldrin Dust or NS-1 Maize, large proportions of the sample could not give any. (Resp. 81%, 90% and 84%) On the other hand, two thirds (66%) knew that fertilizer can increase crop yield, while about one third knew that Aldrin dust kills yam beetles (27%) and that NS-1 Maize yields more than local varieties (38%). More than half (54%) knew that fertilizer is a plant food and not a medicine (21%), but only about one-fifth knew how Aldrin Dust should be applied (19%) or that NS-1 Maize seeds were supplied free by the government or that the government buys back the harvest (17%).

Adoption

In the end, the change agent is interested in adoption: the final acceptance and use of that innovation which contributes the development of the total system. We were, again, only interested in the adoption of health and agricultural innovations.

Health Innovations

More than half (52%) of the respondents had sent a wife to a maternity home for child birth, while only about a third (35%) did not do so. The rest were unmarried or had wives that had not given birth yet.

More than nine out of ten respondents (92%) had been vaccinated against small pox, while more than two-thirds had built a latrine (65%) or received treatment in a hospital or dispensary (76%). The mean number of health innovations per farmer was 2.5.

Agricultural Innovation

Table II/6 gives the percent of respondents that had ever used each of the innovations and the percent that was using it in 1966, the year of data collection.

The table clearly shows the very small numbers of farmers adopting any of the innovations. The most frequently mentioned innovations are oil palm rehabilitation, chickens, community plantation, fertilizer, Aldrin dust and NS-1 maize, which had all been adopted by more than 10 percent of the sample. The last three are all innovations that can be adopted or tried on a very small scale, involving no risk. Fertilizer and NS-1 maize were both vigorously urged by the Government throughout the Region, as were chickens, community plantations and oil palm rehabilitations.

The rehabilitation of oil palm plots was heavily subsidized, to the extent that farmers obtained cash payments for rehabilitating five acres of land, while the community plantations were, for the most part, communal efforts to plant oil palm, with the same subsidy benefits.

Giving a farmer a "1" for each innovation used in 1966 and adding the scores for each farmer, we developed a total adoption index. More than half (51%) of the farmers, did not use any of the innovations in 1966, while 18% used three or more. The mean number of innovations adopted across the sample was 1.9.

Table II/6. PERCENT OF FARMERS EVER USING OR CURRENTLY USING EACH OF 14 AGRICULTURAL INNOVATIONS

Innovation	Percent Ever Used	Percent Currently Using	Percent of ever* users still using innovations in 1966
Oil Palm Rehabilitation	15%	13%	87% (N=146)
Cocoa	5%	3%	60% (N=30)
Rubber	3%	3%	100% (N=30)
Rice	8%	4%	50% (N=51)
Cassava	6%	5%	83% (N=54)
Vegetable Seeds	5%	4%	80% (N=43)
Citrus	8%	5%	63% (N=55)
Cashew	2%	2%	100% (N=20)
Chickens	18%	8%	44% (N=96)
Community Plantation	13%	13%	100% (N=143)
FAID Credit	2%	1%	50% (N=13)
Fertilizer	25%	21%	84% (N=242)
Aldrin Dust Insecticide	20%	17%	85% (N=190)
NS-1 Maize	30%	21%	7% (N=242)
Base N =	1,142	1,142	

* By subtracting this percentage from 100%, one obtains the percentage of ever-users that had discontinued the program in 1966.

Table II/6 also shows (right hand column) that the chicken innovation was most frequently discontinued, which was to be expected in view of the rising costs of feed and of the disease that plagued the program.

For fertilizer, Aldrin dust and NS-I maize, the three innovations we observed more intensely, because it was expecially with them that we hoped to show the effectiveness of our Phase III treatments, we also asked farmers their reasons for their use (if they had used the innovations), or the reasons for not using or discontinuing each of the three practices (if they had not used or had discontinued the innovations).

In the case of fertilizer, nearly one-fifth (18%) could not give a meaningful answer to the question, roughly another fifth (18%) mentioned the heavier yield one can obtain as a reason for use, while one fifth mentioned lack of money (21%) and lack of information (20%) as reasons for non-use or discontinuation.

Nearly two-thirds (62%) could not give a meaningful answer to the question in case of Aldrin dust, about one tenth (12%) mentioned that it kills yam beetles as a reason for use, while about six percent gave lack of money (6%) and lack of information (7%) as the reason for non-use or discontinuation.

About one fourth (26%) would not give a meaningful answer to the question in respect of NS-I maize. More than one-tenth (14%) mentioned improved yield as a reason for use. More than one out of ten (12%) mentioned unavailability of seed from the extension staff as a reason for non-use, while more than one fifth (21%) spoke of lack of information.

The most frequently mentioned single reasons for non-use or discontinuation of the three innovations seem to be lack of information, supplies or money.

CHAPTER III

INNOVATIVENESS, KNOWLEDGE, INFORMAL LEADERSHIP AND THEIR POTENTIAL CORRELATES

The present chapter treats of the conceptual and operational definitions of the main "dependent" and "independent" variables* used in the Nigeria Phase II study. Conceptual definitions tell us in a theoretical way what it is we are studying by defining the concept under consideration in terms of other concepts and locating that concept in the framework of some relevant theory. An operational definition "assigns meaning to a . . . variable specifying the activities or 'operations' necessary to measure the . . . variable." (Kerlinger, 1965, p. 34). That is, operational definitions spell out the manner in which variables** will be measured.

There are five main dependent variables which we shall seek to define conceptually and operationally in the present chapter. We shall define, in turn, (1) agricultural innovativeness, (2) knowledge of agricultural innovations, (3) health innovativeness, (4) knowledge of health innovations and (5) informal leadership.

In addition, definitions will be provided for the main independent variables as well as providing detailed descriptions of the manner in which we set about reducing the large number of independent variables at our disposal to manageable proportions.

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*The terms "dependent" and "independent" are useful shorthand categorizations of variables. The dependent variable is the variable which is being explained or predicted <u>to</u>, whereas the independent variable is the one being used to do the explaining, i.e., the one being predicted <u>from</u>.

**We are, in the present report, using the terms "concept" and "variable" interchangeably.

DEFINING THE DEPENDENT VARIABLES OF THE STUDY

Agricultural Innovativeness

Innovativeness is defined as "the degree to which an individual is relatively earlier to adopt new ideas [and practices] than other members of his social system" (Rogers, 1962, p. 19). The phrase "relatively earlier to adopt" identifies time of adoption of the new idea as being a crucial element in the definition. Thus, the earlier an individual adopts a new idea, the more innovative is that individual than other members of his social system. It is essential, therefore, that an operational definition of innovativeness take account not only of whether or not an individual has adopted a particular set of innovations, but also of precisely when that individual adopted each of the innovations in the set.

In actual practice in Nigeria, two basic operational definitions were developed. The first, labeled "agricultural innovativeness index" took account of the time of adoption of each of 14 agricultural innovations, regardless of whether or not each of the innovations claimed to have been adopted at one point in time were still in current full use at the time of interview (1966). The second, labeled "agricultural adoption* index" refers to whether or not an individual was actually using any of the 14 innovations at the time of interview, regardless of when he had adopted them or of whether there were others which he had previously adopted and had since discontinued their use.

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*Adoption is defined as a decision to continue full use of an innovation" (Rogers, 1962, p. 17). An individual found to be using a particular innovation at the time of interview was deemed to have made the decision to continue its full use.

Selection of Innovations for Index Construction

In Eastern Nigeria, 14 agricultural practices which were deemed to be relatively new to the farmers of Eastern Nigeria at the time of their introduction, were identified. These agricultural practices, for the most part, represented areas of intensive activity by extension workers and, consequently, came to be known as "agricultural extension programs"* during the course of the Nigeria survey. We shall, however, continue to refer to them as agricultural innovations in the present study.

The 14 innovations selected for study in Eastern Nigeria are:

1. Chemical fertilizers
2. Aldrin dust, an insecticide for control of yam beetles
3. NS-1 maize, an improved seed variety
4. Improved poultry breed
5. Improved oil palm seedlings and management
6. Community Plantations of oil-palm, rubber or cocoa (A scheme for collective adoption by a group of farmers)
7. Improved citrus seedlings
8. Improved variety of rice seed
9. Improved cassava (manioc) variety
10. Vegetable seeds
11. Improved cocoa seedlings and management
12. Agricultural credit and loans
13. Cashew seedlings and management
14. Improved Rubber seedlings and management

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*"Agricultural programs" was used in Nigeria to describe all agricultural projects, schemes, programs, and practices regardless of whether they truly were agricultural extension efforts. For example, community plantations were first set up by the Ministry of Rural Development which later co-operated on the project with the Ministry of Agriculture.

There are a number of shortcomings attached to the list of 14 innovations which were studied in Eastern Nigeria, not all of which could be foreseen. Firstly, a number of innovations, such as cocoa and rice, were, for ecological reasons, limited to a few of the villages included in the study. Secondly, not all the innovations, even those which were not ecologically bound, were encouraged with more or less equal intensity throughout each of the 18 villages studied in Phase II. Thirdly, one of the innovations, community plantations, could not be adopted on an individual basis inasmuch as its individual adoption presupposed its collective adoption by other members of the individuals' social system. Finally, instrumental innovations associated with some of the fourteen practices were not adaquately taken into account in selecting innovations for study. Thus, we know only whether or not NS-1 maize seed was adopted, but not whether such attendent innovations as row-cropping, spacing, weeding, were also adopted. It is clear, therefore, that a composite index which reflects the time of adoption of each of the 14 new practices may be hazardous to construct since all the members in our sample of respondents would not have had an equal opportunity to adopt each of the innovations. Indeed, the substantial disparities in levels of innovativeness, adoption, awareness and knowledge evident in Table III/1 may in part by due to these shortcomings.

Fertilizer, (79%), NS-1 maize (71%), oil-palm (74%), and poultry management (82%) appear to be the most universally known innovations across the sample whereas fertilizer (21%), NS-1 maize (21%), and Aldrin dust (17%) appear to be the innovations most frequently mentionad as being currently used. The rather low levels of adoption

Table III/I RELATIVE FREQUENCIES OF AWARENESS, KNOWLEDGE AND ADOPTION SCORES ON SELECTED AGRICULTURAL INNOVATIONS.

Innovation	Percent of Respondents Possessing Awareness Knowledge	Possessing Correct Information	Who Ever Used (Innovativeness)	Using In 1966 (Adoption)
Fertilizer	82%	79%	35%	21%
NS-I Maize	75	71	30	21
Aldrin Dust	38	37	21	17
Oil Palm	86	74	16	13
Community Plantations	34	31	13	13
Poultry	86	82	18	9
Rice	32	23	8	5
Citrus	42	38	7	5
Cassava	38	33	5	5
Vegatable seeds	17	15	5	4
Cocoa	43	31	4	3
Rubber	42	32	3	3
Cashew	14	10	2	2
Credit	16	10	3	1
Total*	645%	566%	170%	122%
Base N =	1,142	1,142	1,142	1,142

*Column figures may add up to more than 100% because some respondents may have been aware of, known about or adopted more than one practice.

(none of the 14 innovations, for instance, were in current use by more than one fifth of the total sample) also contributed to the difficulty of constructing reliable indices of innovativeness and adoption. Bearing these shortcomings in mind, therefore, the following two indices* were constructed.

The Agricultural Innovativeness Index represents a straight addition across all 14 innovations, taking year of adoption of each of the innovations into account. Thus, while each innovation is held to be equivalent in importance to each other innovation in the set, the innovativeness score that each individual attains is weighted by the year in which he adopted different innovatios, regardless of

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*During data-processing, additional indices of innovativeness and adoption based on the same 14 innovations were constructed. These indices range from being inclusive of all the innovations to being selective of only those innovations which seemed, on the basis of common sense and statistical evidence, to be most uniformly applicable to all the villages. A variant of the agricultural innovativeness index consisted of factor analyzing the time of adoption of the 14 innovations to determine that set among them which tended to "hang together", thereby indicating unidimensionality of measurement of agricultural innovativeness. By this means, four innovations, fertilizer, aldrin dust, NS-1 maize and poultry management were composed into an index labeled "agricultural innovativeness (variant)." Two variants of agricultural adoption were also constructed. The first, labelled "Agricultural Adoption (variant)" consisted of factor analysing the adoption vs. non-adoption (in 1966) of the 14 innovations. The three innovations elicited in this manner, fertilizer, aldrin dust and NS-1 maize were combined to form the index. The second, labeled "Agricultural Adoption (Total Score)" consisted of a straight addition of all the innovations (out of the 14) being used by each individual, each innovation being given an equal weight of one. The construction of several indices underlines the exploratory nature of the present study in that, in the absence of a priori information as to which index would be the most useful, we elected to test each of the five indices of innovativeness and adoption by correlating them with the independent variables and selecting those indices giving promise of high payoff for intensive study. The results of these correlations are displayed in Appendix A.

whether he is still using the innovation at the time of interview (1966). Accordingly, each innovation was scored for each individual by subtracting the year of its adoption from 1967 (1967 being the year assigned to all non-adopters so that when it was subtracted from 1967, a score of zero would be rendered). So, if an individual adopted a particular innovation in 1959, his innovativeness score for that particular innovation, taking time of adoption into account, would be eight. Summing across these individual innovation scores, therefore, resulted in a composite index across all 14 innovations being formed. The agricultural innovativeness index, as presently constructed, implies the improbable likelihood that the most innovative individual is the one who has adopted each of the 14 innovations immediately after they were first introduced. One would expect that a farmer who adopts everything in sight is likely to be unselective, unstable and probably incompetent, especially if one takes into account an historical trend in modern countries toward crop-specialization rather than crop-diversification. However, to the extent that no more than one percent of the total sample had reported ever adopting more than eight of the 14 innovations, to that extent are we confident that the incidence of "over-adopting" farmers in the sample is relatively negligable.

The Agricultural Adoption Index is a proportion based on a village by village examination of the adoption versus non-adoption of each of the 14 innovations under study. For each village, any of the 14 innovations mentioned at the time of interview as being

used by any of the members of that village, where submitted to factor analysis in order to determine that homogeneous set of innovations which could be considered to be unidimensionally measuring the same concept. That is, if one innovation in the set was adopted, then other innovations in the same set would also have tended to be adopted. Thus, the adoption index does not take time of adoption into account, but rather whether or not the innovation was in current use in 1966.

Following factor analysis, the actual number of innovations adopted by each member of a village was divided by the total number of innovations that could have been adopted in that village, thereby yielding a proportionate adoption index for each individual. Thus, if a respondent had adopted five innovations and his village had adopted six, then that individual's proportion of agricultural adoption score would be 85 percent.

On the face of it, the agricultural adoption index is not too severely affected by the shortcomings mentioned earlier in the present chapter. Firstly, the problem of ecologically restricted innovations is ameliorated since the index is formed on a village by village analysis of the innovations, then standardized across villages via percentaging. Secondly, the problem of collective adoption of community plantations is circumvented since community plantations, as an innovation, was not included in those villages where groups had not as yet formed to make this collective adoption viable. Thirdly, the innovations which tended to have been most frequently adopted in each of the villages, namely, fertilizer and NS-I maize also represented two of the major innovations being

urged in the governments' agricultural extension program.

Knowledge of Agricultural Innovations

Agricultural innovativeness, as previously explained, is considered as referring essentially to overt adoptive behavior. However, we have also made extensive reference to the cultivation of new ideas in the minds of peasant farmers. We have even suggested strongly that a systematic search for strategies of successful communication of new ideas is a central objective of the present study.

It is almost axiomatic that an individual is unlikely to adopt an innovation without first having learned of its existance. It is reasonable to assume, therefore, that knowledge of an innovation is a necessary condition for adoption of an innovation. It seems further reasonable to assume also that a person who is knowledgeable of an innovation exhibits more innovativeness than other members of his social system even though he may not have adopted that innovation yet. That is, that individual may be said to be exhibiting "cognitive innovativeness" which, to avoid confusion between terms, we shall refer to it as knowledge of innovations.

While overt adoption implies prior knowledge of an innovation, knowledge of an innovation does not, on the other hand, imply subsequent adoption of the innovation. It follows, therefore, that individuals can have knowledge of many more innovations than they are capable of adopting. This is as it should be. Having knowledge of many innovations is having knowledge of many

alternative courses of action that the individual could follow. Armed with this knowledge, the individual has the advantage of making an intelligent assessment of the most appropriate course of action to follow within the framework of his social, economic and ecological environment. Thus, knowledge of innovations is defined as the degree to which an individual has learned of more alternative courses of innovative action than other members of his social system.

In actual practice during the Nigeria Phase II study, two basic operational definitions of knowledge of innovations were developed. The first, labeled "Index of awareness knowledge of agricultural innovations," took account only of whether or not an individual had ever heard of each of the 14 innovations. The second, labeled "Index of correct information about agricultural innovations," took account of whether or not the individual was able to provide pertinent information indicative of possession of depth knowledge of those innovations which he declared himself to be aware. The two indices,* abbreviated for convenience to the "awareness knowledge index" and the "correct information index," were constructed in the following manner.

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*Two additional variants of correct information were also constructed. The first, labeled "correct information (total score)", consisted of assigning an equal weight of one to all innovations about which a respondent could provide correct information, then adding these weights together to form a total score. The second, labeled "correct information (variant)", consisted of assigning an equal weight of one to each bit of accurate information (out of a total possible of nine bits of information per innovation) about each of three specific innovations (fertilizer, aldrin dust, and NS-1 maize), then summing these weights across all three innovations to yield a composite total score. Our intention was to select the most useful

The Index of Awareness Knowledge represents a straight addition of the number of innovations (out of the 14 innovations studied) about which respondents declared themselves to be aware*, each innovation being assigned a weight of one. Some innovations in the set may, for ecological reasons, be limited to certain areas, or may require collective group adoption before individual adoption can take place. Such factors do not seriously impair the formation of a composite index of awareness knowledge since the farmer who maximizes his knowledge of available action alternatives would have needed to be aware that the innovation existed and was available to him in order to make an assessment of its applicability in his situation.

However, given that the innovation is applicable in his social and ecological environment, then we may expect that the diligent farmer bent upon maximizing his knowledge of available courses of alternative action, would take pains to gather enough detailed information about each of the available alternatives in order to assess, intelligently, which of them to adopt. This line of reasoning gave rise to the construction of the index of correct information about agricultural innovations.

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index by examing the pair-wise correlation coefficients between each index and each of the dependent variables. The index (reported in the main body of the report) showing consistently higher pair-wise correlations than the other two was selected. The comparisons between the various indices are displayed in Appexdix B.

*Recall was "aided" to the extent that respondents were asked whether they had ever heard of (name of innovation mentioned).

The Index of Correct Information was composed of items which required the respondent to demonstrate knowledge about pertinent details of those innovations about which he claimed to be aware. To circumvent the difficulties of ecologically bound innovations (which would render an innovation inappropriate and, therefore, unnecessary to know details about), a village by village analysis of the knowledge patterns about the 14 innovations was undertaken. This time, however, given the wide range of levels of correct information (from 79 percent for fertilizer to 10 percent for farm credit and loans (see Table III/1)), Gultman scaleogram analysis instead of factor analysis was used to determine that homogeneous set of innovations in each village which could be held to be measuring the same dimension of the same concept. An average of ten i ems per scale per village was elicited in this manner.

Health Adoption

A measure of health innovativeness comparable to the agricultural innovativeness index was not operationalized in the Phase II study in the sense that information regarding time of adoption of selected health practices was not elicited from respondents. Since he only data gathered with respect to health practices referred to their adoption versus non-adoption, only one index, labeled the health adoption index was constructed. This index consists of a straight addition across the following health practices, each practice being given a weight of one:

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*Where innovations were found to be known by greater than 90% of the respondents in a village, knowledge of that innovation was declared constant and the correct information index of each respondent in that village was given an extra weight of one. Where less than 10% of the respondents were found to know about an innovation, lack of knowledge of that innovation was also declared constant and no weight assigned anyone.

1. Whether or not the respondents' wife* made use of maternity facilities during childbirth.

2. Whether or not the respondent had been vaccinated against small pox.

3. Whether or not the respondent had built a latrine.

4. Whether or not the respondent had availed himself of hospital or dispensary facilities for the purposes of receiving treatment.

Relatively high adoption levels (as compared to the adoption of agricultural innovations) were recorded for each of the four innovations, with small pox vaccination (92 percent) having the highest and use of maternity facilities (52%) having the lowest adoption level (see Table III/2).

Knowledge of Health Problems

Since the awareness dimension of knowledge of health problems was not specifically tapped in Phase II, only one index, labeled "the correct information about health problems index" (abbreviated to "health knowledge index" for the sake of convenience), was constructed. The health knowledge index, which is comparable to the correct information about agricultural innovations index, takes account of whether or not respondents were able to demonstrate sufficient knowledge to answer the following questions satisfactorily:

1. What causes stomach worms?

2. What causes malaria?

3. Why do people boil drinking water?

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*The 19 percent of respondents who were either unmarried or had not had children were assigned a median value between adoption and non-adoption. This assignment was done in order to avoid biasing the index in favor or either adoption or non-adoption.

TABLE III/2 RELATIVE FREQUENCIES OF KNOWLEDGE AND ADOPTION SCORES ON SELECTED HEALTH INNOVATIONS

Name of Innovation	Correct Knowledge	Adoption
Causes of Worms in Stomach	48%	---
Causes of Malaria Fever	8%	---
Boiling of Drinking Water	65%	---
Use of Maternity facilities	---	52%
Receipt of Small-Pox vaccination	---	92%
Construction of Latrine	---	65%
Receipt of Treatment at Hospital/ Dispensary	---	76%
TOTAL*	121%	285%
BASE N =	1,142	1,142

*Column figures may add up to more than 100% because some respondents may have known about or adopted more than one of the innovations.

A satisfactory response to each question was given a weight of one and the index was formed by summing satisfactory responses across the three questions. As indicated in Table III/2, two thirds of the sample knew why people boiled water while only eight percent of the sample could tell what caused malaria.

Opinion Leadership

Much of a change agents' success in introducing new ideas to a village community may depend upon his identifying and gaining the cooperation of village leaders. Of course, there may be as many types of leaders as there are types of leadership positions in both the formal and informal structure of the village system. Some of these leaders are easier to identify than others. Identifying formal leaders for instance, is not usually a difficult task. They are often highly visible heads of local organizations and institutions. However, past research* indicates that formal leaders are not necessarily individuals who are perceived by other members of their social system to be influential in approving or disapproving new ideas. That is, while some individuals may indeed be influential approvers of new ideas and also occupy formal positions of leadership in the social system, it is, on the other hand, just as likely that other individuals may be similarly influential without occupying any formal leadership position. These individuals are usually referred to as informal leaders and are frequently not as readily identifiable as the formal leaders. One of the more reliable techniques used to identify informal leaders is sociometric nomination

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*See Wenton (1957, pp. 347-420) and Katz and Lazarsveld (1955, pp. 247-270).

which requires that members of a social system nominate individuals whom they perceive to be influential in some particular respect. A major advantage of sociometric nominations is that the technique cuts across formal and informal destinctions by determining the identities of individuals perceived as influential, regardless of whether or not they happen to also occupy a formal leadership position. Leaders determined in this manner are usually called "opinion leaders" because they tend to influence the opinions of others.

The sociometric* method of leadership nomination was used during Phase II. Opinion leadership is defined as "the degree to which an individual is able to informally influence other individuals' attitudes or overt behavior in a desired way with relative frequency" (Rogers and Shoemaker, 1968). In order to tap both the dimension of influencing attitude and the dimension of influencing overt behavior, three types of opinion leaders were identified.

Stimulator Opinoin leadership is defined as the degree to which an individual is perceived to generate awareness of desirable innovations with relative frequency. To operationalize this concept, respondents were asked to nominate three individuals in their village** who would be most likely to help an agricultural officer inform farmers about the need to adopt an innovation.

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*Sociometric techniques were also used to identify individuals perceived to be "best friend" and "best farmer." The best friend nominations were sought with the intention of identifying clique and other patterns of social integration. The best farmer nominations were intended to provide the change agent with some idea of the perceptions of farming excellence extant among his clientele. Both these variables turned out to be fairly highly correlated with the three leadership catagories described in the body of this report, suggesting that opinion leaders, best farmers and best friends tend to be one and the same person.

**Since villages varied in population size, the number of nominations

Legitimizer Opinion leadership is defined as the degree to which an individual is perceived to be influential in sanctioning new ideas with relative frequency. The concept was operationalized by requiring respondents to nominate three individuals in their village who would have to support a proposed innovation before other members of the social system would trust it enough to adopt it.

Implementer Opinion leadership is defined as the degree to which an individual is perceived to assume responsibility of encouraging overt adoption of innovations with relative frequency. Operationalization of the variable took the form of asking respondents to nominate three individuals in their village who were most likely to organize farmers to work on a new project.

Opinion Leadership Index. The three leadership variables described above were correlated with each other and submitted to factor analysis to determine whether or not they could be formed into a composite index of opinion leadership. The evidence of the intercorrelations (Table III/3) and the factor analysis indicate that the three leadership measures are very highly related to each other. The interpretation of this finding is that the roles of stimulator, legitimizer and implementer tend to overlap in one person. That is, if an individual is perceived to be a stimulator, then he is also very likely to be also perceived as a legitimizer and an implementer. The three leadership scores, therefore, were

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received by individuals was standardized across villages by converting the number of nominations received to a percentage of total nominations possible in the village.

combined to form a composite opinion leadership index.*

OPERATIONALIZING INDEPENDENT VARIABLES

The selection of pertinent independent variables (i.e., the variables to be used to explain variance in the dependent variables) was based partially on the findings of previous research in the United States and other parts of the world and partially on our observations of local factors, conditions and situations which held promise of being useful in explaining the dependent variables. Thus, two operational plans were developed, each listing the independent variables to be studied.

The first, developed prior to the departure of field teams from the United States, consisted of a listing of all those independent variables which previous research** suggested as being useful for study. The second, developed after pretesting and prior to beginning data-gathering in Nigeria, consisted of modifications and adaptations of the U.S. prepared list of variables and of additions to this list of those variables which local conditions suggested to be important to study. In finalizing the list of both dependent and independent variables, every effort was made to

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*See Appendix C for highest zero order correlates and multiple correlates for each of the three leadership measures as well as for the "best friend" and "best farmer" nominations.

**A major on-going function of headquarters staff at Michigan State University was the organization and maintenance of a Diffusion Document Center. To date, in excess of 1,200 diffusion studies from all over the world have been classified, IBM-coded along various dimensions (such as the type of innovation studied, the locale, the methods of data gathering and the nature of their findings) and this information has been placed into a computerized data-retrieval system.

ensure, not only their relevance to the study, but also their applicability and operationalizability in the Eastern Nigerian context. Six main categories of independent variables were developed prior to data-gathering.

Personal Characteristics included measures of age, education, literacy, nativity, religion, and primary and secondary occupations in order to provide some indication of the demographic characteristics of the sample of 1,142 respondents.

Family Characteristics included measures of family size and composition in terms of number of wives and children possessed in order to obtain information about the relative complexity of prevailing family structures.

Farm Characteristics included measures of the intensity, extensity and productivity of prevailing farming operations. To tap these dimensions, measures of the respondent's degree of crop-diversification (as indicated by the number of different types of food and cash crops grown), his degree of crop-commercialization (as indicated by whether he sold more than or less than half the crop yield of each type of crop grown), size of labor force (as indicated by the number of laborers he is likely to have in a single day to plant yam) and his degree of farm productivity (as indicated by the number of yam poles harvested during the previous harvest).

Characteristics of Communication Behavior included measures of the respondent's symbolic transactions, focussing primarily upon those transaction's occurring between him and expert sources of new ideas and practices. Th s, measures were taken of the respondents exposure to radio, newspapers and movies, his exposure to messages

of an agricultural nature emanating from such expert sources as change agents and newsletters, the degree to which he communicates with his peers about new ideas, the degree to which he perceives such exposures and interactions to have improved his farming operations, the degree of his cosmopoliteness* (as measured by the frequency of his visits to towns and cities outside his village) and the degree of his mastery over symbols as demonstrated by his ability to read in vernacular and in English.

Attitudinal Characteristics included measures of the respondent's educational, occupational and economic asperations, his level of trust in his fellowmen, his need to achieve occupational excellence, and his orientation to farm credit and change, with a view to gaining some indication of the respondent's attitudinal receptivity to new ideas.

Characteristics of Social Status included measures of the respondents' type of house (whether traditional or modern), his possession of personal and household goods and his membership to and positions held in village organizations.**

DATA REDUCTION

We have taken as many indepeneent variables into account as we thought were relevant in the hope that among these would be discovered those most crucial variables which made the biggest difference in explaining why some individuals became knowledgeable about and

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*"Cosmopoliteness is the degree to which an individuals' orientation is external to a particular social system" (Rogers, 1962, p. 17).

**Membership and positions held in community organization were also taken as a measure of the individual's degree of participation in the social life of his community.

adopted innovations earlier than others. It follows, therefore, that the major task of data analysis will be the determination of the most crucial set of independnet variables capable of most efficiently and parsemoniously explaining variance in the dependent variables. A major step in this direction is the reduction of the overall bulk of data gathered to manageable and useful proportions.

Three major methods of data reduction were utilized during data processing: namely, the elimination of all variables which gave little promise of being useful for explaining variance in the dependent variables, the formation of composite indices in which several variables were linearly combined into a single measure, and the use of step-wise regression to determine the smallest set of independent variables capable of efficiently explaining variance in the dependent variables.

Eliminating Variables from the Analysis

There are many reasons for eliminating variables which, on conceptual grounds, may have appeared to be worthy of measurement, but which, for empirical reasons, failed to pay off satisfactorily. The variables may have turned out to be constants, or the correspondence between the measure and the concept it was purporting to measure may have become blurred and ambiguous, or the variability in the measure may have been random rather than systematic, or the variable may be unrelated to any of the dependent variables. Presenting any findings based on a consideration of variables suspected of suffering from any one of the above conditions very frequently leads to misleading interpretations. Thus, apart from

reporting which variables were eliminated for what reason, we shall not present any findings based on them.

The present report, however, is based largely on correlating variables with each other. A number of variables which did not suffer from any of the conditions mentioned above, but which were, nevertheless, not used in the analysis of the dependent variables, were measured for descriptive rather than relational purposes. We refer to these variables as nominal inasmuch as their categories serve a naming rather than a ranking function. For instance, age is a ranking variable since it is possible to rank our sample of respondents from oldest to youngest. Education is similarly a ranking variable. We might take these two variablesand compare them in a ralational sense to see whether there is a systematic tendency for older persons to have had fewer (or more) years of education than younger persons.

Religion on the other hand, is a naming variable since you cannot (at least not reliably) rank people by their religious persuasion. There are no reliable criteria which tell us that Christianity has a higher (or lower) value than Mohamedanism - in fact, it is safer to regard them as being equal though different.

Similarly, although attempts have been made in previous studies to render occupation a ranking variable, it still remains a contentious problem as to wh a fisherman ranks higher (or lower) than a farmer or whether a school teacher ranks higher (or lower) than a skilled craftsman. Nominal variables, therefore, have been removed from the relational analyses and included only in the section of the present report where the characteristics of the sample are described.

Eliminating Constants. A variable should vary. That is, "a variable is a property that takes on different values" (Kerlinger, 1965, p. 32). For an attribute to be considered "variable," there must be differing quantities of that attribute detectable in different persons. For instance, if all the rspondents in a sample were born in the same year, then age becomes a constant since everybody in the sample will have precisely the same age.

For the purposes of the present study, we set up the criterion that if greater than 90 percent of the sample did not vary on a particular attribute, then that attribute would, for all practical purposes, be considered a constant rather than a variable. Thus, in the case of economic knowledge, since greater than 90 percent of the sample knew what happens to food prices when refugees return or if there was an exodus of people to townships, or what happens to the price of cassava when the price of yam increases, these variables was eliminated from the analysis.

Eliminating Ambiguous Variables. The operational definition of a variable should have the property of being clearly indicative of the underlying concept it is purporting to measure. While it is impossible to set up absolute criteria for determining the correspondence between operational definitions and the concepts they are held to be measuring, one useful criterion is to find out whether independent judges are able to agree that the correspondence appears to be valid.

In the case of empathy, independent judges failed to reach a consensual agreement about the validity of correspondence. The

concept was measured by asking respondents how newspapers can help farmers in the village, how life would change with the introduction of electricity and how cinema could improve the village. To the extent that it became impossible to decide whether responses to these questions were indicative of empathy with modern phenomina or were indicative of a presence or lack of knowledge of the nature and function of newspapers, electricity and cinemas, to this extent did the referent of the measure become ambiguous. The variable was, therefore, eliminated from the analysis. For similar reasons, achievement motivation (which was also labeled "occupational primacy"), was eliminated.

Eliminating Random Variables. Not only should a variable vary, but its variability should, at the same time, be systematic. "Systematic variance is the variation in measures due to some known or unknown influences that "cause" the scores to lean in one direction more than another (Kerlinger, 1965, p. 96)". The exposure to newspapers score of educated people will tend to be systematically higher than for uneducated people because educated people tend to be literate. In other words, a systematic trend is discernable which allows us to say that the more educated a person is, the more frequently he is likely to read newspapers.

A random variable, on the other hand, is one in which no such systematic trend is discernable. A frequently occurring manifestation of random variability in survey research refers to questions which require information which is beyond the knowledge of the respondent. As a result, the respondent guesses the answer. The more respondents guessing, the more random the variable.

There is no absolute way of identifying random variables. However, if a variable is poorly distributed in the sense that it has more or less equal numbers of responses recorded for each value that it can take, and if, at the same time, that variable tends to be very poorly correlated with all other variables in the study, then there is reasonable grounds for suspicion that the variability may be due to random rather than systematic "causes". Thus, in measuring interpersonal trust, as many respondents thought it was good to trust relatives as thought it was bad, and as many thought it was good to trust friends as thought it was bad, as many thought people repay kindness with ingratitude as thought otherwise. Moreover, none of these three items which were held to indicate trust, correlated strongly with each other, let along with any of the dependent variables. Similarily measures of <u>familism</u> appeared to be random. Both of these variables were, therefore, eliminated from analysis.

<u>Eliminating Uncorrelated Variables</u>. Our primary objective in Phase II is the explanation of variance in our five main dependent variables. It would seem unrewarding to include variables which are found to bear little or no relationship with the dependent variables. For instance, age is usually a strong predictor of individual innovativeness in the sense that the younger the individual the more likely he is to be innovative. However, in the present study, age did not manifest itself as a strong predictor of innovativeness and knowledge of innovations. It appears, therefore, that knowing a respondent's age will tell you little about whether he is likely to be innovative or not. Similarly, the number of wives an individual

has is seemingly unassociated with his degree of innovativeness. A man with several wives is apparently just as likely to be an innovator as is an unmarried man.

Unlike the removal of constants or the removal of ambiguous or random variables, an uncorrelated variable was removed only from the analysis of that dependent variable with which the variable was not statistically associated. Thus, number of wives, for instance, was removed from all analyses except the analysis of the leadership dependent variables with which the variable, number of wives, was correlated.

There appears to be a common link underlying most of the variables which were eliminated from the analyses, particularly among those eliminated because they appeared to be constant, ambiguous or random: they come mainly from that category of variables which described the attitudinal characteristics of respondents. These variables, such as empathy, interpersonal trust, familism and economic orientations, differ largely from other variables included in the study to the extent that they are "in the mind" variables and, therefore, not directly and overtly observable. This condition renders them hazardous to operationalize since their existance and values in the minds of individuals must be inferred from certain verbal indicants which are always difficult to justify as being reliable measures of them. In any case, their loss is primarily of esoteric concern since they do not lend themselves easily to understanding and manipulation by change agents.

Index Formation

A second major way of reducing the bulk of data gathered is to form a single index out of a number of variables held to be measuring the same underlying concept. We have already demonstrated index formation in the course of constructing the dependent variables. Fourteen innovations were reduced to single indices either by adding them all together or by selecting certain of the innovations and adding them together. Similar reductions were performed on some of the independent variables.

For example, six separate variables, exposure to agricultural newsletters, demonstrations, radio programs, cinema, lectures, and change agents were added together to form a composite index of change agency contact defined as the degree to which individuals are exposed to expert sources of new agricultural ideas and practices. The dimension underlying the index and responsible for binding the six items together was perceived to be the change agency. For the most part, a change agency was responsible for distributing newsletters, for holding demonstrations and delivering lectures, for showing agricultural movies and initiating farming programs on radio.

However, while the index may appear to be valid for conceptual reasons, it is still necessary to test its demensionality empirically. The six items of the index must demonstrably "go together" to form the index in the sense that it can be statistically shown that they are all indicators not only of the same but also of one and only one underlying concept. To test this condition, the items were submitted to factor analysis in which it was found that only four of

them, the exposure to newsletters, radio programs, lectures and change agents could be held to "go together" sufficiently to form them into an index of change agency contact. In speculating as to why the remaining two items, exposure to movies and demonstrations, failed to meet the criteria for inclusion in the index, it seems that, in both cases, the referrent may have been ambiguous. In the case of demonstrations, it may not have been clear to respondents whether these referred to demonstrations held by a change agent in person or whether they referred to demonstration farms. In the case of movies, there is doubt as to whether the referent may have been movies shown by the change agent himself or by some commercial movie house. Thus, some respondents may have been answering to one referent, others to the other and still others to both, thereby clouding and confounding the variables.

In addition to the index of change agency contact, the following indices were also constructed.

The index of agricultural communication which derives from the index of change agency contact and represents a measure of the degree of interpersonal discussion about new ideas generated by exposure to the various expert sources of new ideas.

The index of agricultural improvement which also derives from the index of change agency contact and is a measure of the degree to which the respondent perceived improvement in his farming habits to have resulted from exposure to the various expert sources of new farming ideas.

Three similar indices of commercialization referring to commercialization of food crops, commercialization of palm products and

commercialization of bananas were also constructed. These indices refer to whether the farmer sold more than or less than half of his crop yield from the previous harvest.

The index of personal possessions is composed of items of personal and household possessions such as a radio, wrist-watch, bicycle, laced shoes, iron bed, clock framed photographs, cushioned chairs, cupboard and a 1966 calender.

The index of agricultural advantages is an index composed of items referring to perceived advantages to be gained from three specific innovations; fertilizer, aldrin dust and NS-1 maize.

Finally, as an estimate of the amount of data reduction gained by index formation, the five indices reported above collectively accounted for 33 separate items of information.

Multiple Correlation

A final way to reduce the bulk of gathered data is by the statistical method of step-wise regression which results in several variables being used as a team to explain as much variance as possible in the dependent variable. Multiple correlation is a statistical method whereby a series of independent variables are related to one dependent variable with a view to explaining a maximum of variation in that dependent variable. However, multiple correlation does not clearly indicate which variables in the team or series are doing most of the explaining. To determine the smallest set of variables capable of explaining the greatest percentage of variance in the dependent variables, therefore, the method of step-wise regression (also known as the least-squares delete method) was used.

Step-wise regression eliminates variables from the team of multiple explainers on two counts: (1) by deleting all those variables which are not correlated, either directly or indirectly, with the dependent variable and (2) by deleting all those variables which, in spite of being correlated significantly and even strongly with the dependent variable, nevertheless explain a portion of the variance in the dependent variable that is already being adequately explained by one or more variables still surviving in the team of explainers. For instance, both education and literacy may be correlated with newspaper exposure. However, since education is also highly correlated with literacy in the sense that education may largely subsume literacy and vice versa, it might be sufficient to know only whether a person is either educated or literate but not necessarily both to predict that he will read newspapers. In this event, one or the other of these two variables, as is frequently the case, may be deleted from the team of multiple explainers during the process of step-wise regression.

Thus, the method of step-wise regression accomplishes a major data reduction goal by searching for the fewest number of independent variables capable of most parsimoniously explaining variance in dependent variables. Indeed, it is this final step in data reduction which serves as a spring-board to launch ourselves into the discussion of findings in the following chapter. For having carefully and systematically sifted through the array of data gathered in Phase II, the chapter following will contain not only the results of step-wise regression, but also a rendering of the set of variables so derived in simpler statistics such as means and percentages.

CHAPTER IV

FINDINGS

The present chapter reports the findings of the Eastern Nigeria Phase II study. These findings deal with the explanation of variance in five main dependent variables. The chapter, therefore, is organized by dependent variables. We shall present, in turn, the findings as they relate to (1) agricultural innovativeness, (2) knowledge of agricultural innovations, (3) health innovativeness, (4) knowledge of health problems and (5) opinion leadership.

The organization of the findings with respect to each dependent variable will be to present (1) the highest zero-order correlates of the dependent variable (i.e., the correlation coefficient of each independent variable with the dependent variable), (2) the most parsimonious set of independent variables derived from step-wise regression (i.e. the multiple correlations between a combination of the independent variables surviving step-wise regression and the dependent variable), and (3) cross-tabulations of the most important independent variables with the dependent variable (i.e., the most important findings displayed as percentages and frequencies rather than as correlation coefficients).

EXPLAINING AGRICULTURAL INNOVATIVENESS

Two indices, reflecting individual innovativeness with regard to 14 agricultural innovations, were constructed.

The first, labeled the <u>agricultural innovativeness index</u>, took account of time of adoption but ignored the question of whether or not innovations mentioned as having been adopted were still being used at the time of the interview (in 1966).

The second, labeled the agricultural adoption index, took account of whether or not the innovations were being used at the time of the interview, but disregarded their time of adoption.

Zero-Order Correlates of Innovativeness and Adoption

Presented in Table IV/I are the correlation coefficients of the 13 independent variables* which were found to be most highly correlated with both the agricultural innovativeness index and the agricultural adoption index. Excluded from the list are all other dependent variables of the present study. Examined by the category of independent variables from which they were drawn, we find the following:

Personal Characteristics are represented by level of (1) education and (2) functional literacy.** Thus, the higher the level of education and literacy of a farmer, the more likely he is to have been an early adopter and to be using more innovations in 1966 than other members of his social system.

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*The 13 independent variables were selected on the basis of their being correlated .20 or greater with either agricultural innovativeness or agricultural adoption. The figure, .20, was set arbitrarily after examination of factor analytic results which generally showed variables correlated less than .20 with innovativeness and adoption to be either poor or factorially complex loaders. In any case, while any variable correlated .05 and above with a dependent variable was statistically significant at the 5 percent level of confidence, the expectation of additional variance in dependent variables likely to be explained by variables correlated less than .20 with the dependent variables is not high enough to warrant their consideration.

**The correlation between education and literacy is .69 suggesting that while being very highly associated with each other as per expectation, some individuals, nevertheless, who claimed to have some education could not read while others who claimed to be uneducated could, however, read a simple sentence in English.

Table IV/1. HIGHEST CORRELATES* OF AGRICULTURAL INNOVATIVENESS AND ADOPTION

INDEPENDENT VARIABLES	DEPENDENT VARIABLES: Agricultural Innovativeness	DEPENDENT VARIABLES: (Proportion of) Agricultural Adoption
Index of Agricultural Improvement	.59**	.49**
Index of Change Agency Contact	.52	.46
Index of Agricultural Communication	.51	.44
Index of Personal Possessions	.38	.33
Knowledge of Agricultural Advantages	.35**	.35**
Level of Education	.35	.35
Functional Literacy	.34**	.35**
Newspaper Exposure	.35	.33
Knowledge of Extension Agents	.34	.32**
Formal Group Membership	.35**	.27
Formal Group Officership	.32	.27**
Radio Exposure	.31	.33**
Cosmopoliteness (visited out)	.26	.23
BASE N =	1,142	1,142
Multiple Correlation (using all variables)	.64	.57
Multiple Correlation (Variables surviving LSDEL)	.64	.57
Percent of Variance explained after LSDEL)	42%	32%

*Excluding other dependent variables of the study

**Variables surviving step-wise regression (LSDEL), thus constituting the most parsimonious team of multiple correlates capable of explaining variance in the dependent variables with maximum efficiency.

Characteristics of Social Status are represented by (1) group membership, (2) group officership and (3) index of personal possessions.* Thus, individuals belonging to or active in formal village organizations and who tend to possess personal and household artifacts of modernization, tend also to be higher innovators and adopters than other members of their social system.

Knowledge Characteristics are represented by (1) knowledge of extension agents and by (2) knowledge of agricultural advantages of innovations.** Thus, individuals who can mention extension agents by name and can list advantages which are likely to acrue from the adoption of certain innovations are also likely to be more innovative and higher adopters than other members of their social system.

Characteristics of Communication Behavior is by far the most well represented category of independent variables, containing the indices of (1) agricultural improvement, (2) change agency contact, and (3) agricultural communication as well as exposure scores to (4) radio, (5) newspapers and (6) other sources external to the individuals' village (qosmopoliteness). Thus, an individual who is not only exposed to sources of new ideas, both internal and external to his village, but also talks about these ideas with his peers and, as a result of the exposure and the interpersonal communication, perceives improvement in his farming activities, is likely also to be more innovative and to be a

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*Group membership and group officership as expected, are highly correlated with each other (.71). To a lesser degree, the index of personal possession is also correlated with both group membership (.39) and group officership (.35).

**The correlation coefficient between knowledge of extension agents and the knowledge of agricultural advantages is .31, suggesting a tendency for individuals who know change agents by name are also likely to know about the advantages likely to acrue from adopting certain innovations.

higher adopter of innovations than other members of his social system. Indeed, some of the variables in this category, especially the three indices of improvement, change agency contact and communication, have proved to be the highest single explainers of individual innovativeness and adoption.

As is evident from the matrix below, the variables describing characteristics of communication behavior are highly intercorrelated.

Table IV/2. INTERCORRELATIONS AMONG CHARACTERISTICS OF COMMUNICATION BEHAVIOR VARIABLES

	Agricultural Improvement	Agency Contact	Agricultural Communication	Radio	Newspapers
Agency Contact	.76	---			
Agricultural Communication	.77	.88	---		
Radio Exposure	.40	.46	.43	---	
Newspapers Exposure	.44	.50	.51	.49	---
Cosmopoliteness	.34	.38	.38	.36	.37

The exceptionally high intercorrelations among the three indices of improvement, change agency contact and agricultural communication suggests a very high degree of overlap among them; i.e., each of them tends to subsume each of the others. These high intercorrelations are expected inasmuch as both the agricultural improvement and communication indices are derived from the index of change agency contact.

None of the variables which are included under farming, family, and attitudinal characteristics of respondents appeared to be substantially related to either agricultural innovativeness or adoption.

Multiple Correlations of Innovativeness and Adoption

The 13 highest independent correlates listed in Table IV/1, were submitted to step-wise regression to determine the most parsimonious team of multiple correlates capable of explaining a maximum of variance in agricultural innovativeness and agricultural adoption respectively.

Explaining Agricultural Innovativeness Parsimoniously. The results of step-wise regression indicate that, given the data we have gathered in Eastern Nigeria and the manner in which we have processed and analysed them,* agricultural innovativeness can be explained most efficiently by taking account of only four of the independent variables; namely, (1) the index of agricultural improvement, (2) knowledge of agricultural advantages, (3) functional literacy and (4) formal group membership. The linear combination of these four variables yields a multiple correlation coefficient of .64 with agricultural innovativeness; that is, 42 percent** of the variance in agricultural innovativeness is explained by taking account of only four independent variables (see Table IV/1).

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*The goal of science is, of course, to explain all the variance in the phenomena being studied. To the extent that we fail to do so, to that extent have we either failed to include other crucial (although presently unknown to us) variables in the study or else we have failed to measure the variables included in the study with maximum precision. Both of these conditions represent occupational hazzards to all behavioral science researchers.

**Squaring any correlation oefficient yields an estimate of the percentage of variance explained in the dependent variable. The resulting coefficient is known as the coefficient of determination.

To demonstrate the efficiency of these four variables, if we used all 13 independent variables in a multiple correlation to explain variance in agricultural innovativeness, we would explain precisely the same amount of variance as if we only used the four variables which survived step-wise regression. That is, the variance explained by the other nine independent variables happens to be the same portion of variance in the dependent variable being explained by the four surviving variables, thus making the explanation offered by the other nine variables redundant. For example, if it is known that an individual perceives improvement in his farming operations as a result of having had contact with agencies of change, then it is also known that he has had contact with agencies of change.

Table IV/3 shows the four variables surviving step-wise regression to be related to each other, the relationships between each of the other three variables to the index of agricultural improvement being the strongest. Furthermore, if we were to delete any one of these four

Table IV/3. INTERCORRELATIONS AMONG MOST PARSIMONIOUS CORRELATES OF AGRICULTURAL INNOVATIVENESS

	Agricultural Improvement	Agricultural Advantages	Literacy
Agricultural Advantages	.32	---	
Literacy	.42	.23	---
Group Membership	.28	.23	.18

variables from the multiple correlation, the deletion which would result in the greatest reduction of variance explained in the dependent variable would be that of the index of agricultural improvement, i.e., a reduction from 42 percent to 25 percent. On the other hand, elimination of any one of the other three variables would fail to reduce the percentage of variance explained by the remaining variables by more than three percent. The single most powerful explainer of variance in agricultural innovativeness, therefore, is the index of agricultural improvement resulting from contact with sources of expert information about agricultural matters.

Thus, individuals who tend (1) to perceive improvements in their farming habits as a result of exposure to agencies of change, (2) to be knowledgeable of the advantages likely to acrue from the adoption of fertilizer, aldrin dust or NS-1 maize, (3) to be functionally literate and (4) to be members of formal village organizations, also tend to be relatively earlier to adopt new ideas than other members of their social system.

Explaining Agricultural Adoption Parsimoniously. The results of step-wise regression (Table IV/1) indicate that a somewhat lower percentage (32 percent) of variance on agricultural adoption than was found for innovativeness can be explained by taking account of only six of the 13 independent variables used; namely, (1) the index of agricultural improvement, (2) knowledge of agricultural advantages, (3) functional literacy, (4) knowledge of extension agents, (5) formal group officership, and (6) radio exposure. The first three mentioned variables are shared in common with the team of multiple explainers of agricultural innovativeness.

The six variables surviving step-wise regression also explain precisely the same percentage of variance in agricultural adoption as was the case when all 13 variables were used together in the multiple correlation, thus rendering the explanation offered by the other seven variables redundant.

The intercorrelations among variables surviving step-wise regression (Table IV/4) show the correlation between each variable and the index of agricultural improvement to be, for the most part, higher than

Table IV/4. INTERCORRELATIONS AMONG MOST PARSIMONIOUS CORRELATES OF AGRICULTURAL ADOPTION

	Agricultural Improvement	Agricultural Advantages	Literacy	Knows Agents	Officer-ship
Agricultural Advantages	.32	---			
Literacy	.42	.23	---		
Knows Agents	.42	.31	.25	---	
Officership	.27	.18	.20	.17	---
Radio Exposure	.41	.27	.44	.22	.17

the other correlations. Moreover, if any one of the six variables surviving step-wise regression is deleted from the multiple correlation, the deletion which would result in the greatest reduction of explained variance in the dependent variable would be that of the index of agricultural improvement (from 32 percent to 27 percent). Deleting any one other variable would not result in a reduction in variance explained of more than two percent.

As in the case of agricultural innovativeness, therefore, the single most powerful explainer of variance in agricultural adoption is the index of agricultural improvement resulting from contact with expert sources of agricultural information.

Thus, individuals who tend (1) to perceive improvements in farming habits on the basis of exposure to agencies of change, (2) to be knowledgeable of the advantages likely to acrue from the adoption of NS-1 maize, fertilizer or aldrin dust, (3) to be functionally literate, (4) to know agricultural officers by name, (5) to listen to radio frequently, (6) to hold formal positions in village organizations, tend also to be using more innovations in 1966 than other members of their social system.

Finally, the correlation between the index of agricultural innovativeness and the index of agricultural adoption is .82; i.e., 75 percent of the variance in agricultural innovativeness can be explained by agricultural adoption and vice versa. Such a high correlation is to be expected, not only because of the close conceptual similarity between the two variables, but also because of the fact that the same innovations have entered into the construction of the two indices.

Thus, individuals who are relatively earlier than others to adopt new agricultural ideas also tend to have adopted a relatively greater proportion of innovations than other members of their social system.

Comparing Innovators and Laggards

The variable Innovativeness*, which is defined as "the degree to which an individual is relatively earlier to adopt new ideas than other members of his social system" (Rogers, 1962, p. 19) was dichotomized to render two groups of farmers; innovators, who are the relatively earlier adopters and laggards who are the relatively later adopters.

Thus, the innovator was operationally defined as any individual who had adopted at least one innovation, regardless of whether he was still using that innovation at the time of the interview. The laggard was operationally defined as any individual who had never adopted any of the 14 innovations.

Of the total sample of respondents (1,142), 57 percent (649) were classified as innovators and 43 percetn (493) as laggards. These two categories of individuals were then compared to each other in terms of the variables which emerged as being the most powerful correlates of agricultural innovativeness.

The single most powerful correlate of agricultural innovativeness and agricultural adoption is the index of agricultural improvement made on the basis of contact with sources of expert agricultural information. However, since the index subsumes not only the index of change agency contact, but also the index of agricultural communication, and since both of these indices are indeed highly related to agricultural

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*Since there is such close correspondence between the two variables agricultural innovativeness and agricultural adoption, we shall dichotomize and present findings only on the innovativeness index under the assumption that these findings would be similar to those which would have been yielded by dichotomizing the adoption index.

innovativeness and adoption, the following presentation of findings will include break-downs on all three indices.

Each of the three indices were broken down into their constituent items. The index of change agency contact, for instance, was broken down into exposure to (1) agricultural radio programs, (2) agricultural newsletters (3) agricultural lectures and (4) contact with extension agents.

The index did not include exposure to agricultural demonstrations and agricultural movies because of seeming referent ambiguity. It may have been unclear to respondents whether demonstrations referred to demonstration farms or to actual demonstrations conducted by the change agent, or whether movie exposure referred to commercial house movies or agricultural movies shown by the change agent. However, in the cross-tabulational analyses which follow, exposure to both demonstrations and movies have been included with the caution that they should each be considered to have two referents apiece.

Table IV/5 displays the results of comparing innovators and laggards on their exposure to (1) each of six expert sources of agricultural information, (2) their communication with others about the exposure and (3) their perceived farming improvements made on the basis of the exposure.

Without exception, substantially greater percentages of innovators, as compared to laggards, were not only exposed to, but also talked about and declared themselves to have benefited from contact with each of the six sources of expert agricultural information.

Table IV/5. CONTACT WITH, COMMUNICATION ABOUT, AND FARMING IMPROVEMENTS RESULTING FROM EXPOSURE TO SIX EXPERT AGRICULTURAL SOURCES BY INNOVATORS AND LAGGARDS

	DEPENDENT VARIABLE*		
INDEPENDENT VARIABLES	Innovator	Laggard	Total
Contact with Agricultural Radio Program	50%	22%	38%
Communicated about contact	40	16	30
Improved Farming on basis of contact	27	3	17
Contact with Agricultural Demonstrations	50%	19%	37%
Communicated about contact	39	14	29
Improved Farming emphasis of contact	32	2	19
Contact with Agricultural Agent	35%	5%	22%
Communicated about contact	28	3	17
Improved Farming on basis of contact	21	1	13
Contact with Agricultural Movie	31%	14%	23%
Communicated about contact	25	11	19
Improved Farming on basis of contact	16	1	10
Contact with Agricultural Lecture	29%	6%	19%
Communicated about contact	27	6	18
Improved Farming on basis of contact	19	1	11
Contact with Agricultural Newsletter	21%	4%	14%
Communicated about contact	18	3	12
Improved Farming on basis of contact	17	1	10
Contact with at least one Agricultural Source	79%	40%	62%
Communication about the contact(s)	65	30	50
Improved farming on basis of contact(s)	51	5	32
BASE N =	649	493	1,142

*The dependent variable was dichotomized into innovators (i.e., individuals who have adopted at least one of the innovations of the study during or prior to 1966) and laggards (i.e., individuals who have adopted none of the 14 innovations at any time.)

For instance, consider the last set of three items reported in Table IV/5. Of the total sample, 62 percent of the respondents had been in contact with at least one of the six expert sources. However, the percentage of innovators (79 percent) who had been in contact with at least one expert source is almost double the percentage of laggards (40 percent) reporting a similar contact. Thus, the majority of the 62 percent of individuals in the total sample who reported some contact were innovators.

Also, 65 percent of the innovators, as compared to 30 percent of the laggards, were excited enough by the contact to want to discuss the substance of their exposure with others.

Finally, over half the innovators felt that they had improved their farming habits on the basis of the contact with expert sources as opposed to less than one tenth of the laggards perceiving similar improvements. In other words, the disparity between percent reporting contact and percent reporting improvement is somewhat greater among laggards (i.e., a difference of 35 percent) than among innovators (i.e., a difference of 28 percent). Similar observations can be made with respect to each of the six individual sources of agricultural information, as shown below.

Contact with Agricultural Radio Programs

Nearly two fifths of the total sample of respondents reported hearing agricultural programs on radio. Less than half of these respondents, however, felt that they had made farming improvements on the basis of what they heard in the programs. As can be seen in Table IV/6, most of these respondents who claimed to have made improvements based

Table IV/6. FARMING IMPROVEMENTS MADE ON BASIS OF CONTACT WITH SIX EXPERT SOURCES OF AGRICULTURAL INFORMATION

PERCEIVED IMPROVEMENTS	Contact in 1966 with Agricultural					
	Radio	Demons.	Agent	Movie	Lecture	News-Letter
No Contact with Source	62%	63%	78%	77%	81%	86%
None/Empty Comments/Work Harder	22	18	9	14	8	4
Used Fertilizer/Manure/Compost	8	10	5	3	5	6
Learned about/Planted Yam/ Cassave/Rice/Maize	3	3	3	2	3	2
Spacing/Clearing/Weeding	2	2	2	1	2	1
Learned about/Planted Fruit/ Vegetables/Cashew	2	2	2	2	1	1
Learned about/Planted Oil Palm/ Rubber/Cocoa	2	3	2	1	1	1
Used/Learned about Sprays/Dust/ Chemicals	2	1	1	1	1	1
Mulching/Watering/Timing/Cover Crops	1	1	1	0	0	0
Ridging/Lining	1	1	0	0	0	0
Learned about/Adopted Poultry/ Livestock/Feeds	0	0	0	1	0	0
Total*	105%	104%	103%	102%	102%	102%
BASE N =			1,142			

*Percentages add up to more than 100 percent since each respondent was allowed to mention up to two improvements perceived to derive from contact with each of the six expert sources of agricultural information.

on exposure to agricultural radio programs, mentioned the use of fertilizer, manure, or compost as specific improvements.

One half of all innovators were exposed to an agricultural radio program as opposed to only one fifth of laggards being similarly exposed. Furthermore, more than half the innovators who were exposed felt themselves to have made farming improvements based on the exposure as compared to only three percent of the laggards claiming to have made similar improvements.

Contact with Agricultural Radio Demonstrations

The findings for contact with agricultural demonstrations are, with minor exceptions, almost a perfect replication of the findings for contact with radio programs.

Somewhat fewer laggards (19 percent) had come into contact with demonstrations than with radio programs (22 percent), and somewhat more (32 percent) innovators had made improvements on the basis of exposure to agricultural demonstrations than on the basis of exposure to agricultural radio programs (27 percent).

Also, slightly more individuals (10 percent, Table IV/6) reported learning the use of fertilizer, compost or manure from agricultural demonstrations than from radio programs (8 percent). Thus, it would seem that agricultural demonstrations are somewhat more effective than radio programs in urging farmers to action.

Contact with Agricultural Agents

Slightly more than a fifth of all respondents reported contact with local change agents. Of these respondents, more than half claimed to have made farming improvements on the basis of this contact. Compared to radio programs and demonstrations (less than half the exposed respondents claimed to have made improvements on the basis of exposure to radio and demonstrations), contact with the agricultural agent appears to be more effective in urging action.

Very few laggards (5 percent) as compared to innovators (35 percent) appear to have come into contact with the change agent. This observation, however, cannot be unambiguously interpreted. It seems, on the one hand, that more of the change agents' contacts are associated with farmers who, as a probable consequence of the contact, adopted certain new ideas. Such would be the case if the change agent had initiated the contact and had instigated the adoptions.

On the other hand, however, the higher incidence of contact with innovators and the correspondingly lower percentage of contacts with laggards may be indicative of the change agent being concerned mainly with individuals who already are innovators. Such would be the case if the contact was largely client initiated, i.e., the client, having already decided to adopt an innovation, now approaches the change agent in search of legitimization or of detailed information about the innovation.

Contact with Agricultural Movies

The findings for contact with agricultural movies are similar to the findings for contact with the change agent. A major difference, however, is evident in the observation that less than half of all

respondents claiming exposure to agricultural movies also claimed to have made improvements on the basis of the exposure. Also, considerably more laggards (14 percent) were exposed to movies than had been in contact with the change agent (5 percent).

With regard to specific improvements made on the basis of exposure to movies (Table IV/6), very few respondents appear to have gained any information resulting in farming improvements which are specifically mentionable. Thus, movies would appear to be the least useful medium for urging farmers to action.

Contact with Agricultural Lectures

Slightly less than one fifth of all respondents were exposed to agricultural lectures in 1966. However, better than half of these made farming improvements on the basis of the exposure. The most frequently mentioned improvement (5 percent, Table IV/6) refers to learning the uses of fertilizer, compost and manure.

Very few laggards (6 percent, Table IV/5) compared to innovators (29 percent) were exposed to lectures. Of the innovators who attended lectures two thirds of them made improvements based on what they heard, where as only one percent of all the laggards claimed to have made similar improvements.

Contact with Agricultural Newsletter

The agricultural newsletter is the least frequently mentioned source (14 percent of total sample) of agricultural information. However, since over three quarters of the respondents who were exposed to newsletters claimed to have made farming improvements on the basis of the

exposure, agricultural newsletters would appear to be the most effective medium for impelling action.

Such a statement would be tenable if we were operating under the assumption that each of the six expert sources had the same common function of impelling relatively immediate action. There is no necessary reason for making such an assumption. Indeed, there is, logically, more reason for expecting differential rather than similar effects.

For instance, radio programs may be functionally more appropriate to the creation of awareness whereas newsletters may be more suited to the acquisition of detailed correct information. Certainly, radio programs must be absorbed the first time around whereas newsletters can be referred to over and over again to check and double check details. Information contained in newsletters, therefore, is likely to be more detailed than information transmitted by radio.

It also seems reasonable to assume that awareness preceeds the acquisition of correct information which, in turn, preceeds the performance of such overt action as adoption behavior. Since the acquisition of correct information via newsletters, however, is temporally closer to the performance of overt action than is the acquisition of awareness via radio programs, we may be misled into believing that newsletters are more effective for impelling action than radio programs. While we have no data to substantiate the contention, it is, nevertheless, likely that without radio programs to create the awareness which may impel the reading of newsletters, the effectivity of newsletters may have been greatly reduced.

Thus, agricultural radio programs may have the major function of creating awareness knowledge of the existance of new farming ideas

whereas newsletters may have the major function of providing correct information about the innovations. Similarly, agricultural demonstrations and agricultural movies may serve the same function as agricultural radio programs whereas agricultural lectures and contact with agricultural agents may serve the same function as agricultural newsletters.

To summarize, individuals who tend to be relatively earlier to adopt new farming ideas than other members of their social system also tend to have higher contact levels with (1) agricultural radio programs, (2) agricultural demonstrations, (3) agricultural change agents, (4) agricultural movies, (5) agricultural lectures and (6) agricultural newsletters.

Such innovative individuals also tend to talk more frequently about the substance of the information to which they have been exposed and to perceive improvements in their farming habits based on the exposure of expert agricultural information than do other members of their social system.

Characteristics of Innovativeness on Key Independent Variables

In addition to comparing innovators and laggards on the most powerful correlates of innovativeness, the comparison was extended to include the other independent variables surviving deletion through step-wise regression. For this purpose, innovators were further dichotomized into high and low innovators (See Table VI/7).

Each of the key independent variables selected were dichotomized for purposes of making cross tabulations. With the exception of the agricultural advantages score, the variables were dichotomized on the

Table VI/7. CROSS TABULATIONS OF KEY INDEPENDENT VARIABLES AGAINST THREE LEVELS OF AGRICULTURAL INNOVATIVENESS

INDEPENDENT VARIABLES	AGRICULTURAL INNOVATIVENESS			
	Laggards	Low Innovator	High Innovator	Total
Some Agricultural Improvement*	5%	36%	67%	32%
Mean Improvement Score	.2	1.4	4.1	1.6
Agricultural Advantages (above mean)	32%	77%	86%	64%
Mean Advantages Score	4.1	5.0	5.3	
Some Functional Literacy	10%	20%	40%	21%
Mean Literacy Score	3.0	6.1	12.9	6.7
Some Group Membership	83%	93%	98%	90%
Mean Number of Groups	2.0	2.7	3.6	2.6
BASE N =	455	385	302	1,142

*To find the percentages of individuals scoring below the mean on agricultural improvement, simply subtract the percentages in the row from 100. Thus, in the total sample, there are 68 percent (100-32) of respondents between the mean on agricultural improvement. A similar operation can be performed on each of the other variables.

basis of those respondents scoring zero on the variable being placed in one group and those respondents scoring anything greater than zero being placed in another group. With regard to the agricultural advantages score, the dichotomization was made on the basis of splitting the distribution at the mean.

Across all of the independent variables, the highest percentages and means are consistently recorded for the high innovators, the lowest for the laggards, with the low innovators consistently falling somewhere between these two extremes.

Index of Agricultural Improvement. Since this particular variable was one ofthe subjects of discussion in the section immediately preceeding this one, no further comments need be made here, except to point out the considerably higher mean improvement score (4.1) achieved by innovators as compared to laggards (.2).

Agricultural Advantage Index. Over four fifths of the high innovators, as compared to two fifths of the laggards,were able to report knowledge of some of the advantages which were likely to acrue from the adoption of fertilizer, aldrin dust and NS-1 maize.

Functional Literacy. Two fifths of the high innovators, were able, as compared to one tenth of the laggards, to read an average of 13 words of a simple sentence in English.

Formal Group Membership. In the total sample, 90 percent of the respondents claimed to have membership in at least one formal organization. However, whereas almost all the high innovators have formal group membership in an average of more than three groups, only little over three quarters of the laggards claimed to have membership

in an average of only two formal groups.

Thus, to summarize, individuals who are relatively earlier than others to adopt new ideas also tend (1) to make improvements in their farming operations based on contacts with change agencies, (2) to be more knowledgeable of the benefits likely to acrue from the adoption of specific innovations, (3) to be functionally literate and (4) to have membership in about three formal village organizations.

Finally, as indicated in Table IV/8, almost all the high innovators (who are, therefore, the earliest adopters) were using most of the innovation that they had adopted before 1966. This observation compares with the 100 percent of laggards (who are consequently the latest adopters) who were found to be using none of the 14 innovations during 1966. Thus, the earlier adopters of new ideas tend to continue using a somewhat greater proportion of innovations than do the latter adopters.

Table IV/8. CROSS-TABULATION OF AGRICULTURAL INNOVATIVENESS AGAINST AGRICULTURAL ADOPTION

AGRICULTURAL ADOPTION	AGRICULTURAL INNOVATIVENESS			
	Laggards	Low Innovators	High Innovators	Total
Zero Innovations being used in 1966	100%	23%	5%	49%
Some Innovations being used in 1966	---	77	95	51
Mean Proportion being used in 1966	0.0	.07	.22	.08
BASE N =	455	385	302	1,142

EXPLAINING KNOWLEDGE OF AGRICULTURAL INNOVATIONS

Two separate indices dealing with individual knowledge about the 14 agriculture innovations of the study were constructed.

The first, called the awareness knowledge index, took account of whether an individual was aware or not aware of the existance of each of the 14 agricultural innovations.

The second, called the index of correct information, took account of whether the individual could demonstrate precise knowledge of certain salient characteristics of each of the 14 innovations.

Zero-Order Correlates of Awareness Knowledge and Correct Information

Presented in Table IV/9 are the correlation coefficients of the 17 independent variables* which proved to be more highly correlated with the two knowledge indices than all other variables included in the present study. Excluded from the list are all other dependent variables of the present study. The 17 highest correlates are examined below in terms of the conceptual category of variables from which they were drawn.

Personal Characteristics are represented by (1) level of education and (2) functional literacy. Thus, the higher the level of literacy and education of an individual, the higher his level of awareness knowledge and correct information about agricultural innovations.

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*For procedures of selecting the 17 independent variables, see footnote on Pg. 42.

Table IV/9. HIGHEST CORRELATES* OF AGRICULTURAL AWARENESS KNOWLEDGE AND CORRECT INFORMATION

INDEPENDENT VARIABLES	DEPENDENT VARIABLES	
	Awareness Knowledge Index	Correct Information Index
Index of Change Agent Contact	.55**	.48**
Index of Agricultural Communication	.54	.48
Index of Agricultural Improvement	.52**	.46**
Knowledge of Extension Agents	.45**	.46**
Index of Personal Possessions	.38	.30
Level of Education	.37**	.29
Radio Exposure	.35	.25
Newspaper Exposure	.35	.26
Cosmopoliteness (Visited out)	.33**	.25
Functional Literacy	.32	.26
Movie Exposure	.27**	.27**
Group Membership	.32**	.28**
Group Officership	.28	.20
Educational Aspiration	.29	.24
House Type	.25	.23**
Commercialization of Palm Products	.21**	.17
Index of Agricultural Advantages***	65	.55
BASE N =	1,142	1,142
Multiple Correlation (using all variables)	.67	.60
Multiple Correlation (variables surviving LSDEL)	.66	.59
Percent of Variance Explained (After LSDEL)	44%	35%

*Excluding other dependent variables of the study.

**Variables surviving step-wise regression (LSDEL), thus constituting the most parsimonious team of multiple correlates explaining variance in the dependent variable with maximum efficiency.

***Because this index required knowledge of specific innovations, it was deemed to be so conceptually similar to the dependent variables that it was not included in step-wise regressions lest we attain spurious correlations.

Social Status Characteristics are represented by (1) group membership, (2) group officership, (3) index of personal possessions and (4) house type.* Thus, individuals belonging to or active in formal village groups, and who tend to possess personal and household artifacts of modernization, and who tend to own a house with brick walls and/or a tin roof, tend also to have higher levels of awareness knowledge and correct information about agricultural innovations.

Knowledge Characteristics are represented by (1) knowledge of extension agents and (2) knowledge of agricultural advantages of innovations.** Thus, individuals who know extension agents by name and who can list accur tely the benefits which are likely to acrue from the adoption of specific innovations, tend also to have higher levels of awareness knowledge and correct information about new agricultural ideas.

Attitudinal Characteristics are represented by one variable, educational aspiration.*** Thus, individuals who would have liked to attain higher levels of education than they presently had, tend also to have higher levels of awareness knowledge and correct information about agricultural innovations.

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*House type refers to whether an individual lived in a traditional house which was constructed with mud walls and thatched roof as opposed to a modern house constructed with brick walls and/or tin roof or some combination of the two basic house types.

**Knowledge of agricultural advantages of innovations was operationalized by asking respondents to list the advantages which would acrue from adoption of each of three specific innovations (fertilizer, aldrin dust, and NS-1 Maize). As would be expected, the variable is very highly correlated with both of the knowledge indices.

***Educational aspiration was operationalized by asking respondents what level of education they would have liked to obtain if they were young again.

Farm Characteristics are represented by one variable, commercialization of palm products.* Thus, individuals who tend to sell such palm products as palm oil, palm kernel or palm wine also tended to have higher levels of awareness knowledge and correct information about agricultural innovations.

Communication Behavior Characteristics are, as in the case of agricultural innovativeness and adoption, by far the most well represented category of independent variables. Once again, the indices of (1) change agency contact, (2) agricultural communication and (3) agricultural improvement predominate. Also featuring prominently are exposure to (4) radio, (5) newspapers, (6) movies and (7) other sources external to the individual's village (cosmopoliteness).

Thus, individuals who tend to be exposed to both general and expert sources of information and who tend to talk to each other about the ideas gained from such exposure, tend also to have higher levels of awareness knowledge and correct information about agricultural innovations. Moreover, as is evident from Table IV/9, contact with change agencies is the single most powerful explainer of variance in both of the knowledge indices.

Family Characteristics yielded no variables which were useful in explaining either awareness knowledge or correct information about innovations.**

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*Commercialization of palm products was operationalized by asking respondents whether they sold any of their palm products such as palm kernel, palm oil or palm wine, and, if they did, whether they had sold more than or less than half of their total crop yielded by the last harvest.

**One family characteristic variable number of dependent children was fairly highly associated with two variants of the correct infor-

Multiple Correlations of Awareness Knowledge and Correct Information

In order to determine the most parsimonious team of multiple correlates of awareness knowledge and correct information about agricultural innovations, the 17 independent variables listed in Table IV/9 were submitted to step-wise regression.

Explaining Awareness Knowledge Parsimoniously

Given the data collected and the manner in which they were processed, the results of step-wise regression indicate that awareness knowledge of innovations can be most efficiently and parsimoniously explained by taking account of only eight of the 17 independent variables. These eight variables are the indices of (1) change agency contact and (2) agricultural communication, (3) knowledge af extension workers, (4) level of the respondent's education, (5) his degree of cosmopoliteness, (6) his exposure to movies, (7) his membership in formal groups and (8) the degree to which he sells his palm products (see Table IV/7).

Combining these eight variables linearly yields a multiple correlation of .66 with awareness knowledge of innovations; i.e., 44 percent of the variance in awareness knowledge is accounted for by these eight variables.

The intercorrelations among the eight variables surviving step-wise regression are displayed in Table IV/10. The correlations between each variable and the indices of agricultural improvement and change agency contact generally turn out to be the highest in the matrix.

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mation about the 14 agricultural innovations, particularly those dealing with fertilizer, aldrin dust and NS-1 maize. The dependent variable labelled "correct information (Variant)" in Appendix B consists of an index formed by taking these three innovations only into account.

Table IV/10: INTERCORRELATIONS AMONG THE MOST PARSIMONIOUS CORRELATES OF AWARENESS KNOWLEDGE OF AGRICULTURAL INNOVATIONS (BASE N = 1,142)

	Agricultural Improvement	Agency Contact	Knows Agents	Education	Cosmopoliteness	Movie exposure	Membership
Agency Contact	.76	---					
Knows Agents	.42	.43	---				
Education	.41	.43	.29	---			
Cosmopoliteness	.34	.38	.18	.39	---		
Movie Exposure	.35	.32	.11	.28	.30	---	
Group Membership	.28	.37	.18	.24	.23	.12	---
Commercialization	.07	.06	.12	-.01	.04	-.07	.04

Thus, individuals who tend to have higher contact with change agency sources of expert information and who perceive themselves to have benefited from the contact also tend (1) to know agricultural officers by name, (2) to be more educated, (3) to visit places outside their immediate village surroundings more frequently, (5) to have more exposure to movies, and (5) to hold membership in formal village groups. So, as in the case of explaining agricultural innovativeness and adoption, the index of agricultural improvement, coupled this time with the index of change agency contact,* emerge as the most powerful explainers of an individual's degree of awareness knowledge about innovations.

*The index of change agency contact did not drop out during step-wise regression as it did when explaining agricultural innovativeness and adoption. The explanation is that in the case of awareness knowledge and correct information, contact with change agencies explains an extra unique portion of variance which is not subsumed by the index of agricultural improvement.

Explaining Correct Information About Innovations Parsimoniously.

The results of step-wise regression indicate that a somewhat lower percentage of variance (35 percent) than was found for awareness knowledge can be explained in the case of correct information about innovations by taking account of only six of the variables listed in Table IV/9.

These six variables are (1) index of change agency contact, (2) index of agricultural improvement, (3) knowledge of extension agents (4) movie exposure, (5) group membership, and (6) house type. With the exception of house type*, all the variables surviving as the most parsimonious explainers of variance in correct information about innovations are also included in the team of most parsimonious explainers of awareness knowledge of innovations.

Once again, the index of agricultural improvement, coupled with the index of change agency contact emerge as the most powerful explainers of the degree to which an individual possesses correct information about agricultural innovations.

Finally, the correlation between the index of awareness knowledge and the index of correct information is .84; i.e., 79 percent of the variance in awareness knowledge is explained by correct information and vice versa. To say it another way, if an individual scored high on awareness knowledge, then it can be predicted with a high degree of precision that he would also have scored high on correct information.

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*House type is correlated .26 with agricultural improvement, .27 with agency contact, .18 with knowledge of extension agent, .10 with movie exposure and .14 with group membership.

Comparing High Level and Low Level Knowers

The two dependent variables, awareness knowledge and correct information about agricultural innovations, were dichotomized for purposes of presenting the main findings in cross-tabular form.

Both awareness knowledge and correct information were dichotomized by breaking each of their distributions at their means, thereby rendering two groups of farmers per dependent variable, i.e., the below-the-mean groups representing low level of awareness knowledge and low level of correct information respectively and the above-the-mean groups representing high level of awareness knowledge and correct information respectively.

In the case of awareness knowledge, the mean number of innovations of which the average respondent declared himself to be aware was six whereas in the case of correct information, the mean number of innovations about which the respondent could demonstrate detailed knowledge was five.

The most powerful zero-order correlates of both awareness knowledge and correct information were found to be the indices of agricultural improvement, agricultural communication and change agency contact. When dealing with the findings of agricultural innovativeness in a previous section of the present chapter we broke each of these three indices into their constituent items to see how each is related to agricultural innovativeness. We intended to perform a similar analysis with regard to awareness knowledge and correct information about innovations.

It turns out, however, that the results of the analysis involving both awareness knowledge and correct information* are so similar to those found when dealing with agricultural innovativeness that whatever comments we would make about them would tend to be largely repetitive of those already made with regard to agricultural innovativeness.

Thus, the table displaying the manner in which the constituent items of each of the three indices are related to both awareness knowledge and correct information about agricultural innovations have been placed in the appendices to this report (Appendix C)**

However, a major objective of the present report pertains to the cultivation of new ideas in the minds of men. Since awareness knowledge and correct information about new agricultural ideas represent manifestations of a successful cultivation of such new ideas in the minds of men, it would be useful to the change agent if the findings of certain key independent variables were displayed in simple tabular form rather than remain as correlation coefficients.

Characteristics of Three Levels of Awareness Knowledge

Because of the high degree of similarity of findings between awareness knowledge and correct information about agricultural

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*Indeed, comparing the way the constituent items of each of the three indices relate to awareness knowledge on the one hand and correct information on the other, we note a similarity of findings so close that rarely do corresponding figures differ by more than two percentage points (See Appendix C).

**The reader is invited to study Appendix C and compare the findings reported in it with those already described when dealing with agricultural innovativeness (See Table IV/5).

innovations (See Appendix C), it was decided to use only one of these two dependent variables to see how certain key independent variables are related to it.

The awareness knowledge index was selected and trichotomized to form three categories of farmers: namely, (1) low awareness farmers: i.e., farmers who were aware of no more than two of the 14 agricultural innovations, (2) medium awareness farmers; i.e., those aware of between three and five of the 14 innovations, and (3) high awareness farmers; i.e., those aware of more than five of the 14 innovations.

The key independent variables which were selected are those which survived step-wise regression and, therefore, represent the most parsimonious correlates of the index of agricultural awareness. Each of the selected variables was dichotomized to produce two categories of respondents per variable; one containing all the respondents scoring zero on that variable and the other containing all those respondents scoring greater than zero on that variable.

Table IV/11 presents the results of cross-tabulating these key independent variables with the three categories of the dependent variable. Both the percentage of respondents scoring greater than zero on a variable, and the mean score on that variable attained by respondents in each of the three categories of the dependent variable, are presented in Table IV/11.

Without exception, substantially higher percentages are recorded for high awareness farmers on each of the independent variables, with the percentages for medium awareness farmers falling consistently

Table IV/11. CROSS-TABULATIONS OF KEY INDEPENDENT VARIABLES BY THREE CATEGORIES OF AWARENESS KNOWLEDGE OF INNOVATIONS

INDEPENDENT VARIABLES	AWARENESS KNOWLEDGE OF INNOVATIONS			
	Low Awareness	Medium Awareness	High Awareness	Total Sample
Some Agency Contact*	20%	48%	77%	50%
Mean Number Contacts	1.5	1.5	4.0	.19
Some Agric. Improvements	7%	28%	56%	32%
Mean Improvement Score	.3	1.0	4.4	1.6
Knows Some Agents	8%	29%	68%	31%
Mean Knowledge Score	.1	.3	.7	.3
Some Education	22%	40%	62%	42%
Mean Level Attained	.2	.5	1.0	.3
Some Cosmopolitness	55%	68%	83%	70%
Mean Number of Trips	1.6	3.0	4.7	3.1
Some Movie Exposure	17%	36%	49%	25%
Mean Number Seen	.2	.7	1.3	.8
Some Group Membership	80%	94%	96%	90%
Mean Number Groups	1.7	2.7	3.4	2.6
Some Commercialization	32%	46%	52%	46%
Mean Commercialization Score	1.0	1.6	2.2	1.6
BASE N =	336	396	410	1,142

*To obtain the percentage of respondents having no agency contact, simply subtract percentages in the rows from 100%. Thus, 80 (i.e., 100-20) percent of the low awareness farmers had no contact with change agencies. A similar operation can be carried out with regard to each of the other independent variables.

between the high and low awareness farmers.

Change Agency Contact. Over three quarters of the high awareness farmers have had at least one exposure to an average of four of the six expert sources of agricultural information.* Only one fifth of the low awareness farmers were exposed to an average of less than one** of the six expert sources.

Agricultural Improvement. Over half of the high awareness farmers improved their farming on the basis of contact with expert sources as compared with less than a tenth of the low awareness farmers. The mean improvement score reported by high awareness farmers is considerably higher (4.4 out of a possible eight) as compared iwth low awareness farmers(.3).

Knowledge of Extension Agents. Two thirds of the high awareness farmers knew at least one government extension officer by name whereas less than a tenth of the low awareness farmers claimed to know one by name.

Cosmopoliteness (Visited out). While the majority of the general sample made an average of 3.1 visits outside their immediate village, the high awareness farmers are by far more frequent travellers (four fifths of them reported an average of 4.1 visits) as compared to the low awareness farmers (about half of them reported an average of 1.6 visits).

Level of Education. Two thirds of the high awareness farmers have attained a level of education equivalent, on the average, to having completed primary schooling whereas only one fifth of the low awareness farmers had reported receiving any schooling at all.

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*The six sources are exposure to (1) agricultural radio programs, (2) agricultural demonstrations, (3) agricultural newsletters, (4) agricultural lectures, (5) agricultural movies, and (6) agricultural officers.

**Less than one on the average because the majority of low awareness

Movie Exposure. While the incidence of movie exposure in the general sample is very low (only a quarter of the total respondents reported seeing any movies in the preceeding year), the incidence of movie exposure among high awareness respondents is, nevertheless, considerably higher than it is among low awareness farmers.

Group Membership. Almost everybody (90 percent) in the general sample belongs to at least one formal village group. However, among high awareness farmers, membership to an average of 3.4 village groups is almost universal (96 percent) while, among the low awareness farmers, four fifths of them belong to an average of only 1.7 formal village groups.

Commercialization of Palm Products. More than half the high awareness farmers sold some of their palm products as compared to only a third of the low awareness farmers.

To summarize, therefore, farmers exhibiting a high level of awareness knowledge about farming innovations tend also to exhibit higher levels of (1) contact with change agencies, (2) agricultural improvement based on the contact, (3) knowledge of extension agents, (4) education attainment, (5) visits outside their immediate social systems, (6) movie exposure, (7) formal group membership and (8) commercialization of such palm products as palm wine, palm kernel and palm oil, than other members of their social system.

Finally, as indicated in Table IV/12, over four fifths of the high awareness individuals were above the mean on correct information

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farmers had no contact whatsoever.

about agricultural innovations, as compared to over four fifths of the low awareness individuals who were below the mean.

TABLE IV/12 CROSS-TABULATIONS OF AWARENESS KNOWLEDGE AGAINST CORRECT INFORMATION ABOUT AGRICULTURAL INNOVATIONS

CORRECT INFORMATION	AGRICULTURAL AWARENESS			
	LOW AWARENESS	MEDIUM AWARENESS	HIGH AWARENESS	TOTAL
Below the mean	88%	73%	18%	61%
Above the mean	12	27	82	29
Mean number correct	2.3	4.6	7.3	4.9
Base N=	336	396	410	1,142

On the average, individuals with high awareness were able to give correct information with regard to about seven of the 14 innovations whereas the low awareness individuals were able to provide correct information for a little over two of the agricultural innovations. Thus, individuals who tend to be aware of the existance of many innovations also tend to be able to provide accurate information on salient details pertaining to those innovations.

EXPLAINING HEALTH KNOWLEDGE AND ADOPTION

Because of the similarity of findings for the two dependent variables, (1) knowledge about health problems and (2) adoption of health innovations, we shall present findings about them together, rather than separately as was done for agricultural innovativeness and knowledge of agricultural innovations.

The health adoption index took account of whether or not an individual had adopted each of four health innovations, but did not take account of time of adoption.

The health knowledge index, which is comparable to the index of correct information about agricultural innovations, took account of whether or not an individual was able to demonstrate sufficient knowledge of the causes of three major health problems.

Zero-Order Correlates of Health Adoption and Health Knowledge

The correlation coefficients of the 15 independent variables* which proved to be the highest correlates of health adoption and health knowledge, are presented in Table IV/13. The highest correlates are examined below in terms of the conceptual categories of variables from which they were drawn.

Personal Characteristics are represented by (1) level of education and (2) functional literacy. Thus, the higher the level of education and literacy that an individual has, the more likely he is to have adopted health innovations and to know what causes certain health problems.

Social Status Characteristics are represented by (1) group membership, (2) group officership, (3) index of personal possessions and (4) house type. Thus, individuals belonging to or active in formal village organizations, and who tend to possess personal and household artifacts of modernization, and who tend to own a house with brick

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*The procedures for selecting these 15 variablss are similar to those described in the footnote on page 42 .

TABLE IV/13 HIGHEST CORRELATES* OF HEALTH KNOWLEDGE AND ADOPTION

INDEPENDENT VARIABLES	DEPENDENT VARIABLES	
	Health Knowledge Index	Health Adoption Index
Index of Personal Possessions	.42**	.38 **
Level of Education	.42**	.28
Newspaper Exposure	.39**	.26
Functional Literacy	.39	.22
Radio Exposure	.34	.28
Cosmopoliteness (Visit out)	.34**	.31**
Index of Change Agency Contact	.32	.29
Index of Agricultural Communication	.31	.24
Index of Agricultural Improvement	.29	.23
Educational Aspiration	.27**	.29**
Cosmopoliteness (lived out)	.27	.19
Knowledge of Agricultural Advantages	.24**	.34**
House Type	.16	.24**
Formal Group Officership	.13	.22
Formal Group Membership	.12**	.24
Base N=	1,142	1,142
Multiple Correlation (Using all variables)	.53	.51
Multiple Correlation (Variables surviving LSDEL)	.53	.29
Percentgge of Variance Explained (After LSDEL)	28%	24%

*Excluding the other dependent variables of the study.

**Variables surviving step-wise regression (LSDEL), thus constituting the most parsimonious team of multiple correlates capable of explaining variance in the dependent variables with maximum efficiency.

walls and/or a tin roof, also tend to have adopted health innovations and to know about the causes of certain health problems.

Attitudinal Characteristics are represented by one variable: educational aspiration. Thus, individuals who would have liked to have attained higher levels of education than they did, also tend to have adopted health innovations and to know about the causes of certain health problems.

Communication Behavior Characteristics are, once again, by far the most well represented of all the categories of independent variables. As in the case of agricultural innovativeness and knowledge, the indices of (1) agricultural improvement, (2) agricultural communication and (3) change agency contact about agricultural matters are salient, though to a lesser degree. Included also are the individual's exposure to (4) radio, (5) newspapers and (6) other cosmopolite sources of information which are external to his village.

Thus, individuals who tend to be exposed to both general and specialized sources of information and who talk to each other about the ideas gained from such exposure, tend also to have adopted health innovations and to know about the causes of certain health problems.

Family and Farm Characteristics yielded no variables which were useful in explaining either health adoption or health knowledge.

Multiple Correlations of Health Knowledge and Adoption

To determine the most parsimonious set of multiple correlates of health knowledge and adoption; the 15 independent variables listed in Table IV/13 were submitted to step-wise regression.

Explaining Health Knowledge Parsimoniously

Given the nature of the data that were collected and the manner in which they were processed for analysis, the results of step-wise regression show that knowledge about the causes of certain health problems can be most efficiently and parsimoniously explained by taking account of only seven of the 15 independent variables. These seven variables are (1) the index of personal possessions, (2) level of education, (3) newspaper exposure, (4) cosmopoliteness, (5) educational aspiration, (6) knowledge of agricultural advantages and (7) group membership (Table IV/13).

Together, these seven variables yielded a multiple correlation of .53 with the health knowledge index, i.e., an explanation of 28 percent of the variance in health knowledge.

Displayed in Table IV/14 are the intercorrelations among these seven most efficient explainers of health knowledge. Two variables, education and personal possessions stand out as being more consistently highly correlated with each of the other variables.

Thus, individuals who tend to (1) be more educated, (2) possess more artifacts of modernization, (3) read more newspapers, (4) visit outside their village more frequently, (5) have higher educational aspiration, (6) know the advantages acruing from the adoption of innovations and (7) hold membership in formal groups, are also likely to have higher levels of knowledge about the causes of certain health problems.

Explaining Health Adoption Parsimoniously

The results of step-wise regression show that a slightly smaller percentage of variance than was found for health knowledge, can be

Table IV/14. INTERCORRELATIONS AMONG THE MOST PARSIMONIOUS CORRELATES OF HEALTH KNOWLEDGE. (BASE N = 1,142)

	Level of Education	Personal Possessions	Newspaper Exposure	Cosmopo-liteness	Educational Aspiration	Agricultural Advantages
Personal Possessions	.48	---				
Newspaper Exposure	.55	.49	---			
Cosmopo-liteness	.39	.52	.37	---		
Educational Aspirations	.26	.36	.24	.28	---	
Agricultural Advantages	.26	.27	.23	.22	.30	---
Group Membership	.24	.39	.23	.23	.20	.23

explained with regard to health adoption by taking account of only five of the 15 independent variables listed in Table IV/13.

These five variables are (1) the index of personal possessions, (2) cosmopoliteness, (3) knowledge of agricultural advantages, (4) educational aspirations and (5) house type. With the exception of house-type,* all the variables surviving step-wise regression regarding health adoption were also included as the most parsimonious explainers of health knowledge.

Thus, individuals who tend to (1) possess more artifacts of modernization, (2) visit other cities and towns more frequently (3) know about the benefits to be realized from adopting certain agricultural

*House type is correlated .39 with personal possessions, .17 with agricultural advantages, .17 with educational aspiration and .21 with cosmopoliteness.

innovations (4) have a higher level of educational aspiration and (5) possess a house with brick walls and/or a tin roof, tend also to be higher adopters of certain health innovations.

EXPLAINING OPINION LEADERSHIP

The opinion leadership index was constructed by taking account of the sociometric nominations received by an individual as (1) an initiator of new farming ideas, (2) a legitimizer of new farming ideas and (3) an implementer of new farming ideas.

Zero-Order Correlates of Opinion Leadership

The correlation coefficients of the 18 variables* found to be highly correlated with opinion leadership are presented in Table IV/1b. The list includes other dependent variables. The 18 highest correlates are examined below in terms of the conceptual categories of variables from which they are drawn.

Personal Characteristics are represented by level of education. Thus, there is a tendency for opinion leaders to have higher levels of education than other members of their social system.

Social Status Characteristics are represented by (1) group membership, (2) group officership, (3) the index of personal possessions and (4) house type. In the Eastern Nigerian context, number of wives owned is also taken as an indicant of social status.

Thus, individuals who belong to or are active in village organizations, and who tend to possess personal and household artifacts of modernization and who tend to own a house with brick walls and/or a

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*The procedures for selecting these 18 variables are similar to those described in the footnote on page 42.

Table IV/15. HIGHEST CORRELATES OF OPINION LEADERSHIP

INDEPENDENT VARIABLES	DEPENDENT VARIABLE Opinion Leadership Index
Group Officership	.35*
Index of Change Agency Contact	.33*
Index of Agricultural Improvement	.31
Index of Agricultural Communication	.31
Agricultural Innovativeness Index	.30
Knowledge of Extension Agents	.28*
Group Membership	.28
Agricultural Adoption Index	.25
Number of Wives Owned	.25*
Index of Personal Possessions	.25
Knowledge of FAID Credit	.25
Awa eness Knowledge Index	.24
Correct Information Index	.24
Labor Force	.24*
Total Number of Children Possessed	.23
Adoption of Community Plantations	.23*
House Type	.22*
Newspaper Exposure	.21
Education	.21
	BASE N = 1,142
Multiple Correlation (using all variables)	.53
Multiple Correlation (only variables surviving LSDEL)	.51
Percent of Variance Explained (after LSDEL)	26%

*Variables surviving step-wise regression (LSDEL), thus constituting the most parsimonious team of multiple correlates capable of explaining variance in the dependent variable with maximum efficiency.

tin roof, and who tend to have more than one wife, also tend to be perceived as opinion leaders by other members of their social system.

Knowledge Characteristics are represented by (1) knowledge of extension agents and (2) knowledee of FAID* credit facilities. Thus, individuals who know agricultural officers by name and who know about the FAID credit facilities also tend to be perceived by their peers as being opinion leaders.

Also included among knowledge characteristics are awareness knowledge and correct information about farming innovations, both of which are associated with opinion leadership.

Family Characteristics are represented by (1) number of wives owned, and (2) total number of children (both dependent and self-sufficient) possessed.** Thus, the more wives an individual has, and the more children he has, the more likely it is for that individual to be perceived as an opinion leader by his peers.

Farming Characteristics are represented by one variable, labor force.*** Thus, individuals who tended to employ many laborers to make yam reaps or plant yams tended also to be perceived as opinion leaders by their peers.

Also included among farming characteristics are agricultural innovativeness and agricultural adoption of new farming practices, both of which are significantly correlated to opinion leadership.

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*FAID (The Fund for Agricultural and Industrial Development) is the first step in the direction of a government credit organization. At the time of the study, the loans were so difficult to get and applications so slowly processed that only 113 loans had been approved by the end of the financial year 1965-66.

**Possession of many wives is correlated .60 with possession of many children.

***Labor force was operationalized by asking farmers how many laborers they usually employed on one day to make yam heaps (plant yams).

Communication Behavior Characteristics are represented by the three indices of (1) change agency contact, (2) agricultural communication and (3) agricultural improvement, and (4) exposure to newspapers. Thus, individuals who tend to have high contact with sources of expert information about farming matters, and who not only talk about the information gained but also perceive themselves to have improved their farming as a result of the contact, tend also to be perceived by their peers as being opinion leaders.

Attitudinal Characteristics yielded no variables useful for explaining variance in opinion leadership.

Multiple Correlation of Opinion Leadership

The most parsimonious team of multiple correlates of opinion leadership were determined by submitting the 18 variables listed in Table IV/15 to step-wise regression.

Explaining Opinion Leadership Parsimoniously.

Given the nature of the data collected in Eastern Nigeria and the manner in which they were processed for analysis, the results of step-wise regression show that opinion leadership can be most parsimoniously explained by taken account of only seven of the 18 variables. These seven variables are (1) group officership, (2) the index of change agency contact, (3) knowledge of extension agents (4) number of wives owned, (5) adoption of community plantations* and

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*Community Plantations are organized by the Ministry of Rural Development to encourage co-operative use of village land. Village co-operatives are organized, formally registered as associations, and its members are instructed in the management of community plantations of either cocoa, palm or rubber.

(7) house type (See Table IV/15).

These seven variables combine to yield a multiple correlation of .51 with opinion leadership; i.e., an explanation of 26 percent of the variance in opinion leadership.

Table IV/16 displays the intercorrelations among the seven most efficient explainers of opinion leadership. While the intercorrelations are generally low, the index of change agency contact does,

Table IV/16. INTERCORRELATIONS AMONG THE MOST PARSIMONIOUS EXPLAINERS OF OPINION LEADERSHIP

	Agency Contact	Group Officer	Knows Agents	Number Wives	Labor Force	House Type
Group Officership	.34	---				
Knows Agents	.43	.16	---			
Number of Wives	.08	.22	.06	---		
Labor Force	.21	.14	.09	.18	---	
House Type	.27	.17	.18	.19	.09	---
Community Plantations	.24	.08	.22	.08	.09	.07

nevertheless, stand out as the one variable most consistently highly correlated with each of the other variables.

Thus, individuals who tend (1) to hold official positions in village groups, (2) to have more contact with expert sources of agricultural information, (3) to know agricultural officers by name (4) to have more than one wife, (5) employ many laborers to make yam heaps, (6) be active in village cooperatives for the management of community plantations and (7) live in a house with brick walls and/or

a tin roof, also tend to be perceived by other members of their social system as being able to informally influence other individual's attitudes and overt behaviors in a desired way with relative frequency.

Comparing Opinion Leaders and Followers

Opinion Leadership was initially dichotomized to yield two groups of individuals representing (1) the leaders and (2) the "others", who we shall call the followers.*

The dichotomy yielded 328 individuals (i.e. about one quarter of the total sample of respondents) who received at least one leadership nomination from his peers. It seemed obvious that not all of these individuals exerted an equal amount of influence on the attitudes and overt behavior of others. Indeed, an examination of the distribution of nominations among these individuals (Figure IV/1) reveals that a large proportion (28 percent) of the nominated individuals received less than ten percent of the nominations, whereas a very small minority of the nominated individuals (one percent) received greater than 60 percent of all nominations.

Thus while opinion leadership is a fairly widespread trait, it appears, nevertheless, that it is especially concentrated** in a few individuals. That is, while a large number of individual may

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*A follower, then, may be defined as an individual whose attitudes and overt behavior may be influenced in a desired direction with relative frequency by individuals who he perceives as being informal leaders.

**It was possible to determine the precise degree of leadership concentration in a few individuals. A standard measure of the concentration of opinion leadership in social systems was developed by adapting an already existing measure known as the Gini ratio. This ratio is an index of the concentration of incomes in a social system. In the present analysis a Gini ratio of 87 percent was determined suggesting a remarkably high concentration of opinion leadership in a few individuals across the 18 village systems' studied.

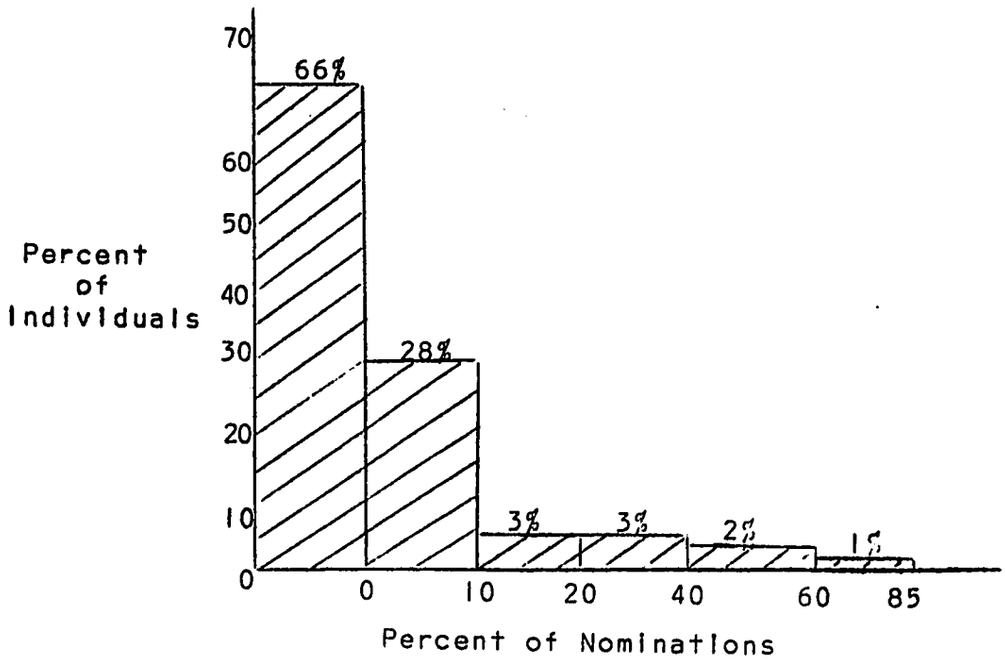

Figure IV/1. DISTRIBUTION OF OPINION LEADERSHIP NOMINATIONS

have some moderate sphere of influence, there are, on the other hand, a few individuals' whose sphere of influence encompasses the majority of individuals in a social system.

This being the case, it was decided to further dichotomize opinion leaders into those with a moderate sphere of influence and those with a high degree of leadership concentration. To achieve this end, any individual who had polled less than ten percent* of all nominations was deemed a moderate leader while all individuals polling ten percent of the nominations or greater were deemed to be high opinion leaders.

* As shown in Figure IV/1, 28 percent of the sample polled ten percent or less of the nominations. However, the bulk of these individuals were in the one to seven percent range. It was decided, therefore, to include all individuals polling exactly ten percent of the nominations with the high opinion leaders, hence the slight variance between the bases shown in Table IV/17 and the percentages shown in Figure IV/1.

Table IV/17, therefore, presents findings which allows us to compare three groups of individuals, high leadership individuals, low leadership individuals and followers. The key independent variables which were selected to compare the three groups are those which survived step-wise regression (Table IV/15).

Characteristics of Leadership on Key Independent Variables

The key independent variables which are used to compare leaders and their followers were dichotomized for tabulational purposes. Table IV/17 shows the results of cross-tabulating these independent variables against the dependent variable.

Across all the independent variables, the highest percentages and means are consistently recorded for high leadership, the lowest percentages and means are recorded for the followers and the moderate leaders consistently fall in between these two extremes.

Level of Education. Three fifths of the high leadership individuals have attained a level of education equivalent, on the average, to having completed primary schooling whereas only two fifths of the followers reported receiving any schooling at all.

Number of Wives Owned. Nearly half the high leadership individuals owned two or more wives as compared to slightly more than one fifth of the followers owning more than one wife.

Number of Dependent Children Owned. While the majority of the sample (81 percent) reported owning at least one dependent child, almost all the high leadership individuals (97 percent) owned an average of five dependent children whereas only three quarters of the followers reported owning an average of only three children.

Table IV/17. CROSS-TABULATIONS OF KEY INDEPENDENT VARIABLES BY THREE CATEGORIES OF OPINION LEADERSHIP

INDEPENDENT VARIABLES	OPINION LEADERSHIP			
	Followers	Low Leaders	High Leaders	Total
Education (Primary or more)*	39%	44%	59%	42%
Mean level attained	.5	.5	.9	.5
Wives owned (Two or more)	22%	39%	45%	26%
Mean number of wives	1.1	1.3	1.7	1.2
Dependent children (one or more)	77%	83%	97%	81%
Mean number dependent children	3.2	4.0	5.2	3.6
Labor force employed (One or more)	51%	69%	86%	59%
Mean number employed	2.1	3.2	5.1	2.2
Knows extension agent (Yes)	23%	40%	66%	31%
Proportion knowing	.2	.4	.7	.3
House Type (Brick and/or tin roof)	12%	22%	36%	17%
Mean score	.2	.4	.6	.3
Group officer (One or more positions)	39%	52%	74%	46%
Mean number of positions	.7	1.2	2.1	1.0
Agency Contact (One or more contacts)	42%	60%	77%	50%
Mean number of contacts	1.4	2.3	3.6	1.9
Adopted Community Plantations (Yes)	10%	13%	24%	13%
Proportion adopting	.1	.1	.2	.1
BASE N =	814	168	160	1,142

*To determine the percentage of individuals who had less than a primary level of education, simply subtract each percentage in the row from 100%. Thus in the total sample, 42 percent of the respondents had some primary education or more, whereas 58 (100-42) percent had no primary education. A similar procedure may be followed for all other independent variables.

Labor Force Employed. Most of the high leadership individuals (86 percent) reported employing an average of five laborers on a single day to make yam heaps, as compared to only half of the followers employing an average of only two laborers per day for the same purpose.

Knowledge of Extension Agents. Two thirds of the high leadership individuals, as compared to only one fifth of the followers were able to report knowing at least one extension officer by name.

House Type. A house with brick walls and/or a tin roof appears to be a rarity in Eastern Nigeria (only 17 percent of the sample owned such a house). However, more than a third of the high leadership individuals reported owning such a house as compared to slightly more than one tenth of the followers claiming to own such a house.

Formal Group Officership. Most of the respondents (30 percent) held membership in at least one formal village organization. However, less than half of them (46 percent) were formal office-bearers in these organizations.

Among high leadership individuals, three quarters of them occupy formal positions, indicating a substantial overlap between formal and informal leadership. Indeed, most high leadership individuals occupy an average of two formal positions as compared to the total sample average of one position.

Change Agency Contact. Over three quarters of the high leadership individuals, as compared to about two fifths of the followers, have had at least one exposure to an average of more than three sources of expert information about agricultural matters.

Adoption of Community Plantations. A little in excess of one tenth of the total sample reported themselves as currently participating in any of the co-operative community plantation schemes. A quarter of the high leadership individuals, as compared to one tenth of the followers, were found to be active participants in community plantation schemes.

To summarize, therefore, farmers who are perceived by greater than ten percent of their peers as being informal opinion leaders also tend (1) to be more educated than their followers, (2) to own more wives and dependent children than their followers, (3) to employ a larger labor force to make yam heaps (4) to know extension officers by name, (5) to own a house with brick-walls and/or a tin roof, (6) to hold formal leadership positions (7) to belong to co-operative community plantation schemes and (8) to have more contact with sources of expert agricultural information than the other members of their social system.

Characteristics of Leadership on Other Dependent Variables

The four other main dependent variables--agricultural innovativeness, knowledge of agricultural innovations, health practice adoption, and knowledge of health problems--were dichotomized for purposes of cross-tabulating them against three levels of opinion leadership; namely, followers, moderate leaders and high concentration leaders. The results are displayed in Table IV/18.

Across the four dependent variables, greater percentages and means are reported for high leaders than for moderate leaders and followers. The latter categories of individuals appear to be similar

Table IV/18. CROSS-TABULATIONS OF OTHER DEPENDENT VARIABLES BY THREE LEVELS OF OPINION LEADERSHIP

OTHER DEPENDENT VARIABLES	OPINION LEADERSHIP			
	Followers	Low Leaders	High Leaders	Total Sample
Health Knowledge (Above mean)*	46%	47%	69%	47%
Mean Level of Knowledge	2.9	2.8	3.4	
Health Adoption (one or more Adoptions)	67%	70%	84%	70%
Mean Level of Adoption	5.6	5.9	6.7	5.8
Awareness Knowledge (Above Mean)	39%	61%	70%	47%
Mean Level of Awareness Knowledge	5.1	7.4	8.6	6.4
Correct Information (Above Mean)	32%	49%	64%	39%
Mean Level of Correct Information	4.5	5.6	6.6	4.9
Agricultural Innovativeness (One or More Adoptions)	51%	64%	81%	57%
Mean Level of Innovativeness	2.8	3.8	6.5	3.4
Agricultural Adoption (One or More Adoptions)	45%	57%	74%	51%
Mean Proportion of Adoptions	.07	.09	.16	.08
Base N =	814	168	160	1,142

* To obtain the percentages of individuals below the mean on health knowledge, simply subtract each percentage in the row from 100%. Thus, 47 percent of the total sample were above the mean on health knowledge whereas 53 (100-47) percent were below the mean.

on health knowledge and health adoption but markedly different on agricultural innovatives and knowledge.

Health Knowledge. Over two thirds of the high leadership individuals, as compared with slightly under half the moderate leaders and the followers, were above the mean on knowledge about the causes of certain health problems.

Health Adoption. A relatively high level (70 percent) of adoption of at least one health practice was recorded across the whole sample. However, a higher percentage (89 percent) of high leadership individuals reported some adoption as compared to the low leadership individuals and the followers (70 percent and 67 percent respectively).

Knowledge of Agricultural Innovations. On both the awareness knowledge index and the correct information index, considerably higher percentages are recorded for high leadership individuals than for followers. On awareness knowledge, high leadership individuals were aware of an average of 8.6 (out of a possible 14) innovations whereas followers were aware of an average of only 5.1 innovations. A similar trend is evident on the index of correct information.

Agricultural Innovativeness. At least four fifths of the high leadership individuals as compared with about half the followers, have adopted at least one of the 14 innovations. It is important to observe here that the high leadership individuals tend to be considerably earlier adopters than their followers. Their average "earliness" of adoption is 6.5 years; (i.e. they adopted at least one innovation in 1960 (1967-6.5). Followers, on the other hand

are, on the average, more recent adopters of at least one innovation. They have an average "earliness" of adoption of 2.8 years, i.e. they tended, on the average, to adopt at least one innovation in 1964 (1967-2.8).

Around three quarters of the high leadership individuals tended to be using a proportion of .16 (or 16 percent) of those innovations which were being used by at least one individual in their villages in 1966. Among the followers, somewhat less than a third of them were using a proportion of .07 (or 7 percent) of those innovations which were adopted by at least one person in their villages during 1966.

Therefore, high leadership individuals tended not only to be earlier adopters of innovations but also had adopted more innovations than their followers.

Thus, to summarize, individuals who tend to be perceived by their peers as having the capacity to informally influence the attitudes and overt behaviors of others in a desired way with relatives frequency also tend (1) to have higher knowledge levels of the causes of certain health problems, (2) to have higher adoption levels of health innovations, (3) to have higher levels of awareness knowledge and correct information about agricultural innovations, and (4) to be relatively earlier adopters of agricultural innovations and to have adopted greater proportions of agricultural innovations than other members of their social system.

CHAPTER V

SUMMARY AND CONCLUSIONS

So far, we have presented findings by taking each of the five dependent variables of the present study and describing them in terms of those of their correlates which provided the most efficient and parsimonious explanation of variance in each of them. With regard to each of the five variables, differing sets of independent variables were found to be the most useful for explaining variance in them with maximum efficience.

Agricultural Innovativeness, it was found, could be most efficiently explained by taking account of only a few of the independent variables; namely, (1) the index of agricultural improvement (which subsumed the index of change agency contact), (2) functional literacy, (3) formal group membership and (4) knowledge of the advantages likely to acrue from the adoption of innovations. These variables explained a little over two fifths of the variance in agricultural innovativeness.

The Index of Awareness Knowledge about agricultural innovations, we found, could be most economically explained by eight independent variables; namely, (1) change agency contact, (2) the index of agricultural improvement, (3) knowledge of extension officers, (4) education, (5) cosmopoliteness, (6) movie exposure, (7) formal group membership and (8) commercialization of palm products. The amount of variance in awareness knowledge explained by these eight variables was 44 percent.

The Index of Health Adoption, it was determined, could be adequately explained by considering only five of the independent variables measured in the present study; namely, (1) the index of personal possessions, (2) cosmopoliteness, (3) educational aspiration, (4) knowledge of the advantages to be gained from adopting innovations and (5) housetype. Together, these five variables explained about a quarter of the variance in health adoption.

The Health Knowledge Index, it turns out, can be most efficiently explained by taking account of only seven of the variables studied in Eastern Nigeria; namely, (1) the index of personal possessions, (2) education, (3) newspaper exposure, (4) cosmopoliteness, (5) educational aspiration, (6) knowledge of agricultural advantages and (7) formal group membership. Given these variables, we find that we are able to explain somewhat more than a quarter of the variance in health knowledge.

Finally, Opinion Leadership is most parsimoniously explained by taking only seven variables into consideration; namely, (1) formal group officership, (2) the index of change agency contact, (3) knowledge of extension agents, (4) number of wives owned, (5) labor force employed, (6) participation in community plantation schemes and (7) house type.

Common Links Across Dependent Variables

Examining the teams of most parsimonious correlates of (1) awareness knowledge of agricultural innovations, (2) agricultural innovativeness, and (3) opinion leadership, there would appear to be a common set of variables which seemingly link these three dependent variables together.

In each team of multiple correlates, the following independent variables are present: (1) the index of agricultural improvement and/or the index of change agency contact, (2) functional literacy or education, and (3) formal group membership or officership. In other words, featuring prominently in each team of multiple correlates are (1) a communication characteristic (2) a personal characteristic* and (3) a social status characteristic.

Now, two of the three dependent variables, awareness knowledge and agricultural innovativeness, ought logically to be directly related to each other. Certainly, we do not expect a farmer to have adopted an innovation before becoming aware of its existance. However, the manner in which the third dependent variable opinion leadership, relates to and interacts with agricultural innovativeness and awareness knowledge is less obvious.

What the findings indicate is that opinion leadership is significantly related to agricultural innovativeness and awareness knowledge. That is, opinion leaders tend to have higher levels of awareness knowledge and innovativeness then do their followers. Yet, neither awareness knowledge nor agricultural innovativeness survive step-wise regression as members of the most parsimonious team of correlate explaining variance in opinion leadership.

The most probable explanation of their absence from the team of multiple correlates seemingly involves the notion of relative time order. What comes before what? Does an individual develop opinion

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* While we have chosen to label both education and literacy as personal characteristics, we could also have justifiably labelled them communication characteristics inasmuch as both of them are tools for broadening and enhancing the content of communication.

leadership as a consequence of having been relatively earlier than others to adopt new ideas and practices? Or is it likely that the individual is already an opinion leader and, as a function of his leadership, tends to be relatively earlier to adopt innovations. If the former supposition were true, then one would expect awareness knowledge and innocativeness to predict opinion leadership; i.e., knowing that an individual is relatively earlier than others to become aware of and adopt new ideas enables us to predict that at some future time, he is also likely to emerge as an opinion leader. If this were the case, then we would also expect awareness knowledge and agricultural innovativeness to survive in the team of most parsimonious correlates of opinion leadership. But they did not survive.

So, maybe opinion leadership preceeds rather than succeeds awareness knowledge and innovativeness to survive in the team of most parsimonious correlates of opinion leadership. But they did not survive.

So, maybe opinion leadership preceeds rather than succeeds awareness knowledge and innovativeness in time. If this were the case, then we would expect opinion leadership to predict awareness knowledge and innovativeness; i.e., knowing that an invividual is an opinion leader enables us to predict that he will tend to adopt new ideas and practices relatively earlier than other members of his social system. Furthermore, we would expect opinion leadership to survive step-wise regression and to feature prominently as a member of the most parsimonious team of multiple correlates of either awareness knowledge or agricultural innovativeness. To say it another

way, the relative time order of occurance among the three dependent variables might very likely be opinion leadership first, awareness knowledge second and overt adoption behavior last.

Thus, while awareness knowledge and agricultural innovativeness may not have survived step-wise regression because they are probably not predictors* of opinion leadership, there is no apparent reason why opinion leadership should not survive step-wise regression in a team of multiple predictors of awareness knowledge and agricultural innovativeness. Indeed, if we make the reasonable assumption that agricultural innovativeness (i.e., overt adoption behavior) is an end-product of a series of events occurring earlier in time, then we can expect that predictors of this end-product might include not only opinion leadership and awareness knowledge in that order, but also the three linking variables mentioned earlier; i.e., agricultural improvement deriving from change agency contact, functional literacy or education, and formal group membership or officership.

These five antecedent variables, therefore, have the potential of constituting the core of the most parsimonious predictors of agricultural innovativeness.

Predicting Agricultural Innovativeness

To test this proposition, we submitted the following variables to step-wise regression in order to determine the most parsimonious and efficient set of predictors of agricultural innovativeness: (1) the health knowledge index, (2) the health adoption index,

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* They may, therefore, be considered postdictors of opinion leadership since knowing that an individual is an innovator may allow one to say that he was very likely an opinion leader as an anticedent of his becoming an innovator.

(3) the functional literacy index, (4) educational attainment, (5) the awareness knowledge of agricultural innovations index, (6) the correct information about agricultural innovations index, (7) the knowledge of agricultural advantages index, (8) membership in formal groups, (9) officership in formal groups, (10) the index of agricultural improvement resulting from change agency contact, and (11) the opinion leadership index. The results of step-wise regression are displayed in Table V/1.

The findings clearly support the expectation that the two dependent variables (namely, awareness knowledge and opinion leadership), coupled with the common set of three independent variables (namely, the agricultural improvement index, functional literacy and formal group membership), together constitute the most efficient set of predictors of agricultural innovativeness. Thus, if an individual (1) is perceived by others to be an opinion leader, (2) is aware of more alternative innovations than others, (3) belongs to more formal village groups than others, (4) is more literate in English than others and (5) is likely not only to have more contact with agencies of change but also to make self-perceived improvements in his farming habits as a result of the contacts, then it can be predicted that that individual is likely to be relatively earlier to adopt new ideas and practices than other members of his social system.

IMPLICATIONS FOR THE CHANGE AGENT

Based upon the findings of the Phase II survey of Eastern Nigerian farmers, we can now take the first steps in constructing strategies for communicating new ideas to farmers. Whatever strategies we suggest at the present time will undoubtedly require further

Table V/1. MOST PARSIMONIOUS PREDICTORS OF AGRICULTURAL INNOVATIVENESS

INDEPENDENT VARIABLES	AGRICULTURAL INNOVATIVENESS
Agricultural Improvement Index	.59*
Awareness Knowledge Index	.50*
Correct Information Index	.44
Formal Group Membership	.35*
Knowledge of Agricultural Advantages	.35
Educational Attainment	.35
Functional Literacy	.34
Formal Group Officership	.32
Opinion Leadership	.30*
Health Knowledge Index	.25
Health Adoption Index	.17
BASE N =	1,143
Multiple R (Before LSDEL)	.67
Multiple R (After LSDEL)	.66
Percentage of Variance Explained (R^2 after LSDEL)	43%

* Variables surviving LSDEL (step-wise regression), thus constituting the most parsimonious team of multiple correlates predicting agricultural innovativeness with maximum efficiency.

refinement via further research in the future. Suffice it now to say that we have identified a few major, albeit somewhat gross predictors of agricultural innovativeness.

The evidence presented in this report points up contact between farmers and change agencies as being the single most important predictor of agricultural innovativeness. To render this information in some meaningful perspective, let us digress for a moment and examine Rogers' (1968) synthesis of prevailing theories of development.

By examining the works of many scholars of international development, Rogers developed the notion of the subculture* of peasantry. The central elements of the subculture of peasantry are:

1. Mutual distrust in interpersonal relations
2. Perceived limited good
3. Dependency upon and hostility toward government authority
4. Familism
5. Lack of innovativeness
6. Fatalism
7. Low aspirational levels
8. Lack of deferred gratification
9. Limited view of the world
10. Low empathy levels

These elements, it is held, characterize persons from traditional societies. Whether these ten elements are indeed valid descriptions of traditional persons is not being contested here.

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* A subculture contains many elements of the broader culture of which it is a part, yet can be characterized by particulars which set it apart from other parts of the culture.

Our interest is to suggest that they are probably not very important hinderances to modernization.

It is our thesis, based upon the findings of the present report, that whether or not the members of a social system manifest any or all of these tendencies is, in terms of obstacles to modernization, overshadowed by whether or not there are active agents of change extant in the social system. That is to say, while the ten elements may be important predictors of the likelihood of rapid change occurring in a social system, the presence or absence of agents of systematic change in that social system is an even more important predictor of change in that system.

Moreover, the picture of a traditional person suggested by the ten elements is so dismal that it is unlikely to strike enthusiasm in the hearts of even the most dedicated change agents. In other words, telling the change agent about the ten elements which characterize traditional people not only dampens his spirits but also provides him with a convenient excuse for his failures. A knowledge of the ten elements, therefore, may actually do more harm than good.

Thus, if the presence of change agents in a society is such an important predictor of its development, it follows, therefore, that motivating the change agent is probably more important than motivating the traditional farmer. In any case, since there are substantially more farmers than change agents, it is easier to concentrate upon motivating a few agents rather than trying to motivate masses of farmers. It is likewise easier to determine whether the ten elements describing a traditional individual are present in a few change

agents than it is to determine whether they are present in masses of farmers.

Given then that agencies of change probably constitute the single most important component for impelling directed change in a social system, the problem then becomes one of advising them about strategies for achieving change with a maximum efficiency and a minimum of cost, effort and time. That is, the change agent has been equipped with a new psychical seed variety, called a new idea, which he must plant in the minds of fhe farmers in his region. Rather than scatter the seed randomly among the farmers, what strategy, arising from the findings of the present study, could we suggest in order to allow him to achieve his ends quickly, cheaply and least effortfully?

Utilizing Opinion Leaders

If most individuals in a social system tend to go for advice and information to a few individuals whom they perceive to be opinion leaders, then the change agent should also go to the same opinion leaders for advice and information. Opinion leaders are useful to the change agent in two main ways.

Firstly, opinion leaders are the change agent's opinion weather vanes. Previous studies have generally found that opinion leaders tend to "conform more closely to social norms than the average member" (Rogers 1962, p, 233). Thus, by consulting with the opinion leader about a proposed change, the change agent may take a reading of prevailing attitudes toward whatever change he proposes. To say it another way, it is in the opinion leader that the change agent checks the normative pulse of s social system.

Second, the opinion leader can become the change agent's alder and abetter in initiating, introducing and implementing new ideas into the social system. Since the opinion leader is also perceived as the individual who must sanction new ideas and practices before others in the social system would be willing to place trust in them, he therefore, serves as the legitimizer of the change agents proposed changes. Thus, instead of trying to persuade all the members of a social system, the change agent concentrates his efforts upon persuading a relatively few opinion leaders to accept the changes he proposes. Persuading them to adopt a proposed change increases the likelihood that their followers will also adopt it without too much time and effort being expended upon them.

However, utilizing the opinion leader presupposes the fact that the average change agent can identify the opinion leaders. In the Eastern Nigerian context, we found that initators, legitimizers and implementers of new projects tend to be the same person. There also tends to be relatively few individuals in whom there is perceived to be a high degree of concentration of leadership qualities. That is, there appears to be a few individuals with respect to whom most members in a social system are in general agreement that they are leaders. Thus, a change agent need only ask the same sociometric questions that we used in the present study to identify the leaders. A small representative sample, say, 30, may be drawn for this purpose.

An alternative way of identifying opinion leaders is to look for individuals having characteristics which the findings of the present study show as describing opinion leaders. Thus, if an

individual holds an official position in two or more formal village organizations, and if at the same time, he has two or more wives, and five or more children and a house with brick walls and/or a tin roof and if he is functionally literate, then the chances of that individual also being an opinion leader are increased. The more characteristics of opinion leaders that he checks out, the more confident is the change agent that he has indeed discovered an opinion leader.

Having determined who the opinion leaders are, the change agent may proceed to apprise them of the many alternative courses of innovative behavior available to them. He should ensure that the information they have about different innovations is as correct and as detailed as possible. In a sense, the opinion leaders become the change agent's disciples and, as such, should be capable of passing on information to other members of the social system with high fidelity.

There are cautions to be observed in utilizing opinion leaders. Using them too often and too openly may reduce their effectiveness. The change agent may unwittingly have persuaded them to accept so many changes that they are in danger of being perceived as deviants by others in the social system. They may consequently cease to be opinion leaders.

Thus, a major strategy for introducing and perpetuating social change involves the identification of opinion leaders and the communication of new ideas and practices to them. Opinion leaders are not only useful weather vanes of the social climate of a system, but also important agents for overcoming resistance to the adoption of

innovations in the general population of a village system. With the cooperation of opinion leaders, the messages emanating from radio programs, from movies and demonstrations, and from lectures, newspapers and pamphlets are likely to be received by more hospitable and receptive minds.

Appendix A: HIGHEST ZERO ORDER CORRELATES AND MULTIPLE CORRELATES OF AGRICULTURAL ADOPTION AND INNOVATIVENESS

INDEPENDENT VARIABLES	DEPENDENT VARIABLES				
	Ag. Adoption (Total Score)	Proportion of) Ag. Adoption Index	Ag. Adoption (Variant)	Ag. Innovative-ness Index	Ag. Innovative-ness (Variant)
Index of Ag. Improvement	.45*	.49*	.56*	.59*	.55*
Index of Agency Contact	.30	.46	.46	.52	.51
Index of Ag. Communication	.35	.44	.46	.51	.48
Index of Personal Possession	.15	.33	.27	.38	.40
Education	.17	.35	.24	.35	.39*
Knowledge of Ag. Advantages	.01**	.35*	.31*	.35*	.39*
Newspaper Exposure	.13	.33	.22	.35	.37
Group Membership	.11	.27	.17	.35*	.31
Functional Literacy	.12	.35*	.21	.34*	.38
Knowledge of Ext. Agents	.20	.32*	.29	.34	.30
Group Officership	.12	.27*	.18	.32	.32*
Radio Exposure	.14	.33*	.27	.31	.36*
Cosmopoliteness (Visit out)	.17	.23	.23	.26	.30
Dependent Children	.34*	.05	.14	.09	.11
Base N =	1,142	1,142	1,142	1,142	1,142
Multiple R (Before LSDEL)	.55	.57	.59	.63	.63
Multiple R (After LSDEL)	.55	.57	.58	.64	.63
Variance Explained (R^2 After LSDEL)	30%	32%	33%	42%	40%

*Variables surviving LSDEL (step-wise regression), thus constituting the most parsimonious team of multiple correlates explaining variance in the dependent variables with maximum efficiancy.

**Not significant at the 5% level of confidence.

NOTE: Excluded from the above list of independent variables are all those designated dependent variables.

Appendix B: HIGHEST ZERO ORDER CORRELATES AND MULTIPLE CORRELATES OF AWARENESS KNOWLEDGE AND CORRECT INFORMATION OF AGRICULTURAL INNOVATIONS

INDEPENDENT VARIABLES	DEPENDENT VARIABLES			
	Awareness Knowledge Index	Correct Information (Total Score)	Correct Information Index	Correct Information (Variant)
Index of Agency Contact	.55*	.40	.48*	.35
Index of Ag.Communication	.54	.45*	.48	.35
Index of Ag. Improvement	.52*	.45*	.46*	.37*
Knowledge of Ext. Agents	.45*	.31*	.45*	.31*
Education	.37*	.29*	.29	.25*
Radio Exposure	.35	.23	.25	.24*
Newspaper Exposure	.35	.24	.26	.22
Cosmopoliteness (visit out)	.33*	.27	.25	.21
Functional Literacy	.32	.27	.26	.23
Group Membership	.32*	.18	.28*	.11
Educational Aspiration	.29	.17	.24	.18
Group Officership	.28	.17	.20	.11
Movie Exposure	.27*	.21*	.27*	.12
Housetype	.25	.17	.23*	.11
Dependent Children	.04**	.38*	.04	.31*
Commercialization (Palm)	.21*	.09	.17	.16
Ag.Advantage Score***	.65	.24	.55	.38
BASE N =	1,142	1,142	1,142	1,142
Multiple R (Before LSDEL)	.67	.62	.60	.53
Multiple R (After LSDEL)	.66	.61	.59	.51
Variance Explained (R^2 After LSDEL)	44%	37%	35%	26%

*Variables surviving LSDEL (step-wise regression) thus constituting the most parsimonious team of multiple correlates explaining variance in the dependent variables with maximum efficiency.

**Not significant at the 5% level of confidence

***Because this variable required knowledge of specific innovations, it was deemed to be so conceptually similar to the dependent variable that it was not included in the step-wise regressions.

NOTE: Excluded from the list of independent variables are all those designated dependent variables.

Appendix C: CONTACT WITH, COMMUNICATION ABOUT, AND FARMING IMPROVEMENTS RESULTING FROM EXPOSURE TO EXPERT AGRICULTURAL SOURCES BY KNOWLEDGE CATEGORIES.

	Awareness High	Knowledge Low	Correct High	Information Low	Total Sample
Contact with Agricultural Radio	61%	26%	57%	26%	38%
Communicated about contact	51	18	47	19	30
Improved farming based on contact	35	7	31	7	17
Contact with Agricultural Demonstrations	55%	26%	56%	24%	37%
Communicated about contact	48	19	48	18	29
Improved Farming based on contact	35	10	36	9	19
Contact with Agricultural Agent	43%	10%	41%	10%	22%
Communicated about contact	36	6	34	6	17
Improved Farming based on contact	28	4	26	4	13
Contact with Agricultural Movies	38%	14%	37%	14%	23%
Communicated about contact	33	12	33	11	19
Improved Farming based on contact	20	4	20	3	10
Contact with Agricultural Lecture	35%	10%	33%	11%	19%
Communicated about contact	33	9	32	8	18
Improved Farming based on contact	25	3	22	4	11
Contact with Agricultural Newsletter	29%	6%	29%	5%	14%
Communicated about contact	24	5	24	4	12
Improved Farming based on contact	22	3	21	2	10
BASE N =	536	608	444	698	1,142

Appendix D: HIGHEST ZERO ORDER AND MULTIPLE CORRELATES OF BEST FRIEND, BEST FARMER AND OPINION LEADERSHIP MEASURES

INDEPENDENT VARIABLES	DEPENDENT VARIALBES					
	Best Farmer	Best Friend	Stimu-lator	Legiti-mizer	Imple-menter	Opinion Leader-ship Index
Group Officership	.19	.16	.34*	.32*	.33*	.35*
Index of Agency Contact	.25	.12	.34	.25	.32*	.33*
Index of Ag. Improvement	.20	.10	.34	.24	.27	.31
Index of Ag.Communication	.23	.12	.34*	.23	.29	.31
Knowledge of Ext. Agents	.22*	.15*	.28*	.23*	.27*	.28*
Ag. Adoption Index	.25*	.14	.26	.22	.27	.25
Number of Wives Owned	.19*	.24*	.23*	.25*	.22*	.25*
Index of Personal Possessions	.16	.09	.26	.19	.26	.25
Knows about Credit	.17	.17*	.24	.22*	.23	.25
Awareness Knowledge Index	.22	.10	.24	.19	.23	.24
Labor Force	.22*	.29*	.23*	.20*	.23*	.24*
Total number children	.16	.20	.20	.25*	.21	.23
Com Plantation Adoption	.09	.09	.24*	.18*	.21*	.23*
Housetype	.16	.18*	.20	.20	.20*	.22*
Correct Info. Index	.16	.13	.21	.18	.20	.21
Newspaper Exposure	.13	.07	.24	.14	.20	.21
Education	.12	.07	.23*	.14	.21	.21
BASE N =	1,142	1,142	1,142	1,142	1,142	1,142
Multiple R (Before LSDEL)	.39	.41	.51	.46	.50	.53
Multiple R (After LSDEL)	.37	.39	.50	.45	.48	.51
Variance Explained (R^2 after LSDEL)	13%	15%	25%	20%	23%	26%

*Variables surviving LSDEL (step-wise regression), this constituting the most parsimonious team of multiple correlates explaining variance in the dependent variables with maximum efficiency.

Appendix E: FREQUENCY DISTRIBUTIONS OF PERSONAL CHARACTERISTICS

Name of Variable	Categories	Percent in Sample	Mean
Primary occupation	Farming	78%	
	Wine tapping, etc.	4	Not applic.
	Non-farming	18	
		100%	
Age	20-29 years	16%	
	30-39 years	25	
	40-49 years	27	
	50-59 years	18	43.4 years
	60-69 years	11	
	70-79 years	2	
	80 or more years	1	
		100%	
Education	0 - Never attended school	57%	
	1 - Primary incomplete	33	
	2 - Primary complete	8	
	3 - Secondary incomplete	1	Not applic.
	4 - Secondary complete	1	
	5 - University incomplete	0	
	6 - University complete	0	
		100%	
Religion	None	0%	
	Anglican, Presbyterian Methodist	23	
	Catholic	28	Not applic.
	Indigenous	38	
	Small sects: (Apostolic, Cherubim & Seraphim, Mount Zion, Faith Tabernacle, etc.)	11	
		100%	
Native of village	No	8%	Not applic.
	Yes	92	
		100%	
Literacy native language (self-reported)	No	66%	Not applic.
	Yes	34	
		100%	
Literacy English (self reported)	No	78%	Not applic.
	Yes	22	
		100%	
Literacy (English) test scores	Illerate	78%	
	1-20 words	1)	32 words
	20-30 words	5)	
	30-35 words	16)	
		100%	

Base N= 1,142

Appendix E: PERSONAL CHARACTERISTICS (Continued)

Name of Variable	Categories	Percent in Sample	Mean
Level of living (sum of 10 possessions owned)	None	26%	
	One	21	
	Two	14	2.6 possessions
	Three	9	
	Four	6	
	Five and over	22	
		100%	
House type	Mud walls/thatched roof	23%	
	Mud walls/zinc roof, or		Not applic.
	Concrete walls/thatched roof	7	
	Concrete walls, zinc roof	10	
		100%	
Group membership	Member of 0 groups	9%	
	Member of 1 group	20	
	Member of 2 groups	22	
	Member of 3 groups	22	2.7 groups
	Member of 4 groups	12	
	Member of 5 groups	8	
	Member of 6 or more	7	
		100%	
Group offership	0 positions	54%	
	1 position	22	
	2 positions	11	1 position
	3 positions	6	
	4 positions	4	
	5 or more positions	3	
		100%	
	Base N=	1,142	

Appendix F: FREQUENCY DISTRIBUTIONS OF FAMILY CHARACTERISTICS

Name of Variable	Categories	Percent In Sample	Mean
Number of wives at home	0 wives at home	14%	
	1 wife at home	58	
	2 wives at home	20	1.2 wives
	3 wives at home	6	
	4 or more wives at home	2	
		100%	
Number of wives dead or divorced	0 wives dead or divorced	61%	
	1 wife dead or divorced	26	0.6 wives
	2 wives dead or divorced	8	
	3 or more wives dead or divorced	5	
		100%	
Number of dependent children	0 dependent children	19%	
	1 dependent child	10	
	2 dependent children	13	
	3 dependent children	14	3.4 children
	4 dependent children	14	
	5 dependent children	11	
	6 dependent children	6	
	7 dependent children	4	
	8 or more dependent children	9	
		100%	
Number of non-dependent children	0 non-dependent children	68%	
	1 non-dependent child	13	
	2 non-dependent children	7	0.8 children
	3 non-dependent children	5	
	4 or more non-dependent children	7	
		100%	
Total number of children	0 children	16%	
	1 child	8	
	2 children	10	
	3 children	11	
	4 children	14	4.3 children
	5 children	12	
	6 children	8	
	7 children	6	
	8 children	5	
	9 or more children	10	
		100%	
	Base =	1,142	

Appendix F: FAMILY CHARACTERISTICS (Continued)

Name of Variable	Categories	Percent in Sample	Mean
Number of children of school-going age	0 children of school-age	27%	
	1 child of school-age	13	
	2 children of school-age	14	
	3 children of school-age	13	2.8 children
	4 children of school-age	10	
	5 children of school-age	7	
	6 children of school-age	5	
	7 or more children of school-age	11	
		100%	
Number of children that receive or received education	0 educated children	34%	
	1 educated child	16	
	2 educated children	17	2.1 children
	3 educated children	11	
	4 educated children	9	
	5 or more educated children	13	
		100%	
	Base =	1,142	

Appendix G: FREQUENCY DISTRIBUTIONS OF FARM CHARACTERISTICS

Name of Variable	Categories	Percent in Sample	Mean
Food crops and percentage of farmers harvesting them	Yam	94%	
	Cassava	90	
	Maize	81	Not applic.
	Coco yam	71	
	Rice	12	
Food crops and percentage of farmers selling them at all	Yam	41%	
	Cassava	45	
	Maize	44	Not applic.
	Coco yam	30	
	Rice	10	
Food crops and percentage of farmers selling more than half of the harvest	Yam	4%	
	Cassava	15	
	Maize	18	Not applic.
	Cocoa yam	9	
	Rice	8	
Palm produce and percentage of farmers harvesting it	Kernels	47%	
	Oil	48	Not applic.
	Wine	32	
Palm produce and percentage of farmers selling it at all	Kernels	42%	
	Oil	41	Not applic.
	Wine	28	
Palm produce and percentage of farmers selling more than half	Kernels	39%	
	Oil	37	Not applic.
	Wine	22	
Fruits and percentage of farmers harvesting them	Bananas	36%	
	Plantains	35	
	Pineapple	16	Not applic.
	Citrus	19	
	Native fruits	17	
Fruits and percentage of farmers selling them	Bananas	25%	
	Plantains	21	
	Pineapple	10	Not applic.
	Citrus	14	
	Native fruits	10	
Fruits and percentage of farmers selling more than half	Bananas	14%	
	Plantain	11	
	Pineapple	8	Not applic.
	Citrus	10	
	Native fruit	7	

Base N = 1,142

Appendix G: FARM CHARACTERISTICS (continued)

Name of Variable	Categories	Percent in Sample	Mean
Vegetables and percentage of farmers harvesting them	Okra	58%	Not applic.
	Pepper	46	
	Groundnut	13	
	Mellon	34	
Vegetables and percentage of farmers selling them at all	Okra	22%	Not applic.
	Pepper	18	
	Groundnut	8	
	Mellon	12	
Vegetables and percentage of farmers selling more than half	Okra	9%	Not applic.
	Pepper	9	
	Groundnut	4	
	Mellon	6	
Number of labourers employed on an average day in the growing season (self-reported)	0 labourers	41%	2.7 labourers
	1 labourer	4	
	2 labourers	13	
	3 labourers	11	
	4 labourers	10	
	5 labourers	8	
	6 or more labourers	13	
		100%	
Number of yam poles (self-reported)	0-9 yam poles in barn	47%	21 yam poles
	10-19 yam poles in barn	18	
	20-29 yam poles in barn	12	
	30-39 yam poles in barn	6	
	40-49 yam poles in barn	7	
	50-59 yam poles in barn	1	
	60-69 yam poles in barn	3	
	70 or more yam poles in barn	6	
		100%	
Reasons for not planting more crops (first mention)	Not enough money	65%	Not applic.
	Not enough land	7	
	Poor health/age, etc.	10	
	Miscellaneous	18	
		100%	
How farmers would use money to grow more crops (first mention)	Buy more crops	42%	Not applic.
	Hire labourers	31	
	Buy more land	22	
	Fertilizer/insecticides, etc.	4	
	Miscellaneous	1	
		100%	
	Base N =	1,142	

Appendix G: FARM CHARACTERISTICS (continued)

Name of Variable	Categories	Percent in Sample	Mean
How farmers would raise money to improve their farm (first mention)	Borrow from villagers friends, relatives	28%	Not applic.
	Sell more farm products	22	
	Work harder	15	
	Take another job	14	
	Borrow from government	6	
	Borrow from co-op	3	
	Join Isusu	2	
	Borrow from sons abroad	3	
	Miscellaneous	7	
		100%	
	Base N =	1,142	

Appendix H: FREQUENCY DISTRIBUTIONS OF ATTITUDINAL CHARACTERISTICS

Name of Variable	Categories	Percent in Sample	Mean
Spend money on brilliant relative or build zinc house	Relative	95%	Not applic.
	DK/NA/etc.	2	
	Zinc house	3	
		100%	
Spend money on land-dispute or start a trade	Land dispute	68%	Not applic.
	DK/NA/etc.	9	
	Start trade	23	
		100%	
What farmers would spend on if they had all the money they needed (first mention)	Own children	42%	Not applic.
	Self	35	
	Farm	12	
	Others outside nuclear family	11	
		100%	
Educational Aspirations	University	51%	Not applic.
	Secondary school	33	
	Primary school	13	
	None	3	
		100%	
Occupational Aspirations	Teacher	17%	Not applic.
	Doctor	13	
	Clerk	12	
	Trader	8	
	Farmer	14	
	Agricultural Agent	8	
	Lawyer	6	
	Engineer	5	
	Miscellaneous	17	
		100%	
Attitudes towards work and percent of farmers having work-oriented attitudes	Work should come first	82%	Not. applic.
	Judge a man by his success in his occupation	81	
	Most important qualities are ambition and determination	80	
Farmers perceptions of how newspapers would help farmers prosper	Could not help	45%	Not applic.
	Vague & unrealistic answers	4	
	Tell us about new ideas, etc.	30	
	Specific and realistic improvements	21	
		100%	
	Base N =	1,142	

Appendix H: ATTITUDINAL CHARACTERISTICS (continued)

Name of Variable	Categories	Percent in Sample	Mean
Farmers perception of how electricity would change their life	No change	16%	Not applic.
	Vague & unrealistic	31	
	Specific but no direct improvement	43	
	Specific and realistic improvements	10	
		100%	
Farmers perceptions of how cinema could civilize the village	Cannot civilize	43%	Not applic.
	Vague & unrealistic	14	
	Specific but no direct improvement	21	
	Specific and realistic improvements	22	
		100%	
Criteria for selecting best farmer (first mention)	Size of harvest	31%	Not applic.
	DK/NA/etc.	12	
	Size of farm	12	
	Works hard/much experience	11	
	Size of income	7	
	Crop diversification	7	
	Size of labor force	7	
	Use of innovations	4	
	Commercialization	3	
	Miscellaneous	6	
		100%	

Base N = 1,142

Appendix I: FREQUENCY DISTRIBUTIONS OF COMMUNICATION CHARACTERISTICS

Name of Variable	Categories	Percent in Sample	Mean
Places outside the village ever lived in for more than one year; weighted by degree of urbanization and distance	0 - None	49%	Not applic.
	1 - Town in region	17	
	2 - City in region	10	
	3+ Places outside the region	24	
		100%	
Places outside the village traveled to with the past year, weighted by degree of Urbanization and distance	0 - None	30%	Not applic.
	1 - Town in region	11	
	2 - City in region	18	
	3+ Places outside region	41	
		100%	
Radio exposure (self-reported number of days listened to radio in past two weeks)	0 - Days	59%	Not applic.
	1 - Day	5	
	2 - Days	8	
	3 - Days	5	
	4 - Days	4	
	5-13 Days	9	
	14+ Days	10	
		100%	
Newspaper readership in past month (self-reported)	No papers read/read to him	80%	Not applic.
	Cannot read but papers read to him	9	
	Read one or more papers	11	
		100%	
Number of newspapers read in past month (self-reported)	0 - Newspapers	80%	1.3 papers
	1 - Newspaper	4	
	2 - Newspapers	5	
	3 - Newspapers	3	
	4 - Newspapers	2	
	5-27 Newspapers	5	
	28+ Newspapers	1	
		100%	
Number of films seen in past year	0 - Films	65%	0.8 films
	1 - Film	16	
	2 - Film	11	
	3+ Films	8	
		100%	

Base N = 1,142

Appendix I: COMMUNICATION CHARACTERISTICS (continued)

Name of Variable	Categories	Percent in Sample	Mean
Channels of communication for hearing news from nearby township (first mention)	People from the village	31%	Not applic.
	Villagers who read papers or hear radio	10	
	Travelers/strangers	11	
	Radio	20	
	Newspapers	9	
	Miscellaneous	19	
		100%	
Channels of communication for learning news from Enugu (first mention)	Radio	44%	Not applic.
	Villagers who read papers or hear radio	18	
	People from this village	15	
	Miscellaneous	23	
		100%	
Know the name of one or more extension workers coming to the village	No	69%	Not applic.
	Yes	31	
		100%	
Agricultural media and percent of sample exposed to each in 1966 (self-reported)	Radio	38%	Not applic.
	Demonstration	37	
	Film	23	
	Talked with agent	22	
	Lecture	19	
	Newsletter/pamphlet	14	
		100%	
Total exposure score to media (one point for each medium, add for each farmer)	0 - Media	38%	1.5 media
	1 - Media	22	
	2 - Media	16	
	3 - Media	10	
	4 - Media	6	
	5 - Media	5	
	6 - Media	3	
		100%	
Agricultural media and percent of sample claiming to have made farm improvements as a result of being exposed to each	Radio	17%	Not applic.
	Demonstration	19	
	Film	9	
	Talk with agent	13	
	Lecture	11	
	Newsletter/pamphlet	10	

Base N = 1,142

Appendix I: COMMUNICATION CHARACTERISTICS (continued)

Name of Variable	Categories	Percent in Sample	Mean
Number of farm improvements made on basis of being exposed to agricultural media in 1966	0 Farm improvements	68%	0.8 improvements
	1 Farm improvement	12	
	2 Farm improvements	7	
	3 Farm improvements	5	
	4 Farm improvements	4	
	5 Farm improvements	2	
	6 Farm improvements	2	
		100%	
Agricultural media and percent of sample who claimed to have talked to others about exposure to them	Radio	30%	Not applic.
	Demonstration	29	
	Film	19	
	Talked with agent	17	
	Lecture	18	
	Newsletter/pamphlet	12	
Number of times farmers claim to have discussed their exposure to agricultural media in 1966	0 Discussions	50%	1.2 discussions
	1 Discussion	18	
	2 Discussions	12	
	3 Discussions	8	
	4 Discussions	5	
	5 Discussions	4	
	6 Discussions	3	
		100%	
Total number of votes received across five functions: best farmer, best friend, informer, legitimizer and implementer	0 Votes	55%	1.9 votes
	1 Vote	23	
	2 Votes	6	
	3-10 Votes	11	
	11+ Votes	5	
		100%	
Number of days respondent claims to have spoken to his first choice for <u>informer</u> during the past month	0 Days	24%	Not applic.
	1 Day	7	
	2 Days	9	
	3 Days	8	
	4 Days	7	
	5 Days	4	
	6-10 Days	11	
	11-20 Days	6	
	21-31 Days	10	
	Chose himself	11	
	DK/NA/etc.	3	
		100%	

Base N = 1,142

Appendix I: COMMUNICATION CHARACTERISTICS (continued)

Name of Variable	Categories	Percent in Sample	Mean
Number of days respondent claims to have spoken to his first choice for legitimizer during the past month	0 Days	24%	Not applic.
	1 Day	6	
	2 Days	8	
	3 Days	7	
	4 Days	7	
	5 Days	5	
	6-10 Days	12	
	11-20 Days	7	
	21-31 Days	11	
	Chose himself	8	
	DK/NA/etc.	5	
		100%	
Number of days respondent claims to have spoken to his first choice for implementer during the past month	0 Days	23%	Not applic.
	1 Day	6	
	2 Days	9	
	3 Days	6	
	4 Days	8	
	5 Days	5	
	6-10 Days	12	
	11-20 Days	7	
	21-31 Days	11	
	Chose himself	7	
	DK/NA/etc.	6	
		100%	
Total number of times radio was preferred over three other sources of communication	0 Times radio preferred	44%	1 time
	1 Time radio preferred	23	
	2 Times radio preferred	27	
	3 Times radio preferred	6	
		100%	
Total number of times neighbors were preferred over three other sources of communication	0 Times neighbors preferred	39%	1 time
	1 Time neighbors preferred	30	
	2 Times neighbors preferred	22	
	3 Times neighbors preferred	9	
		100%	
Total number of times sons abroad were preferred over three other sources of communication	0 Times sons abroad preferred	14%	1.4 times
	1 Time sons abroad preferred	45	
	2 Times sons abroad preferred	33	
	3 Times sons abroad preferred	8	
		100%	
Total number of times the extension agent was preferred over three other sources of communication	0 Times extension agent preferred	4%	2.5 times
	1 Time extension agent preferred	9	
	2 Times extension agent preferred	22	
	3 Times extension agent preferred	65	
		100%	

Base N = 1,142

Appendix J: FREQUENCY DISTRIBUTIONS OF KNOWLEDGE CHARACTERISTICS

Name of Variable	Categories	Percent in Sample	Mean
Knowledge on what causes worms to be in the stomach of children	Incorrect	20%	Not applic.
	DK/NA/other	32	
	Bad food/bad water/dirt	48	
		100%	
Knowledge on what causes Malaria fever	DK/NA/other	92%	
	Mosquitos	8	Not applic.
		100%	
Knowledge on why people boil their drinking water	Incorrect	17%	
	DK/make tea/etc.	18	Not applic.
	Kill germs	65	
		100%	
Number of programs about which respondent was able to give information by unaided recall	0 Programs	2%	
	1 Program	4	
	2 Programs	6	
	3 Programs	7	
	4 Programs	10	
	5 Programs	12	6.5 programs
	6 Programs	12	
	7 Programs	11	
	8 Programs	9	
	9 Programs	7	
	10 Programs	7	
	11 Programs	5	
	12+ Programs	8	
		100%	
Number of programs about which respondent had correct information	0 Programs	3%	
	1 Program	7	
	2 Programs	6	
	3 Programs	11	
	4 Programs	12	
	5 Programs	12	5.7 programs
	6 Programs	12	
	7 Programs	11	
	8 Programs	7	
	9 Programs	6	
	10 Programs	6	
	11+ Programs	7	
		100%	

Base N = 1,142

Appendix J: KNOWLEDGE CHARACTERISTICS (continued)

Name of Variable	Categories	Percent in Sample	Mean
Disadvantage of fertilizer	None/it is good	46%	
	DK/no idea/never used	35	
	Kills crops if wrongly applied	14	Not applic.
	Other	5	
		100%	
Disadvantages of Aldrin Dust	None/it is good	21%	
	DN/no idea/never used	70	
	Poisonous	9	Not applic.
	Other	1	
		100%	
Disadvantages of NS-1 Maize	None/it is good	44%	
	DK/no idea/never used	40	Not applic.
	Hard to chew	10	
	Other	6	
		100%	
Advantages of using Fertilizer	No advantage	0%	
	DK/no idea/incorrect	23	
	Increases yield	67	Not applic.
	Other	10	
		100%	
Advantages of using Aldrin Dust	No advantages	1%	
	DK/no idea/incorrect	62	Not applic.
	Kills beetles	27	
	Other	10	
		100%	
Advantages of NS-1 Maize	No advantages	2%	
	DK/no idea/incorrect	33	
	Yields better	38	Not applic.
	Bigger seeds	11	
	Other	16	
		100%	
Correct knowledge on fertilizer	Medicine	21%	
	DK/NA	25	Not applic.
	Plant Food	54	
		100%	
Correct Knowledge on Aldrin Dust application	DK	73%	
	Partially correct	8	Not applic.
	Mentions rubbing dust on yam seed	19	
		100%	
Correct knowledge on how MOA helps farmers with NS-1 Maize	DK	79%	
	Partially correct	4	Not applic.
	Free seed/pays for harvest	17	
		100%	

Base N = 1,142

Appendix K: FREQUENCY DISTRIBUTIONS OF ADOPTION CHARACTERISTICS

Name of Variable	Categories	Percent in Sample	Mean
Had wife go to maternity for child birth	No	35%	
	NA	13	Not applic.
	Yes	52	
		100%	
Had Small Pox vaccination	No	8%	
	Yes	92	Not applic.
		100%	
Built a latrine	No	35%	
	Yes	65	Not applic.
		100%	
Got treatment in hospital or dispensary	No	24%	
	Yes	76	Not applic.
		100%	
Number of health innovations adopted	0 Health innovations*	15%	
	1 Health innovation	7	
	2 Health innovations	19	2.5 health
	3 Health innovations	29	innovations
	4 Health innovations	30	
		100%	
Total number of agricultural innovations used in 1966	0 Agricultural innovations	51%	
	1 Agricultural innovation	21	
	2 Agricultural innovations	10	
	3 Agricultural innovations	7	1.9 agric.
	4 Agricultural innovations	4	innovations
	5 Agricultural innovations	3	
	6+ Agricultural innovations	4	
		100%	
Reasons for use/ non-use or discontinuation of <u>fertilizer</u>	DK/NA	18%	
	Use: Increases yield	18	
	Use: Other	8	
	Non-use: Lack of money	21	Not applic.
	Non-use: Lack of supplies	7	
	Non-use: Lack of information	20	
	Non-use: Other	8	
		100%	
	Base N =	1,142	

* Includes "DK", "NA" etc. answers

Appendix K: ADOPTION CHARACTERISTICS (continued)

Name of Variable	Categories	Percent in Sample	Mean
Reasons for use/ non-use or discontinuation of Aldrin Dust	DK/NA	62%	Not applic.
	Use: Kills beetles	12	
	Use: Other	7	
	Non-use: Lack of money	6	
	Non-use: Lack of information	7	
	Non-use: Other	6	
		100%	
Reason for use/ non-use, or discontinuation of NS-1 Maize	DK/NA	26%	Not applic.
	Use: Improved yield	14	
	Use: Other	9	
	Non-use: Lack of supplies	12	
	Non-use: Lack of information	21	
	Non-use: Other	18	
		100%	
	Base N =	1,142	