

PERCEPTIONS OF AGRICULTURE STUDENTS FROM
KENYA TOWARD THEIR USE OF METHODS
AND MEDIA FOR COMMUNICATING
AGRICULTURAL INFORMATION

By

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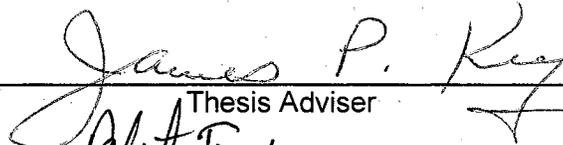
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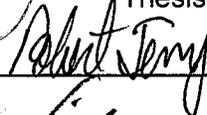
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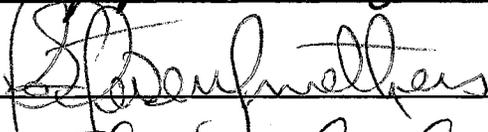
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CHAPTER I

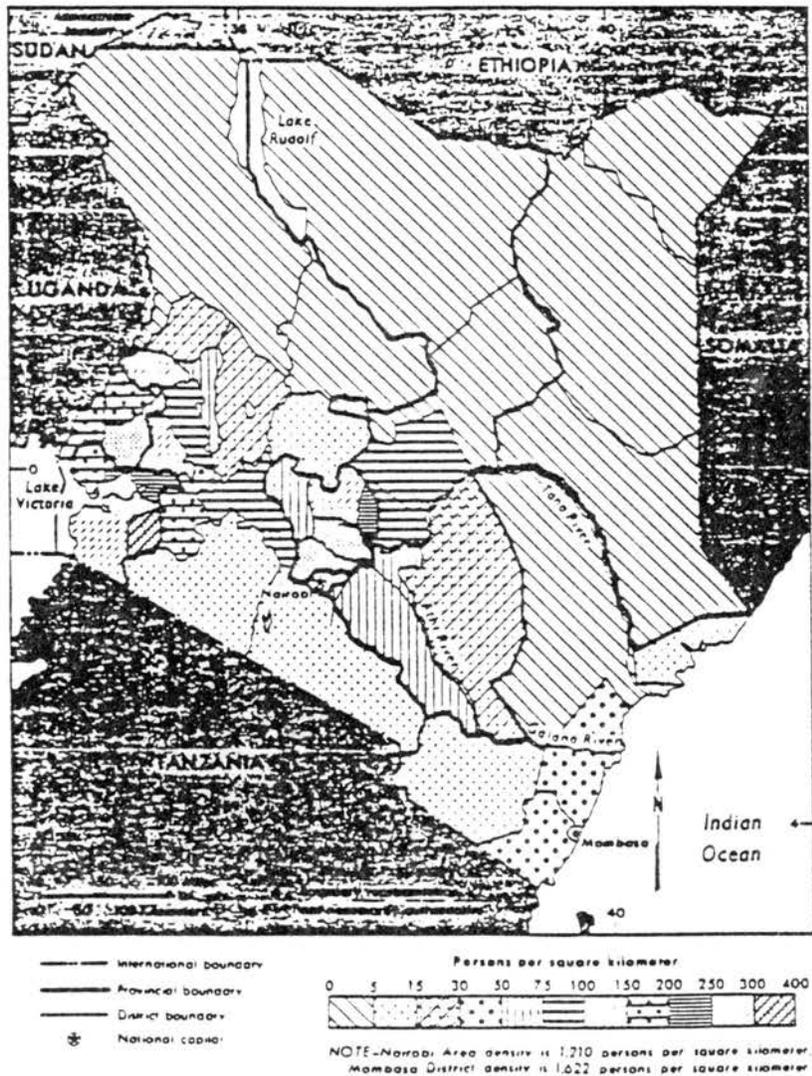
INTRODUCTION

Agriculture is the main industry in Kenya and provides livelihood including food, energy, income, and employment to approximately 80 percent of the population. According to the World Bank figures (Europa World Book, 1994), agriculture including forestry and fishing contributed 26 percent of the country's gross domestic product in 1992.

Kenya has a population of over 25 million people and the nation's growth rate at 3.9 percent is one of the highest in the world. Todaro (1985) points out that an increasing population means an increasing demand for food, yet only 20 percent of Kenya's land is arable; hence, the majority of the population live in the fertile and high rainfall areas of Kenya (Figure 1). Kenya's priority is to produce enough food to feed its fast growing population. In the meantime, food output not keeping pace with population growth, the crop production has been extended into marginal land. With this trend, Kenya's main hope of improving the output of its available land lies in applying new technology in agriculture. Indeed, development planners, policy makers, and development agencies recognize that increasing agricultural production especially among the subsistence farmers would help Kenya achieve the country's goal of self-sufficiency in food.

Zijp (1994) and Melkote (1991) identified information as crucial in agricultural production in addition to land, labor, and capital. And with these food-sufficiency concerns, there is need for information on new technology that will enable Kenya feed the people and also compete in the world market.

Figure 1 Population Density by District, 1979



Source: Based on information from Kenya, Ministry of Economic Planning and Development, Central Bureau of Statistics, *Statistical Abstract, 1981*, Nairobi, 1981, 13.

these food-sufficiency concerns, there is need for information on new technology that will enable Kenya to feed the people and also compete in the world market.

Since agriculture makes a major contribution to the economy of Kenya, the need to identify effective methods and media resources for communicating the information is of paramount importance. This study focuses on the methods and media used for communicating innovative agricultural information in Kenya. In addition, it looks at problems and hindrances encountered by the agricultural information communicators in using methods and media; future use of methods and media; and in-service training needs of the agricultural information communicators.

Problem Statement

Although a wide range of information sources and also new technology in agriculture is becoming increasingly available in Kenya, there is little evidence that delivery methods and media have been increasingly used to channel this information. Delivery of agricultural information is crucial; therefore, it is important that we determine methods and media which Kenyan agricultural students studying in agriculturally-related areas in the U.S. and Canada perceive as effective in communicating agricultural information to farmers and their families.

The Director and staff of Agricultural Information Center (AIC), the Kenya Agricultural Research Institute (KARI), the staff at Agricultural institutions, and agricultural information communicators would benefit from this research. The findings would contribute to the planning of training programs in the use of methods and media for communicating agricultural information in Kenya and

other countries in Africa. The information would also contribute to the designing of in-service training programs in the use of methods and media for the agricultural information communicators.

Purpose of the Study

The main purpose of this study was to determine the perceptions of methods and media used for communicating agricultural information in Kenya by Kenyan students studying in agriculturally-related programs in the U.S. and Canada. In addition, the participants' perceptions of the usefulness, frequency, future use, problems and hindrances encountered, and in-service training needs of methods and media will also be determined.

Objectives of the Study

Specific objectives include:

1. To determine the frequency of use of the selected methods and media.
2. To determine the perceptions of the surveyed students toward the effectiveness of delivery methods and media in communicating agricultural information.
3. To determine the anticipated use of methods and media for communicating agricultural information.
4. To determine the problems and hindrances encountered in using media.
5. To determine perceptions on need for additional training in using selected methods and media.

6. To determine the demographic make-up of the participants.

Rationale for the Study

With the increasing demand for agricultural information in Kenya, it is necessary to get the perceptions of methods and media usage of those personnel who act as agricultural information communicators.

Assessments have come to be viewed by administrators as a necessary tool in policy analysis, decision making process, and in program management. According to Borg & Gall (1983), assessments are conducted in order to generate data that will help policymakers and program managers make sound decisions concerning program plan, design, and content. An assessment is effective to the extent that it offers ideas pertinent to pending actions and as a result more effective decisions are made. By conducting this study and obtaining the perceptions of these Kenyan students, an information base may be formed to be used by the planners, program managers, and trainers to analyze the effectiveness of the methods and media being used and also contribute to decision making for future programming.

Assumptions

The study was based on several assumptions including:

1. The students surveyed had some agricultural field experience in Kenya before being sent by the employer to study in an agriculturally-related area in the U.S. or Canada.

2. The participants understood the delivery methods and the media selected for this study.

3. The Kenyan students surveyed would be able to recall accurately the methods and media they used for communicating agricultural information in their home country, Kenya, prior to their coming to study in the U.S. or Canada.

4. The participants were honest and conscientious in providing their responses, opinions, and perceptions on their use of methods and media.

5. The study would create some awareness among the agricultural personnel of the need for re-assessing their use of methods and media for communicating agricultural information.

Background

Kenya's economy depends on the agricultural sector for production, manufacturing, and trade. According to 1990 export figures reported in The Europa World Book (1994), tea contributed 25 percent of Kenya's exports while coffee contributed 18 percent. Crops including coffee, tea, maize, sugar cane, fruits, and vegetables are grown for local and export market. Table I includes figures for both crop and livestock production.

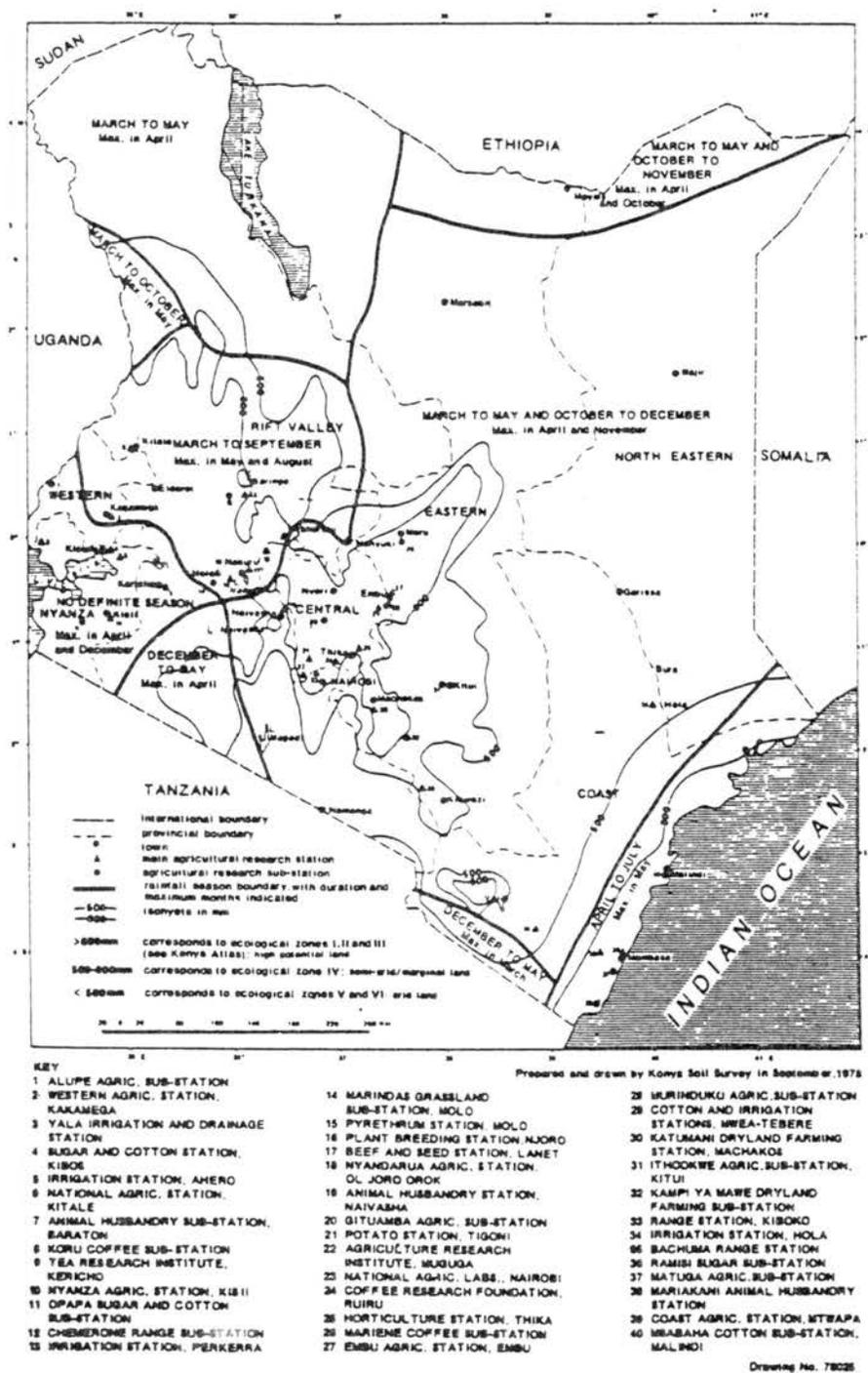
It is well established that the agricultural research and extension program in Kenya may provide a significant contribution toward the ultimate objective of increasing agricultural production. Agricultural technology is developed locally through approximately 43 research stations located in major farming areas in Kenya (Figure 2). However, literature indicates that agriculturists (researchers, extension agents, and other change agents) have been criticized because most useful information has been left in research centers for lack of appropriate

TABLE I AGRICULTURAL PRODUCTION IN KENYA 1990 - 1992

	Principal Crops ('000 metric tons)		
	1990	1991	1992
Wheat	190	195	200
Rice (paddy)	59	60	58
Maize	2,290	2,340	2,561
Sorghum	111	98	107
Sweet potatoes	537	550	600
Cassava (Manioc)	723	761	770
Pulses	235	240	235
Vegetables	631	643	655
Sugar cane	4,700	4,580	4,430
Plantains	340	350	360
Coffee (green)	104	86	70
Tea	197	204	188
Livestock ('000 head)			
Cattle	13,793	13,000	11,000
Sheep	6,516	6,500	6,000
Goats	8,000	8,000	7,500
Pigs	105	105	105
Camels	810	820	810
Poultry	25,000	25,000	25,000

Source: *FAO, Production Yearbook.*

Figure 2 AGRICULTURAL RESEARCH STATIONS IN KENYA AND AGRO-CLIMATIC ZONES BASED ON RAINFALL



Source. Kenya. Ministry of Agriculture. Scientific Research Division. Annual report. 1975. p. xiii.

information dissemination (Cleaver, 1993). And specifically in the Kenya situation, in a summary, in his 1984 Madaraka Day (June 1st, anniversary of self-government, first celebrated in 1963) speech, President Moi summed up the agricultural information dissemination inadequacy:

"I am pleased to record that our farmers continue to respond positively in support of our major objectives in agriculture. It is also gratifying to witness success of our agricultural research activities. Already, high yield and disease resistant seeds for maize, wheat, beans, sorghums and seedlings for upland rice, cassava, coffee, and sugarcane have been developed.

These research efforts cannot, however, be an end in themselves. They can only be useful, if they are matched by improved farming methods by our farmers. Unfortunately, reports continue to be received of complaints by some of the farmers that they are not receiving efficient services and facilities. The trend must be reversed with new attitudes and practices by extension staff who have the responsibility of translating research findings and new agricultural knowledge into action by farmers." [*Standard*, 1994]

With the urgent need for securing food supplies for the population in Kenya, traditional agriculture and farming practices need to be replaced by modern practices. And in a Foreign Broadcast Information Service (FBIS) December 18, 1989 report, on the address by President Moi during the graduation ceremony at Egerton University, he urged experts (researchers and extension agents) and the graduates to, "encourage Kenyans to increase production of indigenous food crops which were resistant to diseases and drought" and he added "all Kenyans should strive to make the country self-sufficient in food."

The Role of Agricultural Extension

As in many other countries in Africa, the diversity of agricultural research and extension services in Kenya is usually distributed by the government

ministries; private and public organizations, non-governmental organizations, commodity exporters and/or rural agencies. Their role may be further divided to address specific needs of livestock, cash crops, food crops, forestry, and ranch management.

While Food and Agricultural Organization (FAO) figures reported a farmer-agent-ratio of 400 to 10,000 families per agent in developing countries such as Kenya, Zambia, Ethiopia, and Somalia as reported by Coombs and Ahmed (1974), they also point out that those figures do not reflect the distribution of farming populations. Indeed, Roling (1976) and other researchers have documented that there is the tendency for extension agents to help better-off farmers leaving subsistence farmers on their own (Leonard, 1977 & Perraton, 1981). In addition, some countries such as Kenya have also concentrated available resources in some regions or particular cash crops such as coffee and tea due to their importance as foreign exchange earners.

Another factor that is not reflected by the agent-farmer ratio figures is that simply knowing the number of agents in a locality does not necessarily indicate the quality of work or exact amount of time spent on agriculture.

In an effort to overcome this problem of agent-farmer ratio, a Training and Visit (T&V) program was introduced in Kenya in 1982. A report on (World Bank Country Study: Kenya, 1989), indicates that each frontline extension agent covers an average of 500 families. One of the advantages of this extension approach was that it brought out the researcher closer to the farmer (Leonard, 1977). The exposure also allowed the researcher to learn of the farmer's problem first hand and also to offer a solution in return.

However, while agricultural extension and research agents have used methods such as farm demonstrations, field trips, home visits and so on to

communicate agricultural information, there is no evidence that methods and media have been increasingly used. In this study, the researcher plans to get the perceptions of some of those agricultural and research extension personnel.

Agricultural Information Center and its Role in

Agricultural Information Communication

Agricultural Information Center (AIC) was set up in 1969 in order to produce extension leaflets, radio programs, films, tapes and slides for the extension staff and farmers in Kenya.

In her survey of agricultural publications, Kinara (1984) points out that assumption had been made by researchers and agricultural officials that the center staff are able to write and publish agricultural information from different disciplines in agriculture.

However, the present staff at the center is unlikely to fulfill that objective because of the small numbers and inexperience. In addition, the task to record the available knowledge in Kenya agriculture is too large for the skeleton staff. Therefore, in the meantime the center staff continues to assist with the production of manuals and extension leaflets as needed (AIC Annual report, 1991).

But the center has also had successes, the radio broadcasters transferred from the Ministry of Information and Broadcasting produced radio programs regularly. According to the center report for 1991, a total of 101 programs --52 each 30-minute Chakula kwa Taifa (food for the nation), 49 each 15-minute Nipe Habari--were aired through the nation's Kenya Broadcasting Corporation. In order for the center to accomplish its objectives, it may be necessary to train the

center staff in production of communication materials and also encourage researchers to work closely with the center staff working on their publications.

In the mainstream mass media, there are different types of mass media delivery methods available for use by the Extension and research personnel including farmers' journals--*Farmer Gazette, Dairy Farmer, and Kenya Farmer*. Other media include newspapers (daily and weekend), radio, television, slide and film projectors and so on. However, as mentioned earlier, there is little evidence that agricultural and extension agents have increasingly used these channels to communicate agricultural information.

Progressiveness and Level of Education

Although formal education does not provide the information needed by the farmer, it does provide people with the ability to receive, understand and utilize the information needed for their work. According to 1990 estimates provided by the World Bank (Europa World Book, 1994), the adult literacy rate for Kenya was 69% (males 80%; females 58%).

According to Rogers and Shoemaker (1971), several surveys in extension communication indicate that there is a positive relationship between progressiveness and level of education of the farmers. Table II contains report figures on a field experiment in Kenya by Ascroft and others (1973) showing that progressive farmers tend to be more literate and have more access to newspapers than the less progressive farmers.

TABLE II **Progressiveness and Level of Education**

PROGRESSIVENESS BY EXPOSURE TO DAILY PAPERS, AND RADIO					
	Progressiveness				Division total
	most progsve	upper middle	lower middle	lagg- ards	
Daily paper exposure					
Frequently	71 %	42 %	44 %	38 %	49 %
Rarely	18	46	40	33	35
Never	11	12	16	29	16
Total	100 %	100 %	100 %	100 %	100 %
Radio exposure					
Frequently	79 %	54 %	52 %	49 %	59 %
Rarely	21	46	48	51	41
Total	100 %	100 %	100 %	100 %	100 %
Base	92	97	102	63	354

PROGRESSIVENESS BY LITERACY					
Literacy	Progressiveness				Division total
	first adptrs	early majrty	late majrty	lagg- ards	
None	28 %	42 %	39 %	57 %	40 %
Vernacular only	15	24	22	18	20
Swahili also	32	19	22	11	22
English also	25	15	17	14	18
Total	100 %	100 %	100 %	100 %	100 %
Base	92	97	102	63	354

Source. Ascroft, Joseph and others. *Extension and forgotten farmers*. First report of a field experiment [in Tetu Division, Nyeri District, Kenya]. Institute for Development Studies, University of Nairobi. 1973.

Definition of Terms

For the purpose of this study, the following terms were defined accordingly:

Communication: The transfer of information between individuals or groups of individuals by human or technical means (working committee of the International Broadcast Institute meeting at Cologne cited in Moemka, 1994).

Communication channel is the means (medium) by which messages travel from a source to a receiver (Rogers, 1983).

Information: The communication or perception of knowledge and intelligence. In this study, it refers to communication of scientifically based agriculture to the farmers and interested persons by the research and extension staff (Smith, 1978).

Adoption is a decision to continue full use of an innovation.

Adoption process: The mental process an individual experiences (or goes through) from first hearing of an innovation to final adoption.

An innovation is an idea perceived as new by the individual.

Diffusion is the process by which an innovation spreads.

Diffusion process is the spread of a new idea from its invention or creation to its ultimate users or adopters.

A social system is a population of individuals who are functionally differentiated and engaged in a collective problem-solving behavior.

Perceptions: a behavioral understanding or value of observation from a particular situation.

Agricultural information communicator is a member of the extension, research, or non-government personnel who is involved in disseminating agricultural information to individuals.

Delivery method is a tool of various types used by educators to distribute information to the audience.

Population is any set or group of things that are alike in respect of particular characteristics.

AIC - Agricultural Information Center

KARI - Kenya Agricultural Research Institute

CHAPTER II

REVIEW OF LITERATURE

Introduction

The purpose of this chapter is to review the literature relating to this study. The major areas of literature for this study include: 1) History of communication technology; 2) Review of communication theories included in this study; 3) Diffusion theory; 4) Communication channels; 5) Information, communication, and interaction; 6) Diffusion and adoption of innovation; 7) Role of women in agricultural information sharing; 8) Use of methods and media for communicating agricultural information; 9) Communication training needs for agricultural change agents; and 10) Future use of media for communicating agricultural information.

History of Communication

In their outline of historical advances in communication, DeFleur & Ball-Rokeach (1989) point out that during each age, people's daily lives were deeply influenced by the communication systems that were in place during the particular period.

The earliest transition in communication technology made by human beings was about 5,000 years ago in the Age of Writing. The Chinese and Maya specifically developed writing independently, but the earliest transition took place among Sumerians and Egyptians.

The second transition in communication technology was the Age of Print in 1455 in Mainz. Whereas crude forms of printing can be found back in history, the first book was produced by a printing press using movable

type cast in metal before Columbus made his first voyage. Eventually the technology spread over Europe and to the rest of the world thereafter.

The third transition in communication technology was the Age of Mass Communication in the nineteenth century, with the emergence of newspapers and electric media in the form of telephone. More realistically Age of Mass Communication started in the beginning of the twentieth century with the invention and widespread adoption of film, radio, and television (pp. 25-26).

And recently, a new communication technology has been developed--the Age of Computers. The computer and other communication technology that are being developed now or in the future will also impact people's daily lives today in as much the same way as it was during the time "prehistoric ancestors" hunted woolly mammoths with spears at the edge of great glaciers. Hence, it is important for every communicator to understand that "the nature of a society's communication process is significantly related to every aspect of their daily lives."

Review of Communication Theories

Included in this Study

Persuasion Theory

This approach utilizes method or medium to present a message to influence the specific forms of targeted individuals or audience beliefs, opinions, attitudes, and actions. Lowery and DeFleur (1988) stated that effectiveness of a communication depends upon who delivers it. Hence, it is his or her responsibility to design the message and use a channel that will enhance modification of behavior. DeFleur and Ball-Rokeach (1989) wrote that new ideas could be presented to farmers through a radio program designed for a farm audience, a pamphlet distributed by a county agent, an agricultural experiment

farm audience, a pamphlet distributed by a county agent, an agricultural experiment bulletin, or even an advertising brochure from a company specializing in farm products.

Theory of Social Organization Norms

The way farmers interact may lead the communicator to clues about the most effective method for communicating agricultural information. Farm families like to participate as a group in the neighborhood or in community affairs. They retain strong social ties with neighbors; thus, interpretations made by neighbors could be of critical importance in determining likelihood of adoption of an innovation (DeFleur and Ball-Rokeach, 1989).

Modeling Theory

This theory helps explain long-range influence of behavioral imitation. For example if a person (farmer) sees another using a particular technique for coping successfully with a problem that the observer also faces from time-to-time, he or she may try out the techniques as a potential solution. If it works well, the experience of being able to cope with the problem more effectively when it occurs is rewarding. Hence, the connection between the problem and the behavior that solves it is reinforced (Lowery and DeFleur, 1988).

Diffusion Theory

In order to effectively communicate agricultural information, it is important to understand the process of diffusion. Rogers (1983) defines diffusion as a process by which an innovation is communicated through certain channels over time among members of a social system.

the advantage of increased production farming, then they may try out the technology. Trying to use the new technique allows the farmer an opportunity to learn. If farmers can see the results of an innovation, then they may adopt the idea. And in order for a diffusion process to succeed, the type of method, venue, and sender of information are very important. In the diffusion of agricultural innovations where a change agent attempts to introduce new technologies through a particular social system (a group of people in a community), communication plays a significant role. When the change agent introduces a new technology, he actually attempts to direct change in a predetermined manner in order to persuade the clientele. Therefore, the communication channels that the change agent uses are vital to the successful implementation of the program. Rogers (1962) points out that where diffusion of innovation is the main goal, communication programs are expected to fulfill certain functions:

1. Create an awareness or consciousness about the innovation.
2. Transmit information about the innovation and lead to correct decision making, attitude formation, and behavior change.
3. Disseminate information about the innovation through a social system or a group which would result in the legitimization of the innovations.
4. Persuade the individual or group to adopt the innovation.
5. Obtain feedback from the individual or group.

Communication Channels

Generally, a communication situation has five main elements including: source, message, channel, receiver, and feedback. For the purpose of this study on use of methods and media, emphasis will be on the channels used to communicate agricultural information.

Rogers (1983) defines communication channels as the means (medium) by which messages travel from a source to a receiver. Lindner (1981), and Rogers (1983) indicate there are three channels of agricultural information: 1) interpersonal channels of information that involve face-to-face exchange between individuals; 2) mass media channels that enable one or few individuals to reach a larger audience; and 3) machine-assisted interpersonal communication channels including videos, satellites, and computers.

Research has shown that channels act differently on different groups (Lindsey, 1994). Therefore, a communication channel that is appropriate for one group may be inappropriate to another group. Evans (1978) suggests that what certain channels do, others may not be able to (Table III). Hence, when planning a communication strategy for a program, it is important to consider what a particular channel will have on the attitudes, values, beliefs, and knowledge levels of the audience. In order to be able to influence the audience in the desired way, the change agent may use a channel by itself or use a combination of channels.

According to Rogers (1971), mass media channels are the most rapid and efficient means to inform an audience about an innovation. These media include radio, television, newspapers and so on. Interpersonal channels involve a face-to-face exchange between two or more individuals. However, according to Rogers (1983) although the media are utilized by many farmers for agricultural information, interpersonal communication is more important in persuading an individual to adopt a new idea. In addition, interpersonal channels are more important than mass media channels for later adopters than early adopters (Rogers, 1983).

TABLE III Advantages and disadvantages of principal Media

	ADVANTAGES	DISADVANTAGES
Written communication		
LETTER MEMORANDUM REPORT ABSTRACT MINUTES ARTICLE PRESS-RELEASE etc	Provides written record and evidence of despatch and receipt; capable of relaying complex ideas; provides analysis, evaluation and summary; disseminates information to dispersed receivers; can confirm, interpret and clarify oral communications; forms basis of contract or agreement.	Can take time to produce, can be expensive; communication tends to be more formal and distant; can cause problems of interpretation; instant feedback is not possible; once despatched, difficult to modify message; does not allow for exchange of opinion, views or attitudes except over period of time.
Oral communication		
FACE-TO-FACE CONVERSATION INTERVIEW MEETING ORAL BRIEFING PUBLIC ADDRESS ORAL PRESENTATION TELEPHONE-CALL CONFERENCE TRAINING SESSION etc.	Direct medium of communication; advantages of physical proximity and, usually, both sight and sound of sender and receiver; allows for instant interchange of opinion, views attitudes – instantaneous feedback; easier to convince or persuade; allows for contribution and participation from all present.	More difficult to hold ground in face of opposition; more difficult to control when a number of people take part; lack of time to think things out – quality of decision-making may be inferior; often no written record of what has been said; sometimes disputes result over what was agreed.
Visual communication		
NON-VERBAL COMMUNICATION – EXPRESSION, GESTURE, POSTURE DIAGRAM CHART TABLE GRAPH PHOTOGRAPH FILM SLIDE FILM VIDEO-TAPE MODEL MOCK-UP etc.	Reinforces oral communication; provides additional visual stimulus; simplifies written or spoken word; quantifies – provides ideas in number form; provides simulations of situations; illustrates techniques and procedures; provides visual record.	May be difficult to interpret without reinforcing written or spoken word; requires additional skills of comprehension and interpretation; can be costly and expensive in time to produce; may be costly to disseminate or distribute; storage may be more expensive; does not always allow time for evaluation.

Source: Evans, D.W. People and communication. London, Pitman, 1978. p. 9

Information, Communication, and Interaction

Gabriel Tarde's opinion of communication cited in Hornick (1988) dominates studies of diffusion in sociology. Questions posed here include: 1) Is it the availability of information that determines the time of adoption or the character of communication? 2) In what stage of a diffusion process is availability of importance? 3) What is the exact role of various media that transmit information.

Although communication technology and dissemination of information have improved, there are no clear answers that point toward a particular society. Society changes over time; hence, extensive research has to be done in order to understand how networks of communication operate in diffusion of innovation in agriculture as new innovations become available from agriculture research and other sources.

Katz (1961) is one of the proponents of interpersonal influence and mass media as the main cause of diffusion of innovation. He suggests that the central problem of communication and diffusion in the modern society has to do with the nature of the linkages between networks of interpersonal relations on one hand and mass media on the other. It can be said that there is general consensus that both mass media and interpersonal relationships do affect diffusion, especially when the individuals or household are the adoption units (Rogers, 1971).

Diffusion and Adoption of Innovation

Projects that depend on a single medium to reach their audiences may find that some part of the audience is inaccessible or does not understand, or if

it understands does not use the medium as a stimulus for practice change. Projects that use multiple channels have a higher probability of success because different channels serve different needs. If the needs for information vary with the adoption stage, then the communication channel most appropriate for delivering that information may also vary (Hornik, 1988). For example, a common diffusion model suggests that in the knowledge stage as individuals become aware of innovation, they rely on mass media; as individuals move toward decision, they rely on personal sources.

Hornik (1988) argues that even when a medium physically reaches an individual, it may not serve as an effective communication channel depending on whether it involves reading printed material, understanding radio messages, or talking to socially distant extension agents.

Another dimension of needs looks across content areas. For example, some topics seem to require more or less visual support of verbal messages, or other channel capacities related to the way they are most easily presented. It would then appear that some channels are more likely to be more effective than others. In this study, the researcher plans to determine which channels the participants perceive to be effective.

Adopter Categories

Diffusion sociologists such as Rogers (1962) classify members of a social system into five categories based on how the members adopt an innovation (Figure 3).

1) Innovators are eager to try new ideas. They have a communicating pattern even when they are far apart. They have substantial investments and are willing to take a risk even if an innovation turns a failure. They also have the ability to understand and apply complex knowledge.

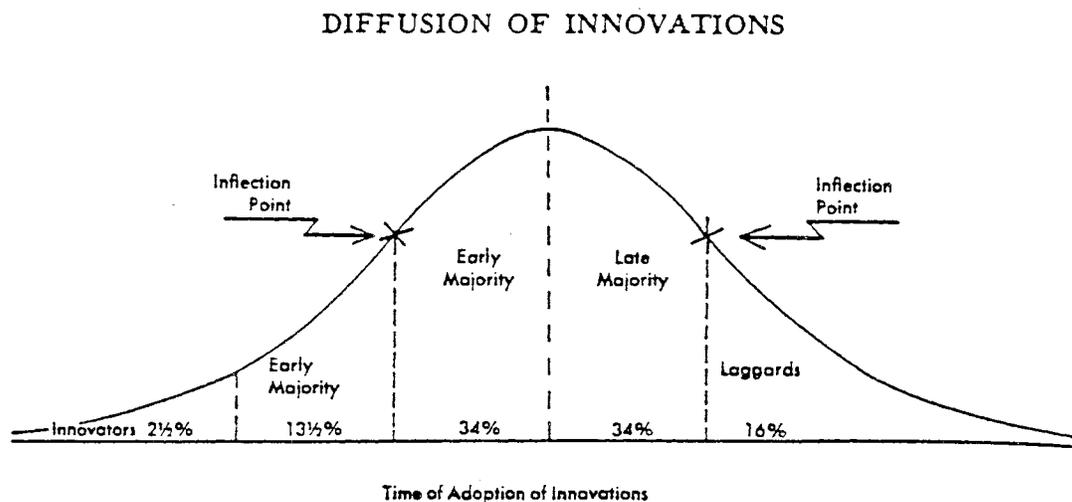


Figure 3 Source: Rogers (1962), p. 162

2) Early adopters are used by change agents. They are considered "the man to check with" before trying a new idea.

3) Early majority usually follow, but seldom lead in adopting an innovation. They adopt new ideas just before the average member of a social system.

4) Late majority adopt new ideas after the average member of the society has adopted.

5) Late adopters (Laggards) are the last to adopt an innovation. Sometimes by the time they adopt an idea, it may be already replaced by a new idea.

The classification of the system's members into categories is based on the relative time at which an innovation is adopted. Rogers (1983) points out that time is an important aspect in the diffusion process. A diffusion study undertaken by Iowa State University in the 1940s focused on the diffusion of information on hybrid seed corn for Iowa farmers. As a result of 20 years of genetic research, agricultural scientists released a hybrid corn that increased

yields by 20 percent. In 1928, the hybrid was released to the Iowa farmers and promoted by Iowa Agricultural Extension Service and commercial seed companies. Rogers (1983) indicates that by 1941, 100 percent of the farmers in Iowa had adopted the innovation.

However, studies show that other factors such as experience, age, and economics influence adoption. Studies in diffusion have also shown that adopter categories change with innovation. These findings serve as evidence for the need for the researcher and other communicators to intensify research that might answer questions posed in this review and elsewhere in order to enhance communication and accelerate diffusion of innovation.

Role of Women in Agricultural Information Sharing

Agricultural technology in developing countries has been designed and disseminated in the assumption that farmers are male. Yet, women have always played an important role in agriculture (Table IV). In Kenya, 95 percent of women smallholders work on their own farms. And as more men move into off-farm employment, women are heading farm households (Saito and Spurling, 1992).

Kenya policies (for example in pricing, research, and agricultural extension) provide a framework through which women are meant to gain access to information. But, for historical and practical reasons, women still remain at a disadvantage in getting information and resources that they require to work more productively (World Bank country study: Kenya, 1989).

Cleaver (1993); Saito & Spurling (1992); and World Bank Country study: Kenya (1989) point out that on the farm, women's time for agriculture is constrained by their traditional responsibilities for household chores, water, fuelwood, and

TABLE IV
DIVISION OF LABOR BY GENDER AMONG SMALLHOLDERS

	Males*				Females*			
	Plant	Weed	Harvest	Market	Plant	Weed	Harvest	Market
CROP								
Maize	54	55	54	24	87	87	89	52
Potatoes	8	8	8	4	13	13	14	7
Coffee	13	12	11	10	13	16	16	13
Tea	5	5	5	4	5	6	6	6
Pyrethrum	5	5	5	4	7	7	6	5
Cotton	6	6	6	5	8	8	8	5
LIVESTOCK								
	Work regularly				Work regularly			
Poultry care		3				9		
Stall feed livestock		8				12		
Graze cattle		25				24		
Milk cattle		12				37		
Graze sheep, goats		21				27		
Carrying water		5				89		
Carrying wood		5				89		
Preparing wood		5				90		
Cleaning house		5				90		
Caring for children		1				63		
Buying food		23				71		

* Percent of those above 15 years of age who work regularly on task

Source: Government of Kenya (GOK), Integrated Rural Surveys 1976 - 79 Basic Report cited in World Bank Country Study, 1989.

childcare (Table IV and V). Because fewer women are educated than the men, women can less easily acquire information (Table VI). Therefore, communicators in agricultural information need to consider these factors when planning to persuade an individual or group to adopt an innovation.

Saito & Spurling (1992) argue that a reorientation of the extension messages has become necessary in order to improve the congruence of

technical messages and communication strategies with the reality of small-scale agriculture under the women farmers (Cleaver 1993).

TABLE V
WOMEN'S WEEKLY TIME ALLOCATION FOR FIVE
PRODUCTIVE ACTIVITIES

Activity	High Potential Areas		Low Potential Areas	
	% of Women	Hrs/Week	% of Women	Hrs/Week
Collecting Firewood	90	5.25	81	6
Farming (crops)	90	12.25	62	13.5
Tending animals	66	19.5	53	12
Milking	35	5.75	50	8
Marketing	44	6	53	10.75

Source: Krystal and Gommers, 1979; cited in World Bank Country Study, 1989

TABLE VI
COMPARATIVE ENROLLMENTS BY STAGE OF SCHOOLING

1986	Women	Men	Total	% Women
Primary, Standard 1	439000	473000	912000	52
Primary, Standard 2	150000	195000	345000	43
High School, Form 1	68000	94000	162000	42
High School, Form VI	6000	11000	17000	35
1983-84				
University	2088	4855	6943	30

Source: World Bank Country Study, Kenya: The Role of Women in Economic Development, 1989.

suggests that improving the well-being of women whose principal economic activity remains farming, means helping them to become better farmers.

Indeed, women farmers group forums are used extensively in Kenya as the contact for disseminating agricultural information. Such groups constitute an important means of reaching the less progressive farmer. According to a 1989 World Bank survey, extension agents follow up group meetings with farm visits to the individual women farmers and report that these women groups tend to adopt extension messages more readily than individual contact farmers.

Due to women's significant contribution to household income and their increasing contribution in the labor force, integrating them directly into the development planning process can increase the two main goals of development-raising household income and creating employment. International women's forums have been calling for increased involvement at all stages in the drafting of national development plans and in implementation process (Lycette, 1984; FAO Plan of Action, 1990).

Use of Methods and Media for Communicating Agriculture Information

Methods

Fisher and Wesselmann (1968), Pirtle (1989), and Lindsey (1994) referred to several types of methods used for communicating agricultural information.

Farm visits occur at the producers farm whereby the agricultural information communicator goes to the learner.

Office visits occur when the learner goes to look for the communicator.

Farm demonstrations help build the confidence of the communicator and client as they practice the technique.

Visit to research station allows the producer to see the latest research or experiment.

Workshops allow participants to be trained in a skill, practice the procedure and have it completed at the end of the session.

Field trips allow producers to see practices, skills, and projects done by others.

Group lecture is a group teaching method for communicating information.

Group discussions allow a speaker to introduce a topic and a discussion by the group members follows thereafter.

Seminar is a small group of people who have a specialized area of interest and get an opportunity to hear an expert on a particular issue.

Field day allows experts from research station, extension, and sales companies to teach specific topics to individuals or groups simultaneously.

Mass Media

Hayami & Ruttan (1971) argue that the critical element in agricultural development is information linkage among farmers, public research institutions, private agricultural supply firms, and the market for products.

Since agricultural extension personnel are well involved in the process of change of behavior through dissemination of information and other related functions, it is important that these personnel use a technology that can speed up the change process. Lionberger (1982) pointed out that in transferring information, change agents should use as many communication channels as possible. The importance of using communication technology, including video, radio, television, print, and even computers as one of these channels was emphasized by White, Nair, and Ascroft (1994).

Cooper (1983) recommends six major questions to be considered in selecting the type of communication channels to use when disseminating information:

1. What experience do you have in planning and delivering the information?
2. What is the primary purpose of the information transfer or the nature of the problem?
3. Is the information transfer a one-time or an on-going activity?
4. How does the use of communication channels aid the learning process?
5. What constraints exist for the information transfer regarding cost, schedule, number of participants, and access to participants?
6. What alternative delivery channels cost, especially on a unit per clientele basis; and does your organization support the use of such communication channel?

After getting satisfactory answers to these questions, a change agent could then decide on a channel or technology for transferring the information (Cooper, 1983).

Radio and other mass media have been used to support agriculture in many places. Axinn and Thorat (1972) list radio and printed publications among the teaching methods used most in developing countries.

The media could greatly assist diffusion and spread agricultural education. A 1963 study in Costa Rica investigated the relationship between mass media and the diffusion of agricultural, health, and social educational innovations. A small group of village volunteers listened to a weekly radio program, discussed and summarized them to the radio programmer. The agricultural innovations chosen for the communications included: soil conservation, use of fertilizers, use

of tractors, general mechanization, and use of insecticides (Roy, Waisenen & Rogers 1969). The research illustrates the influence media could have in assisting the diffusion of information.

Radio

Radio can be used to reach both illiterate and literate audiences. In 63 out of 91 Third World countries surveyed by Katz and Wendell (1978) there was at least one radio to every twenty people and in nearly a half, one radio to every ten people.

Media could assist diffusion of information to farmers with little wealth. In a 1975 Cultural Popular Action (ACPO) study investigating the proportion of rural adult population reached by radio programs in Central America, the study results showed that wealth has something to do with the audience numbers reached. For example, in Bolivia, radio programs reach even the poorer members of the society. In Dominican Republic, the program reaches the landless and also those with the smallest farm holdings. Therefore, in general radio programs have considerable success in reaching poor members of peasant communities but seldom reach the poorest (White, 1976).

Radio campaigns demonstrate another way of linking group study with the use of print. In 1960s and 1970s, groups in Tanzania met twice a week and listened to a radio agricultural and health program under a trained guide and secretary who sent back the groups' feedback to the campaign organizers. According to Hall (1978) survey, the digging of latrines and their use increased 123 percent in eight villages. The study showed that the campaigns had a considerable success in reaching 75 percent of the poor members of the society (Matiko, 1976; Hall, 1978).

Media can be useful in disseminating specific skills. In 1975 studies in Botswana, teaching techniques for planting fruit trees, the results showed that there was a higher survival rate of trees planted following a print and radio educational program than there had been in a previous scheme without the media program (BEC Evaluation Unit, 1975).

In Chile, radio school methods were used to teach horticulture, goose keeping, and rabbits management. Thereafter, the innovation for horticulture and goose keeping was adopted but not the rabbit management where the groups could not afford the breeding pair (Amtmann et al. 1977).

In the Philippines, radio is said to be the most "preferred medium" for information on agriculture and it was found that 83 percent of farmers' co-operators used radio (Gomez 1976). And in Guatemala, radio has been found to be effective both by itself and when linked with the work of an agricultural extension agent (Rich et al. 1978).

In Malawi, 27 percent of the farmers reported radio as their source of agricultural information (Perraton, Jamison and Orivel, 1981); a finding that is consistent with the Nigerian data considering the difference in level of income between the two countries.

Media evaluation can tell the producers how their audiences feel about the information; hence, be able to plan to provide it in a regular and systematic manner. Between April and December 1977, an experiment was conducted for the program *Re Bostseng* (Ask Us) that is broadcast by Botswana Extension College. A follow-up study showed that the program was successful in reaching rural audiences and that the programs were more popular in the rural areas than in the urban areas.

Slides

These are low cost visual aids which are easy to transport, allow prior arrangement before presentation, and allow presenter to stop and elaborate on required details or to answer questions.

Video tapes

The video is convenient and easy to use. Also, the video tapes can be used to present details that would otherwise be complicated to explain verbally.

Pamphlets and Booklets

In Lesotho, one experiment compared the use of print materials by individuals and through existing women's organizations. Lesotho Distance Teaching Center prepared pamphlets on how to crochet and issued them to individuals. Group leaders were given some training in how to use the booklets and how to conduct their groups. Evaluation showed that individuals were able to get high scores in a "how to crochet test" while groups that used the booklet as recommended, 95 percent of group members learned to crochet.

Newsletters

Agricultural information communicators submit articles to newsletters published at AIC in order to reach an audience with a specific interest.

Newspapers and Magazines

Print media can be used to disseminate information to individuals. According to Oskam (1993), more than 50 percent of the 170 Oklahoma farmers surveyed indicated they would "prefer to receive agricultural safety and health from magazines" while 8 percent preferred radio. When asked from what media

they receive agriculture safety and health, 43 percent of those surveyed "identified magazines as their primary source" (Oskam, 1993).

Rural newspapers and magazines have also been used to communicate information for rural development. In some African nations, some of the newspapers are centrally produced, usually by a ministry of education or information and distributed throughout the country or a specific region. Others are produced in a village or a small town and circulated within a small area. Alongside such papers, a number of organizations produce magazines, focusing on a specific interest: *Za Achikumbi* in Malawi, and *Agripromo* in francophone West Africa, both almost entirely covering agricultural topics (Bhola, 1980).

Stevenson (1988) wrote that a Dutch development experiment in Kenya in 1970s equipped a mobile van with hardware for producing a simple offset paper and moving it to a village where local residents were encouraged to become reporters and editors were trained to produce the newspapers. When the newspaper became self-sustaining technically and socially, the van was re-equipped and moved to another village.

Although none of the papers was ever self-sustaining financially, social objectives, including education, practical information on health, economic and social conditions, encouragement of reading habits, and participation of readers in development, were achieved.

The agricultural extension staff may need to explore and utilize the available and any new publications. As Perraton (1981) points out, the rural newspapers could be a good medium to disseminate agricultural information, but they are not utilized to their full potential by the agriculturists. Perraton (1981) sums up the media use in Africa:

We can assume that rural newspapers are of value in societies where new literates, and rural people generally short of printed material value whatever is available. They can be easily set up and run on a modest

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scale, and can be used to carry information about agriculture. However, as in television, there is little information available to assess its effectiveness (p. 106).

Communication Training Needs for Agricultural Change Agents

With the coming of new technology in information communication, extension personnel are being called upon to change their presentation styles to styles more appropriate to the new modes of disseminating information. And in order for the change agents to persuade individuals or groups, then it is important they select a channel(s) that will improve their communication effectiveness through their use of the new technology.

One opening that would allow extension personnel to gain practical skills developing technical competencies to keep up with change such as using new communication technology is through in-service training. In designing effective in-service programs, several components must be considered including specific goals and objectives; designing activities; available resources; participants' awareness and readiness; and evaluation.

According to Rakow (1981), there are four criteria which may help developers of in-service programs evaluate their results:

1. Medium selection: The program should incorporate use of specific instructional technology to teach specific skills.
2. System Focus: The focus of the program should be presented in the context of the organization's overall goal. Such a training program should provide the employees with background information and the overall expectations of the organization.

3. Skill Transfer: The program should afford the employee the opportunity to transfer skills learned during the training experience to the job situation.

4. Performance Objectives: The program should be based on the skills that employees need to apply on the job.

Dunlap (1958) recognized the importance of in-service training:

...an organization is known by the people who make up its staff. Continuous in-service and professional training is essential for a staff to be competent in interpreting new developments in subject matter, teaching methods and procedures, and in keeping various publics informed (pp. 213-214).

According to Hornick (1988) study of developing countries, in contrast to extension training program, there are no media-based programs for in-service extension agents. The researcher believes the participants' perceptions on training needs will be a logical base for an in-service training program. Agunga (1993) points out that it is the communicator's challenge to get policymakers to recognize the communicator functions in development programming.

Future Use of Media in Communicating Agricultural Information

Hornick (1988) offers two suggestions for improving utility of communication in agriculture: 1) making broadcast content reflect local contexts by decentralizing production and adding a link between farmers and producers; 2) organizing listening clubs to support and localize the radio broadcasts, sometimes creating a link with extension agents.

Leading scholars in communication are now arguing that communication on coequal basis is practically more relevant and useful. White (1994) and others argue that the major problem with the T&V extension approach is its

operating methodology which is "top-down and proinnovation." Media such as video and radio may be used to promote dialogue between the specialist source and clientele.

Cleaver (1993) explains that communication technology can be used to reach clientele in countries where extension services have become too expensive and are now being restructured. Examples of countries where restructuring is being done include Benin, Cote d'Ivoire, Kenya and so on.

Radio programs can also be used to reach farmers where extension staff have high numbers of farmers. Studies in the late 1960s in Western Nigeria found that many farmers were "reached by agricultural programs on radio." And only one-third of the farmers in the sample "knew their local extension worker" while only "one-fifth knew him well" (Axinn and Thorat, 1972). Similarly in 1972 in Northern Nigeria, studies showed that 47 percent of farmers used radio as a source of agricultural information compared to 20 percent who received their information from the extension worker and 16 percent who received information from friends and neighbors (Katz & Wedell, 1978).

In a report of their case study in India, Melkote & Vallath (1994), suggest that change agents should avoid message biases in extension communication. An examination of extension training materials--leaflets, booklets, posters, and radio scripts--used in the T&V program in teaching the Andhra Pradesh community revealed that the language used was not easily communicable to farmers. Messages were loaded with names of weights and measures unfamiliar to farmers; forcing them to confront a host of unfamiliar names of pesticides. The researchers cited a typical instruction radio broadcast on how to protect his crop:

In the early stages 10 percent BHC powder or 10 percent Toxaphone or 10 percent Carboryl at the rate of 20-25 kilograms per hectare or 4 percent Phosalone at the rate of 15-20 kilograms per hectare should be

dissolved in 500 liters of water and sprayed on the crop. In later stages, 25 percent Quinalphos 1000 milliliters strength or 50 percent BHC powder 2 1/2 to 3 3/4 kilograms strength mixed in 500 liters of water should be sprayed on the crop. [An English translation of Telugu language radio broadcast.] (p. 322).

Radio is a good medium for conveying messages but unsuitable for communicating names and numbers. Although the language was addressed to the lay person, it was highly scientific and technical. The limitations of radio to handle such scientific, fact-oriented information were not given serious thought. This again emphasizes selection of suitable media if change agents want to persuade their clientele to adopt an innovation. Indeed, the selection of suitable media will continue to be an important factor in the diffusion of innovation as new technology evolve.

Summary

The major purpose of this chapter was to review literature in the following areas: 1) History of communication technology; 2) Review of communication theories included in this study; 3) Diffusion theory; 4) Communication channels; 5) Information, communication, and interaction; 6) Diffusion and adoption of innovation; 7) Role of women in agricultural information sharing; 8) Uses of media in communicating agricultural information; 9) Communication training needs for agricultural change agents; and 10) Future use of media in communicating agricultural information.

The literature review indicated that agricultural information communicators can help producers change their farming practices. And while many factors may influence and contribute change in practice, it is important for the communicator to consider those factors before developing the program.

One of the major factors to consider is selection of a method or medium that meets the audience needs. The delivery method or medium selected could target an individual farmer or a group of women farmers. In addition, the method selected could be used on its own, in combination with another method, or in combination with media.

CHAPTER III

METHODOLOGY

Introduction

The purpose of this research is to determine the perceptions of methods and media used for communicating agricultural information in Kenya by students enrolled in agriculturally-related programs in the U.S. and Canada. In an attempt to attain the objectives of this study, the researcher developed a questionnaire seeking responses to the issues listed in the objectives:

1. To determine the frequency of use of the selected methods and media.
2. To determine the perceptions of the surveyed students toward the effectiveness of delivery methods and media in communicating agricultural information.
3. To determine the anticipated use of methods and media for communicating agricultural information.
4. To determine the problems and hindrances encountered in using media.
5. To determine perceptions on need for additional training in using selected methods and media.
6. To determine the demographic make-up of the participants.

Chapter III was developed to include: 1) Population; 2) Development of Instrument; 3) Validating the Questionnaire; 4) Administration of the Questionnaire; and 5) Processing and Analysis of the Data.

Population

The population selected for this study consisted of all full-time undergraduate and graduate students from Kenya studying in agriculturally-related programs in the U.S. and Canada. Undergraduate and graduate students whose names were on file with the International Agricultural Program--Kenya Project at Missouri were selected for the study. In addition, a list of graduate Kenyan students was provided by the Ministry of Agriculture and Livestock Development. The two lists had a total of 65 students. Therefore, all the students studying agriculture-related areas were included in the study. The rationale for selecting this group of students was due to their extensive professional experiences in agriculture-related areas in Kenya.

Development of the Instrument

Since the goal of the study was to determine the perceptions of methods and media used for communicating agricultural information in Kenya, a mail survey of the Kenyan students enrolled in agriculture-related programs in the U.S. and Canada seemed to be the most feasible research approach for collecting the data. This was based on the recognition that a questionnaire can be used as a means of eliciting experiences, feelings, beliefs, or attitudes of respondents.

The questionnaire was organized in five sections. Section A of the instrument included 11 questions which were designed to ascertain demographic and employment information about the participants. The demographic and employment questions were included in order to describe the sample.

Section B sought information about the perceptions of frequency of use and effectiveness of delivery methods. Section C was intended to elicit perceptions of frequency of use and effectiveness of delivery media. In Section B and C, the questionnaire instructed the respondents to select their responses from five choices--for perception of use. The choices included 1="Not used" and 5="Heavily used." Also in Section B and C, the respondents were asked to indicate effectiveness of selected methods and media on a five-point scale where 1="Not effective" and 5="Very effective." The question in Section D asked the respondents to indicate how often they use slides and video tapes on selected areas of agricultural issues where 1="Never" and 5="Very often." Section E included two questions seeking respondents' in-service training needs in media and methods for communicating agricultural information in Kenya where 1="None" and 5="Very much."

The instrument was approved by the Oklahoma State University Institutional Review Board to comply with all requirements for human subject research. The IRB Approval Number is AG-96-004 (Appendix A).

Validating the Questionnaire

In developing a questionnaire, a researcher faces the problems of measurement including reliability and validity. According to Hubbard (1939), questionnaires are "peculiarly vulnerable" when employed for collecting personal information. He pointed out that with questionnaire usage: 1) some respondents are more dependable than others, hence a few questionnaires distributed among competent people would give more valid data than a wider distribution which includes unqualified people; 2) the perceptions of a group as a whole are more valuable than those of individuals, hence the need for relying upon averages in

the measures of a group's perception; and 3) where respondents have standards or mechanical aids agreement is more valid, hence the value of defining terms or supplying definite criteria where judgment is involved.

In order to test for clarity, the questionnaire was presented to each of the graduate students enrolled in the research design class at Oklahoma State University, July 1995. Revisions were made according to their recommendations. The revised questionnaire was then circulated to the advisory committee members, one committee member suggested that the format on the questionnaire be improved. Another committee member suggested that the cover letter explain clearly to the participants that the effectiveness of information required is on Kenya. The recommendations from the advisory committee members were incorporated into the final draft of the questionnaire. The final version was used as the survey instrument for the participants in this study (Appendix B).

Survey Pilot-test

In order to test for content validity, the questionnaire was pilot-tested with seven students randomly selected from the population. Survey packages with a cover letter were mailed to the seven students on August 11, 1995. During the pilot-test, none of the participants reported any concerns and/or problems. The seven of the 65 students were not included in the investigation.

Administration of the Questionnaire

The actual data collection for this study was undertaken from October 1995 to January 1996. In order to boost the return rate of the questionnaire,

several precautionary steps were taken. A letter of introduction and a request for participation was mailed to each of the Kenyan students in the population.

To help prevent the instrument from getting "lost" in stacks of the papers, the questionnaire was printed on bright lift-off lemon 13B colored paper. A cover letter written on official Oklahoma State University letterhead bearing the name and signature of the Advisory Committee Chairman was included in the survey package (Appendix C). An addressed return envelope was included in the survey package.

Return, stamped envelopes were coded so that the participants who did not respond could be identified. As questionnaires were returned, the names of the participants were removed from the master mailing list. Reminder notices were e-mailed to the participants who did not return the questionnaire after two weeks. The first survey response was 39 (67 percent) from the students. On January 25, 1996, a follow-up e-mail was sent to the non-respondents. Of these, three were no longer in the U.S., four agreed to return the questionnaire, and one could not be reached. The follow-up increased the responses to 81 percent, with 47 out of 58 students participating.

Processing and Analyzing the Data

Due to the descriptive nature of the data, it was decided to summarize the findings through the use of descriptive statistics. All responses from the respondents were coded on the Microsoft Excel 4.0 program.

The mean scores, standard deviation, and percentages for each delivery method and medium were calculated and the methods and media were rated using the calculated data to determine the appropriate category of effectiveness and use.

In referring to the mean responses in the tables in this study, it was necessary to assign values to response categories and also to define the range and real limits of each category. The scale used to determine the mean response of the respondents' perceptions of frequency of use, effectiveness, and training needs for methods and media for communicating agricultural information is the following:

Response Categories	Numerical Value	Range of Limits for Categories
Heavily used	5	4.5 - 5.00
Frequently used	4	3.5 - 4.49
Sometimes used	3	2.5 - 3.49
Rarely used	2	1.5 - 2.49
Not used	1	1.0 - 1.49

The scale used to determine the mean response of respondents' perceptions of effectiveness for delivery method and media for communicating agricultural information follows:

Response Categories	Numerical Value	Range of limits for Categories
Very effective	5	4.5 - 5.00
Effective	4	3.5 - 4.49
Somewhat effective	3	2.5 - 3.49
Of little effectiveness	2	1.5 - 2.49
Not effective	1	1.0 - 1.49

The scale used to determine the mean response of the respondents perceptions of problems and hindrances encountered in using media is the following:

Response Categories	Numerical Value	Range of Limits for Categories
Very Often	5	4.5 - 5.00
Often	4	3.5 - 4.49
Sometimes	3	2.5 - 3.49
Seldom	2	1.5 - 2.49
Never	1	1.0 - 1.49

The following scale was used to determine perceptions for additional training needs:

Response Categories	Numerical Value	Range of Limits for Categories
Very Much	5	4.5 - 5.00
Much	4	3.5 - 4.49
Some	3	2.5 - 3.49
Little	2	1.5 - 2.49
None	1	1.0 - 1.49

CHAPTER IV PRESENTATION AND ANALYSIS OF DATA

Introduction

The main purpose of this study was to determine the perceptions of methods and media used for communicating agricultural information in Kenya by students studying in agriculturally-related programs in the U.S. and Canada. In addition, the study sought the participants' perceptions of the usefulness, effectiveness, future use, and training needs of the selected methods and media.

The data was collected from 47 students from Kenya who are enrolled in agriculture-related areas in universities in the U.S. or Canada. The response from the participants was 81 percent out of the 58 selected students. This chapter focuses on description and analysis of data collected in order to address the objectives outlined in Chapter I.

In responding to the survey, not all questions were answered by all respondents; therefore, the "N" may vary in different tables.

Demographics of the Population

Respondents' Age

The respondents age ranged from 24 to 43 years which was grouped into five category levels (Table VII). The mean age of the respondents was 34 years. The higher mean age may be attributed to the group's longwork experience prior to attending university in the U.S. or Canada.

TABLE VII
RESPONDENTS' AGE DISTRIBUTION

Age category level	Responses	
	Frequency	Percent
21 - 25	1	2.1
26 - 30	10	21.2
31 - 35	15	32.0
36 - 40	19	40.4
40 - 45	2	4.3
Total	47	100.0

Respondents' University

This part of the question was concerned with the respondents' university of enrollment. The 47 respondents were enrolled in 11 universities in the U.S. and three in Canada. Table VIII provides a summary of the universities the respondents were enrolled in at the time of the study.

Gender of Respondents

The total group of respondents was composed of 35 men and 12 women (Table IX). The low number of women represented in the study may be related to preference to educate men more than women. The literature review indicated that the literacy rate for women was lower than men's starting from Standard 1 and decreasing at each level through university (Table VI).

Enrollment Status of Respondents

Of the respondents, 97.9 percent were enrolled at graduate level with 59.6 percent at masters level and 38.3 percent at doctoral level. Only 2.1 percent were enrolled at undergraduate level (Table X).

TABLE VIII
RESPONDENTS' UNIVERSITY DISTRIBUTION

University	Responses	
	Frequency	Percent
U.S.		
Mississippi State	7	14.9
Missouri	5	10.6
Iowa State	5	10.6
Kansas State	4	8.5
Texas Tech	4	8.5
Michigan	3	6.4
Oklahoma State University	2	4.3
North Carolina State University	2	4.3
Texas A&M	2	4.3
University of Illinois	2	4.3
Cornell	1	2.1
CANADA		
Guelph	5	10.6
Saskatchewan	4	8.5
University of Alberta	1	2.1
Total	47	100.0

TABLE IX
GENDER OF THE RESPONDENTS

Gender	Responses	
	Frequency	Percent
Men	35	74.5
Women	12	25.5
Total	47	100.0

TABLE X
RESPONDENTS' LEVEL OF ENROLLMENT

Level of Enrollment	Responses	
	Frequency	Percent
Doctoral	18	38.3
Masters	28	59.6
Undergraduate	1	2.1
Total	47	100.0

Choice of Field of Study

The participants were asked to indicate why they chose the field of study that they were enrolled in at the time of the study. Of the respondents, the largest percentage (70 percent) indicated that it was due to interest with consensus of the sponsor and/or employer. Another 27.7 percent indicated that the choice for the field of study was recommended by the employer (Table XI).

TABLE XI
RESPONDENTS' CHOICE OF STUDY

Choice of field of study	Responses	
	Frequency	Percent
Interest	33	70.2
Selected by employer	13	27.7
Other	1	2.1
Total	47	100.0

Respondents' Current Field of Study

As shown in Table XII, the highest percentage of the respondents were enrolled in Horticulture (14.9 percent), Animal Science (14.9 percent), and Agricultural Economics (14.9 percent). The second highest percentage of respondents was in the Soil Science program (10.6 percent) and Agronomy (10.6 percent). The third highest percentage of respondents was in Plant Pathology with 8.5 percent.

Respondent's Employment Experience and Occupation

Table XIII shows that 97.9 percent of the respondents had previous full-time work experience. The data in Table XIV show that the largest number of respondents, 29.8 percent had experience in Extension followed by Research (27.7 percent). The two accounted for approximately 57 percent of the respondents' work experience.

The length of time that the respondents were in their occupations ranged from 2 to 17 years with a mean of six years (Table XV).

When asked to indicate type of duties performed in the most recent job, 31.8 percent of the responses indicated that the respondents had performed duties in extension. The second highest responses of duties performed was in research which provided 29 percent of the responses followed by 21 percent of the responses in teaching (Table XVI). The researcher would like to point out that respondents indicated they performed more than one duty at a particular time such as extension/administration, extension/research; therefore the frequency is greater than 47.

TABLE XII
RESPONDENTS' PROGRAM AREAS

Program Area	Responses	
	Frequency	Percent
Horticulture	7	14.9
Animal Science	7	14.9
Agricultural economics	7	14.9
Soil Science	5	10.6
Agronomy	5	10.6
Plant Pathology	4	8.5
Veterinary	3	6.4
General Agriculture	2	4.3
Plant Breeding	2	4.3
Entomology	1	2.1
Food Technology	1	2.1
Crop Production	1	2.1
Marketing	1	2.1
Total	47	100.0

TABLE XIII
RESPONDENTS' WORK EXPERIENCE

	Responses			
	Yes		No	
	N	%	N	%
Have you had full-time work experience?	46	97.9	1	2.1

TABLE XIV
RESPONDENTS' WORK EXPERIENCE

Type of work	Responses	
	Frequency	Percent
Extension	14	29.8
Research	13	27.7
Administration	5	10.6
Horticulture	2	4.3
Animal Production	5	10.6
Teaching	5	10.6
Agricultural Economics	2	4.3
None	1	2.1
Total	47	100.0

TABLE XV
RESPONDENTS' DURATION OF EMPLOYMENT

Number of years	Responses	
	Frequency	Percent
1 - 5	25	54.4
6 - 10	18	39.1
11 - 15	2	4.3
16 - 20	1	2.2
Total	46	100.0

TABLE XVI
RESPONDENTS' DUTIES IN THE MOST RECENT EMPLOYMENT

Experience	Responses*	
	Frequency	Percent
Extension	35	31.8
Research	32	29.0
Teaching	23	21.0
Administration	13	11.8
Manager	5	4.6
Clerical	1	.9
No experience	1	.9
Total	110	100.0

* Respondents could check one or more as related to their duties.

Anticipated Employment

Respondents were asked employment they anticipated working in after completion of their studies. Table XVII, indicates the frequency distribution of the responses of the anticipated employment. Teaching was the anticipated area of employment identified by most of the respondents. The second most anticipated area of employment was crop research which provided 21.6 percent of the responses followed by crop protection with 18.9 percent of the responses. The two accounted for 40.5 percent of the responses. Responses in Extension (13.5 percent), Livestock Research (9.5 percent) and Soil and Water Management (9.5 percent) were the next most frequent areas that respondents anticipated working in. Only 1.3 percent of the responses indicated the respondents were undecided.

The respondents were asked what sector they anticipated working in. The data in Table XVIII shows that 40 percent of the respondents anticipated

working in Research Station followed by teaching in agricultural college, university, or agricultural institute (29.8 percent) and agricultural extension (21.3 percent). Only 2.1 percent identified private business industry as the sector in which they anticipated to work.

TABLE XVII

RESPONDENTS' ANTICIPATED AREA OF EMPLOYMENT

Area of employment	Responses*	
	Frequency	Percentage
Teaching	17	23.0
Crop research	16	21.6
Crop protection	14	18.9
Agricultural extension	10	13.5
Soil and water management	7	9.5
Livestock research	7	9.5
Farm and ranch management	2	2.7
Undecided	1	1.3
Total	74	100.0

* Respondents could choose more than one area

TABLE XVIII

RESPONDENTS' ANTICIPATED SECTOR OF EMPLOYMENT

Sector	Responses	
	Frequency	Percentage
Agricultural Research Station	19	40.4
Agriculture Extension	10	21.3
Agricultural College or University	10	21.3
Agriculture Training Institute	4	8.5
Private industry-agriculture	2	4.3
Private business/industry	1	2.1
Undecided	1	2.1
Total	47	100.0

Availability of Research Information to Individuals in
Different Parts of Kenya

The responses in Table XIX indicate that the perception of a total of 72.3 percent is that research information is not easily available to individuals in different parts of Kenya. However, 25.6 percent indicated that the information is available to individuals.

TABLE XIX
RESPONSE ON RESEARCH INFORMATION AVAILABILITY

	Responses					
	Yes		No		Didn't Answer	
	N	%	N	%	N	%
Do you believe research information is available to individuals in different parts of Kenya?	12	25.6	34	72.3	1	2.1

Also, the respondents were asked, why or why not-- Research information is easily available to individuals in different parts of Kenya. The following are respondents' anecdotes:

Positive:

Research is designed together with extension workers and farmers. Results are available to both.

Annual reports are available at various libraries and research institute and published papers

At individual Research Center annual reports and national levels

Research centers are found in most parts of Kenya

Negative:

Most technology transfer is concentrated in high potential areas where infrastructure is developed.

There is no research linkage. There is also language/communication barriers between extension/research and clientele

Research findings are left in technical form in research stations

Not available in simple enough language for ordinary farmers to understand and implement the recommendations.

Low linkage between research and Agricultural Extension

Unavailability of journals and report articles in most parts

Information is lacking

None prepared for media release. Unavailability of published research material.

Inadequate public libraries. Published research materials expensive for most people. Lack of interest and appreciation of research work.

Need to travel to source of information and visit with the personnel working there. Going to Agriculture libraries.

Dissemination of research information not given priority.

Annual report not published and when published it may not be up-to-date.

The little available is at the national office

Absence of simplified publication for the farmers

No, due to budget constraints

Lack of clearly defined process of information flow between research and Extension.

Both positive and negative:

Some information released through Extension staff. However, a lot remains at research center.

Mainly exchanged between research centers. Some to extension staff and occasionally to farmers.

Respondents' Target Audience

In an attempt to determine the respondents' target audience, the participants were asked to rank in order of importance (1=most important and 5=least important audience) the audience they target when communicating agricultural information. The list of audience included farmers, ranchers, educators, youth, women groups, agriculture-related business and their workers, or any other.

The data in Table XX show that a majority of the respondents ranked farmers as their most important target audience with an average ranking of 1.2. Women groups were ranked second in importance with an average ranking of 3.0 followed by educators ranked as third with a mean ranking of 3.4. Youth were ranked fourth with a mean of 3.5, while ranchers were ranked fifth with an average ranking of 3.6.

Frequency of Use of Selected Methods

This study examined the respondents' perceived frequency of use of methods when disseminating agricultural information in Kenya. The methods selected included farm demonstration, farm visits, field trips, field days, office visits, visit to research station, group lectures, group discussions, workshops, and seminars.

Table XXI shows the ratings and means of the frequency of use of the selected methods. The respondents' use farm visits and farm demonstrations for communicating agricultural information. They rated farm visits as "frequently

TABLE XX
RANK OF IMPORTANCE OF TARGET AUDIENCE

Target audience	Responses - N=231											Rank Order
	Most Important		Important		Somewhat Important		Of little Importance		Least Important		Average Rank	
	N	%	N	%	N	%	N	%	N	%		
Farmers	44	94.0	0	0	1	2.0	0	0	2	4.0	1.2	1
Ranchers	2	5.3	7	17.9	7	17.9	9	23.0	14	35.9	3.6	5
Educators	0	0	9	22.0	10	19.5	17	41.5	5	17.0	3.4	3
Youth	0	0	6	15.8	14	36.8	9	23.7	9	23.7	3.5	4
Women	0	0	21	46.7	8	17.8	9	20.0	7	15.5	3.0	2
Agriculture-related business and their workers	0	0	3	13.0	7	30.4	3	13.0	10	43.6	3.9	6

used" with a mean of 3.7. Other "frequently used" methods were farm demonstration (3.6), office visits (3.6), and field trips (3.5). Methods indicated as "sometimes used" included workshops (3.1), seminars (3.0), group lectures (2.9), and visitors to research station (2.8). The method least used by the respondents was group discussion, also a "sometimes used" with a 2.5 mean.

TABLE XXI
RESPONDENTS' PERCEPTION OF FREQUENCY OF
USE OF SELECTED METHODS

Method	Responses		
	Mean	SD	Category
Farm visits	3.7	.66	Frequently used
Farm demonstration	3.6	.67	Frequently used
Office visits	3.6	.68	Frequently used
Field trips	3.5	.80	Frequently used
Workshops	3.1	.81	Sometimes used
Seminars	3.0	.80	Sometimes used
Group lectures	2.9	.79	Sometimes used
Visit to Research Station	2.8	.80	Sometimes used
Group discussions	2.5	1.03	Rarely used

Scale Limit of use: 1 - Not used; 5 - Heavily used

Effectiveness of Selected Methods

The data in Table XXII indicate that farm demonstration (4.1), followed very closely by farm visits (3.8), workshops (3.8), seminars (3.6) were rated by respondents as "effective." Other methods rated "sometimes effective" included

visit to research station (3.4) and field trips (3.4). Office visits (2.9) and group discussions (2.9) had the lowest mean of "effectiveness" method.

TABLE XXII
RESPONDENT'S PERCEPTION OF EFFECTIVENESS
OF SELECTED METHODS

Method	Responses		
	Mean	SD	Category
Farm demonstration	4.1	.72	Effective
Farm visits	3.8	.77	Effective
Workshops	3.6	.86	Effective
Seminars	3.6	.79	Effective
Visit to Research Station	3.4	.90	Somewhat
Field trips	3.4	.97	Somewhat
Office visits	2.9	.91	Somewhat
Group lectures	2.9	.90	Somewhat
Group discussions	2.9	.90	Somewhat

Scale limit of effectiveness: 1 - Not effective; 5 - Very effective

Frequency of Use of Selected Media

The data in Table XXIII presents the respondents' perception of frequency of use of selected media. The respondents used handouts "sometimes" with a rating of 2.9. Brochures (2.8) and leaflets (2.9) received "sometimes used" rating. Other media identified as "sometimes used" included magazine article(s) with a mean rating of 2.7, farm journal article(s) with a mean rating of 2.7 followed by newspaper article(s) with a mean rating of 2.6 and television programs with a mean of 2.6. Video tapes received the lowest mean indicating they were "sometimes used."

TABLE XXIII
RESPONDENTS' PERCEPTION OF
FREQUENCY OF USE OF MEDIA

Method	Responses		
	Mean	SD	Category
Handouts	2.9	.87	Sometimes
Brochures	2.8	.82	Sometimes
Leaflets	2.8	.82	Sometimes
Magazine article(s)	2.7	.87	Sometimes
Farmer journal article(s)	2.7	.82	Sometimes
Television programs	2.6	.83	Sometimes
Newsletters	2.6	.94	Sometimes
Newspaper article(s)	2.6	.75	Sometimes
Slide show	2.2	.84	Rarely used
Film shows	2.2	.85	Rarely used
Audio cassettes	2.0	.75	Rarely used
Video shows	2.1	.85	Rarely used

Scale Limit of use: 1 - Not used; 5 - Heavily used

Effectiveness of Selected Media

This study examined the respondents' perceived effectiveness of media used when disseminating agricultural programs in Kenya. The media selected included handouts, newsletters, brochures, leaflets, radio shows, magazine articles, newspaper articles, farmer journal articles, slide shows, audio cassettes, television programs, video shows, and film shows.

Table XXIV represents the respondents' perception of effectiveness of selected media. Video tape and films were rated as "effective" with a mean of 3.6. Slide show (3.4), television programs (3.4), and radio program 3.3 were rated as "somewhat effective." Other media rated as "somewhat effective" included farmer journal articles (3.1), handouts (3.0), and brochures (3.0).

Audio cassettes (2.9), magazine articles (2.9), and leaflets (2.9). Newspaper articles with a "somewhat effective" rating of 2.8 had the lowest mean of the media.

TABLE XXIV
RESPONDENTS' PERCEPTION OF EFFECTIVENESS
OF SELECTED MEDIA

Method	Responses		
	Mean	SD	Category
Video shows	3.6	1.20	Effective
Film shows	3.6	1.20	Effective
Slide show	3.4	1.00	Somewhat
Television programs	3.4	.95	Somewhat
Radio program	3.3	.86	Somewhat
Farmer journal article(s)	3.1	.84	Somewhat
Handouts	3.0	.93	Somewhat
Brochures	3.0	.85	Somewhat
Newsletters	2.9	.73	Somewhat
Leaflets	2.9	.91	Somewhat
Magazine article(s)	2.9	.89	Somewhat
Audio cassettes	2.9	.93	Somewhat
Newspaper article(s)	2.8	.66	Somewhat

Scale limit of effectiveness: 1 - Not effective; 5 - Very effective

Problems and Hindrances Related to Using Media for Communicating Agricultural Information

Table XXV provides information on responses regarding the problems and hindrances encountered in using media. An overall mean response of 3.3 meant that the listed problems were experienced "sometimes."

TABLE XXV
 RESPONDENTS' PERCEPTION OF PROBLEMS AND/OR HINDRANCES
 RELATED TO USING SELECTED MEDIA

Problems and Hindrances	Responses										Mean Response
	<u>Very Often</u>		<u>Often</u>		<u>Sometimes</u>		<u>Seldom</u>		<u>Never</u>		
	N	%	N	%	N	%	N	%	N	%	
Unavailability of equipment	14	30.0	9	19.0	12	25.5	8	17.0	4	8.5	2.91
Excessive weight of equipment	7	15.0	10	21.2	23	49.0	5	10.6	4	8.5	3.31
Lack of equipment transportation	7	15.0	13	27.7	16	34.0	8	17.0	3	6.3	3.25
Lack of access to visual aid equipment	9	19.0	15	32.0	14	30.0	8	17.0	3	6.3	3.25
Lack of training	13	27.7	15	32.0	16	34.0	3	6.3	0	0	3.80
Overall Mean Response											3.33

Scale Limit: 1 - Never; 5 - Very often

The problem of lack of training was "often" experienced as reflected by high mean of 3.8. Lack of access to visual aid equipment was "sometimes" experienced with a mean of (3.4), excessive weight of equipment was "sometimes" experienced at a mean rating of (3.3), and lack of transportation of equipment at (3.2). Unavailability of equipment was "sometimes" experienced with a mean rating of (2.9).

The respondents identified other problems and hindrances including lack of electricity, "require too much time," and "inadequate resources."

Anticipated Use of Slides and Video Tapes if Readily Available

Table XXVI shows the anticipated use of slides and video tapes if readily available for communicating agricultural information. An overall mean of 4.2 meant that the respondents would use the slides and video tape "often." On individual selected topics, the respondents indicated they would use the slides and video tapes "often" when communicating agricultural information on marketing (4.5), horticulture (4.3), and animal production (4.3). Crop production (4.24), pests and diseases (4.2), and Agroforestry (4.2) had mean responses that were fairly close. These means fell in the category limits for "often" as their level of use.

The researcher would like to point out that slides and video tapes on marketing had the highest response of 4.45 which represents "often" category.

TABLE XXV
 RESPONDENTS' PERCEPTION OF PROBLEMS AND/OR HINDRANCES
 RELATED TO USING SELECTED MEDIA

Problems and Hindrances	Responses										Mean Response
	<u>Very Often</u>		<u>Often</u>		<u>Sometimes</u>		<u>Seldom</u>		<u>Never</u>		
	N	%	N	%	N	%	N	%	N	%	
Unavailability of equipment	14	30.0	9	19.0	12	25.5	8	17.0	4	8.5	2.91
Excessive weight of equipment	7	15.0	10	21.2	23	49.0	5	10.6	4	8.5	3.31
Lack of equipment transportation	7	15.0	13	27.7	16	34.0	8	17.0	3	6.3	3.25
Lack of access to visual aid equipment	9	19.0	15	32.0	14	30.0	8	17.0	3	6.3	3.25
Lack of training	13	27.7	15	32.0	16	34.0	3	6.3	0	0	3.80
Overall Mean Response											3.33

Scale Limit: 1 - Never; 5 - Very often

Anticipated Use of Channels (Methods and Media)
if Resources Available

In order to determine the perceptions of the participants on the methods and media they would use if resources were available, the respondents were asked to list three methods and three media they would use. The data in Table XXVII indicates that the respondents anticipated using methods and media. For methods, the highest percentage of respondents listed farm demonstration (44 percent), followed by field days (33 percent), and farm visits (23 percent). For media, the highest percentage of respondents indicated they would use radio (41.5 percent), followed by video tapes (39.0 percent), and television programs (19.5 percent).

TABLE XXVII
RESPONDENTS' PERCEPTION OF METHODS AND MEDIA
THEY WOULD USE IF GIVEN RESOURCES

Methods	Responses*	
	N	%
Farm demonstration	39	44
Field days	29	33
Farm visits	20	23
Total	88	100.0
Media		
Radio	34	41.5
Video tape	32	39.0
Television programs	16	19.5
Total	82	100.0

* Respondents could list more than one method or media

Anticipated Use of Methods and Media Not
Previously Used

Of the respondents, 17 percent indicated they would use video tapes. Slide shows were identified by 15 percent followed by computer (10 percent), farmers journal article(s) 10 percent, and newspaper article(s) 10 percent (Table XXVIII).

TABLE XXVIII

RESPONDENTS' ANTICIPATED USE OF METHODS AND MEDIA
NOT PREVIOUSLY USED

Responses		
Now that you have studied in the U.S./Canada in your area of specialization, what method(s) or media would you use that you did not previously use?	Frequency	Percent
Video tapes	8	17.0
Slide show	7	15.0
Computer	5	10.0
Farmers journal	5	10.0
Newspaper article(s)	5	10.0
Film shows	4	9.0
Radio	4	9.0
Field days	4	9.0
Magazine	3	6.5
Workshops	2	4.5
Total	47	100.0

Additional Training Needs in Using Methods and Media

Table XXIX provides information on perceived training needs of the respondents in using selected media for communicating agricultural information. The overall mean response of 3.74 indicated that additional training need in using media was perceived to be at "much" needed level.

The highest mean response for training need was for combined media with "much" needed rating of 4.4. Other media that received a "much" needed rating were magazine articles (4.0), newspaper articles (4.0), video recorder and camera (3.9), and 16 mm film projector (3.5). The lowest mean response for training need was 35 mm camera with a "some" rating of 2.9.

The data in Table XXX indicates perceived training needs of the respondents in using selected methods. The overall rating of 2.72 indicated that additional training need in using methods was perceived to be at "some" need category. The workshop management received a "some" need rating of 3.1 followed by seminar management (2.97). The lowest mean response for training need was farm demonstration with a "little" (2.36) rating.

Each participant was asked the question, "As provided at your university in the U.S./Canada, knowledge in communications is quite effective in preparing Kenyan students to achieve career goals in agriculture, why or why not?"

The responses provided are summarized in Table XXXI. Slightly over 57

TABLE XXIX

RESPONDENTS' PERCEPTION OF ADDITIONAL TRAINING
NEEDED IN USING SELECTED MEDIA

Media	Responses										
	<u>Very Much</u>		<u>Much</u>		<u>Some</u>		<u>Little</u>		<u>None</u>		Mean Response
	N	%	N	%	N	%	N	%	N	%	
35 mm Slide projector	12	26.7	12	26.7	11	24.4	7	15.5	3	6.7	3.47
35 mm Camera	7	16.0	6	13.6	16	36.4	11	25.0	4	9.0	2.90
16 mm Film projector	7	15.5	18	40.0	14	31.1	4	9.0	2	4.4	3.53
Video recorder and camera	14	32.0	16	36.0	11	25.0	3	7.0	0	0	3.90
Publishing article(s) in newspaper	19	41.3	15	32.6	8	17.4	4	8.7	0	0	4.00
Publishing article(s) in magazine	21	45.7	15	32.6	6	13.0	3	6.5	1	2.2	4.00
Combined media (audio and video)	29	61.7	12	25.5	2	4.3	3	6.4	1	2.1	4.40
Overall Mean Response											3.74
Scale Limit: 1 - None; 5 - Very much											

TABLE XXX

RESPONDENTS' PERCEPTION OF ADDITIONAL TRAINING
NEEDED IN USING SELECTED METHODS

Methods	Responses										Mean Response
	<u>Very Much</u>		<u>Much</u>		<u>Some</u>		<u>Little</u>		<u>None</u>		
	N	%	N	%	N	%	N	%	N	%	
Group lectures	1	2.1	8	17.3	13	28.3	13	28.3	11	24.0	2.48
Farm demonstrations	5	10.6	4	8.5	6	12.8	20	42.6	12	25.5	2.36
Seminar management	6	12.8	9	19.1	16	34.0	10	21.3	6	12.8	2.97
Workshop management	5	10.6	11	23.4	17	36.2	12	25.5	2	4.3	3.10
Overall Mean Response											2.72

Scale Limit: 1 - None; 5 - Very much

percent of the those surveyed indicated that as provided at the university they are enrolled in, knowledge in communication is quite effective in preparing them to achieve career goals in agriculture.

TABLE XXXI

EFFECTIVENESS OF KNOWLEDGE IN COMMUNICATION AS PROVIDED BY RESPONDENTS' UNIVERSITY IN PREPARING RESPONDENTS TO ACHIEVE CAREER GOALS IN AGRICULTURE

	Responses					
	Yes		No		Didn't Answer	
	N	%	N	%	N	%
As provided at your university in the U.S/Canada, knowledge in communications is quite effective in preparing Kenyan students	27	57.4	18	38.3	2	4.3

Responses - Effective:

My department teaches seminar preparation and presentation skills
Encouraged to use media in presentations

Good example of meetings/workshops with colleagues

Practice Agriculture extension skills in discussions

Good example of interaction between researchers, extension agents, farmers in counties

Responses - Not effective:

No classes emphasizing communication skills in my department

Student needs to create interest and imagination as extracurricular activity

Both - Somewhat effective and ineffective:

High tech communication; therefore, need awareness to select ones to suit Kenya farmers

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this chapter was to present a summary of the study problem, design, methodology, and major findings. The conclusions and recommendations presented were based upon a detailed inspection of the data analysis.

Summary of the Study

Purpose of the Study

The main purpose of this study was to determine the perceptions of methods and media used for communicating agricultural information in Kenya by Kenyan students studying in agriculturally-related areas in the U.S. and Canada. In addition, the participants' perceptions of the usefulness, frequency, future use, and in-service training needs of methods and media were assessed.

Objectives of the Study

Specific objectives included:

1. To determine the frequency of use of the selected methods and media.
2. To determine the perceptions of the surveyed students toward the effectiveness of delivery methods and media in communicating agricultural information.

3. To determine the anticipated use of methods and media for communicating agricultural information.
4. To determine the problems and hindrances encountered in using methods and media.
5. To get perceptions on need for additional training in using selected methods and media.
6. To determine the demographic make-up of the participants.

Rationale for the Study

With the increasing demand for agricultural information in Kenya, it was necessary to get the perceptions of methods and media usage of those personnel who work as agricultural information communicators.

Assessments have come to be viewed by administrators as a necessary tool in policy analysis, decision making process, and in program management. Assessments are conducted in order to generate data that will help program managers make sound decisions concerning program plan, design, and content. An assessment is effective to the extent that it offers ideas pertinent to pending actions and as a result more effective decisions are made. This study was done to determine the perceptions of methods and media used for communicating agricultural information in Kenya and to get a basis for recommendations for future programs.

Design of the Study

Following a literature review and research related to this study, the design was established to address the purpose and objectives of the study.

The population selected for this study consisted of all full-time undergraduate and graduate students from Kenya studying in agriculture-related

areas in the U.S. and Canada. The rationale for selecting this group of students was due to their extensive professional experiences in agriculture information dissemination in Kenya.

Since the goal of the study was to determine the perceptions of methods and media used for communicating agricultural information in Kenya, a mail survey of the Kenyan students enrolled in agriculture-related programs in the U.S. and Canada seemed to be the most feasible research approach for collecting the data.

In order to test for clarity, the questionnaire was presented to each of the graduate students enrolled in the research design class at Oklahoma State University, July 1995. Revisions were made according to their recommendations. Thereafter, the revised questionnaire was circulated to the advisory committee members. The recommendations from the advisory committee members were incorporated into the final draft of the questionnaire. The final version was used as the survey instrument for the population in this study (Appendix B). In order to test for validity, the questionnaire was pilot-tested with seven students randomly selected from the population.

The data collection for this study was undertaken from October 1995 to January 1996. A cover letter written on official Oklahoma State University letterhead bearing the name and signature of the Advisory Committee Chairman, a questionnaire, and an addressed return envelope were included in the survey package. A response of 81 percent with 47 out of 58 students was received.

Due to the descriptive nature of the data, it was decided to summarize the findings through the use of descriptive statistics. All responses from the respondents were coded on Microsoft Excel 4.0 program. In order to determine the respondents' perceptions, the researcher used percentages, frequency distribution, and mean to analyze the data.

Findings of the Research

The major focus for this study was to determine the perceptions of Kenya students studying in agriculture-related areas in the U.S. and Canada regarding their use of methods and media for communicating agricultural information in Kenya. Also, the study determined the frequency of use and effectiveness of the selected methods and the media. The following are findings of major concerns.

Characteristics of the Respondents

Table XXXII provides a summary of information of the respondents' characteristics.

TABLE XXXII
SUMMARY OF RESPONDENTS' CHARACTERISTICS

Characteristic	Frequency	Percentage
<u>Age</u>		
21 - 25	1	2.1
26 - 30	10	21.2
31 - 35	15	32.0
36 - 40	19	40.4
40 - 45	2	4.3
<u>Education</u>		
Doctoral	18	38.3
Masters	28	59.3
Undergraduate	1	2.1
<u>Gender</u>		
Men	35	74.5
Women	12	25.5
<u>Employment experience (years)</u>		
1 - 5	25	54.4
6 - 10	18	39.1
11 - 15	2	4.3
16 - 20	1	2.2
None	1	2.2

Summary of Respondents' Target Audience

The respondents ranked farmers as the most important audience followed by women, and educators (Table XXXIII).

TABLE XXXIII
SUMMARY OF RESPONDENTS' RANK OF
TARGET AUDIENCE

Target Audience	Responses	
	Average Rank	Rank in importance
Farmers	1.2	1
Women	3.0	2
Educators	3.4	3
Youth	3.5	4
Ranchers	3.6	5
Agriculture-related businesses and their workers	3.9	6

Summary of Frequency of Use and Effectiveness of Selected Methods

Farm visits, farm demonstration, office visits, and field trips were rated as "frequently" used methods. Workshops and seminars were rated as "sometimes" used.

Farm demonstrations, farm visits, workshops, and seminars were rated as "effective." Field trips, visit to research station were rated as "somewhat" effective followed by office visits, group lecture, and group discussions (Table XXXIV).

TABLE XXXIV

RESPONDENTS' PERCEPTIONS OF FREQUENCY OF USE AND
EFFECTIVENESS OF SELECTED METHODS

Method	Mean Responses			
	Mean	Frequency	Mean	Effectiveness
Farm demonstration	3.6	Frequently	4.1	Effective
Farm visits	3.7	Frequently	3.8	Effective
Field trips	3.5	Frequently	3.4	Somewhat
Office visits	3.6	Frequently	2.9	Somewhat
Visit to Research Station	2.8	Sometimes	3.4	Somewhat
Group lectures	2.9	Sometimes	2.9	Little
Group discussions	2.5	Sometimes	2.9	Little
Workshops	3.1	Frequently	3.6	Effective
Seminars	3.0	Frequently	3.6	Effective

Summary of Frequency of Use andEffectiveness of Selected Media

The respondents identified radio program, handouts, and brochures as the media they used "sometimes."

Video tapes and film shows were rated as "effective" while radio programs television programs, slide shows were rated as "somewhat" effective media (Table XXXV).

TABLE XXXV
 RESPONDENTS' PERCEPTIONS OF FREQUENCY OF USE
 AND EFFECTIVENESS OF SELECTED MEDIA

Method	Mean Responses			
	Mean	Frequency	Mean	Effectiveness
Radio program	3.1	Sometimes	3.3	Somewhat
Handouts	2.9	Sometimes	3.0	Somewhat
Newsletters	2.6	Sometimes	2.9	Somewhat
Brochures	2.8	Sometimes	3.0	Somewhat
Leaflets	2.8	Sometimes	2.9	Somewhat
Newspaper article(s)	2.6	Sometimes	2.9	Somewhat
Magazine article(s)	2.7	Sometimes	2.9	Somewhat
Farmer journal article(s)	2.7	Sometimes	3.1	Somewhat
Slide show	2.2	Rarely	2.9	Somewhat
Audio cassettes	2.0	Rarely	2.9	Somewhat
Television programs	2.6	Sometimes	3.4	Somewhat
Video shows	2.1	Rarely	3.6	Effective
Film shows	2.2	Rarely	3.6	Effective

Summary of Problems and Hindrances Related to
 Using Media for Communicating
 Agricultural Information

Table XXXVI provides a summary of means of responses on problems experienced while trying to use media for communicating agricultural information.

The study findings show that in their effort to use selected media, the respondents "often" experienced lack of training. Lack of training was identified as the number one problem followed by excessive weight. Lack of equipment transportation and lack of access to visual aid equipment tied for the second lowest mean. Unavailability of equipment received the lowest mean.

TABLE XXXVI
 RESPONDENTS' PERCEPTIONS OF PROBLEMS
 AND HINDRANCES RELATED TO USING
 SELECTED MEDIA

Problems and Hindrances	Mean Responses	Category
Lack of training	3.80	Often
Excessive weight of equipment	3.31	Sometimes
Lack of equipment transportation	3.25	Sometimes
Lack of access to visual aid equipment	3.25	Sometimes
Unavailability of equipment	2.91	Sometimes
Overall Mean Response	3.33	Sometimes

Summary of Anticipated Use of Methods and Media

Table XXXVII provides a summary of information on anticipated use of methods and media under specified provisions. If given resources, the respondents indicated they would use farm demonstrations, field days, and farm visits methods; while for media, they would use radio, video tapes, and television programs. And for methods not used before coming to U.S. or Canada, but would now use, they revealed they would use video tapes, slide shows, computer, farmers journal for media and field days for methods. On use of the nine types of slides and video tapes presented, if readily available, all of them fell in the "often" use category. Slides and video tapes for marketing received the highest rating (4.45) for anticipated "often" use followed closely by animal production and horticulture (4.3), and then followed by crop production and soil science.

TABLE XXXVII
SUMMARY OF ANTICIPATED USE OF
METHODS AND MEDIA

Slides and Video Tapes on selected topics if readily available

<u>Topic</u>	<u>Mean Response</u>	<u>Category</u>
Marketing	4.45	Often
Horticulture	4.30	Often
Animal production	4.30	Often
Soil conservation	4.24	Often
Crop production	4.24	Often
Pests and diseases	4.20	Often
Agroforestry	4.20	Often
Home Economics	4.00	Often
Rural Youth	4.00	Often

Methods and Media if given resources

<u>Method</u>	<u>%</u>	<u>Media</u>	<u>%</u>
Farm demonstrations	44	Radio	41.5
Field days	33	Video tapes	39.0
Farm visits	23	Television programs	19.5

Not used before but would now use

<u>Method</u>	<u>%</u>	<u>Media</u>	<u>%</u>
Field days	9.0	Video tapes	17.0
Workshops	4.5	Slide shows	15.0
		Computer	10.0
		Farmers journal articles	10.0
		Newspaper articles	10.0
		Film shows	9.0
		Radio	9.0
		Magazine articles	6.5

Summary of Additional Training Needs in
Using Methods and Media

The overall rating of 2.72 indicated that training need in methods was perceived to be at "some" need training level. While workshop management and seminar management fell in the "some" training needed category, group lectures and farm demonstration fell in the "little" training needed category (Table XXXVIII).

Table XXXIX provides information on perceived training needs of the respondents in using selected media for communicating agricultural information. The overall mean response of 3.74 indicated that additional training need in using media was perceived to be at "much" needed level. Of the seven media presented to the respondents, five fell in the "much" training needed category. Combined media (audio and video) received the highest mean (4.4) followed by magazine articles, newspaper articles, and video recorder. The 35 mm camera received the lowest mean for training need.

TABLE XXXVIII

SUMMARY OF RESPONDENTS' PERCEPTIONS OF ADDITIONAL
TRAINING NEEDED IN USING SELECTED METHODS

Method	Mean	Training Needed
Workshop management	3.10	Some
Seminar management	2.97	Some
Group lectures	2.48	Little
Farm demonstrations	2.36	Little
Overall Mean Response	2.72	Some

TABLE XXXIX
 RESPONDENTS' PERCEPTIONS OF ADDITIONAL TRAINING
 NEEDED IN USING SELECTED MEDIA

Media	Mean	Training Needed
Combined media (audio and video)	4.40	Much
Publishing article(s) in newspaper	4.00	Much
Publishing article(s) in magazine	4.00	Much
Video recorder and camera	3.90	Much
16 mm Film projector	3.53	Much
35 mm Slide projector	3.47	Some
35 mm Camera	2.90	Some
Overall Mean Response	3.74	Much

Effectiveness of Knowledge in Communication as
 Provided by Respondents' University in Preparing
 Them to Achieve Career Goals in Agriculture

Although the respondents did not identify particular classes in communication, they indicated their department encouraged and provided suitable environment as demonstrated in their responses. Of the respondents, 57.4 percent indicated that their university encourages communication through "seminar preparation and presentation skills." Also, they are encouraged to use media in presentation, some interpersonal communication through interaction between researcher, extension agents, and farmers. Meanwhile, 38.3 percent of the respondents indicated there was no requirement of classes emphasizing communication skills in their department.

Conclusions

The following conclusions are based on the interpretation and findings of this study:

1. The study findings showed the selected methods are effective and frequently used.
2. Since the respondents indicated they sometimes used media and perceived them as effective; this supports the idea that there is need for use of most of the selected media.
3. When asked what methods and media they would use if resources were made available, the respondents indicated they would primarily use methods: farm demonstrations and radio programs. For methods and media that they did not use before coming to the U.S. or Canada for their study, the respondents indicated they would now use media more often. These findings suggest a variety of methods and media are needed.
4. The respondents surveyed indicated they encountered problems and hindrances in their effort to use media. The respondents indicated that lack of training was the most prominent problem they experienced followed by excessive weight, lack of transportation, and lack of access to the visual aid equipment. This is an indication that critical problems and hindrances exist which need to be addressed.
5. The agricultural planners, AIC, KARI, and agricultural training institutions should be aware of the areas of training needs of the respondents. The training need for methods was rated at the "some" level, while for media it was at the "much" level. These findings suggest there is need for methods and media training.

Recommendations

The following recommendations are made as a result of the data analysis and research findings:

1. The suggestions of the Kenya students surveyed should be forwarded to the agricultural planners and faculty in their respective departments--Director and staff at Agriculture Information Center, Director of Kenya Agriculture Research Institute, Principals and faculty at agriculture training institutions, and agricultural information communicators--so that the findings may serve as a guide for additional training and provision of resources.

2. AIC and KARI should encourage the use of the selected methods for communicating agricultural information.

3. AIC, KARI, and agricultural planners should encourage their staff to use media even if the staff have little experience.

4. There is need to develop and up-date slides, video tapes, and other media for use by the agricultural information communicators.

5. There is critical need for planners to provide more funding to help overcome the problems and hindrances: increase media equipment, transportation, and decentralize media to allow access by the users.

6. AIC and agricultural training institutions should design a program to provide additional training in using selected media and methods.

Recommendations for Further Research

The recommendations are judgments based on the findings of this study:

1. Further study to determine the perceptions of the agricultural information clientele and compare them with those of the disseminators

regarding effectiveness of methods and media used to communicate agricultural information.

2. A study to determine what influences attitude of agricultural information clientele and disseminators toward agricultural information innovations.

SELECTED REFERENCES

- Agunga, R. (1993). Communication roles in Third World development. *Journal of Applied Communications*, 77 (1).
- Agriculture Information Center Annual Report. (1991). Nairobi, Kenya.
- Amtmann, M., Fernades, M. and Moraga, R. (1977). *La tecnica de "radio-vision" en la capacitacion campesina* (Centro de sociologia del desarrollo rural, Universidad Austral de Chile, Valivia).
- Ascroft, J., Roling, Niels, Kariuki, Joseph, Chege, and Fred. (1973). "Extension services in Tetu." Nairobi, University of Nairobi, Institute of Development Studies.
- Axinn, G. H. & Thorat, S. (1972). *Modernizing world agriculture*, Preger: New York.
- Bammi, V. (1983). *The content of Agricultural Broadcasting in two Indian states*. Master's thesis, University of Pennsylvania, Philadelphia.
- BEC Evaluation unit (1975). "The growing fruit trees campaign for 4B club members." (unpublished report) Botswana Extension College, Gaborone.
- Bhola, H. S. (1980). 'Reading materials for new reading public: a policy brief' *Literary Review* 1, pp.1-45.
- Borg, W. R. & Gall, M. D. (1983). *Educational research*. White Plains, N.Y.:Longman.
- Cleaver, K. M. (1993). A strategy to develop agriculture in Sub-Saharan Africa and a focus of the World Bank. Washington, D.C.
- Coombs, P. H. & Ahmed, M. (1974). *Attacking rural poverty: How nonformal education can help*. Baltimore, John Hopkins University Press.
- DeFleur, M. L. & Ball-Rokeach, S. (1989). *Theories of Mass Communication*. 5th ed. White Plains, N.Y.:Longman.

- Dunlap, M. L. (1958). The administrative organization, program procedures, and personal policies of Louisiana Cooperative Extension Service,. Unpublished doctoral thesis, University of Wisconsin.
- The Europa World Year Book 35th ed.* (1994). London: Europa Publications.
- Evaluation unit, Botswana Extension College (1977) Technical note no.4: The costs of the campaign. Botswana Extension College, Gaborone.
- Evans, D. W. (1978). *People and Communication*. London: Pitman.
- Fisher, J. D. and Wesselmann, R.A. (1968). Agricultural Extension Training: A Course Manual for Extension Training Programs. USAID, Nairobi, Kenya.
- Gomez, E.D. (1976). 'Radio programs and their impact on multiple cropping: a preliminary evaluation' *Agricultural economics and development* 6:2.
- Hall, B.L. (1978). "Mtu ni afya: Tanzania's health campaign." Clearinghouse, Washington D.C.
- Hayami, Y. & Ruttan, V. W. (1971). *Agricultural Development: An International Perspective*. Baltimore: John Hopkins Press.
- Hornik, R. C. (1988). *Development communication: Information, Agriculture, and Nutrition in the Third World*. White Plains, N.Y.: Longman.
- Hubbard, F. "Questionnaires." Review of Education research, Vol. 9, No.5 (December 1939), pp. 505-506.
- Katz, E. (1961). *The part played by people in the flow of Mass Communications*. New York: Free Press.
- Katz, E. & Wedell, G. (1978). *Broadcasting in the Third World*. Macmillan, Luton.
- Kenya News Agency. (1989, December 18). "Moi urges self-sufficiency in food." *Foreign Broadcast Information Service Daily Reports: Africa & Middle East*.
- Kinara, A. M. (1984). *A survey of books, reports, and journals on Kenya agriculture and their use in communicating research findings via extension workers to farmers in Kenya*. Master's thesis, Loughborough University, Britain.

- Leonard, D. K. (1977). *Reaching the peasant farmer*. Chicago: University of Chicago Press.
- Lindner, R. K. (1981). Adoption as a decision-theoretic process. *Doctoral Dissertation Abstracts International*, 42, 6A.
- Lindsey, Jr., R. L. (1994). *Assessment of program delivery methods and media concerning chemical regulations in agriculture and lawn and garden uses by selected cooperative extension personnel in Oklahoma*. Master's thesis, Oklahoma State University.
- Lionberger, H. F. & Gwin, P.H. (1982). *Communication Strategies: A guide for Agricultural change agent*. Dansville, IL: The Interstate Printers and Publishers, Inc.
- Lowery, S. A. and DeFleur, M.L. (1988). *Milestones in Mass Communication Research: Media Effects (2nd ed.)*. White Plains, NY: Longman.
- Lycette, M. (1984). "Improving Women's Access to Credit in the Third World: Policy and Project Recommendations." ICRW Occasional Papers, No. 1. Washington, D.C.: International Center for Research on Women.
- Matiko, J. (1976). "Radio Campaigns for Adult Education in Tanzania." Conference paper, Stanford University.
- Melkote, S.R. & Vallath, C. "Operational impasses in knowledge sharing: Case study examples." In White, S., Nair, K. S. & Ascroft J. eds. (1994). *Participatory Communication: Working for change and development*. Thousand Oaks, CA: Sage Publications Inc.
- Moemka, A.A. ed. (1994). *Communicating for development: a new pan-disciplinary perspective*. Albany, N.Y.: State University of New York Press.
- Oskam, J. B. (1993). *A Two-Part Study of Agricultural Health and Safety Communication Through Selected Mass Media*. Masters thesis. Oklahoma State University, Stillwater, Oklahoma.
- Perraton, H. (1977). *Starting the Botswana Extension College*. International Extension College, Cambridge.
- Perraton, H., Jamison, D.T. & Orivel, F. (1981). *Mass Media for Agricultural Extension in Malawi*. The World Bank.

- Pirtle, R. L. (1989). *Agriculture Producers' Perceptions of Cooperative Extension Service Program Delivery Methods in Washington County, Oklahoma*. Unpublished thesis, Oklahoma State University, Stillwater, Oklahoma.
- Rakow, (1981). The true test of result-oriented training. *Instructional Innovations*, 26 (7).
- Rich, T. (1978). *Basic Village Education Guatemala Evaluation Report: Evaluation Summary no.3*. Human Resources Institute, University of South Florida.
- Rogers, E. (1983). *Diffusion of Innovations* - 3rd ed. New York: The Free Press.
- Rogers, E.M. & Shoemaker, F. (1971). *Communication of innovations: a cross-cultural approach*. 2nd. ed. New York: Free Press.
- Rogers, E. (1962). *Diffusion of innovations*. New York. The Free Press.
- Roling, N. (1976). "The diffusion of innovations and the issue of Equity in rural development." *Communication Research*, 3 (2).
- Roy, P., Waisanen, F. & Rogers, E. (1969). *The Impact of Communication on Rural Development*. UNESCO, Paris.
- Saito, K. A. & Spurling, D. (1992). *Developing Agricultural Extension for Women Farmers*. World Bank Discussion Paper No. 156. Washington, D.C.: World Bank.
- _____ (1984, June 2). Moi: Madaraka Day Speech on June 1. *The Standard*: Nairobi, Kenya.
- Standard*. (1984, June 2). "Daniel Arap Moi Speech on the occasion of Madaraka Day (Self Government Day)."
- Stevenson, R. L. (1988). *Communication, Development, and the Third World: The Global Politics of Information*. University of North Carolina at Chaperhill. New York:Longman.
- Todaro, M. (1994). *Economic Development*. 5th ed. New York, N.Y.: Longman.
- White, R. (1976). *An alternative pattern of basic education: Radio Santa*. UNESCO, Paris.

White, S., Nair, K. S. & Ascroft, J. Eds. (1994). *Participatory Communication: Working for change and development*. Thousand Oaks, CA: Sage Publications Inc.

_____ Women in Agricultural development: FAO; Plan of Action, 1990. Rome: 1990.

_____ World Bank Country Study, Kenya: The role of women in Economic Development. (1989). World Bank, Washington D.C.

Zijp, W. (1994). *Improving the transfer and use of agricultural information: a guide to information technology*. World Bank, Washington, D.C.

APPENDICES

APPENDIX A
INSTITUTIONAL REVIEW BOARD FORM

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 08-15-95

IRB#: AG-96-004

Proposal Title: PERCEPTIONS OF AGRICULTURE STUDENTS FROM KENYA
TOWARD THEIR USE OF METHODS AND MEDIA FOR COMMUNICATING
AGRICULTURAL INFORMATION

Principal Investigator(s): James P. Key, Elsie W. Wanjohi

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

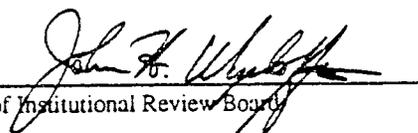
ALL APPROVALS MAY BE SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD
AT NEXT MEETING.

APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A
CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD
APPROVAL.

ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR
APPROVAL.

Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval
are as follows:

Signature:

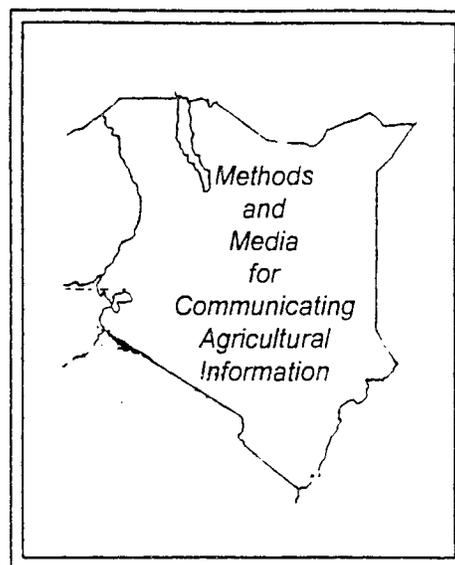

Chair of Institutional Review Board

Date: August 25, 1995

APPENDIX B
QUESTIONNAIRE USED FOR THE SURVEY

**PERCEPTIONS OF AGRICULTURE
STUDENTS FROM KENYA
TOWARD THEIR USE OF
METHODS AND MEDIA
FOR COMMUNICATING
AGRICULTURAL
INFORMATION**

Please complete this survey and return it in the enclosed envelope by **October 12, 1995**. Your response will be kept confidential. The information you provide will be reported as group data only.



SECTION A: DEMOGRAPHIC INFORMATION

Please complete the following information by checking (x) in the appropriate space or by writing your response in the space provided.

1. I am
Male___ Female___
2. Year of birth_____
3. University_____
4. Major Field of Study:_____
5. Enrollment Status: Doctoral___ Masters___ Undergraduate___ Other___
6. Why did you choose your field of study?
Interest___ Selected by the employer___ Other___

Please continue on the next page.

7. Have you had full-time work experience? Yes ___ No ___

If yes:

a. What was your most recent occupation? _____

b. Period you were in this position: _____

c. Please indicate your duties during your most recent job. (Indicate all that apply.)

i. Clerical _____

ii. Manager _____

iii. Administration _____

iv. Research _____

v. Teaching _____

vi. Extension _____

vii. Other (Please specify) _____

8. Employment you anticipate upon completion of your studies and return to your country.
(Check any that apply.)

a. Agricultural Extension _____

b. Teaching _____

c. Farm and Ranch Management _____

d. Soil and Water Management _____

e. Crop Research _____

f. Crop Protection _____

g. Livestock Research _____

h. Undecided _____

i. Others: (Please specify) _____

9. In which sector do you plan to work?

a. Agriculture Extension _____

b. Private industry--agriculture _____

c. Private business/industry _____

d. Agricultural College or University _____

e. Agricultural Training Institute _____

f. Agricultural Research Station _____

g. Employment outside Kenya _____

h. Undecided _____

i. Other: (Please specify) _____

10. Do you believe research information is easily available to individuals in different parts of Kenya?

Yes ___ No ___

Why or Why not?

11. Please rank in order of importance (1=most important audience and 5=least important audience.) the following audiences that you target with information about agriculture.

___ Farmers ___ Ranchers ___ Educators ___ Youth ___ Women groups

___ Agriculture-related business and their workers _____ Other.

Please continue on the next page.

SECTION B: PERCEPTION AND FREQUENCY OF INFORMATION DELIVERY METHOD

12. Please circle the response that best indicates your perceptions of use and frequency of use effectiveness of the following delivery methods for communicating agricultural information.

Perceptions of use						Effectiveness				
<i>Not used</i>	<i>Rarely used</i>	<i>Sometimes used</i>	<i>Frequently used</i>	<i>Heavily used</i>		<i>Not effective</i>	<i>Of little effectiveness</i>	<i>Somewhat effective</i>	<i>Effective</i>	<i>Very effective</i>
1	2	3	4	5	INFORMATION DELIVERY METHOD	1	2	3	4	5
1	2	3	4	5	Farm Demonstration	1	2	3	4	5
1	2	3	4	5	Farm visits	1	2	3	4	5
1	2	3	4	5	Field trips	1	2	3	4	5
1	2	3	4	5	Field Days	1	2	3	4	5
1	2	3	4	5	Office visits	1	2	3	4	5
1	2	3	4	5	Visit to Research Station	1	2	3	4	5
1	2	3	4	5	Group Lectures	1	2	3	4	5
1	2	3	4	5	Group Discussions	1	2	3	4	5
1	2	3	4	5	Workshops	1	2	3	4	5
1	2	3	4	5	Seminars	1	2	3	4	5
Other: _____										

SECTION C: PERCEPTION AND FREQUENCY OF INFORMATION DELIVERY MEDIA

13. Please circle the response that best indicates your perception of frequency of use and effectiveness of the following media:

Perceptions of use						Effectiveness				
<i>Not used</i>	<i>Rarely used</i>	<i>Sometimes used</i>	<i>Frequently used</i>	<i>Heavily used</i>		<i>Not effective</i>	<i>Of little effectiveness</i>	<i>Somewhat effective</i>	<i>Effective</i>	<i>Very effective</i>
1	2	3	4	5	INFORMATION DELIVERY MEDIA	1	2	3	4	5
1	2	3	4	5	Handouts	1	2	3	4	5
1	2	3	4	5	Newsletters	1	2	3	4	5
1	2	3	4	5	Brochures	1	2	3	4	5
1	2	3	4	5	Leaflets	1	2	3	4	5
1	2	3	4	5	Radio shows	1	2	3	4	5
1	2	3	4	5	Magazine article(s)	1	2	3	4	5
1	2	3	4	5	Newspaper article(s)	1	2	3	4	5
1	2	3	4	5	Farmers Journal article(s)	1	2	3	4	5
1	2	3	4	5	Slide show	1	2	3	4	5
1	2	3	4	5	Audio Cassettes	1	2	3	4	5
1	2	3	4	5	Television programs	1	2	3	4	5
1	2	3	4	5	Video shows	1	2	3	4	5
1	2	3	4	5	Film shows	1	2	3	4	5
Other: _____										

Please continue on the next page.

14. How often do you encounter the following problems and/or hindrances in using media?

	Very often	Often	Sometimes	Seldom	Never
a) Unavailability of equipment	___	___	___	___	___
b) Excessive weight of equipment	___	___	___	___	___
c) Lack of equipment transportation	___	___	___	___	___
d) Lack of access to visual aid equipment	___	___	___	___	___
e) Lack of training	___	___	___	___	___
f) Others: (Please list.) _____	___	___	___	___	___

SECTION D: METHODS AND MEDIA USE

15. If readily available, how often would you use slide and video tapes containing information on the following: (Please check any that apply.)

	Very often	Often	Sometimes	Seldom	Never
Crop production	___	___	___	___	___
Animal production	___	___	___	___	___
Horticulture	___	___	___	___	___
Agroforestry	___	___	___	___	___
Pests and diseases	___	___	___	___	___
Home economics	___	___	___	___	___
Rural Youth	___	___	___	___	___
Marketing	___	___	___	___	___
Soil Conservation	___	___	___	___	___

16. If given resources, what three most important communication channels would you use for communicating agricultural information? (Refer to Question 12 and 13 for methods and media.)

Methods

Media

1. _____
2. _____
3. _____

1. _____
2. _____
3. _____

17. Now that you have studied in the U.S./Canada in your area of specialization, what method(s) or media would you use that you did not previously use?

Please continue on the next page.

SECTION E: ADDITIONAL TRAINING

18. Please indicate the response that best indicates training need(s) in the following media.

	Very much	Much	Some	Little	None
a) 35 mm slide projector	___	___	___	___	___
b) 35 mm camera	___	___	___	___	___
c) 16 mm film projector	___	___	___	___	___
d) Video recorder and camera	___	___	___	___	___
e) Publishing articles in newspaper(s)	___	___	___	___	___
f) Publishing articles in magazine(s)	___	___	___	___	___
g) Combined media (audio and video)	___	___	___	___	___
h) Other:	___	___	___	___	___

19. How much additional training would you need to feel comfortable in using the following instructional methods for communicating agricultural information.

	Very much	Much	Some	Little	None
a) Group lectures	___	___	___	___	___
b) Demonstrations	___	___	___	___	___
c) Seminar management	___	___	___	___	___
d) Workshop management	___	___	___	___	___
e) Other:	___	___	___	___	___

20. Do you think your department could reach more of your target audience through the use of media in the future?

___ Yes ___ No.

Why or Why not?

21. As provided at your university in the U.S./Canada, knowledge in communications is quite effective in preparing Kenyan students to achieve career goals in agriculture.

___ Yes ___ No

Why or Why not?

Thank you for participating in this survey !

APPENDIX C
COVER LETTER



September 29, 1995

Dear Colleague,

Agriculture is the main industry in Kenya and provides a livelihood to approximately 80 percent of the population. Indeed, agriculture will continue to be an important sector in Kenya's economy. In order for farming clientele to receive agricultural information, it is important that agriculture and research staff use methods and media that will enhance adoption of innovative agricultural messages.

I am a graduate student from Kenya, planning to conduct a study on: "Perceptions of Agriculture Students From Kenya Toward Their Use of Methods and Media for Communicating Agricultural Information," as part of the requirements for my doctoral program in Agricultural Education. The main purpose for this study is to determine the methods and media used in communicating agricultural information in Kenya. The data you provide will be beneficial to all individuals and institutions in planning in-service training programs in the use of methods and media for the agriculture change agents, which will in turn improve agriculture in Kenya.

You have been selected for this study because of your interest in agriculture as indicated by your enrollment in college in an agriculture-related program. You also represent the country under consideration for this study--Kenya. The study will involve both undergraduate and graduate students. No individual responses will be revealed. The information you provide will be used as group data.

Please take a few minutes to complete the enclosed questionnaire and return it in the enclosed stamped envelope by October 12, 1995.

If you have any question(s), please call Elsie Wanjohi at (405) 744-4050 or
E-mail: Wanjohi@osuunx.ucc.okstate.edu

With thanks,

Dr. James P. Key
Chairman Advisory Committee

Elsie W. Wanjohi
Graduate Teaching Assistant

VITA

Elsie Wairimu Wanjohi

Candidate for the Degree of

Doctor of Education

Thesis: PERCEPTIONS OF AGRICULTURE STUDENTS FROM KENYA TOWARD
THEIR USE OF METHODS AND MEDIA FOR COMMUNICATING
AGRICULTURAL INFORMATION

Major Field: Agricultural Education

Biographical:

Personal Data: Born in Nyeri, Kenya, November 17, 1949, the daughter
of David Kinyua and the late Martha Wambui.

Education: Received Kenya Certificate of Education from Alliance Girls'
High School, Kenya in December 1969; received Diploma in
Agriculture from Egerton College, Kenya in December 1972;
received a Bachelor of Science degree in Agricultural
Communications in July 1992 and a Master of Science in Mass
Communications in May 1994 from Oklahoma State University;
and completed requirements for Doctor of Education degree at
Oklahoma State University in December 1996.

Experience: Assistant Agricultural Officer from January 1973 to June 1973;
Principal/Director Thika, Embu, and Wambugu Institutes from July
1973 to December 1987; Member, Board of Governors Kagumo College,
Kenya from May 1987 - May 1990; Agricultural Information Officer, AIC,
Kenya from January 1988 to May 1990; press release and media intern,
Agricultural Communications, OSU, Summer, 1992; Graduate Assistant
(publications editor) Agricultural Communications, OSU, Fall 1992-present.
University Apartment Assistant from February 1993 to present. Graduate
teaching assistant, August 1995 - May 1996, OSU.

Membership: Phi Kappa Phi, Gamma Sigma Delta, Golden Key, Agricultural
Communicators in Education, and Association for Women in Development
(International).

Award: Association of American University Women - International Fellowship
1993-94.