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ADOPTERS OF NEW FARM IDEAS

Characteristics and Communications Behavior

AGRICULTURAL EXTENSION SERVICES OF Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota and Wisconsin.

FARM FOUNDATION AND FEDERAL EXTENSION SERVICE COOPERATING

Preface

This publication is the second in a series of bulletins by the Subcommittee for the Study of Diffusion of Farm Practices. This group is a part of the North Central Rural Sociology Committee, sponsored by the Farm Foundation, Chicago, Illinois, and the Association of Land-Grant Colleges and Universities.

North Central Regional Publication No. 1, *How Farm People Accept New Ideas*, was received with widespread interest; over 80,000 copies were distributed in the first four years of its publication. The present bulletin is intended to complement, rather than to replace, the original report and to present findings of additional research.

The original bulletin set forth a framework or a theory as to how farmers adopt new technology. Since the original bulletin was published in 1955, considerable research has been completed and it is now possible to further support and extend the understanding of how farmers adopt new practices. A recent bibliography lists 135 studies of the diffusion of new ideas which have appeared in scientific journals, theses, research bulletins, and unpublished papers. Many of the studies emphasize the characteristics of the adopters of new ideas which are pertinent to educational programming.

How Farm People Accept New Ideas emphasizes the process through which individual adopters accept new ideas. This bulletin describes the characteristics of innovators and other adopters which should be considered in Extension program planning.

Subcommittee for the Study of Diffusion of Farm Practices

JOE M. BOHLEN
Iowa State University

C. MILTON COUGHENOUR
University of Kentucky

HERBERT F. LIONBERGER
University of Missouri

EDWARD O. MOE
Michigan State University

EVERETT M. ROGERS
Ohio State University

ADOPTERS OF NEW FARM IDEAS

Characteristics and Communications Behavior

THERE IS ALWAYS a time lag between the origin of a new idea and its complete adoption. About 14 years elapsed between the introduction of hybrid seed corn and its adoption by most farmers. Soil testing as a basis for fertilizer application has been recommended for over 20 years. Yet the majority of farmers have not adopted it. Although the time lag in the adoption of new farm practices and ideas probably is decreasing, several years may be required for their widespread use.

A major concern of rural sociological research has been to reduce this time lag between scientific discovery and actual use of new developments in farming. One body of facts growing out of these studies indicates that farmers who adopt practices in various points in time have distinctive characteristics. Educational programs of County Agents, Vocational Agricultural teachers, and other change agents which are developed with an understanding of these characteristics are more likely to be effective. This suggests that change agents design educational programs which meet the needs and communication skills of the various farm audiences whom they serve.

This publication attempts to summarize research findings in rural sociology which describe these characteristics of adopters. A system of classifying farmers in regard to the relative points in time at which they adopt new ideas and practices will be used for this purpose.

Generalizations stated in this report are based upon studies carried out in North Carolina, Iowa, Wisconsin, New York, Kansas, Ohio, Kentucky, Missouri, Michigan, Illinois, Pennsylvania, and a number of foreign countries. These findings generally are applicable to the family-type farming areas of the United States and other countries. The findings of research on the adoption of farm practices generally are supported by the research on adoption of new ideas in medicine, education, and industry.

Adopting New Ideas

Two interrelated processes help bring new ideas from their source of initial development to acceptance by farmers. These processes are called *diffusion* and *adoption*.

The diffusion process refers to the spread of new ideas from originating sources to ultimate users. In the case of agriculture, it is the process by which new farm practices or ideas are communicated from sources of origin, usually scientists, to farmers.

The adoption process is a mental process through which an individual passes from first hearing about a new idea to its final adoption. It may be divided into stages. A division commonly utilized by rural sociologists is:

1. *Awareness.* The individual knows of the new idea but lacks information about it.
2. *Interest-information.* The individual becomes interested in the idea and seeks more information about it.
3. *Evaluation-application-decision.* The individual makes a mental application of the new idea to his present and anticipated future situation and makes the decision either to try it or not.
4. *Trial.* The individual uses the new practice on a small scale to validate its workability on his own farm.
5. *Adoption.* The individual uses the new practice on a full scale and incorporates it into his way of farming.

At any point in this process an idea may be rejected. Even after adoption of an idea, the process may be repeated when an alternative is presented.

A major difference between the diffusion process and the adoption process is that diffusion occurs between persons while adoption is an individual matter. An understanding of both processes is important to a change agent.

Factors Affecting Adoption

The research studies reported in this bulletin were primarily concerned with ideas developed by agricultural scientists and approved by Experiment Stations, Extension Services, and other agricultural agencies. Examples of new ideas studied are hybrid corn, weed sprays, livestock feed additives, bulk milk tanks, pesticides, fertilizer, tillage practices, and new farm machinery.

Some individuals may accept new ideas regardless of

what other farmers do. Other ideas require acceptance by a group of farmers before any one of them can use the idea. An example of the latter is the use of electricity; unless a sufficient number of one's neighbors are ready to use central-station electricity, an individual farmer cannot obtain it (a power supplier must have an economic minimum number of customers before he can distribute electric power at rates the customers can afford). Another example of group adoption is the use of bulk milk tanks. The use of these tanks is not economically feasible until several farmers are willing to change from the can-cooling method.

Most farm practices are functionally interrelated. Frequently the adoption of one practice makes possible the adoption of others. In some cases, the adoption of a given practice must precede the adoption of others. For example, the adoption of bulk milk tanks is frequently followed by the installation of pipe-line milking systems.

The relative speed with which a new idea is adopted depends partially upon the characteristics of the new idea. Some characteristics affecting the rate of adoption are:

1. *Cost and economic returns.* New practices that are high in cost generally tend to be adopted more slowly than do the less costly ones. However, regardless of cost, practices which produce high returns for dollars invested tend to be adopted more rapidly than those which yield lower returns. Also, practices producing quick returns on investments tend to be adopted more rapidly than those which produce deferred returns or returns spread over a long period of time.

2. *Complexity.* New ideas that are relatively simple to understand and use will generally be accepted more quickly than more complex ideas. For example, increased fertilizer application is likely to be more readily accepted than an innovation in fertilizer application methods.

3. *Visibility.* Practices also vary in the extent to which their operation and results are easily seen or demonstrated. For example, sprinkler irrigation is a highly visible practice; in contrast, some rat poisons kill the rodents in their burrows and the results cannot be observed and evaluated easily by the farmer. The more visible the practice and its results, the more rapid its adoption is.

4. *Divisibility.* Practices such as fertilizer applications, different fertilizer analyses, feed additives, weed sprays, or seed varieties may be tried on a sample basis and the results compared with those from previous practices. However, bulk milk tanks and milk parlors cannot be tried out easily on a small scale. A practice that can be tried on a limited basis will generally be adopted more rapidly than one that cannot.

5. *Compatibility.* A new idea or practice that is consistent with existing ideas and beliefs will be accepted more rapidly than one that is not. A farmer who believes that he gains status from planting straight rows may be slow to accept contouring, often referred to as "planned crooked rows." Farmers who already have adopted hybrid seed corn and who are familiar with the concept of hybrid vigor are more likely to adopt hybrid hogs and hybrid chickens. One research study showed that farmers who owned a power sprayer for the use of insecticides on crops adopted chemical weed sprays more quickly than those who did not own power sprayers.

Adopter Categories

Farmers adopt practices at different times. Research indicates that the diffusion of a new practice usually requires several years. In the first years, a few farmers adopt it; then in a short span of time, a large number try it; and finally the remainder accept it. This represents the typical pattern.

The distribution of farmers adopting a new idea by year of adoption generally has the shape of the normal curve (see Figure 1). This characteristic on the diffusion curve permits distributing farmers into adopter categories.

The first to adopt a new practice are *innovators*. Research in the Midwest indicates that these farmers have personal and social characteristics which are significantly

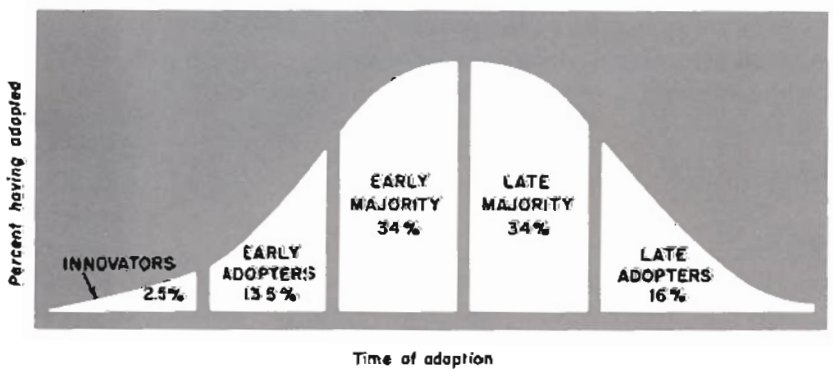


Figure 1. — Distribution of farmers among the five categories according to time of adoption.

different from those adopting later. This category includes about one farmer in forty.

Those in the second category of farmers to adopt a practice are called *early adopters.* They too have distinctive characteristics. About one in eight farmers fall in this category.

The majority of adopters—about seven in ten farmers — fall in the next category. For some purposes, this category may be divided into the *early and late majority.*

The last farmers to try new practices may be referred to as *late adopters* or *laggards.* They comprise possibly one out of six farmers in the Midwest. They possess personal and social characteristics different from those adopting earlier.

An innovator for one practice is likely to be an innovator for other practices. Research has shown that individuals tend to be consistent as to the relative time at which they adopt new farm ideas. This permits the construction of farm practice adoption scales which may be used to place farmers into adopter categories. It should be recognized that this classification of farmers is most useful when it includes a large number of farmers. Although farmers in a small area may not be distributed in these proportions in the various categories, these categories are highly useful in building educational programs.

Personal Characteristics of Adopters

Research studies indicate important differences among the five adopter categories with regard to attitudes, values, abilities, group memberships, social status, and farm business characteristics. This suggests that the successful change agent will need to employ one approach to reach the early adopters with an innovation and a different approach to reach the late majority. To use the most effective technique to reach each sub-audience, a change agent must understand the personal characteristics of each adopter category.

ATTITUDES AND VALUES

1. Innovators have more favorable attitudes toward science than do farmers in other adopter categories. Laggards have less knowledge about agricultural research and are more suspicious of scientists. Innovators are more likely to have direct contact with a scientist and are more prone than the average farmer to adopt a new practice on the basis of research findings.

Innovators tend to place high value on the role of science in agriculture and to recognize the contribution of the scientist to their operations. In contrast, laggards and the late majority place less value on science and have less appreciation of the scientist's role.

2. Laggards and late majority farmers place more trust in agricultural "magic" and traditional beliefs than do innovators and early adopters. Examples of agricultural magic are planting crops or dehorning cattle by the "signs of the moon" or witching for wells with a Y-shaped branch. Innovators generally scoff at all types of agricultural magic.

3. The first farmers to adopt new practices tend to place less value on the security that comes from being debt-free. They are willing to borrow money and to take risks in order to realize a profit. The adoption of

some new practices, such as bulk tanks, sprinkler irrigation, and new farm equipment, requires the investment of considerable capital. Laggards, on the contrary, are reluctant to borrow money. They try to get out of debt and to stay out.

4. Innovators have more venturesome attitudes than do the last farmers who adopt new practices. Innovators reach decisions more quickly than other farmers and often adopt new practices soon after they learn about them. In one study, the innovators adopted a new weed spray the same year that they learned about it. After hearing about it, some of the laggards took 10 years to adopt the practice. Since uncertainties are involved in the initial farm use of a new idea, innovators take certain risks that their later-adopting neighbors are not willing to take.

Older age tends to be associated with conservative attitudes, diminishing farm enterprises, and an emphasis on security. Although research findings have not been entirely consistent as to the relationships between age and time of adoption, most studies have found laggards to be older than innovators. In one study, laggards averaged 55 years while innovators and early adopters averaged 38 years of age.

ABILITIES

1. Research findings generally indicate that farmers who are among the first to adopt new practices have the most formal education. In a Midwestern study, innovators averaged slightly more than a high school education; about twenty percent were college graduates. In contrast, the laggards averaged only slightly more than a grade school education.

2. The first farmers to adopt new practices tend to have special *mental* abilities. For an innovator, adoption requires a high level of intelligence and an ability to deal with abstractions. Research has shown that innovators read more farm magazines and Extension bulletins than do laggards. This suggests that they may have superior reading skills. The first farmers to adopt must be able to secure much of their new farm information from printed mass media sources, while late majority and laggards depend upon personal contacts with their neighbors who already have adopted.

GROUP MEMBERSHIPS

Research indicates that farmers who are relatively early in adopting new practices are more active in formal organizations such as farm organizations, cooperatives, PTA's, and churches. Laggards belong to fewer formal groups. This tends to mean fewer contacts with sources of new ideas. Innovators also belong to more kinds of groups.

Innovators and early adopters are more active in state-wide and county-wide organizations; late majority and laggards are active mainly in formal groups in the local community and neighborhood, if they are in any groups at all.

Family and kinship ties are stronger for laggards and late majority than for innovators and early adopters.

The informal friendship patterns of the laggard tend to be confined to his locality, while those of the innovator are more cosmopolitan. Innovators are less likely to exchange work and equipment with their neighbors, less likely to visit their neighbors, and more likely to disregard their neighbors' opinions of new farming practices. Innovators recognize that their neighbors do not have respect for their farming methods. This does not disturb the typical innovator who has a wider range of contacts.

Innovators travel over a wide area to observe new farm practices in operation. They often may be members of friendship cliques with other innovators. One innovator remarked, "I saw and discussed broiler operations and cattle feeding operations in Indiana, Illinois, and Iowa, as well as Ohio this year." Another said, "I visited with swine research men at the Iowa and Minnesota (Agricultural Experiment) Stations."

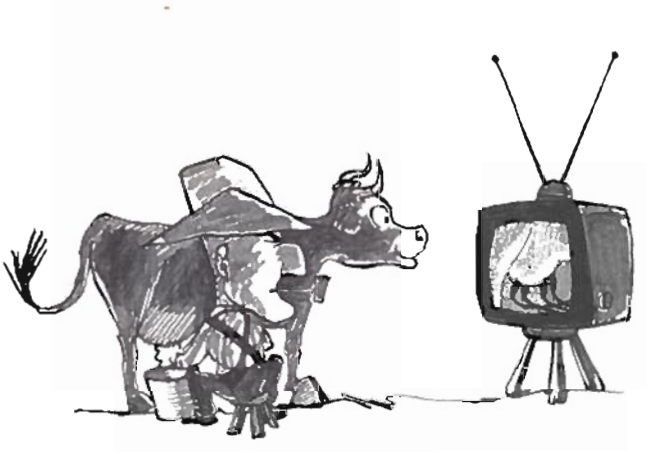
Community norms on adoption affect the respect that innovators receive. In "progressive" communities, innovators may be looked to by their neighbors for information and advice. In "backward" communities, their farming methods are viewed with suspicion by their neighbors who are less prone to change.

SOCIAL STATUS

A general finding of sociological research in many states is that innovators have a higher social status than do laggards. Innovators ordinarily have greater community prestige, higher incomes, larger farms, and more wealth than other farmers. Even though innovators may have high social status, their farming methods may not be respected. Laggards usually have the lowest social status.

Change agents have frequently referred to a "trickle-down process" in agriculture whereby the first adopters

influence other farmers who, in turn, influence still others to adopt. Research indicates that information generally spreads from higher to lower status farmers. Most farmers look up the status ladder to others who have somewhat higher status than themselves as sources of information and advice. The higher a farmer is on the status scale, the more selective he becomes in his choice of personal sources of information.



FARM BUSINESS CHARACTERISTICS

There are differences in the nature of the farm businesses among the adopter categories. The farm enterprises of innovators in comparison to those who adopt later are characterized by:

1. Larger farms
2. Higher gross farm incomes
3. Greater farm efficiency
4. More specialized enterprises
5. Greater farm ownership

Sources of Information

Farmers obtain information from many sources. Research has shown that sources most used by farmers vary with stages in the adoption process. Table 1 lists the relative frequency that sources of information are mentioned by farmers at each of the stages. It must be clearly recognized that the order may vary with specific practices, places, and people.

It can be seen in Table 1 that mass media sources, such as farm magazines, newspapers, and radio, are most important at the awareness and interest stages. Neighbors and friends are more important than mass media at the evaluation and trial stages. When farmers use a new practice on a small scale, agricultural agencies generally are secondary in importance to neighbors and friends. A tentative decision to use the new practice has been made at the trial stage, but further information is needed on how to use the practice on their farm and how to incorporate it into their farming system.

Since most new farm practices involve the sale of a new farm product, a question might arise as to why dealers and commercial sources of information are not more important in the adoption process. One answer may be that farmers sometimes question the trustworthi-

Table 1. Rank Order of Information Sources by Stage in the Adoption Process

AWARENESS: learns about a new idea or practice	INTEREST: gets more information about it	EVALUATION: tries it out mentally	TRIAL: uses or tries a little	ADOPTION: accepts it for full-scale and continued use
1. Mass media — radio, T.V., newspapers, magazines	1. Mass media	1. Friends and neighbors	1. Friends and neighbors	1. Friends and neighbors
2. Friends and neighbors — mostly other farmers	2. Friends and neighbors	2. Agricultural agencies	2. Agricultural agencies	2. Agricultural agencies
3. Agricultural agencies, Extension, Vo-Ag., etc.	3. Agricultural agencies	3. Dealers and salesmen	3. Dealers and salesmen	3. Mass media
4. Dealers and salesmen	4. Dealers and salesmen	4. Mass media	4. Mass media	4. Dealers and salesmen

Personal experience is the most important factor in continued use of an idea.

ness and expertness of dealers and salesmen because they have a product to sell.

Information Sources and Adopter Categories

The typical innovator not only receives more different types of information about new practices, but also is likely to receive information sooner and from more technically accurate sources. Innovators subscribe to more farm magazines than farmers in other adopter categories. Mass media sources of information of all kinds, including bulletins and farm radio and TV shows, are important to farmers in every adopter category. Laggards are reached more frequently through mass media than through personal contact with change agents. Mass media sources of information may make a farmer *aware* of a new practice. They seldom are effective in convincing him to adopt it.

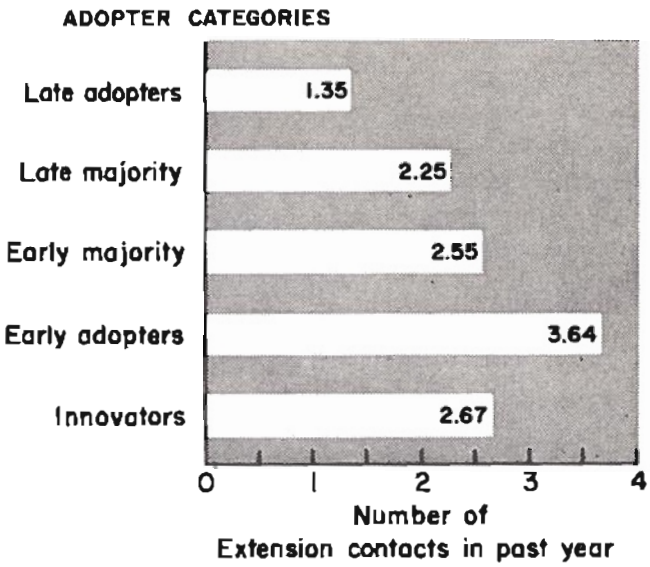


Figure 2. — Contacts of adopter categories with Cooperative Extension Service.

SCIENTISTS

It already has been pointed out that innovators more often have direct contact with agricultural scientists than do farmers in other adopter categories. Innovators also have more favorable views toward scientists and toward the use of science in agriculture. They read more research bulletins and reports are more likely to know scientists personally.

CHANGE AGENTS

Research indicates that early adopters have more contact with County Extension Agents, Vocational Agricultural teachers, and other agricultural agency workers than do farmers in other adopter categories including the innovators. One reason why this is true seems to be that the innovator often learns about new practices *before* the local change agent. The innovator travels widely, visits with other innovators and agricultural scientists, and is likely to regard his local County Extension Agent as a "technical equal." Many innovators view their County Agent in a "potential role" in which he may be called upon for information if needed.

Figure 2 presents a typical pattern of Extension contact by adopter categories. The early adopters not only have the most *total* Extension contacts, but also are ranked especially high in the number of *personal* Extension contacts that they have through meetings, office calls, and farm visits. Laggards have an average of only 1.35 Extension contacts per year. Furthermore, these contacts are mostly newspaper articles and radio shows. Laggards and the late majority have very little personal contact with their County Agent.

Contact with other change agents probably follows a similar pattern. Research findings of farmers' contacts with Vocational Agricultural teachers indicate early adopters are reached most frequently, followed by innovators, early majority, late majority, and laggards.

FRIENDS AND NEIGHBORS

Laggards and late majority are more likely to depend upon friends and neighbors in the immediate locality as a source of new farm information than upon other sources. Innovators and early adopters are not locality-bound in their choice of farmers as sources of information. For innovators, expertness is the prime consideration in their selection of information sources.

Innovators, in that they are out in front of other farmers, cannot depend upon friends and neighbors or others in the locality for new ideas. On the other hand, by the time the late majority and laggards consider adopting an idea, they are surrounded by other farmers who have information and opinions about it.

Mass media are important in creating awareness of new practices, while personal influence from neighbors and friends is most important in convincing farmers to adopt. Farmers living within the immediate locality of an innovator may not be important referents to him. This does not mean that innovators are not influenced by other people. An innovator's referents are more likely to be scattered over a wide geographical area and to be those members who also are inclined to quick adoption of new practices. Association among innovators often provides group support for changes made or contemplated that the local neighborhood does not provide.

How Information Reaches the Farmer: An Illustration

One of the major concerns of change agents in agriculture is the relationship between farmers in the various adopter categories. Some of these relationships, particularly the crucial importance of early adopters in the diffusion process, are presented systematically in Figure 3. The early adopters, as has been pointed out, accept new practices well before the average farmer, but not so much sooner that they are ridiculed as innovators may be. As a result, the early adopters are looked to by other farmers as sources of information and advice about new practices. Change agents have relatively more contact with these early adopters than with any other adopter category. Information which helps this group decisively is passed along to other farmers with some revisions and recommendations.

In Figure 3, the sources of information about a new practice for 14 farmers are shown against a background of mile grid, common in the Midwest. This gives a good picture of the location of their farms in the area. The time of adoption of the new practice is given in each case:

Farmer No. 1 was an innovator. He secured his information about the practice directly from an agricultural scientist. The only farmer in the community who looked to him for advice was Farmer No. 2, an early adopter. Eight neighbors of the early adopter secured information

Table 2. Summary of Characteristics and Communication Behavior of Adopter Categories

Characteristic or Behavior	Innovators	Early adopters	Majority		Laggards or Late adopters
			Early	Late	
1. Time of adoption	First 2.5 per cent to adopt new ideas	Next 13.5 per cent to adopt	Next 34 per cent to adopt	Next 34 per cent to adopt	Last 16 per cent to adopt
2. Attitudes and values	Scientific and venturesome	Progressive	More conservative and traditional	Skeptical of new ideas	Agricultural magic and folk beliefs; fear of debt
3. Abilities	High level of education; ability to deal with abstractions	Above average education	Slightly above average education	Slightly below average education	Low level of education; have difficulty dealing with abstractions and relationships
4. Group memberships	Leaders in county wide or state organizations; travel widely	Leaders in organizations within the community	Many informal contacts within the community	Little travel out of community; little activity in formal organizations	Few memberships in formal organizations other than church; semi-isolates
5. Social status	Highest social status, but their farming practices may not be accepted	High social status; looked to by neighbors as "good farmer"	About average social status	About average social status	Lowest social status
6. Farm businesses	Largest, most specialized, and most efficient	Large farms; slightly less specialized and efficient	Slightly larger than average sized farms	Slightly smaller than averaged sized farms	Small farms; low incomes; seldom farm owners
7. Sources of information	Scientists; other innovators; research bulletins	Highest contact with local change agents; farm magazines; Extension bulletins	Farm magazines; friends and neighbors	Friends and neighbors	Mainly friends and neighbors; radio farm shows

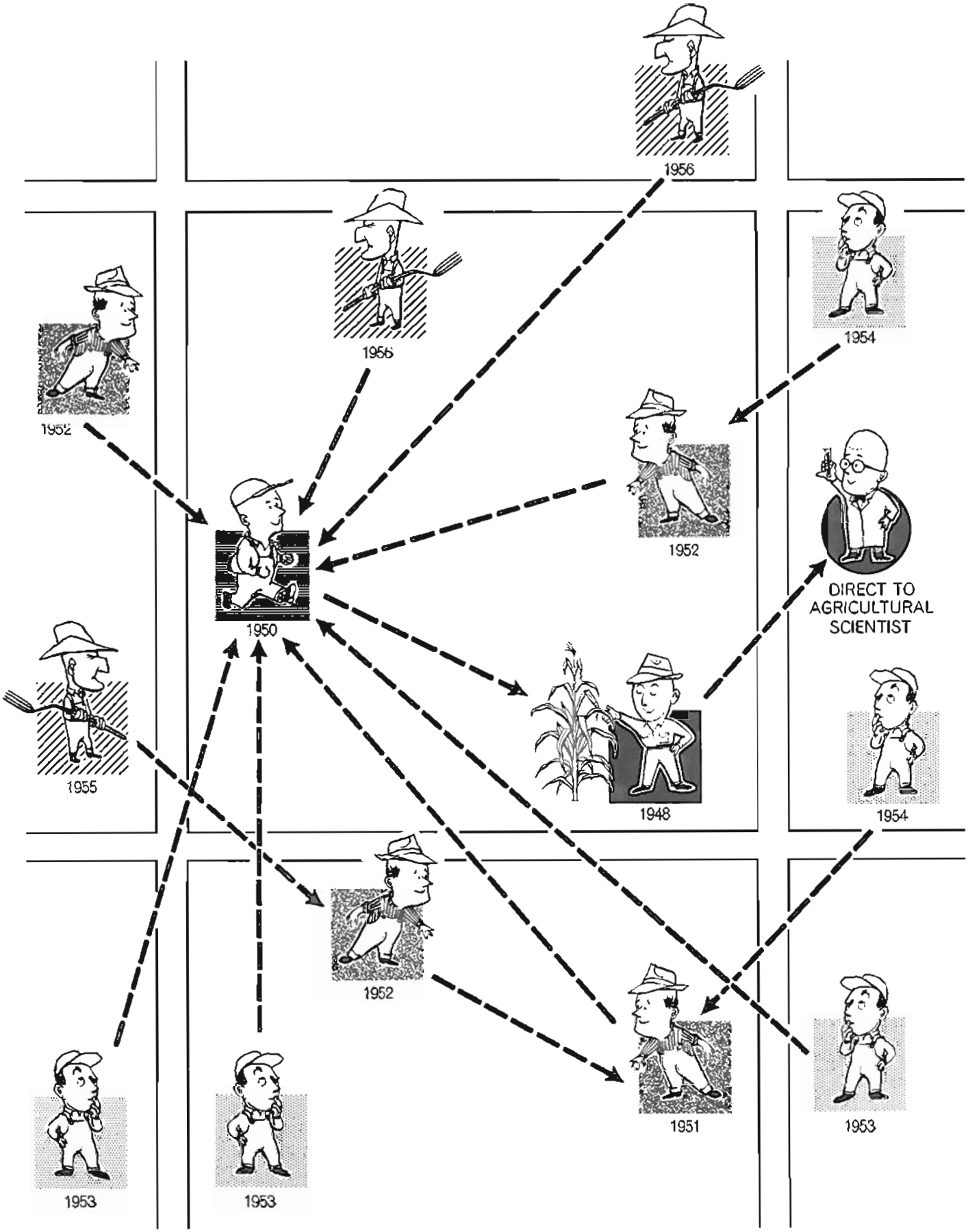


Figure 3. — How fourteen Midwest farmers obtained information on a new farm practice. Farm locations are shown against a mile grid.

from him. Some adopted it directly, others indirectly. For example, Farmer No. 12, across the road from Farmer No.2, secured information from 4, who got his from 3, who in turn had received his from 2.

This diagram represents a good summary of the operation of the diffusion and adoption processes. An understanding of these processes is basic in building and implementing educational programs.

Summary

This publication summarizes and synthesizes the many research studies that have been completed by rural sociologists on the topic of the diffusion of agricultural technology. Special emphasis is placed upon the characteristics and communication behavior of the adopters of the new farm practices.

The characteristics and communication behavior of farmers by various adopter categories are summarized in Table 2.

Some Applications

Farmers who are early, intermediate, and late adopters of new ideas and practices in farming have distinctive characteristics. Educational programs developed in terms of these characteristics are more likely to be successful than are those that fail to take them into account. It is fairly obvious that an educational program developed for innovators or early adopters would not mean much to laggards. One designed for laggards makes little sense to an innovator.

The question arises as to what group of farmers an agricultural agent has in mind when he designs a program or parts of a program. The knowledge now available makes it possible to develop programs specifically for farmers in the different adopter categories and, by doing so, to develop a total educational program which is logically consistent and which maximizes the contributions of the various adopter groups to each other. This is one way to increase the impact of educational programs.

Innovators, although a small group, cannot be ignored in the development of educational programs. They can be expected to go directly to public and private research sources, such as land-grant colleges, universities, and experiment stations for information. Their major educational problem is keeping informed, and they are well aware of it.

Early adopters, who are a little less prone to change, are somewhat less likely to seek information and may require some proof of local applicability of new ideas.

Later adopters are less inclined to seek new information, and more proof of local applicability almost certainly will be required. These are some of the conditions that need to be considered in developing educational programs.

Whether or not farmers in an adopter category are sought after as sources of information by other farmers is another relevant consideration. While innovators are carefully watched by other farmers in the locality, they are not likely to be consulted as sources of farm information. Even where they are consulted, their advice is likely to be discounted.

The farmers most sought as sources of farm information are likely to adopt new practices a little later than innovators and may require some selling to convince them of the merit of the new practice. They are most likely to be found in the early adopter category in communities that place a high premium on alertness to new developments in farming and on quick acceptance of them.

In communities less amenable to change, persons most sought as personal sources of farm information are likely to be in the early or even late majority category. In either case, farmers frequently sought as source of farm information may be depended upon to inform late adopters about new ideas in farming. However, the advice given along with the information is likely to be different in communities placing a premium on change and in those generally resisting changes in farming.

Innovators and early adopters assume risks that late adopters are not willing to, and perhaps cannot safely, assume. They provide the local trial needed to show that the new new idea or practice is locally applicable and useable. Speeding up adoption rates of those normally late to adopt may require some means of providing for the risk taking and local legitimating functions.

In considering educational programming through group action, it is well to remember the following:

(1). Late majority and laggards are not likely to attend meetings called for educational purposes, nor are they likely to be members of formal organizations where new ideas in farming are commonly discussed.

(2). Innovators are likely to attend meetings, but are not likely to be impressed by what other farmers in the locality think just because they happen to be their neighbors.

(3). Early adopters and the early majority are most likely to be present at local meetings and are most likely to be influenced by others in attendance. They also are most likely to be active members in such formal groups as farm organizations, civic clubs, and local improvement associations.

It is unlikely that Extension Agents and other change agents in agriculture will have available in the near future all the information they would like or need to develop sound educational programs. More imagination is needed in utilizing the information presently available and the findings of research on the diffusion and adoption processes.

Sample Readings

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Cooperative extension work in agriculture and home economics. Michigan State University and the U.S. Department of Agriculture cooperating. N. P. Ralston, Director, Cooperative Extension Service, Michigan State University, East Lansing. Printed and distributed under Acts of Congress, May 8 and June 30, 1914.

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