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Diffusion of Iowa State University research information through mass media: the Cooperative Extension Service, knowledge gaps and information equity

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Diffusion of Iowa State University research information through mass media: The Cooperative Extension Service, knowledge gaps and information equity

by

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INTRODUCTION

The friction between the competing demands of citizens for lower taxes and for expanded services has led many governmental agencies to turn to innovative methods of financing and providing traditional services (Kent 1987). The Cooperative Extension Service (CES) is presently struggling with the problem of how to achieve its mission of disseminating research information to clients given funding constraints and other changes affecting agriculture.

Extension bulletins have been an important tool for the Cooperative Extension Service in disseminating research-based results obtained from the various research centers of land grant institutions. These bulletins have a unique advantage in that, unlike most mass media, bulletins can devote as much space as is necessary to a topic and are likely to be saved by the user for future reference (Fett and Mundy 1990).

According to Fett and Mundy (1990), the circulation of bulletins published by the CES has decreased in recent years. Part of this decrease is due to extension administrators controlling waste and limiting press runs to actual demand, and charging a modest fee, but for many publications the number distributed is far smaller than the number of farmers who could benefit from the information (Fett and Mundy 1990). From this it can be assumed that extension may not be reaching all of the farmers and rural clients that could benefit from the results of publicly-funded research.

In order to fulfill its mission of disseminating research information to farm clients despite increasing budget and personnel constraints, the Cooperative Extension Service will need to find efficient and economical methods to distribute information to its intended audience. By providing

research results and information to private industry and mass media, a "multiplier" effect occurs, in which the information is spread to the customers and audience with no further effort or cost on the part of the Cooperative Extension Service.

One method under consideration is publishing the results of annual yield test results, previously available only from the Cooperative Extension Service offices in bulletin form, in farm magazines or newspapers in the form of a supplement to the publication.

In discussing the increasing importance of timely information, Don Dillman states; "The move towards substitution of information for other resources is propelled in part by the fact that the resources of time and energy are finite, while information as a resource may be infinite" (Dillman 1985). As a substitution of information for other resources occurs, information then gains economic value and economic factors begin to affect dissemination.

What effects are likely to occur as a result of a change in method of disseminating land grant university research results? Will the dissemination of the research information through a farm magazine or newspaper allow a larger number of farmers to gain access to the information? Will some socioeconomic groups benefit more than others from this change in strategy of disseminating research results? Is there a group of farmers not receiving this information through either bulletins or mass media?

Communication theory can provide a framework for predicting the effects on the audience for land grant university research. In particular, the knowledge gap hypothesis provides a basis for predicting that groups of

different socioeconomic status will receive the benefits of mass communication unequally.

In present times, the overall trend is a general withering of public information (because of budget constraints) and a tendency to increase the fees for remaining services. As a result, the less well-off groups are disadvantaged twice over. They are priced out of the market on new commercialized services and become more dependent on government institutions which are themselves increasingly impoverished and unable to meet their clients' demands or needs (Golding and Murdock 1986).

This paper uses the present predicament of the Cooperative Extension Service as an opportunity to study the issues of privatization of public information, information inequity, and socioeconomic characteristics of the audience for research information.

The literature review discusses the Cooperative Extension Service as a component of the national land grant university system. The questionnaire and statistical data involve only the research information developed by Iowa State University and disseminated by the Cooperative Extension Service to Iowa farmers.

LITERATURE REVIEW

The Cooperative Extension Service

In the middle of the 19th century, when much of the state of Iowa was still being settled, the State Agricultural Society made the following recommendation to the Iowa State Legislature of 1854-1855:

> The office or mission of agricultural chemistry is to explain the whole process of vegetable life, and to furnish to the tillers of the soil every useful fact or information which bears upon the economy of field labor or general husbandry.
>
> The farmer wants to be advertised of the newest and best mode of culture in his own state, climate and soil. It should be the business of this department of state to supply this information in the most authentic and reliable form; also to gather up the practical experience of the best farmers of the whole world, and to circulate the same quarterly or annually in the form of cheap tracts, broadcast over the state (Bliss 1960).

The State Agricultural Society intended for the state agricultural bureau that would be developed under this proposal to produce three results. The first desired result was to greatly elevate the standard of agriculture, increase agricultural production and add to the wealth of the state. The second intended result was to prevent early deterioration of the soil under "the present forms of careless and random cultivation." And third, the achievements of agricultural and organic chemistry in its application to the business of husbandry would lead to the institution of agricultural schools (Bliss 1960).

This early proposal illustrates the advanced thinking of some of the leading Iowa farmers of this pioneering period of the Midwest. It is interesting to note, and relevant to the topic, that at this early time in Iowa's history, there was already a stated need for "cheap tracts," or bulletins, to disseminate agricultural research information.

The original bill implementing the Land-Grant College Act was introduced by Representative Justin S. Morrill of Vermont and passed into law in 1859. The Morrill Land-Grant College Act granted each state public land in the amount of 30,000 acres per Senate and House member, or the equivalent amount of value in scrip if public domain land was not available. Each state was to use this money as a trust to endow a college where practical education in agriculture and engineering would be emphasized.

A second bill, first introduced in 1872 and passed in 1890, provided continuing funding to support land-grant colleges (Rasmussen 1989).

The concept of a system of agricultural experiment stations was first discussed at a convention of land grant colleges in 1871. In 1882, the first bills authorizing the implementation of this system were introduced and in 1887 the Hatch Act was passed by Congress. This law provided for a yearly grant for each state for the support of an agricultural experiment station.

Soon, experiment station directors and administrators at agricultural colleges throughout the nation and the United States Department of Agriculture (USDA) realized that they needed to reach the farmers with practical research information if the system was going to survive (Rasmussen 1989).

Of these institutions, the USDA had the most experience in public communication and began issuing individual bulletins and articles about the results of agricultural research in its annual report. These bulletins and articles were criticized by the farm press as compendiums of old useless

material and farmers complained that the research reports could not be applied to their needs (Rasmussen 1989).

In 1889, the USDA began issuing bulletins as Farmers Bulletins, a format that became popular (Rasmussen 1989).

As their research programs got under way, the experiment stations began issuing their own bulletins and many farm journals based their articles on the material published by the USDA. In this way the institutions were able to reach farmers that otherwise would not have been able to obtain the results of land grant system research (Rasmussen 1989).

Iowa's Thirty-first General Assembly approved Iowa's first state extension act on April 10, 1906. This act provided Iowa State College with the following responsibility:

> ...undertake and maintain a system of Agricultural Extension work. Under this the said college shall be authorized to conduct experiments in the various portions of the state, and in giving instructions wherever in the judgement of the college authorities it shall be advisable... (Morgan 1934).

The Smith-Lever Act, which launched extension education nationally, was signed into law by President Woodrow Wilson on May 8, 1914 and although it has been frequently amended and was rewritten in 1953, the statement of basic purpose as clearly stated by Congress has been the same: "To aid in diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics and to encourage the application of the same" (Rasmussen 1989).

This act also clearly charged the Cooperative Extension Service with improving agricultural production.

As the Cooperative Extension Service developed, many methods of disseminating the results of agricultural research were tried.

Demonstrations were considered an important method of providing information about new techniques and innovations.

"In the early years of extension there was much discussion as to the methods of extension teaching. ...Some went as far as to argue that demonstrations were the only really effective method of conducting extension work" (Bliss 1960).

Iowa's Extension Service, however, has never relied on any one method of instruction. Charts, leaflets, bulletins, lectures, demonstrations, publicity, local leaders, organizations, and samples of corn, other grains, and animals were all used to provide farmers with agricultural innovations based on research (Bliss 1960).

In 1927, the agricultural colleges published 1,600 bulletins and circulars and distributed 17 million copies of them. A 1927 study of farmers in Minnesota, Wisconsin, and Ohio showed that 62 percent of the farmers had received bulletins; 82 percent receiving them reported reading them; and 48 percent had made some practical application of the information contained in them (Rasmussen 1989).

The land grant university and extension service are distinctive American inventions. The extension service provides a link between the research community and the rural audience for research findings. In its early history, extension's role was clear and straightforward and there was a close interrelationship between farmers and extension (Hildreth and Armbruster 1981).

Even if more farmers are provided access to the information through the use of mass media, there is much more to making a decision than simply having information available. The important act is not the securing of

information from a particular place; it is the interaction that interprets the information in a local context (Dillman 1985).

The Cooperative Extension Service has been cited as a successful model for securing users' adoption of its research results (Rogers 1983). Part of the reason for this success is the interpersonal communication channels provided by local county agents. According to Rogers, interpersonal communication is more likely to cause attitude change, while mass media are more important in increasing knowledge of ideas (Rogers 1983).

It is against this history of substantial institutional efforts and successes in communication of agricultural information that the present changes in communication strategy must be considered.

In 1985, a Cooperative Extension Service task force on communications technology released a report that foreshadowed a new methodology in extension education. The report showed the relationship of media technologies to three functions of extension and to audience size and type.

The task force listed the three functions of the Cooperative Extension Service as information delivery, education delivery, and problem solving. According to the task force, information delivery to wide general audiences could be best accomplished by electronic publishing, computer networks, broadcast television, traditional newspapers and radio. Smaller and more select audiences would benefit from telephone access and publications (Rasmussen 1989).

It is the information delivery to wide general audiences that provides the focus of this paper.

Extension - Information for All?

There have been critics of the research institutions and the Cooperative Extension System. The basis of much of the criticism is that the research performed at Agricultural Experiment Stations and land-grant universities is developed for and directed at large, affluent farmers.

As they developed, experiment stations in each state established ties with those farmers who were most receptive to their research results. These were not the small farmers (Dale 1981).

Although the mission of the land grant complex was to provide benefits that were to be widespread among the farming class; "In practice, the colleges quickly established close working relationships with the most productive and wealthiest class of farmers," (Hightower 1973).

In addition, Hightower states that agribusiness corporations bought their way into the land grant community with grants for research and scholarships. Agribusiness plays an important role in determining research priorities by way of the influence exerted through research investments and close working relationships with research staff (Hightower 1973).

In 1988, the Cooperative Extension System adopted the following mission statement: "The Cooperative Extension System helps people improve their lives through an educational process which uses scientific knowledge focused on issues and needs" (Rasmussen 1989).

Extension in Transition

This historical background provides a framework for understanding an addition to CES communication strategy. Structural changes throughout farm production, marketing systems and food processing have changed the

role of extension. Production supply firms and agricultural cooperatives provide field representatives who help farmers with technical information. An increasing number of professional consultants provide similar services (Hildreth and Armbruster 1981).

This provides increasing competition for the Cooperative Extension System in distributing technical agricultural information.

In addition, extension faces other challenges. Like other government agencies funded by tax dollars, it faces severe fiscal constraints, and the traditional delivery system based on county agents has begun to lose its effectiveness in today's agriculture. The education level of farmers has increased and many have technical backgrounds that are equivalent to or surpass those of county extension staff (Hildreth and Armbruster 1981).

Farmers can be sorted into three general types; 1) larger than family, or industrial farmers, 2) medium-sized family farms, and 3) small part-time farmers who rely on off-farm income. The very large and very small farmers are increasing in prevalence while the number of middle-sized family farmers is diminishing (Buttel 1987).

Because of this division, the Cooperative Extension Service can no longer serve the entire farming community by producing a single constellation of technologies intended for "farmers as a whole" (Buttel 1987). The emergence of new information technologies allows innovative farmers to bypass extension agents and obtain technical agricultural information directly (Dillman 1985).

Credibility of agricultural information is an important quality and is concentrated in the land grant university system or in professional societies populated by land grant university researchers and graduates

(Walter 1989). To take advantage of this credibility, much of the knowledge that is used by private sector information distributors is based on land grant university research.

The extension service cooperates with this strategy. Extension agents and administrators view private enterprise as a client and perform many of the same services for private, non-mass media information providers as they do for farmers (Walter 1989).

Extension is evaluated in part by the economic return to the cost of research as measured by the improved profitability of the users of the research. Time and information mean money. A more commercial attitude is required of extension workers, which may create a tension between extension workers and their clients (Proost and Roling 1992).

Present staffing levels prohibit extension from delivering the same level of service to farmers as the private sector can provide. By providing information to the private sector for dissemination a "multiplier" effect occurs, and the economic return to publicly-funded research may be enhanced (Walter 1989).

Knowledge Gap Hypothesis

The knowledge gap hypothesis as proposed by Tichenor, Donahue and Olien states:

> As the infusion of mass media information into a social system increases, segments of the population with higher socioeconomic status tend to acquire this information at a faster rate than the lower status segments, so that the gap in knowledge between these segments tends to increase rather than decrease (Tichenor, Donahue and Olien 1970).

Knowledge Gap

Some portions of the public tend to be chronically uninformed. In general, the greater the level of education of a segment of the population, the greater is that group's knowledge of various topics (Gaziano 1983).

The major sources of knowledge in the United States are formal schooling, interpersonal contacts, organization memberships and mass media. All these sources are distributed or used unequally in the population (Gaziano 1989).

Gaziano (1984) also states that high education groups appear to have more sources of information than do the less educated.

In a discussion of knowledge gap literature, Gaziano (1983) states that the term knowledge gap has several meanings. A distinction is made between knowledge gaps which refer only to the relationship between education and knowledge without reference to media, and knowledge gaps that are a result of media treatment or media exposure. This literature review will focus on the creation of knowledge gaps as a result of media treatment or exposure.

One prediction that can be made as a result of the knowledge gap hypothesis is that over time, acquisition of knowledge of a heavily publicized topic will spread at a faster rate among higher socioeconomic status groups than lower socioeconomic groups (Gaziano 1983).

Another prediction is that at a given point in time, there should be a higher correlation between acquisition of knowledge and education for topics highly publicized in the media than for topics less highly publicized (Gaziano 1983).

An assumption relating to the knowledge gap hypothesis is that the lower socioeconomic status population segments do not remain completely uninformed, but that the growth of knowledge is relatively greater among higher socioeconomic status groups. This hypothesis also applies primarily to public affairs information and science news that has less general appeal (Tichenor, Donahue and Olien 1970).

One of the explanations for the appearance of this gap is that the mass media that carry the information are traditionally used more by high socioeconomic status persons. Print media are geared to the interests and tastes of this high status population segment (Tichenor, Donahue and Olien 1970).

Theoretical causes of the knowledge gap phenomenon can be placed into two categories: audience related factors such as ability, motivation and media behavior (or exposure) which are held to be causes of widening gaps, and message-related "ceiling effects," which are held to be causes of narrowing gaps (Ettema and Kline 1977).

Exceptions to this generalization are the argument by Tichenor, Donahue and Olien (1970) that an equalization of motivation on the part of the audience may narrow knowledge gaps, and Katzman's (1974) argument that gaps may be widened through unequal access to communication technology (Ettema and Kline 1977).

An emphasis on transituational deficits (such as lack of communication skills on the part of lower socioeconomic status groups) as the primary explanation of knowledge gap phenomenon predicts that gaps will always widen and never narrow. If a lack of communication skills on the part of lower socioeconomic status individuals is considered a cause of the

knowledge gap, then this lack of communication skills holds under all circumstances and it could be considered that all knowledge gaps will never narrow until ceiling effects intervene to allow the less skilled to catch up (Ettema and Kline 1977).

One explanation of informational inequality is that it appears to be a manifestation of economic and social inequality. The process by which the mass media system widens the information gap derives from the language and terminology that is familiar to the highly educated section of the population. According to this theory, the lower status groups have not mastered the terminology and the abstract concepts presented by media (Suominen 1975).

By contrast, an emphasis on situation-specific differences as a primary explanation for the gap phenomenon predicts that gaps widen in those circumstances in which lower socioeconomic status persons are less motivated to acquire the information or in which the information is less functional for them. When the motivation to acquire information is increased, the knowledge gaps may narrow (Ettema and Kline 1977).

Findings from the study by Lovrich and Pierce (1984) show that motivation and socioeconomic status are not simple surrogates for each other but both are related to policy-relevant knowledge. Situation-specific variables play a greater part in the acquisition of policy knowledge than do transituational factors. Motivation-based, situation-specific variables are the primary influences upon policy-relevant knowledge. An implication of this is that acquisition of public policy-relevant knowledge reflects personal motivations.

This theory predicts that knowledge gaps may narrow for reasons other than ceiling effects. Some knowledge domains are of more interest and use to higher socioeconomic status groups. The motivation to acquire information in a specific knowledge domain can be a significant factor in mediating gap effects (Ettema, Brown and Luepker 1983).

Contradictory results of research on knowledge gap phenomena all emphasize one key concept: motivation to acquire information in the knowledge domain under study. Gaps widen when there is difference in motivation among population segments (Ettema, Brown and Luepker 1983).

Social Framework

Another way to conceptualize distribution and acquisition of knowledge is to view these processes within a social control framework. Within any social system, some subgroups are more conducive to change, while others are more resistant to change. Those subgroups predisposed to change tend to adopt and act upon information at a faster rate than more stagnant subgroups (Donohue, Tichener and Olien 1975).

Another consideration is that while people do not know about a particular topic, they also express no particular need for such information. People do not usually subjectively experience a need for certain information, even though they objectively appear to lack it (Suominen 1975). Therefore, they have no motivation to acquire any information they appear to lack.

Everett Rogers (1976) suggested that the knowledge gap hypothesis should be considered a communications gap and that attitudinal and behavioral effects of communication be considered. Interpersonal

communication channels should also be studied to determine the effect of audience interconnectedness in modifying or magnifying the gap effects (Rogers 1976).

Rogers also suggests some possible explanations of communication effects gaps. In many cases the members of higher socioeconomic status groups possess greater receptivity to change-oriented communication messages. Also the members of the higher socioeconomic status groups may possess a greater amount of resources which can be risked for innovation.

The sources or producers of change-oriented messages are usually more similar to the higher status groups, hence these messages have greater effects on the higher socioeconomic groups than the lower socioeconomic groups. The lack of integration of the members of the lower socioeconomic status groups in the interpersonal networks means that they are not even reached by the trickle-down of information (Rogers 1976).

People do not develop social and communication relationships with other people in a random manner. Interpersonal diffusion of new ideas is mediated by social norms which structure the action and interaction (Galloway 1977).

How individuals perceive a new idea can be regarded in large part as reflecting the norms that guide their decisions and also where they stand in relation to their opportunities for action resulting from their access or lack of access to scarce resources (Galloway 1977).

Thus, patterns of interpersonal communication have an effect on the existence of knowledge gaps. It appears that when the patterns of interpersonal communication cut across the substrata of social groups, gaps are more likely to narrow than to widen (Galloway 1977).

Information Gaps

The impact of communication technology affects different socioeconomic groups unequally. A new technique in communication has two effects. It raises the information level of all levels of individuals and it widens the gap between the "information-rich" and the "information-poor" (Katzman 1974). Katzman offers several reasons for this two-fold effect but the one that is relevant to this study is that there seems to be a correlation between initial information levels and the motivation to use new communication techniques (Katzman 1974).

"Opportunities to advance learning outside of formal schooling are more available to the affluent than to the poor" (Gaziano 1989). Financial reasons and "internal barriers" prevent the lower-income groups from having access to communications technologies such as cable, microcomputers and videotex or teletext terminals. External barriers include laws, sanctions and customs; internal barriers include such factors as low education, lack of experience, lack of self-confidence and ability, and inability to formulate strategies. Both kinds of barriers are related to socioeconomic status (Gaziano 1989).

Those people who have access to more information become aware of new communication techniques and will be more likely to use the new technique. Information gaps can be found within new information technologies as well as the mature information technologies such as newspapers. This aspect of the knowledge gap hypothesis concerns the unequal rate of adoption of new information technologies. And within the groups of adopters of a new information technology, there is a difference, or gap, in use and benefits.

Technology Gaps

This inequity is further reinforced by the creation of new information industries based on emerging technologies. These are promoted almost exclusively as commercial operations and consequently access is through the price system (Golding and Murdock 1986).

A prior phase in the opening of such information gaps is the adoption of information technologies by some potential users and not by others. Three levels of information gaps intertwine to the detriment of lower socioeconomic status groups. New information technologies are typically designed for carefully defined and economically attractive user groups. This first phase powerfully discriminates against the truly information needy (Ettema 1984).

Then, within this economically attractive target group there may be a further gap developed between adopters and non-adopters. And, finally, within the adopters, there develops a gap in use and benefits (Ettema 1984).

Is there a difference of adoption of new technologies between rural and urban residents? A study conducted by LaRose and Mettler (1989) indicates that with the exception of cable television (which depends on an infrastructure), rural residents are as likely to have as wide a variety of new information technologies as urban dwellers. And with the exception of automatic pagers and automatic teller machines, they are as likely to use the new information technologies (LaRose and Mettler 1989).

Privatization of Public Information

Another aspect to consider concerning the dissemination of research information by means of mass communication is the issue of privatization of public information. H.I. Schiller quoted from hearings held by the Committee on House Administration in 1979, "the federal government has become the nation's chief generator of knowledge in just about every field..." (Schiller 1981).

Schiller further stated that information itself, the product of public tax money, could be appropriated and sold at a profit. The question, yet to be answered, is should information developed by the government be considered an economic good that can be packaged and sold or a public good available to all (Schiller 1981).

Privatization involves moving the production and provision of communications and information services from the public sector to the private market. Success in the marketplace then becomes a major criterion for judging the performance of communications and information organizations. This new market-oriented system of provision addresses people predominately through their identity as consumers (Murdock and Golding 1989).

Because of this, privatization of information also has unequal effects on different socioeconomic status groups. High socioeconomic status groups are able to acquire information from several sources, and privatization has little effect on their ability to obtain public information. Privatization of public information has an adverse effect on low socioeconomic status groups.

According to Schiller (1984), there is a deepening division of the society into information-privileged and information-impoverished sectors.

"What hypothetically could be a truly information-rich society, is on the way to becoming a community divided into information 'haves' and 'have-nots'" (Schiller 1984).

As government produces less data because of budget cuts, will private information systems take up the slack? Just (1983) provides a descriptive analysis of agricultural data markets which shows several categories of information.

Public information is in the public domain and is available to everyone. Private information is controlled and dispensed by private firms, generally for a fee.

Another broad classification is between current and historical data. Current data are up-to-the-minute data that are usually market oriented; commodity prices or monthly crop production reports are examples. Historical data depict trends for econometric analysis.

A third category is market data, of which price, acreage, livestock numbers and stocks are examples; and structural data, a broad term that includes income, productivity, nutrition, and distribution of resources (Just 1983).

As government involvement in agricultural information wanes, private producers of information are concentrating on current market information, while the production of historical and structural data is declining (Just 1983). Public policy is developed based on structural and historical information and may suffer from the lack of this data in the future.

As information is produced and disseminated by private information systems, there will be a tendency to aim this information towards those who have the ability to pay. Market segmentation according to ability to pay already exists in agriculture (Walter 1989).

Private suppliers, even when they are used to amplify extension's dissemination activities, aim their efforts towards those who best suit their own objectives. These are often above average-sized farmers (Walter 1989).

The fact that information is purchased (or closely aligned with purchased goods or services) may affect the flow of agricultural information and result in a more fragmented and less open knowledge system. "Farmers who used to share information during study-group meetings may become more reluctant to do so when they have paid for this information," (Proost and Roling 1992).

Commercialization of information formerly available through the extension service for free or at a nominal fee may affect some fundamental aspects of the extension system. If the extension system was privatized, "It would no longer be an agency responsive to the public interest as a whole, but would become driven by the interests of those clients able to pay the bills" (Harter 1992).

Agriculture is following the same trend as industry in substituting information for energy and time. Don Dillman quotes Emery Castle, "This move towards substitution of information for other resources is propelled in part by the fact that the resources of energy and time are finite, whereas information as a resource may be infinite" (Dillman 1985). When thought of in this manner, information becomes a commodity.

HYPOTHESES

Given the prevailing attitudes of taxpaying citizens towards government budgets, it is likely that government-funded agencies and programs are going to continue to be required to accomplish more with fewer resources. The Cooperative Extension Service, like other government-funded agencies, will need to find efficient and effective ways to provide service with decreasing resources.

As the discussion of communication theory indicates, using mass media to disseminate research information may continue to reach high socio-economic status farmers, but an information gap may develop (or continue to exist) between high socioeconomic status farmers and low socioeconomic status farmers. A tension may be created between the two social goals of productivity and equity.

Comparing the results of different methods of disseminating research information provides an opportunity to test for a knowledge gap between high and low socioeconomic status groups, and to evaluate the effects of the issues of privatization of information and equity of access to information.

The first issue to explore is efficiency. By publishing the results of land grant university research in commercial publications, will more farmers have access to the information?

Hypothesis 1: The dissemination of agricultural research information through mass media will reach a larger number of farmers than will dissemination through extension channels.

The Cooperative Extension Service's traditional method of disseminating research information through bulletins has depended largely

on personal contact, either through a visit to the county office, or other meetings. Diffusion of innovation theory supports the concept that mass media are more important in increasing knowledge of ideas.

This result was also found in Fett and Mundy's study (1990), where considerably more farmers received the research information through the supplement than through research bulletins the previous year.

Another issue to explore is equity of access to information. Are there groups of farmers with identifiable characteristics that are more likely to have access to research information? Are there groups of farmers who do not have access to the research information? What are the characteristics of these groups?

Is there an identifiable group that gains access to the information through publication in mass media that did not previously have access? More importantly, is there a group of farmers that received the information from the extension service, but not through the publications? How large is this group, and what are its characteristics?

All individuals do not adopt innovations at the same time. There is a pattern, and individuals can be categorized on the basis of when they begin using a new idea. These categories have socioeconomic traits identified with them. Early adopters generally have more years of education, higher social status, larger sized units, and are more likely to have a commercial (rather than subsistence) economic orientation than are later adopters (Rogers 1971).

Communication theory provides a framework for predicting how a change in method of disseminating research information will affect access to the information by farmers.

One of the explanations for the appearance of the knowledge gap is that the mass media that carry the information are traditionally used more by high socioeconomic status persons. Print media are geared to the interests and tastes of this high status population segment (Tichenor, Donahue and Olien 1970).

Hypothesis 2: Groups that have indicators of higher socioeconomic status will be more likely to gain access to research information through mass media than those farmers with lower socioeconomic status.

Knowledge gap studies show that information disseminated through mass media is received unequally by different socio-economic status groups. High socio-economic status farmers are therefore more likely to benefit from research information published as a supplement in a farm magazine.

This was also a finding in the Fett and Mundy (1990) study of Wisconsin farmers.

Indicators of socioeconomic status in this study are size, age, education and income. For purposes of statistical testing, hypothesis 2 will be divided into four hypotheses.

Hypothesis 2a: Farmers that plan to plant more acres of crops will be more likely to gain access to research information through mass media than groups of farmers with smaller farms.

Hypothesis 2b: Farmers that are younger will be more likely to gain access to research information through mass media than groups of farmers who are older.

Hypothesis 2c: Farmers that have more formal education will be more likely to gain access to research information through mass media than groups of farmers with less formal education.

Hypothesis 2d: Farmers that have more farm income will be more likely to gain access to research information through mass media than groups of farmers with less farm income.

The use of extension for research information will probably follow the same trends as mass media and commercial sources of information. It is likely that socioeconomic indicators will predict access to extension information.

Hypothesis 3: Groups that have higher indicators of socioeconomic status will be more likely to gain access to research information from extension sources than those who have lower indicators of socioeconomic status.

As with hypothesis 2, this hypothesis will be tested for four measures of socioeconomic status - size, age, education and income.

Hypothesis 3a: Farmers that plan to plant more acres of crops will be more likely to gain access to research information through extension sources than groups of farmers with smaller farms.

Hypothesis 3b: Farmers that are younger will be more likely to gain access to research information through extension sources than groups of farmers who are older.

Hypothesis 3c: Farmers that have more formal education will be more likely to gain access to research information through extension sources than groups of farmers with less formal education.

Hypothesis 3d: Farmers that have more farm income will be more likely to gain access to research information through extension sources than groups of farmers with less farm income.

A primary explanation for gap phenomenon predicts that gaps widen in those circumstances in which lower socioeconomic status persons are less motivated to acquire the information or in which the information is less functional for them. When the motivation to acquire information is increased, the knowledge gaps may narrow (Ettema and Kline 1977).

Hypothesis 4: Farmers who rate the research information as more important in planning their operation are more likely to acquire the information.

Communication effects from privatization may be difficult to separate from the knowledge gap effect. One difference is the sources of information that farmers use in making farming decisions. If mass media and commercial sources of information are aimed towards a market of high socio-economic status farmers (Walter 1989), then a comparison would show that farmers who receive information through privately-owned, high-technology sources are more likely to have indicators of higher socio-economic status than farmers who do not have access to these sources.

As publicly-funded information decreases, and private sources of information become predominant, it follows that this information will be targeted toward the higher socio-economic status groups. Lower socio-economic status groups will find fewer sources of information aimed toward their needs. Lower socio-economic status groups are also less likely to have adopted new information technologies.

There seems to be a correlation between initial information levels and the motivation to use new communication techniques (Katzman 1974).

The questionnaire asked respondents to indicate if they received crop variety test results in the past and where they received this information.

Some predictions based on the knowledge gap hypothesis and issues of privatization should be explored.

What are the socioeconomic characteristics of farmers who received crop variety test information from both extension and mass media? What are the characteristics of the farmers who received the information from one place, but not the other? What are the characteristics of those farmers who did not obtain the information at all? Are there significant differences in the characteristics of these groups? How large are these groups?

Hypothesis 5: Groups that receive the research information from both extension and mass media sources will have higher indicators of socioeconomic status than those groups that do not receive the information from either source.

This hypothesis can also be tested more precisely if divided into segments according to socioeconomic categories.

Hypothesis 5a: The group that obtains corn test results both from the special insert and from the extension service the previous year will plan to plant more acres of crops than those who receive the information from neither source.

Hypothesis 5b: The group that obtained corn test results both from the special insert and from the extension service the previous year will have more formal education than those who receive the information from neither source.

Hypothesis 5c: The group that obtained corn test results both from the special insert and from the extension service the previous year will be younger than those who receive the information from neither source.

Hypothesis 5d: The group that obtained corn test results both from the special insert and from the extension service the previous year will have higher income than those who receive the information from neither source.

The questionnaire also asked the respondents to indicate the various sources of information that they receive. For the purposes of this study, the sources can be grouped into mass media, commercial sources, and extension sources.

What are the socioeconomic characteristics of farmers who use mass media frequently? What are the characteristics of those who use commercial sources of information frequently? What are the characteristics of those who use extension frequently? Are there significant differences in characteristics among these groups? How large are these groups?

Hypothesis 6: Groups with higher indicators of socioeconomic status will use a greater number of sources for information.

Hypothesis 7: The group that received corn test results both from the special insert and from the extension service the previous year will use more sources of information than those who receive the information from neither source.

The test of hypothesis 7 will be more interesting if it is divided into segments according to the category of the source of information. This will allow a comparison of mass media, commercial sources and extension sources to see if the same trends are exhibited for each category of source.

Hypothesis 7a: The group that received corn test results both from the special insert and from the extension service the previous year will

use more mass media sources of information than those who receive the information from neither source.

Hypothesis 7b: The group that received corn test results both from the special insert and from the extension service the previous year will use more commercial sources of information than those who receive the information from neither source.

Hypothesis 7c: The group that received corn test results both from the special insert and from the extension service the previous year will use more extension sources of information than those who receive the information from neither source.

METHODOLOGY

The Iowa State University Cooperative Extension Service published the 1991 Iowa Corn Yield Test Report as a special insert in the December 28, 1991 issue of *Iowa Farmer Today*. A random sample of 599 subscribers was obtained from *Iowa Farmer Today* and questionnaires were sent to this sample using the Dillman Total Design method (Dillman 1978).

Iowa Farmer Today is a farm newspaper that is mailed free to all farmers in the state of Iowa.

The first mailing was sent in the middle of January, 1992, and included the questionnaire (Appendix A), a personalized cover letter (Appendix B) and a self-addressed, postage-paid return envelope.

The Iowa Corn Yield Test Report questionnaire mailed in 1992 used the same questions as did the Fett and Mundy study (1990) and a 1991 questionnaire for the Iowa Soybean Yield Test Report that was published in the *Iowa Soybean Review* in 1990.

Some questions were added to the 1992 survey questionnaire in order to obtain more complete socioeconomic information from the respondents. In addition to asking the number of acres farmed, the 1992 questionnaire gathered information on level of education, farm income and age (questions 19, 20 and 21).

Questions were also added that clarified where respondents received previous Iowa Corn Yield Test Reports. The 1991 questionnaire designed for soybean growers asked if the respondent had received the report at any time in the past two years. To allow comparisons to be made from survey to survey this question remained on the 1992 questionnaire but additional

questions were added to specify exactly when the respondent had received the information (questions 8 and 9).

Table 1 shows the response rate and categories of respondents to the 1992 questionnaire.

Table 1. Survey response rate

Farming Status	Frequency	Percent	Valid Percent
Part-time farmer	60	13.9	13.9
Full-time farmer	249	57.5	57.5
Not a Farmer	22	5.1	5.1
Address unknown	1	.2	.2
Deceased	4	.9	.9
Refused/blank	4	.9	.9
Retired farmer	93	21.5	21.5
Total	433	100.0	100.0

Of the 599 questionnaires sent, 433 or 72.3 percent were returned. Of the 433 returned questionnaires, only those who were classified as full-time farmers or part-time farmers were instructed to answer the questions. Those respondents who were not a full-time or part-time farmers (question 1) were instructed to return the questionnaire blank.

The responses from each survey were coded and entered into SPSS, a social science statistics program for statistical analysis. A coding manual was prepared and is reproduced as Appendix C.

Those respondents who were not full-time or part-time farmers were then recoded and given a missing value status. They were not included in the statistical analysis.

The questionnaire generated several indicators for measurement of access to the research information.

Question 3 asked the respondents to recall if they received the issue of *Iowa Farmer Today* (question 3a) and if they recalled looking at the special insert containing the corn variety test results (question 3b). Question 6 asked the respondents if they saved the insert to refer to at a later time. Of these variables, question 3b may be considered the most valid measure of access to the information in the insert.

The question that asked whether the repondents recall receiving the issue of *Iowa Farmer Today* did not measure whether the respondent looked at the special insert containing the information. The variable that asked the repondents if they saved the insert to refer to later may not measure accurately whether the respondent looked at the information in the insert. (It is possible to save the information without reading it.)

Several questions were designed to measure access to the information through the Cooperative Extension System. Question 7 asked the respondents to report if they received the current corn yield test results from anyplace other than the special insert in *Iowa Farmer Today*.

As in previous years, the information was available from the extension office in bulletin form. Other ways that respondents might have obtained the information included extension meetings, friends or neighbors, and farm input dealers.

Question 8 asked the respondents to report if they received the 1990 (previous year) corn yield test results. In order to provide data consistent with data collected in other studies (Fett and Mundy 1990 and an *Iowa Soybean Digest* survey), question 9 asked the respondents if they had received the Iowa Corn Yield Test Report at any time in the past two years.

This variable was not used in this study to measure access to research information.

Several new variables were created for statistical analysis. A variable to measure farm size was computed by adding the variables for the amount of acreage of the four crops that respondents plan to plant (question 2); the number of acres of corn, acres of soybeans, acres of oats and the number of acres of forage. The variable of size, along with age (question 19), years of formal education (question 20), and income (question 21) were used as indicators of socioeconomic status.

Another variable was created to place the respondents into one of four categories according to their access to two sources of information; mass media and extension sources.

This variable refers to one of four divisions of the respondents as classified by whether they received the research information from both the publication and in bulletin form, in neither form or one but not the other. The definition of this variable will be explained in more detail in the analysis section.

A series of variables was developed to create scores of the number of sources used for information. Respondents were asked to identify sources of information from a list provided (question 15). The sources were divided into three categories and a variable was created to measure the number of sources in that category used by the respondent, as well as total sources.

The first category reflected mass media sources and included the variables *Iowa Farmer Today*, daily newspapers, weekly newspapers, farm magazines, radio and television.

The second category was created to reflect commercial sources of information and included the variables commercial newsletters, other commercial publications, professional paid farm consultants, seed dealers, farm chemical salespersons or other suppliers, and teletext or videotext systems.

The third category was created to provide a score of extension sources of information and included the variables extension bulletins, extension newsletters, extension meetings, conversations with extension agents, and also information gathered from other farmers. This last variable was placed within the extension category because it is a form of interpersonal communication as contrasted with mass media or commercial sources.

RESULTS

Frequencies

The first hypothesis suggested that a new method of disseminating research results to farmers would reach a greater number of farmers. By using mass media, research predicts that a "multiplier" effect will occur and the research results will reach a larger number of farmers.

Hypothesis 1. The dissemination of agricultural research information through mass media will reach a larger number of farmers than will dissemination through extension channels.

Comparison of the number of farmers reached by the different methods of disseminating information will provide a basis for judgement of the support for this hypothesis.

Table 2 shows the number of respondents that indicate they recalled receiving the issue of *Iowa Farmer Today* that contained the special insert with the corn variety test results. Of the respondents, 84.7 percent recalled receiving the issue.

Table 2. Frequency - Recall receiving *Iowa Farmer Today*

Recall Receiving Issue	Frequency	Percent	Valid Percent
no	47	15.2	15.3
yes	260	84.1	84.7
missing	2	0.1	missing
Total	309	100.0	100.0

Table 3 shows the number of respondents that indicate they recalled looking at the special insert. Of the 260 respondents that recalled receiving the issue, 256 of them responded to this question. Of these respondents, 89.5 percent recalled looking at the special insert containing the corn yield test results.

Calculation shows that of the 309 full-time or part-time farmers that responded to the survey, 229 or 74.1 percent recalled looking at the special insert.

Table 3. Frequency - Recall looking at the special insert

Recall Looking at Insert	Frequency	Percent	Valid Percent
no	27	10.4	10.5
yes	229	88.1	89.5
missing	4	1.5	
Total	260	100.0	100.0

Another indicator of access to the research results is measured by whether or not the respondents saved the insert for later use. One of the advantages of extension bulletins is that they can be saved by the reader for future reference (Fett and Mundy 1990). However, there is also the possibility that the respondents may save the insert by habit without reading or using the information. For this reason, this variable may not be as valid as the previous one in measuring access to research information.

Table 4 shows the number of respondents who indicated they saved the insert to refer to at a later time.

Table 4. Frequency - Saved the special insert

Did You Save Special Insert?		Frequency	Percent	Valid Percent
no		106	40.5	42.2
yes		151	57.6	58.8
missing		5	1.9	
	Total	262	100.0	100.0

Respondents were also asked to indicate whether they recalled receiving the corn test yield results from extension sources. Table 5 shows the number of respondents that indicate they received the 1991 corn yield test results in bulletin form from the extension service. For those respondents who indicated that they received the information, there is an additional breakdown of the sources from which they received the information.

Table 5. Frequency - Received 1991 corn yield test results

Received 1991 Bulletin		Frequency	Percent	Valid Percent
no		252	81.6	81.8
yes		56	18.1	18.2
missing		1	.2	
	Total	309	100.0	100.0

Of the 56 respondents who indicated that they had received the information through extension sources, eight said the bulletin was delivered by mail, two received the bulletin at an extension meeting, 11 respondents received the bulletin at the extension office, one received the bulletin from a friend, 33 received the bulletin from a seed or farm chemical dealer, and five said they received the bulletin from other sources. (These numbers add up to more than the total who indicated "yes" because respondents were allowed to select more than one source.)

While this variable measures access to the 1991 corn yield research information in bulletin form, it is interesting to note that of the 56 respondents that indicate yes, 38 (67.9 percent) indicated they received the bulletin from dealers or other sources, and not directly from extension.

This indicator of use of extension as a source for the research information is not likely to be representative of farmers that would normally seek out the information through extension since many had received the information through the *Iowa Farmer Today* special insert.

Table 6 shows information that is more useful for comparison of sources. This table shows the respondents who indicated that they received the 1990 corn yield test results in bulletin form through extension sources. At that time, the corn yield research results were not made available to extension clients through mass media.

Table 6. Frequency - Received 1990 corn yield test results

Received 1990 Bulletin	Frequency	Percent	Valid Percent
no	172	55.7	56.8
yes	131	42.4	43.2
missing	6	1.9	
Total	309	100.0	100.0

Of the 131 respondents who indicated that they received the information in 1990, 14 said the bulletin was delivered by mail, 13 received the bulletin at an extension meeting, 68 respondents received the bulletin at the extension office, three received the bulletin from a friend, 34 received the bulletin from a seed or farm chemical dealer, and four said they received the bulletin from other sources. (These numbers add up to more than the total who indicated "yes" because respondents were allowed to select more than one source.)

As with the 1991 results, a large portion of those responding positively to this question actually received the extension bulletin from sources other than extension. Of the 131 who answered yes, 38 (29 percent) received the bulletin from a dealer or other sources.

Hypothesis 1 proposed that publishing the Corn Yield Test Report in a farm publication would provide information access by a greater number of farmers. Comparing the number of farmers who responded that they recalled looking at the insert (Table 3) with the respondents who received the information in bulletin form from the extension service the previous year

(Table 6) shows a definite increase in numbers of farmers who had access to the information.

Of the respondents, 229 recalled looking at the special insert published in the *Iowa Farmer Today* that contained the 1990 results, while 131 received the 1990 results in bulletin form from the extension service. These numbers provide support for hypothesis 1, and indicate that the publication of research results in mass media does provide a larger number of farmers access to the information.

Respondents were asked to provide a rating on how important they felt the Corn Yield Test Report was in planning their farming operation (question 13). Table 7 provides a summary of the responses to this question.

Table 7. Ratings of corn yield test information

Rating	Frequency	Percent	Valid Percent
Not important	33	10.7	11.0
Interesting	126	40.8	41.9
Important	132	42.7	43.9
Essential	10	3.2	3.3
missing	8	2.6	
Total	309	100.0	100.0

Of the respondents, 132 (42.7 percent) replied that the Corn Yield Test Report is an important source of information in planning their corn crops, and ten (3.2 percent) indicated that it is essential to their

planning. The total of these two percentages indicates that 142 (45.9 percent) feel the research information is of value to their farming operation.

Comparison of Means

What are the characteristics of those groups that recall receiving the research information from the *Iowa Farmer Today* compared to those who indicated they don't recall receiving the information?

Are there any differences in socioeconomic characteristics between those respondents who received the information from the extension service compared with those who did not?

Mass media sources

One way to compare the groups is to divide the respondents into groups according to the access or lack of access to the information and compare socioeconomic traits using a T-test to compare means.

Hypothesis 2 states that groups that gain access to research information through publication in mass media will have higher indicators of socioeconomic status than those who do not gain access to the information. This hypothesis was tested for four measures of socioeconomic status - farm size (acres planted), age, education and income.

Tables 8-11 provide a summary of T-test results by farm size, age, education and income for those respondents who did and did not recall looking at the special insert containing Corn Yield Test results in *Iowa Farmer Today*.

Table 8 shows the comparison of means of the size of farms of the respondents who did not recall looking at the insert and the respondents who did recall looking at the insert.

Table 8. T-test for size - Recall looking at insert

Group 1: Respondents who do not recall looking at insert
Group 2: Respondents who recall looking at insert

T-test for size of farm

	Number of Cases	Mean	Standard Deviation	Standard Error
Group 1	23	335.0870	240.155	50.076
Group 2	210	457.0619	377.944	26.081

		Pooled Variance Estimate			Separate Variance Estimate		
F Value	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.
2.48	.015*	-1.51	231	.132	-2.16	35.28	.038*

* Significant at p=.05

Hypothesis 2a states that farmers that plan to plant more acres of crops will be more likely to gain access to research information through mass media than groups of farmers with smaller farms.

As Table 8 indicates, the group of respondents that did not recall looking at the insert had a mean farm size of 335 acres while those that did recall had a mean size of 457 acres. The difference in means is statistically significant.

Hypothesis 2b states that farmers that are younger will be more likely to gain access to research information through mass media than groups of farmers who are older.

Table 9. T-test for age - Recall looking at insert

Group 1: Respondents who do not recall insert
Group 2: Respondents who recall insert

T-test for age

	Number of Cases	Mean	Standard Deviation	Standard Error
Group 1	25	51.3600	15.094	3.019
Group 2	223	48.8475	12.981	.869

		Pooled Variance Estimate			Separate Variance Estimate		
F Value	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.
1.35	.266	.90	246	.368	.80	28.12	.431

As Table 9 indicates, the group of respondents that did not recall looking at the insert had a mean age of 51 while those that did recall had a mean age of 48. The difference in means is not statistically significant. Hypothesis 2b is not supported.

Hypothesis 2c states that farmers that have more formal education will be more likely to gain access to research information through mass media than groups of farmers with less formal education.

Respondents were asked to select one of five possible responses. In Table 10, response 1 indicates 1-8 years of education, 2 indicates 9-11

years, 3 indicates 12 years (graduated high school), 4 indicates 13-15 years, and 5 indicates 16 or more years (graduated college).

As Table 10 indicates, the group of respondents that did not recall looking at the insert had a mean education indicator of 3.04 (equivalent to high school graduation) while those that did recall had a mean indicator of 3.5 (some college). The F-test for difference in variance is statistically significant so the t-test for the separate variance estimate is used. The difference in means is not statistically significant. Hypothesis 2c is not supported.

Table 10. T-test for education - Recall looking at insert

Group 1: Respondents who do not recall insert
Group 2: Respondents who recall insert

T-test for years of formal schooling (scale of 1-5)

	Number of Cases	Mean	Standard Deviation	Standard Error
Group 1	25	3.0400	1.338	.268
Group 2	223	3.5112	.981	.066

		Pooled Variance Estimate			Separate Variance Estimate		
F Value	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.
1.86	.022*	-2.19	246	.030*	-1.71	26.97	.099

* Significant at p=.05

Hypothesis 2d states that farmers that have more farm income will be more likely to gain access to research information through mass media than groups of farmers with less farm income.

Respondents were asked to select one of five possible responses. In Table 11, response 1 indicates under $20,000, 2 indicates $20,000 to 39,999, 3 indicates $40,000 to 99,999, 4 indicates $100,000 to 199,999, and 5 indicates $200,000 or more.

As Table 11 indicates, the group of respondents that did not recall looking at the insert had a mean income indicator of 2.8 while those that did recall had a mean indicator of 3.2. The difference in means is not statistically significant. Hypothesis 2d is not supported.

Table 11. T-test for income - Recall looking at insert

Group 1: Respondents who do not recall insert
Group 2: Respondents who recall insert

T-test for income (scale of 1-5)

	Number of Cases	Mean	Standard Deviation	Standard Error
Group 1	23	2.8261	1.302	.272
Group 2	210	3.2238	1.171	.081

		Pooled Variance Estimate			Separate Variance Estimate		
F Value	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.
1.24	.439	-1.53	231	.128	-1.40	26.05	.172

Hypothesis 2 is not supported by statistical analysis. Only size has significant difference in means for the groups who did or did not gain access to the research information through mass media.

As the tables show, the socioeconomic trait of size of farm (the number of acres planted) has a significant difference in means between those respondents who recall looking at the special insert compared to those who don't recall looking at the special insert. The group of respondents who recall looking at the insert is likely to plant more acres of crops.

Discriminant analysis of the socioeconomic indicators provides a another method of evaluating the value of the four indicators in predicting information access. None of the variables appear to be significant predictors. Table 12 shows the summary table which indicates that education is the socioeconomic variable with the most weight in predicting whether a group will access research information through the special insert. Size is the next most important socioeconomic variable.

Neither education or size is statistically significant in predicting access to the information through mass media.

Extension sources

The socioeconomic characteristics can be compared for other measures of access through the extension system. Respondents can be divided into two groups by whether they did or did not receive the Iowa Corn Yield Test Report from extension in the previous year.

Table 12. Discriminant analysis of factors predicting recall of insert

Group means

		SIZE (acres)	AGE	EDUCATION	INCOME
No	0	321.70000	49.15000	3.10000	2.95000
Yes	1	463.04082	48.53061	3.55612	3.27041
	Total	449.95370	48.58796	3.51389	3.24074

Group Standard Deviations

	SIZE	AGE	EDUCATION	INCOME
0	254.95492	15.47247	1.41049	1.23438
1	385.82754	13.05625	.97240	1.14728
Total	377.41995	13.25884	1.02517	1.15634

Variable	Tolerance	Minimum Tolerance	F to enter	Wilks' Lambda
SIZE	1.0000000	1.0000000	2.5637	.98816
AGE	1.0000000	1.0000000	.39428E-01	.99982
EDUC	1.0000000	1.0000000	3.6366	.98329
INCOME	1.0000000	1.0000000	1.3959	.99352

Summary Table

Step	Action Entered	Removed	Vars In	Wilks' Lambda	Sig.	Label
1	EDUC		1	.98329	.0579	Years of Formal Schooling
2	SIZE		2	.97647	.0792	Acres

Structure Matrix:
Pooled-within-groups correlations between discriminating variables and canonical discriminant functions
(Variables ordered by size of correlation within function)

	FUNC 1
EDUC	.83972
SIZE	.70505
INCOME	.28288
AGE	-.22017

Canonical Discriminant Functions

Fcn	Eigenvalue	Pct of Variance	Cum Pct	Canonical Corr	After Fcn	Wilks' Lambda	Chisquare	DF	Sig
				:	0	.9765	5.072	2	.0792
1*	.0241	100.00	100.00	.1534	:				

* marks the 1 canonical discriminant function remaining in the analysis.

Hypothesis 3 states that groups that have higher indicators of socioeconomic status will be more likely to gain access to research information from extension sources than those who have lower indicators of socioeconomic status.

As with hypothesis 2, this hypothesis will be tested for four measures of socioeconomic status - size, age, education and income.

Tables 13-16 provide a summary of T-test results by size, age, education and income for those respondents who did and did not recall receiving the Iowa Corn Yield Test Report from extension in 1990.

Hypothesis 3a states that farmers that plan to plant more acres of crops will be more likely to gain access to research information through extension sources than groups of farmers with smaller farms.

As Table 13 indicates, the group of respondents that did not receive research information from extension had a mean size of 373 acres while those that did have access to the 1990 information had a mean size of 547 acres.

Because the F-test shows a statistically significant difference in variance, the separate variance estimate is used. The difference in means is statistically significant.

Hypothesis 3b states that farmers that are younger will be more likely to gain access to research information through extension sources than groups of farmers who are older.

Table 13. T-test for size - Received information from extension

Group 1: Respondents who did not receive bulletin
Group 2: Respondents who received bulletin

T-test for size of farm (acres)

	Number of Cases	Mean	Standard Deviation	Standard Error
Group 1	158	373.2848	321.386	25.568
Group 2	122	547.5000	482.169	43.654

		Pooled Variance Estimate			Separate Variance Estimate		
F Value	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.
2.25	.000*	-3.62	278	.000*	-3.44	200.11	.001*

* Significant at p=.05

As Table 14 indicates, the group of respondents that did not receive the bulletin from extension in 1990 had a mean age of 49.5 while those that did had a mean age of 48.5. The difference in means is not statistically significant. Hypothesis 3b is not supported.

Hypothesis 3c states that farmers that have more formal education will be more likely to gain access to research information through extension sources than groups of farmers with less formal education.

Table 14. T-test for age - Received information from extension

Group 1: Respondents who did not receive bulletin
Group 2: Respondents who received bulletin

T-test for age

	Number of Cases	Mean	Standard Deviation	Standard Error
Group 1	163	49.5215	13.543	1.061
Group 2	129	48.4496	12.771	1.124

		Pooled Variance Estimate			Separate Variance Estimate		
F Value	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.
1.12	.489	.69	290	.492	.69	281.22	.489

Respondents were asked to select one of five possible responses. In Table 15, response 1 indicates 1-8 years of education, 2 indicates 9-11 years, 3 indicates 12 years (graduated high school), 4 indicates 13-15 years, and 5 indicates 16 or more years (graduated college).

As Table 15 indicates, the group of respondents that did not receive the bulletin had a mean indicator of 3.13 (equivalent to high school graduation) while those that did had a mean indicator of 3.8 (some college). The difference in means is statistically significant.

Hypothesis 3d states that farmers that have more farm income will be more likely to gain access to research information through extension sources than groups of farmers with less farm income.

Table 15. T-test for education - Received information from extension

Group 1: Respondents who did not receive bulletin
Group 2: Respondents who received bulletin

T-test for years of formal schooling (scale 1-5)

	Number of Cases	Mean	Standard Deviation	Standard Error
Group 1	163	3.1350	1.021	.080
Group 2	129	3.7907	.990	.087

		Pooled Variance Estimate			Separate Variance Estimate		
F Value	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.
1.07	.710	-5.52	290	.000*	-5.54	278.45	.000*

* Significant at p=.001

Respondents were asked to select one of five possible responses. In Table 16, response 1 indicates under $20,000, 2 indicates $20,000 to 39,999, 3 indicates $40,000 to 99,999, 4 indicates $100,000 to 199,999, and 5 indicates $200,000 or more.

As Table 16 indicates, the group of respondents that did not receive the bulletin from extension had a mean indicator of 3.06 while those that did had a mean indicator of 3.4. The difference in means is statistically significant.

Hypothesis 3 is supported, except for the socioeconomic indicator of age. Tables 13-16 show that there is a statistically significant difference in the mean socioeconomic characteristics of size, education and income

Table 16. T-test for income - Received information from extension

Group 1: Respondents who did not receive bulletin
Group 2: Respondents who received bulletin

T-test for income (scale 1-5)

	Number of Cases	Mean	Standard Deviation	Standard Error
Group 1	145	3.0690	1.267	.105
Group 2	126	3.3571	1.128	.100

		Pooled Variance Estimate			Separate Variance Estimate		
F Value	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.
1.26	.180	-1.96	269	.050*	-1.98	268.84	.049*

* Significant at p=.05

between those respondents that obtained research information from the extension service in 1990 and those who did not.

The group of respondents who obtained the bulletin from the extension service plan to plant more acres of crops (Table 13), have more years of schooling (Table 15), and have higher income (Table 16) than those who answered that they did not obtain the research information from the extension service.

There was no statistically significant difference in age (Table 14) between the groups.

As with access to the special insert, discriminant analysis of the socioeconomic indicators provides another method of evaluating the value of the four indicators in predicting access to extension information.

Table 17 shows the summary table which indicates that education is the socioeconomic variable with the most weight in predicting whether a group will access research information through the extension bulletin. Size is the next most important socioeconomic variable.

Crosstabulation

Are the variables measuring access to the information through extension or mass media related or unrelated? Crosstabulation of the variables shows that there is no statistically significant relationship between the recall of looking at the special insert and either obtaining this year's bulletin from extension or last year's bulletin.

There is a difference in numbers that indicates that the special insert published in *Iowa Farmer Today* became a substitute for the extension bulletin. Table 18 shows that of 256 respondents, only 51 or 19.9% obtained the bulletin from the extension service (or other sources) in 1991.

Table 19 shows that of the 252 respondents, 119 or 47.2% obtained the bulletin from the extension service (or other sources)in 1990.

As identified in the literature review on the knowledge gap hypothesis, an important factor in explaining the cause of information inequity is the level of motivation of the intended audience to acquire the information. When groups have similar motivation to acquire the information, then knowledge gaps narrow or disappear (Ettema, Brown and Luepker 1983).

Table 17. Discriminant analysis of factors predicting access to bulletin

Group means

		SIZE	AGE	EDUC	INCOME
No	0	372.41727	49.36691	3.15827	3.12230
Yes	1	554.91525	48.22881	3.83051	3.36441
Total		456.21012	48.84436	3.46693	3.23346

Group Standard Deviations

		SIZE	AGE	EDUC	INCOME
No	0	331.43762	13.95861	1.02334	1.25952
Yes	1	488.11568	12.73491	.99833	1.09907
Total		420.01244	13.39685	1.06428	1.19241

Variable	Tolerance	Minimum Tolerance	F to enter	Wilks' Lambda
SIZE	1.0000000	1.0000000	12.595	.95293
AGE	1.0000000	1.0000000	.45962	.99820
EDUC	1.0000000	1.0000000	28.164	.90054
INCOME	1.0000000	1.0000000	2.6479	.98972

Summary Table

Step	Action Entered	Removed	Vars In	Wilks' Lambda	Sig.	Label
1	EDUC		1	.90054	.0000	Years of Formal Schooling
2	SIZE		2	.87949	.0000	

Structure Matrix:

Pooled-within-groups correlations between discriminating variables and canonical discriminant functions
(Variables ordered by size of correlation within function)

	FUNC 1
EDUC	.89779
SIZE	.60038
AGE	-.28762
INCOME	.26016

Canonical Discriminant Functions

Fcn	Eigenvalue	Pct of Variance	Cum Pct	Canonical Corr	After Fcn	Wilks' Lambda	Chisquare	DF	Sig
				:	0	.8795	32.618	2	.0000
1*	.1370	100.00	100.00	.3471	:				

* marks the 1 canonical discriminant function remaining in the analysis.

Table 18. Crosstabulation - Received 1991 bulletin by received insert

Received this year's bulletin	Recall looking at insert		
	No	Yes	Row Total
	Count **Exp Value** **Row Pct** **Column Pct** **Tot Pct**		
No	21 21.6 10.2% 77.8% 8.2%	184 183.4 89.8% 80.3% 71.9%	205 80.1%
Yes	6 5.4 11.8% 22.2% 2.3%	45 45.6 88.2% 19.7% 17.6%	51 19.9%
Column Total	27 10.5	229 89.5%	256 100%

Chi-Square	Value	DF	Significance
Pearson	.10012	1	.75169

Table 19. Crosstabulation - Received 1990 bulletin by received insert

		Recall looking at insert		
Received last year's bulletin	**Count** **Exp Value** **Row Pct** **Col Pct** **Tot Pct**	No	Yes	Row Total
	No	17 13.7 12.8% 65.4% 6.7%	116 119.3 87.2% 51.3% 46.0%	133 52.8%
	Yes	9 12.3 7.6% 34.6% 3.6%	110 106.7 92.4% 48.7% 43.7%	119 47.2%
	Column Total	26 10.3	226 89.7%	252 100%

Chi-Square	Value	DF	Significance
Pearson	1.84876	1	.17393

Table 20 measures the relationship between motivation, as measured by the respondents rating of the importance of the information to their crop plans, and access to the information, as measured by the recall of looking at the special insert.

Table 20. Crosstabulation - Importance of information by recall insert

How important is the information in planning	Recall looking at insert: No	Yes	Row Total
Count **Exp Val** **Row Pct** **Col Pct** **Tot Pct**			
Not important	7 1.7 41.2% 28.0% 2.8%	10 15.3 58.8% 4.4% 4.0%	17 6.7%
Interesting	14 10.6 13.1% 56.0% 5.5%	93 96.4 86.9% 40.8% 36.8%	107 42.3%
Important	4 11.8 3.4% 16.0% 1.6%	115 107.2 96.6% 50.4% 45.5%	119 47.0%
Essential	0 1.0 .0% .0% .0%	10 9.0 100.0% 4.4% 4.0%	10 4.0%
Column Total	25 9.9%	228 90.1%	253 100%

Chi-Square	Value	DF	Significance
Pearson	26.70665	3	.00001

Approximate Statistic	Value	ASE1	T-value	Significance
Phi	.32490			.00001 *1
Contingency Coefficient	.30900			.00001 *1

*1 Pearson chi-square probability

Hypothesis 4 states that farmers who rate the research information as more important in planning their operation are more likely to acquire the information. Table 20 indicates that there is a statistically significant relationship between how important the information is in planning and whether the respondents recall looking at the insert.

Analysis of Variance

One of the most important issues involved in disseminating publicly funded information is the issue of information equity. Do all segments of society have the same access to information? Does a change in method of dissemination affect some groups more than others?

As the literature relating to the knowledge gap hypothesis and privatization of information indicates, not all segments of the population benefit equally from information flow.

In order to test whether there is a difference in characteristics between those groups that have access to information and those who do not, a new variable was created.

This variable has four components (Figure 1). Group 1 consists of those respondents who received the Iowa Corn Yield Test Report from the extension in 1990 and recalled looking at the special insert in the *Iowa Farmer Today*. Group 2 consists of those respondents who did not receive the bulletin in 1990 but did recall looking at the special insert. This segment could be considered a new audience for the research information.

Group 3 consists of respondents who obtained the bulletin in 1990 from extension but did not recall looking at the special insert. This is the segment that might be lost if research results are published only through commercial publications.

	Received the 1990 Corn Yield Test Report bulletin	Did not receive the 1990 Corn Yield Test Report
Recalled looking at the special insert	GROUP1 Accesses both forms of information n=108 37.6%	GROUP2 "New" audience for information n=112 39.0%
Did not recall looking at the special insert	GROUP3 Audience that could be "lost" n=20 7.0%	GROUP4 Did not access information n=47 16.4%

Figure 1. Components of variable GROUP

Group 4 is made up of those respondents who neither received the bulletin from the extension in 1990 nor recalled looking at the special insert in *Iowa Farmer Today*. This group, for some reason, is not accessing research information.

Hypothesis 5 states in general that groups that receive the research information from both sources will have higher indicators of socieconomic status than those groups that do not receive the information from either source.

The literature review does not provide a foundation for predicting the characteristics of those groups that receive the information from one source but not the other. It is interesting to note the characteristics of these groups.

Hypothesis 5a states that the group that received corn test results both from the special insert and from the extension service the previous year (Group 1) will plan to plant more acres of crops than those who receive the information from neither source (Group 4).

Table 21 shows the analysis of variance of size for the four groups (defined above). The difference in size is statistically significant.

Table 21. One way ANOVA - Size by Group

Variable SIZE By Variable GROUP

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	1812443.759	604147.9196	3.7907	.0109*
Within Groups	271	43190669.78	159375.1653		
Total	274	45003113.54			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Group1	103	530.7670	426.3895	42.0134	447.4336 To 614.1004
Group2	106	383.5472	310.7093	30.1788	323.7083 To 443.3861
Group3	18	591.4444	713.4553	168.1630	236.6515 To 946.2374
Group4	48	369.3333	352.9876	50.9494	266.8364 To 471.8302
Total	275	449.8145	405.2714	24.4388	401.7029 To 497.9262

Scheffe Procedure
No two groups are significantly different at the .050 level

*Significant at p=.05

Group 1 has a mean size of 530 acres, while Group 4 has a mean size of 369 acres. Interestingly, Group 3 (18 respondents) has the largest mean of 591 acres. As explained above, this is the group that received the information from the extension office the previous year, but did not recall looking at the special insert.

ANOVA shows a significant difference in means between groups, but the more conservative Scheffe test which gives significance for all possible individual combinations between groups does not show statistical significance, probably due to the low numbers in groups 3 and 4.

Hypothesis 5b states that the group that received corn test results both from the special insert and from the extension service the previous year (Group 1) will have more formal education than those who receive the information from neither source (Group 4).

Table 22 shows the analysis of variance of the groups by education as measured by formal years of schooling. The difference is statistically significant. Group 1, those respondents who obtained information from both sources, had a significantly higher level of education than Group 4, those who received the information from neither source, and Group 2, those respondents that recalled looking at the special insert, but did not obtain the bulletin in the previous year.

The conservative Scheffe's test shows that there are statistically significant differences in the groups by education in the manner predicted by the knowledge gap hypothesis and the literature on privatization.

Table 22. One way ANOVA - Education by Group

Variable EDUC (Years of Formal Schooling) By Variable GROUP
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	30.8542	10.2847	10.3889	.0000*
Within Groups	283	280.1632	.9900		
Total	286	311.0174			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Group1	108	3.8611	.9517	.0916	3.6796 To 4.0427
Group2	112	3.1875	.9057	.0856	3.0179 To 3.3571
Group3	20	3.4500	1.1459	.2562	2.9137 To 3.9863
Group4	47	3.1277	1.2090	.1763	2.7727 To 3.4826
Total	287	3.4495	1.0428	.0616	3.3283 To 3.5706

Scheffe Procedure
(*) Denotes pairs of groups significantly different at the .050 level

Mean	Group	4 2 3 1
3.1277	4	
3.1875	2	
3.4500	3	
3.8611	1	* *

* significant at p=.05

Hypothesis 5c states that the group that received corn test results both from the special insert and from the extension service the previous year (Group 1) will be younger than those who receive the information from neither source (Group 4).

Table 23 indicates that there is no significant difference in the mean age between the four groups. Hypothesis 5c is not supported.

Hypothesis 5d states that the group that received corn test results both from the special insert and from the extension service the previous year (Group 1) will have higher income than those who receive the information from neither source (Group 4).

Table 23. One way ANOVA - Age by Group

Variable AGE by variable GROUP

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	393.9205	131.3068	.7449	.5261
Within Groups	283	49884.2955	176.2696		
Total	286	50278.2160			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Group1	108	48.8426	12.7588	1.2277	46.4088 To 51.2764
Group2	112	48.5804	13.3063	1.2573	46.0889 To 51.0718
Group3	20	47.0500	12.9675	2.8996	40.9810 To 53.1190
Group4	47	51.5106	14.4596	2.1092	47.2651 To 55.7561
Total	287	49.0523	13.2589	.7826	47.5118 To 50.5927

Scheffe Procedure
No two groups are significantly different at the .050 level

Table 24 shows that there is no significant difference in the mean income between the four groups.

Table 24. One way ANOVA - Income by Group

Variable INCOME by Variable GROUP

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	6.2531	2.0844	1.4417	.2310
Within Groups	263	380.2263	1.4457		
Total	266	386.4794			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Group1	106	3.3868	1.1004	.1069	3.1749 To 3.5987
Group2	101	3.0693	1.2268	.1221	2.8271 To 3.3115
Group3	19	3.1053	1.2425	.2851	2.5064 To 3.7041
Group4	41	3.0732	1.3673	.2135	2.6416 To 3.5047
Total	267	3.1985	1.2054	.0738	3.0533 To 3.3437

Scheffe Procedure
No two groups are significantly different at the .050 level

Use of Sources

To investigate the use of sources, new variables were created to measure the number of sources that a respondent uses for agricultural information. Variables were created that count the number of sources that a respondent uses as indicated in question 15.

The sources listed in the questionnaire were divided into types. The first source category is described as mass media and is formed by counting the responses to six variables: *Iowa Farmer Today*, daily newspapers, weekly newspapers, farm magazines, radio and television.

Table 25 shows the frequency of use of mass media.

Table 25. Score of mass media use

Mass Media			
Value	Frequency	Percent	Valid Percent
0.00	15	4.9	4.9
1.00	10	3.2	3.2
2.00	34	11.0	11.0
3.00	49	15.9	15.9
4.00	54	17.5	17.5
5.00	82	26.5	26.5
6.00	65	21.0	21.0
Total	309	100.0	100.0

The second category of source can be described as commercial sources of information. The audience pays to receive the information. The variable is formed by counting the "yes" responses to five variables: commercial newsletters; commercial publications; consultants; seed, fertilizer or farm chemical dealers; and videotext or teletext.

Table 26 shows the frequency of use of commercial sources.

Table 26. Score of commercial source use

Commercial sources			
Value	Frequency	Percent	Valid Percent
0.00	28	9.1	9.1
1.00	91	29.4	29.4
2.00	74	23.9	23.9
3.00	66	21.4	21.4
4.00	41	13.3	13.3
5.00	9	2.9	2.9
Total	309	100.0	100.0

The third category of source is formed by counting the "yes" responses to five variables that measure the use of extension sources. Table 27 shows the frequency of use of these sources.

A final variable was computed that measures the use of all the sources and is equal to the total of the three categories of sources added together. There are sixteen possible sources. Table 28 shows the frequency of use of all sources.

Table 27. Score of extension source use

Extension sources

Value	Frequency	Percent	Valid Percent
.00	31	10.0	10.0
1.00	73	23.6	23.6
2.00	43	13.9	13.9
3.00	54	17.5	17.5
4.00	50	16.2	16.2
5.00	58	18.8	18.8
Total	309	100.0	100.0

Hypothesis 6 states that groups with higher indicators of socioeconomic status will use a greater number of sources for information.

To test whether socioeconomic characteristics are related to the number of sources that a respondent uses, a statistical correlation was performed with the indicators of socioeconomic status and the source variables. Table 29 shows a summary of the results of this correlation analysis.

As Table 29 indicates, the total use of sources correlates strongly with all four socioeconomic indicators in the manner predicted by hypothesis 6.

There is a correlation of use of mass media sources with three of the four socioeconomic indicators.

Table 28. Score of total source use

Total Use of Sources

Value	Frequency	Percent	Valid Percent
.00	12	3.9	3.9
1.00	1	.3	.3
2.00	7	2.3	2.3
3.00	7	2.3	2.3
4.00	18	5.8	5.8
5.00	11	3.6	3.6
6.00	21	6.8	6.8
7.00	28	9.1	9.1
8.00	30	9.7	9.7
9.00	35	11.3	11.3
10.00	36	11.7	11.7
11.00	28	9.1	9.1
12.00	28	9.1	9.1
13.00	22	7.1	7.1
14.00	12	3.9	3.9
15.00	8	2.6	2.6
16.00	5	1.6	1.6
Total	309	100.0	100.0

The use of commercial sources and extension sources also correlate strongly with socioeconomic indicators. This finding indicates that the dissemination of research information through extension sources may not be as egalitarian as the mission statement of the extension service suggests.

Table 29. Correlation of source with SES indicators

Correlations:	Mass Media	Commercial	Extension	Total
SIZE	.1073	.3244**	.2342**	.2789**
AGE	-.1794*	-.2855**	-.1649*	-.2643**
EDUCATION	.2267**	.3213**	.3629**	.3928**
INCOME	.1568*	.2871**	.2289**	.2850**

N of cases: 259
1-tailed Significance: * - p=.01 ** - p= .001

Multiple Regression - Socioeconomic factors

Further analysis of the use of sources in relation to the dissemination of research information can be performed by determining which of the socioeconomic indicators is the strongest predictor of the use of sources.

Hypothesis 6 states that groups with higher indicators of socioeconomic status will use a greater number of sources for information and Table 29 showed significant correlation between all but one indicator and the various categories of sources. Multiple regression analysis can be used to help determine the socioeconomic factors that have the most value in predicting use of a larger number of sources.

A stepwise analysis of the four indicators of socioeconomic status by use of mass media sources shows that education is the factor with the most

weight in predicting the number of mass media sources used, and income is the second most important variable. Table 30 shows the results of two steps of analysis. Size and age do not contribute significantly to prediction of use of mass media sources.

Table 30. Multiple regression analysis - mass media

Multiple R	.26454
R Square	.06998
Adjusted R Square	.06272
Standard Error	1.49560

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	2	43.08871	21.54435
Residual	256	572.62558	2.23682

F = 9.63169 Signif F = .0001

Variable	B	SE B	Beta	T	Sig T
EDUCATION	.311616	.088143	.214007	3.535	.0005
INCOME	.177595	.078503	.136943	2.262	.0245
(Constant)	2.489706	.389665		6.389	.0000

Variables not in the Equation

Variable	Beta In	Partial	Min Toler	T	Sig T
SIZE	-.012114	-.010784	.737126	-.172	.8634
AGE	-.122133	-.121366	.912372	-1.952	.0520

.050 Limits reached.

A stepwise analysis of the four indicators of socioeconomic status by use of commercial sources shows that size is the factor with the most weight in predicting the number of commercial sources used, and education

is the second most important variable. Table 31 shows the results of the four steps of analysis with all four variables contributing significantly to prediction of use of commercial sources.

Table 31. Multiple regression analysis - commercial sources

Multiple R	.47788
R Square	.22837
Adjusted R Square	.21622
Standard Error	1.11021

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	4	92.65587	23.16397
Residual	254	313.07386	1.23257

F = 18.79316 Signif F = .0000

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
SIZE	4.875705E-04	1.92704E-04	.162748	2.530	.0120
EDUCATION	.247368	.069605	.209278	3.554	.0005
AGE	-.018449	.005407	-.196627	-3.412	.0008
INCOME	.191379	.065885	.181793	2.905	.0040
(Constant)	1.393609	.444195		3.137	.0019

.100 Limits reached.

A stepwise analysis of the four indicators of socioeconomic status by use of extension sources shows results very similar to that for mass media (Table 30). Education is the factor with the most weight in predicting the number of extension sources used, and income is the second most important variable. Table 32 shows the results of two steps of analysis. Size and age do not contribute significantly to prediction of use of extension sources.

A stepwise analysis of the four indicators of socioeconomic status by use of all sources shows that education is the factor with the most weight in predicting the number of sources used, and income is the second most important variable. Table 33 shows the results of three steps of analysis. Age also contributes significantly to prediction of use of all sources, but size does not.

Table 32. Multiple regression analysis - extension sources

Multiple R	.41252
R Square	.17017
Adjusted R Square	.16369
Standard Error	1.48040

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	2	115.05440	57.52720
Residual	256	561.04599	2.19159

F = 26.24912 Signif F = .0000

Variable	B	SE B	Beta	T	Sig T
EDUCATION	.525870	.087247	.344645	6.027	.0000
INCOME	.267735	.077705	.197015	3.446	.0007
(Constant)	.081855	.385705		.212	.8321

Variables not in the Equation

Variable	Beta In	Partial	Min Toler	T	Sig T
SIZE	.078756	.074226	.737126	1.189	.2357
AGE	-.062857	-.066125	.912372	-1.058	.2909

.050 Limits reached.

Table 33. Multiple regression analysis - all sources

Multiple R	.49026
R Square	.24036
Adjusted R Square	.23142
Standard Error	2.99216

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	3	722.36952	240.78984
Residual	255	2283.02044	8.95302

F = 26.89481 Signif F = .0000

Variable	B	SE B	Beta	T	Sig T
EDUCATION	1.042431	.183823	.324038	5.671	.0000
INCOME	.709762	.157087	.247721	4.518	.0000
AGE	-.041035	.014544	-.160690	-2.821	.0052
(Constant)	5.203318	1.191589		4.367	.0000

---------- Variables not in the Equation ----------

Variable	Beta In	Partial	Min Toler	T	Sig T
SIZE	.085830	.084383	.734243	1.350	.1783

.050 Limits reached.

Analysis of variance - Source by Group

Further analysis of the use of sources in relation to the dissemination of research information can be performed by comparing the use of sources of each of the groups of respondents developed previously to test if a relationship exists.

Tables 34 through 37 show analysis of variance with Scheffe test of the use of sources by the variable group.

Hypothesis 7 states that the group that received corn test results both from the special insert and from the extension service the previous year (Group 1) will use more sources of information than those who receive the information from neither source (Group 4).

The literature review does not provide a foundation for predicting the characteristics of those groups that receive the information from one source but not the other. It is interesting to note the characteristics of these groups.

Table 34. ANOVA - Score of mass media by groups 1-4

Variable mass media by variable group

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	64.1843	21.3948	8.7620	.0000*
Within Groups	294	717.8828	2.4418		
Total	297	782.0671			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Group1	110	4.4273	1.4867	.1418	4.1463 To 4.7082
Group2	116	4.0948	1.5658	.1454	3.8069 To 4.3828
Group3	20	4.5500	1.1910	.2663	3.9926 To 5.1074
Group4	52	3.1346	1.8153	.2517	2.6292 To 3.6400
Total	298	4.0805	1.6227	.0940	3.8955 To 4.2655

Scheffe Procedure
(*) Denotes pairs of groups significantly different at the .050 level

Mean	Group	4 2 1 3
3.1346	Group4	
4.0948	Group2	*
4.4273	Group1	*
4.5500	Group3	*

* Significant at p=.05

Hypothesis 7a states that the group that received corn test results both from the special insert and from the extension service the previous year (GROUP1) will use more mass media sources of information than those who receive the information from neither source (GROUP4).

Table 35. ANOVA - Score of commercial sources by groups 1-4

Variable commercial source by variable group

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	75.5650	25.1883	18.0180	.0000*
Within Groups	294	410.9988	1.3980		
Total	297	486.5638			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Group1	110	2.7182	1.2425	.1185	2.4834 To 2.9530
Group2	116	1.7845	1.1330	.1052	1.5761 To 1.9928
Group3	20	2.3000	1.1286	.2524	1.7718 To 2.8282
Group4	52	1.4615	1.1793	.1635	1.1332 To 1.7898
Total	298	2.1074	1.2799	.0741	1.9615 To 2.2533

Scheffe Procedure
(*) Denotes pairs of groups significantly different at the .050 level

Mean	Group	4 2 3 1
1.4615	Group4	
1.7845	Group2	
2.3000	Group3	
2.7182	Group1	* *

* significant at p=.05

Table 34 indicates that Group 4, those respondents who did not receive the research information either from extension in 1990 or from the special insert use fewer mass media sources than the other three groups.

Group 4 indicated only 3.1 sources out of a possible six. The difference in number of sources is statistically significant.

Hypothesis 7b states that the group that received corn test results both from the special insert and from the extension service the previous year (Group 1) will use more commercial sources of information than those who receive the information from neither source (Group 4).

Table 35 shows that Group 1, those respondents who received the research information from both the extension service and through the special insert, used significantly more sources than Group 2 (those who recalled receiving the insert, but not the bulletin) and Group 4 (those who receive the information from neither source).

Hypothesis 7c states that the group that received corn test results both from the special insert and from the extension service the previous year (Group 1) will use more extension sources of information than those who receive the information from neither source (Group 4).

Table 36 shows that there is a significant difference in the use of extension sources between Groups 1 and 3 and Group 4; and Group 1 and Group 2.

Those respondents who received the information from the extension service and the special insert (Group 1) used significantly more extension sources than either Group 2 (those who did not get the bulletin but recalled the special insert) or Group 4 (those who did not receive the information).

Table 36. ANOVA - Score of extension sources by group

Variable extension source by variable group

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	144.2542	48.0847	21.1468	.0000*
Within Groups	294	668.5143	2.2739		
Total	297	812.7685			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean		
Group1	110	3.4818	1.5128	.1442	3.1959	To	3.7677
Group2	116	2.1897	1.4561	.1352	1.9219	To	2.4575
Group3	20	3.1500	1.6311	.3647	2.3866	To	3.9134
Group4	52	1.7885	1.5635	.2168	1.3532	To	2.2237
Total	298	2.6611	1.6543	.0958	2.4725	To	2.8497

Scheffe Procedure
(*) Denotes pairs of groups significantly different at the .050 level

Mean	Group	4 2 3 1
1.7885	Group4	
2.1897	Group2	
3.1500	Group3	*
3.4818	Group1	* *

* significant at p=.05

Hypothesis 7 states that the group that received corn test results both from the special insert and from the extension service the previous year (Group 1) will use more sources of information than those who receive the information from neither source (Group 4).

Table 37 shows that the four groups had significant differences in the total use of sources. Group 4 used significantly fewer sources of information and was significantly different from all other groups.

Table 37. ANOVA - Score of total source use by group

Variable total source by variable group

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	760.7305	253.5768	24.3039	.0000*
Within Groups	294	3067.4741	10.4336		
Total	297	3828.2047			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Group1	110	10.6273	3.2815	.3129	10.0072 To 11.2474
Group2	116	8.0690	3.0552	.2837	7.5071 To 8.6309
Group3	20	10.0000	3.0950	.6921	8.5515 To 11.4485
Group4	52	6.3846	3.5378	.4906	5.3997 To 7.3695
Total	298	8.8490	3.5902	.2080	8.4397 To 9.2583

Scheffe Procedure
(*) Denotes pairs of groups significantly different at the .050 level

Mean	Group	4 2 3 1
6.3846	Group4	
8.0690	Group2	*
10.0000	Group3	*
10.6273	Group1	* *

* significant at p=.05

DISCUSSION

Results of Hypotheses

Hypothesis 1: The dissemination of agricultural research information through mass media will reach a larger number of farmers than dissemination through extension channels.

The Cooperative Extension Service's traditional method of disseminating research information through bulletins depended largely on personal contact. Diffusion of innovation theory supports the concept that mass media are more important than other channels of information in increasing knowledge of ideas.

This hypothesis was supported by the increase in numbers of farmers who said they recalled looking at the special insert in the *Iowa Farmer Today* as opposed to the number who said they obtained the bulletin from the extension service in 1990.

Hypothesis 2: Groups that have indicators of higher socioeconomic status will be more likely to gain access to research information through mass media than those farmers with lower socioeconomic status.

Hypothesis 2a: Farmers that plan to plant more acres of crops will be more likely to gain access to research information through mass media than groups of farmers with smaller farms.

This hypothesis was supported by a statistically significant difference in size of farm (Table 8).

Hypothesis 2b: Farmers that are younger will be more likely to gain access to research information through mass media than groups of farmers who are older.

This hypothesis was not supported.

Hypothesis 2c: Farmers that have more formal education will be more likely to gain access to research information through mass media than groups of farmers with less formal education.

This hypothesis was not supported.

Hypothesis 2d: Farmers that have more farm income will be more likely to gain access to research information through mass media than groups of farmers with less farm income.This hypothesis was not supported.

Hypothesis 3: Groups that have higher indicators of socioeconomic status will be more likely to gain access to research information from extension sources than those who have lower indicators of socioeconomic status.

Hypothesis 3a: Farmers that plan to plant more acres of crops will be more likely to gain access to research information through extension sources than groups of farmers with smaller farms.

This hypothesis was supported by a statistically significant difference in size (Table 13).

Hypothesis 3b: Farmers that are younger will be more likely to gain access to research information through extension sources than groups of farmers who are older.

This hypothesis was not supported.

Hypothesis 3c: Farmers that have more formal education will be more likely to gain access to research information through extension sources than groups of farmers with less formal education.

This hypothesis was supported by a statistically significant difference in level of education (Table 15).

Hypothesis 3d: Farmers that have more farm income will be more likely to gain access to research information through extension sources than groups of farmers with less farm income.

This hypothesis was supported by a statistically significant difference in income (Table 16).

Hypothesis 4: Farmers who rate the research information as more important in planning their operation are more likely to acquire the information.

Table 20 measures the relationship between motivation, as measured by the repondents rating of the importance of the information to their crop plans, and access to the information, as measured by the recall of looking at the special insert.

Table 20 indicates that there is a statistically significant relationship between the variables of how important the information is in planning and whether the repondent recalls looking at the insert. Hypothesis 4 is supported.

Hypothesis 5: Groups that receive the research information from multiple sources will have higher indicators of socioeconomic status than those groups that do not receive the information at all.

Hypothesis 5a: The group that obtains corn test results both from the special insert and from the extension service the previous year will plan to plant more acres of crops than those who receive the information from neither source.

This hypothesis was supported by a statistically significant difference in size (Table 21).

Hypothesis 5b: The group that obtained corn test results both from the special insert and from the extension service the previous year will have more formal education than those who receive the information from neither source.

This hypothesis was supported by a statistically significant difference in level of education (Table 22).

Hypothesis 5c: The group that obtained corn test results both from the special insert and from the extension service the previous year will be younger than those who receive the information from neither source.

This hypothesis was not supported.

Hypothesis 5d: The group that obtained corn test results both from the special insert and from the extension service the previous year will have higher income than those who receive the information from neither source.

This hypothesis was not supported.

Hypothesis 6: Groups with higher indicators of socioeconomic status will use a greater number of sources for information.

Table 29 shows a significant correlation between indicators of socioeconomic status and number of sources for information. This hypothesis is supported.

Hypothesis 7: The group that received corn test results both from the special insert and from the extension service the previous year will use more sources of information than those who receive the information from neither source.

This hypothesis was supported by a statistically significant difference in total number of used (Table 33).

Hypothesis 7a: The group that received corn test results both from the special insert and from the extension service the previous year will use more mass media sources of information than those who receive the information from neither source.

This hypothesis was supported by a statistically significant difference in number of mass media sources (Table 30).

Hypothesis 7b: The group that received corn test results both from the special insert and from the extension service the previous year will use more commercial sources of information than those who receive the information from neither source.

This hypothesis was supported by a statistically significant difference in number of commercial sources (Table 31).

Hypothesis 7c: The group that received corn test results both from the special insert and from the extension service the previous year will use more extension sources of information than those who receive the information from neither source.

This hypothesis was supported by a statistically significant difference in number of extension sources (Table 32).

Knowledge Gap Hypothesis

This study provides additional support for the prediction that information inequity exists in the audience for agricultural research results.

Hypotheses 2 and 3 were fashioned to provide a test of the knowledge gap hypothesis in relation to mass media and extension sources for agricultural research information. Hypothesis 2, which tests mass media,

was not supported. The respondents who recalled looking at the special insert in *Iowa Farmer Today* were statistically larger in farm size than those who did not recall the insert, however there was no significant difference in education, age or income.

The analysis of hypothesis 3 showed that there is evidence for an information gap among the respondents when extension sources are analyzed. Those respondents who obtained the 1990 Corn Test Yield Results bulletin had significantly larger farms, had more formal education and had higher income than those who did not obtain the bulletin. Age was not significantly different between the two groups.

These results provide support for the knowledge gap hypothesis in the audience for extension bulletins, but not for the research information when published in mass media. Population groups with larger farms and more formal education are more likely to obtain research information from extension.

The use of mass media by the Cooperative Extension Service as a means to disseminate research information appears to reach people with broader socioeconomic characteristics than the traditional method of distribution of bulletins.

As the results show, the special insert did reach a considerably larger number of farmers than the traditional method. So publication of research results in mass media reaches a much larger group of those farmers receptive to research information and also reaches a broader SES spectrum.

The results of the test for hypothesis 4 provide additional support for the theory that a difference in motivation accounts for the information

gap. Those farmers who rated the information as more important were also more likely to recall looking at the special insert.

Based on the results of this study, an information gap does exist in the audience for research information. This gap is manifested more strongly when the information is disseminated through traditional extension channels. An information gap would become more prevalent if the only source of information was through commercial sources.

Privatization of Information

The effects of privatization of information and some aspects of the knowledge gap hypothesis are intertwined. Particularly, the prediction that groups with indicators of higher socioeconomic status will use more sources of information is common to both models of information inequity.

Hypotheses 5 and 6 tested whether the respondents in this study that had higher indicators of socioeconomic status used more sources for agricultural information than those with lower indicators.

Hypothesis 5 predicted that those respondents that gathered the Corn Test Yield Results from both extension and the special insert would have larger farms, more education, more income and be younger. This hypothesis was partially supported. Respondents who obtained the information from both sources had larger farms and a higher level of education than those who received the information from neither source. Age and income were not significantly different.

The mixed results for the test of this hypothesis provided support for the argument that privatization of extension information may not affect

segments of the population with higher socioeconomic status, but might harm some segments of the population.

While informational inequity for extension information exists to some extent, extension channels are very similar to mass media in reaching across spectrums of socioeconomic groups when compared to commercial sources.

Hypothesis 6 predicts a direct correlation between socioeconomic status indicators and the number of sources used by the respondent. This hypothesis was statistically supported for all indicators of SES (except age for mass media) and all categories of sources; mass media, commercial and extension.

Implications are that farmers with indicators of higher socioeconomic status will be more likely to obtain agricultural information even if one channel of communication is eliminated.

Hypothesis 7 reinforces these conclusions. Using the groups as determined by access to research information sources (see figure 1), a comparison of the total number of sources was performed. Those respondents who received the Iowa Corn Yield Test Report from both the insert and the bulletin used more mass media, commercial and extension sources than the group that did not receive the information from either.

Conclusions

Group 4 will be a hard group to reach with information. This group, for whatever reason, did not gain access to the information through either of the corn yield test channels studied. As predicted by the knowledge gap

hypothesis and the discussion of the issues of privatization, this group has indicators of lower socioeconomic status.

Possible causes for this lack of access may be speculated upon. This group may have less motivation to seek out the information. Possibly, the farming decisions made by this group are not based on agricultural research. Limited access to capital and machinery and a possible shortage of time may make it difficult to adapt their farming operations to utilize new information. They may not understand how to make use of the information.

The issues that the discussion of privatization of information raise as concerns are valid. Agricultural information is used more by those groups that have higher socioeconomic status and those same groups also use more sources of information.

The findings in this study show that extension information channels are not as egalitarian as mass media in reaching across the socioeconomic spectrum. An increasing dependence on commercial sources as a "multiplier" would further skew the characteristics of the audience towards higher socioeconomic status to the detriment of the lower socioeconomic status groups.

Presenting the information in more channels of information reaches a larger number of farmers. The strategy of using mass media and commercial sources to leverage the resources of the CES appears to be sound. Although some farmers will still not have access to the information, they are among the same group that is presently not obtaining the information.

Further study is recommended to accurately identify the characteristics of the group that is not obtaining the research information

and determine their motives (or lack of motives) in regard to agricultural research information. How are they obtaining the information necessary to plan their farming operation?

The consideration of this group leads to discussion of a potential weakness in this study. The sample was selected from the subscribers to the farm magazine *Iowa Farmer Today* and represents those farmers who subscribe to the magazine.

Iowa Farmer Today is sent free to every farmer in the state of Iowa, however there may be a small number of farmers that do not receive the newspaper. Therefore, there is some possibility that the size of the group of farmers who do not obtain the research information (Group 4) may be understated if the reasonable assumption is made that farmers who do not subscribe are likely to fall into this group.

If this is so, then any effects of privatization of information may be understated in this study. The findings presented in this study, however, provide a clear trend that many of the information inequity concerns presented in the discussions of knowledge gaps and privatization of information have foundation.

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APPENDIX A. QUESTIONNAIRE

Agricultural Information Questionnaire
Iowa Farmer Today
Corn Yield Test Report


IOWA FARMER TODAY

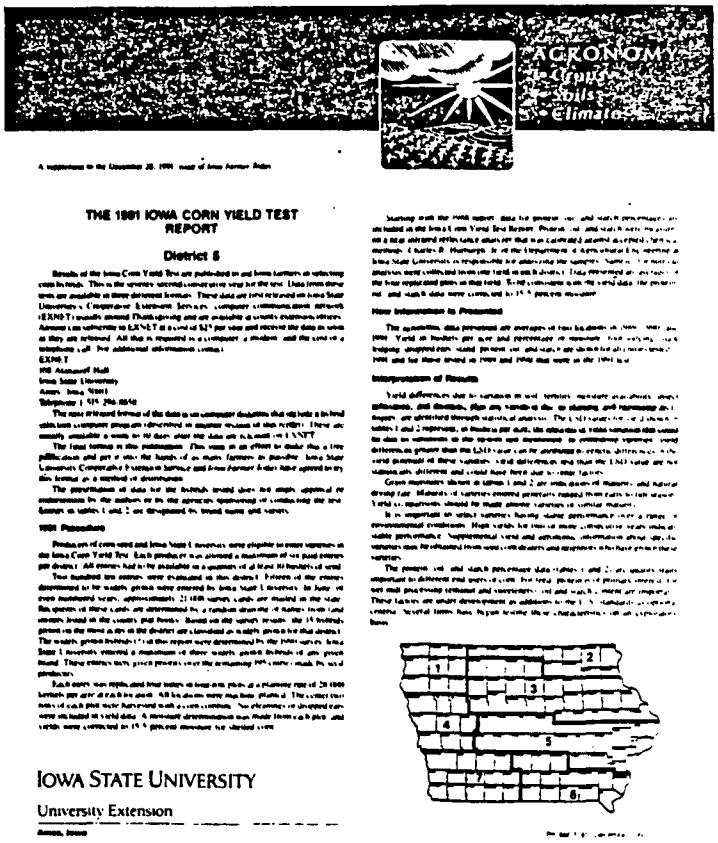
Supplement to IFT: ISU 1991 Corn Yield Test Results

Farmland values le... off

Test yields useful data

'91 in REVIEW

Desert Storm s call to duty meant leaving families, farms


AGRONOM... Crops... Soils... Climate...

THE 1991 IOWA CORN YIELD TEST REPORT

District 5

IOWA STATE UNIVERSITY

University Extension

Iowa Farmer Today
December 28, 1991 Issue

Special Insert Cover

Department of Journalism and Mass Communication, Iowa State University
204 Hamilton Hall, Ames, IA 50011

Please turn to Question 1 on the back of this page

Agricultural Information Questionnaire

1. Are you currently a part-time or full-time farmer?
   ____ part-time farmer
   ____ full-time farmer
   ____ retired (and not engaged in farming)
   ____ not a farmer

(If you are **not a farmer** or **retired**, please leave the rest of the questionnaire blank and return the questionnaire to us in the enclosed postage-paid envelope.)

2. In order to know what crop information would be useful to you, we have a few questions about the kind and acreage of crops you expect to grow in 1992.

a. Do you expect to grow corn? ____No ___Yes About how many acres? _____

b. Do you expect to grow soybeans? ____No ___Yes About how many acres? _____

c. Do you expect to grow oats? ____No ___Yes About how many acres? _____

d. Do you expect to grow forage? ____No ___Yes About how many acres? _____

3. On December 28, 1991, **Iowa Farmer Today** published a special insert that gave Iowa State University variety test results for corn. (A copy of **Iowa Farmer Today** cover containing the insert and the insert cover are shown on the front of this questionnaire.)

   a. Do you recall receiving this issue of **Iowa Farmer Today**?
      ___ Yes
      ___ No (If you answered "No," please skip to Question 7.)

   b. Do you recall looking at the special insert?
      ___ Yes
      ___ No

4. Do you recall reading any of the other articles about corn that were included in the December 28 issue of **Iowa Farmer Today**?
   ___ Yes
   ___ No

5. Do you recall reading any of the advertisements in the December 28 issue of Iowa **Farmer Today**?
   ___ Yes
   ___ No

6. Did you save the 1991 Iowa Corn Yield Test Report insert to refer back to later?
   ___ Yes
   ___ No

This year and in previous years information about corn variety test trials has been available from county Extension offices in bulletin form.

7. Have you received the Iowa Corn Yield Test Variety Report for 1991 (this year's report) from any source other than the insert in **Iowa Farmer Today**?
   ___ No
   ___ Yes (How did you receive it? Check all answers that apply.)
      ___ The Extension office mailed it or delivered it to me.
      ___ I received it at an Extension meeting.
      ___ I picked it up at the Extension office.
      ___ A friend or neighbor gave it to me.
      ___ A salesman or dealer gave it to me.
      ___ Other

8. Did you receive the Iowa Corn Yield Test Variety Report for 1990 (last year's report)?

___ No
___ Yes (How did you receive it? Check all answers that apply.)
- ___ The Extension office mailed it or delivered it to me.
- ___ I received it at an Extension meeting.
- ___ I picked it up at the Extension office.
- ___ A friend or neighbor gave it to me.
- ___ A salesman or dealer gave it to me.
- ___ Other

9. Have you any time in the past two years received the Iowa Corn Yield Test Variety Report?

___ No
___ Yes (How did you receive it? Check all answers that apply.)
- ___ The Extension office mailed it or delivered it to me.
- ___ I received it at an Extension meeting.
- ___ I picked it up at the Extension office.
- ___ A friend or neighbor gave it to me.
- ___ A salesman or dealer gave it to me.
- ___ Other

10. Did you receive information about corn variety selection from the county Extension office in a form other than a bulletin anytime during the past two years?

___ No
___ Yes (How did you receive it?)
- ___ Extension meeting
- ___ Extension newsletter
- ___ Extension agent column in the newspaper
- ___ Visit to the Extension office
- ___ Phone call to Extension agent
- ___ EXNET (Extension computer network)
- ___ Other (Explain) _____

11. Do you own a computer?
- ___ No (If no, go to question 12.)
- ___ Yes

If yes, have you ever received computer disks from Extension containing crop variety test results?
- ___ No
- ___ Yes

12. Have you ever received information from computer disks containing Extension crop variety tests or information at a location other than your home or office?
- ___ No
- ___ Yes (From where did you receive it? Check all that apply.)
  - ___ Extension office
  - ___ Friend or neighbor
  - ___ Professional consultant
  - ___ Dealer or salesman
  - ___ Other (Explain) _____

13. How important to you is the information in the Iowa Corn Yield Test Report in planning your corn crops? (Check the one answer closest to your opinion.)
- ___ Variety test results are absolutely essential to my crop planning. I don't make a decision until I have examined them.
- ___ Variety test results are one important source of information for me in planning my crops.
- ___ I'm interested in corn variety test results, but don't depend on them when making crop decisions.
- ___ I seldom or never look at corn variety test results when making crop decisions.

Please go to question 14 on the back of the page

14. Each year Iowa State University Extension produces bulletins reporting crop variety tests and recommendations on how to control plant pests. We have listed five of these publications below. In the **first column**, please indicate whether or not you have received each bulletin in the past two years by checking the "yes" or "no." In the **second column**, put in the number that indicates how useful you would find it to receive this information as an insert in **Iowa Farmer Today** or a similar publication.

1 = Very useful 2 = Somewhat useful 3 = Little value 4 = No value

Name of Publication	Have received this bulletin		Usefulness as ag magazine or newspaper supplement
Soybean Variety Test Report	___ Yes	___ No	_____
Oat Variety Test Report	___ Yes	___ No	_____
Weed Management Guide	___ Yes	___ No	_____
Estimated Costs of Production	___ Yes	___ No	_____
Insect Management Recommendations	___ Yes	___ No	_____

15. Now we would like to know from what sources you receive information useful to you in operating your farm. That is, where do you receive information about growing crops, producing livestock, managing your farm, etc.? The following table lists a number of information sources.
Please indicate in **Column A** each source from which you at least occasionally receive farming information. For the time being, ignore column B. We will explain it later.

Source	**Column A** Receive info from this source YES	NO	**Column B** Grade I'd give this source Grade (See Question 18)
Iowa Farmer Today	____	____	____
A daily newspaper	____	____	____
A weekly newspaper	____	____	____
Farm magazines	____	____	____
Radio	____	____	____
Television	____	____	____
Commercial newsletters	____	____	____
Other commercial publications	____	____	____
Professional paid farm consultant	____	____	____
Seed dealer, farm chemical salesperson or other supplier	____	____	____
Extension bulletins	____	____	____
Extension newsletters	____	____	____
Extension meetings	____	____	____
Conversations with Extension agent	____	____	____
Other farmers	____	____	____
Teletext or videotext systems such as DTN (Dataline) or EXNET	____	____	____

16. Now let's say that you were going to make out a report card giving grades on how useful you consider the sources of information in the table above. You can give grades of A, B, C, D or F. An "A" would mean that you consider the source excellent in providing you useful farming information. An "F" would mean the source is almost useless. If you are not familiar with a source, you don't need to give a grade. Put these grades in **Column B.**

17. What month would be the best for you to receive information about variety test results?

_____ (Month)

18. If the Corn Yield Test Report were available only as an insert in Iowa Farmer Today (and not through Extension bulletins), would you be as likely to see it?

___ Yes
___ No

In order for the information in this questionnaire to be used effectively, would you please complete the following questions.

19. How old were you on your last birthday? _____ years old

20. How many years of formal schooling did you complete?

___ 1-8 years (Elementary school)
___ 9-11 years (Attended some high school)
___ 12 years (Graduated high school)
___ 13-15 years (Attended some college)
___ 16 or more years (Graduated college)

21. Which of the income categories below best estimates your average gross income from the sale of farm products during the past three years - that is, on the average for 1989, 1990 and 1991? (This is the figure called "gross income" on line 11, Schedule F of the IRS 1040 form.)

___ Under $20,000
___ $20,000 to 39,999
___ $40,000 to 99,999
___ $100,000 to 199,999
___ $200,000 or more

Thank you for your valuable cooperation. Now please return the questionnaire in the postage paid envelope provided.

APPENDIX B. SURVEY CORRESPONDENCE

The Dec. 28, 1991 issue of **Iowa Farmer Today** contained a special insert - the 1991 Iowa Corn Yield Test Report from Iowa State University. Since this is the first time that the completed results have been printed in **Iowa Farmer Today**, we are surveying you and other subscribers to learn what you think of receiving variety trial information in this way.

This survey is being conducted by the Department of Journalism and Mass Communication at the Iowa State University in cooperation with **Iowa Farmer Today** and Iowa State University Extension. You are one of a small group of farmers selected to represent all Iowa corn farmers. Your response to the survey is, of course, voluntary. However, if results are to truly represent the views of all corn farmers in the state, we need your response.

We ask that you take the 15-20 minutes necessary to fill out the questionnaire as soon as possible. A postage-paid return envelope is provided for your convenience. You will note that there is an identification number on your questionnaire. The number is used only to check whether or not a questionnaire has been returned. Neither your name, nor any individual information you provide, will ever be released to **Iowa Farmer Today**, Extension, or any other source. All responses are treated confidentially.

Please accept our sincere thanks in advance for your help. If you have any questions about the survey, please feel free to write me or call my office at 515-294-0492. If I am not in, please leave a message on my recording machine with your phone number, and I will call you back as soon as I can.

Sincerely,

Eric A. Abbott
Professor

APPENDIX C. CODING MANUAL

```
 Variable: IDNUM          Label: I. D. Number
No value labels       Type: Number  Width:  3  Dec: 0     Missing: * None *

 Variable: DATREC         Label: Date Received
No value labels       Type: Number  Width:  6  Dec: 0     Missing: * None *

 Variable: STATUS         Label: Farming Status
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     .00
       1.00   Part-time farmer                  2.00   Full-time farmer
       3.00   not a farmer                     4.00   address unknown
       5.00   deceased                         6.00   refused/blank
       7.00   retired

 Variable: CORN           Label: Expect to Grow Corn
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
        .00   no                               1.00   yes
       8.00   not applicable                   9.00   missing value

 Variable: CACRES         Label: Acres of Corn
No value labels       Type: Number  Width:  4  Dec: 0     Missing:     9.00

 Variable: BEANS          Label: Expect to Grow Beans
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
        .00   no                               1.00   yes
      8.00   not applicable                    9.00   missing value

 Variable: SACRES         Label: Acres of Beans
No value labels       Type: Number  Width:  4  Dec: 0     Missing:     9.00


 Variable: OATS           Label: Expect to Grow Oats
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
        .00   no                               1.00   yes
      8.00   not applicable                    9.00   missing value

 Variable: OACRES         Label: Acres of Oats
No value labels       Type: Number  Width:  4  Dec: 0     Missing:     9.00

 Variable: FORAGE         Label: Expect to Grow Forage
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
        .00   no                               1.00   yes
      8.00   not applicable                    9.00   missing value

 Variable: FACRES         Label: Acres of Forage
No value labels       Type: Number  Width:  4  Dec: 0     Missing:     9.00
```

```
Variable: RECREC        Label: Recall Receiving Issue
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                1.00   yes
      8.00   not applicable                    9.00   missing value

 Variable: RECINST      Label: Recall Looking at Insert
No value labels       Type: Number  Width:  1  Dec: 0     Missing:     9.00

 Variable: RECART       Label: Recall Reading Article
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                1.00   yes
      8.00   not applicable                    9.00   missing value

 Variable: RECADV       Label: Recall Reading Advertisements
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                1.00   yes
      8.00   not applicable                    9.00   missing value

 Variable: SAVINST      Label: Did You Save Special Insert
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                1.00   yes
      8.00   not applicable                    9.00   missing value

 Variable: TYRBULL      Label: Received This Year's Insert
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                1.00   yes
      8.00   not applicable                    9.00   missing value

 Variable: TEXTMAIL     Label: Extension Delivered 1991 Bulletin
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                1.00   yes
      8.00   not applicable                    9.00   missing value

 Variable: TEXTMEET     Label: Received 1991 Bulletin at Meeting
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                1.00   yes
      8.00   not applicable                    9.00   missing value

 Variable: TEXTOFF      Label: Received 1991 Bulletin at Office
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                1.00   yes
      8.00   not applicable                    9.00   missing value

 Variable: TFRIEN       Label: Received 1991 Bulletin from Friend
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                1.00   yes
      8.00   not applicable                    9.00   missing value
```

```
 Variable: TDEAL          Label: Received 1991 Bulletin from Dealer
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value

 Variable: TYROTH         Label: Received 1991 Bulletin from Other
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value

 Variable: LYRBULL        Label: Received 1990 Bulletin
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value

 Variable: LEXMAIL        Label: Received 1990 Bulletin by MAil
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value

 Variable: LEXTMEET       Label: Received 1990 Bulletin at Meeting
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value

 Variable: LEXTOFF        Label: Received 1990 Bulletin at Office
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value

 Variable: LFRIEN         Label: Received 1990 Bulletin from Friend
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value

 Variable: LDEAL          Label: Received 1990 Bulletin from Dealer
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value

 Variable: LYROTH         Label: Received 1990 Bulletin from Other
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value

 Variable: EXTBULL        Label: Received Extension Bulletin
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value
```

```
 Variable: EXMAIL        Label: Extension Mailed Bulletin
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value

 Variable: EXTMEET       Label: Received Bulletin at Extension Meeting
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value

 Variable: EXTOFF        Label: Received Bulletin at Extension Office
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value

 Variable: FRIEN         Label: Received Bulletin from Friend
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value

 Variable: DEAL          Label: Received Bulletin from Dealer
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value

 Variable: EXOTH         Label: Received Bulletin from Other
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value

 Variable: OTHEXT        Label: Extension Info from Other Source
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value

 Variable: OEXTMEET      Label: Other Info from Extension Meeting
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value

 Variable: OEXNWSLT      Label: Other Info from Extension Newsletter
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value

 Variable: OEXAGNT       Label: Other Info from Ext. Agent Column
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value
```

```
 Variable: OVSTOFFC      Label: Other Info from Visit to Ext. Office
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                 1.00   yes
      8.00   not applicable                     9.00   missing value

 Variable: OPCEXAGT      Label: Other Info by Phone Call to Ext. Agent
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                 1.00   yes
      8.00   not applicable                     9.00   missing value

 Variable: OEXNET        Label: Other Info from EXNET
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                 1.00   yes
      8.00   not applicable                     9.00   missing value

 Variable: OTHER         Label: Other Sources of Extension Information
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00                                      1.00   yes
      8.00   not applicable                     9.00   missing value

 Variable: COMP          Label: Own a Computer
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                 1.00   yes
      8.00   not applicable                     9.00   missing value

 Variable: COMPDIS       Label: Received Information on Computer Disk
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                 1.00   yes
      8.00   not applicable                     9.00   missing value

 Variable: OCOMPDIS      Label: Received Computer Disk from Other
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                 1.00   yes
      8.00   not applicable                     9.00   missing value

 Variable: DISEXTOF      Label: Received Disk from Extension Office
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                 1.00   yes
      8.00   not applicable                     9.00   missing value

 Variable: DISFRIEN      Label: Received Disk from Friend
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                 1.00   yes
      8.00   not applicable                     9.00   missing value

 Variable: DISCONS       Label: Received Disk from Consultant
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                 1.00   yes
      8.00   not applicable                     9.00   missing value
```

```
 Variable: DISDEAL       Label: Received Disk from Dealer
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                1.00   yes
     8.00   not applicable                    9.00   missing value

 Variable: DISOTH        Label: Disk from Other Source
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                1.00   yes
     8.00   not applicable                    9.00   missing value

 Variable: PLAN          Label: How Important is Information in Planning
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
     4.00   Essential                         3.00   Important
     2.00   Interesting                       1.00   Not important
     8.00   not applicable                    9.00   missing value

 Variable: RBEAN         Label: Received Soybean Variety Test Report
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                1.00   yes
     8.00   not applicable                    9.00   missing value

 Variable: UBEAN         Label: Rating of Soybean Variety Test Report
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
     1.00   Very useful                       2.00   Somewhat useful
     3.00   Little value                      4.00   No value
     8.00   not applicable                    9.00   missing value

 Variable: ROAT          Label: Received Oat Variety Report
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                1.00   yes
     8.00   not applicable                    9.00   missing value

 Variable: UOAT          Label: Rating of Oat Variety Test Report
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
     1.00   Very useful                       2.00   Somewhat useful
     3.00   Little value                      4.00   No value
     8.00   not applicable                    9.00   missing value

 Variable: RWEED         Label: Received Weed Management Guide
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                1.00   yes
     8.00   not applicable                    9.00   missing value

 Variable: UWEED         Label: Rating of Weed Management Guide
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
     1.00   Very useful                       2.00   Somewhat useful
     3.00   Little value                      4.00   No value
     8.00   not applicable                    9.00   missing value
```

```
 Variable: RCOST          Label: Received Costs of Production
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value

 Variable: UCOST          Label: Rating of Costs of Production
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
     1.00   Very useful                        2.00   Somewhat useful
     3.00   Little value                       4.00   No value
     8.00   not applicable                     9.00   missing value

 Variable: RINSECT        Label: Received Insect Management Recommendatio
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value

 Variable: UINSECT        Label: Rating of Insect Management Recommendati
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
     1.00   Very useful                        2.00   Somewhat useful
     3.00   Little value                       4.00   No value
     8.00   not applicable                     9.00   missing value

 Variable: INFTDY         Label: Iowa Farmer Today
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value

 Variable: GTDY           Label: Iowa Farmer Today Grade
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
     1.00   A                                  2.00   B
     3.00   C                                  4.00   D
     5.00   F                                  8.00   not applicable
     9.00   missing value

 Variable: INFDNEWS       Label: Daily Newspaper
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value

 Variable: GDNEWS         Label: Daily Newspaper Grade
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
     1.00   A                                  2.00   B
     3.00   C                                  4.00   D
     5.00   F                                  8.00   not applicable
     9.00   missing value

 Variable: INFWNEWS       Label: Weekly Newspaper
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      .00   no                                 1.00   yes
     8.00   not applicable                     9.00   missing value
```

```
 Variable: GWNEWS        Label: Weekly Newspaper Grade
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      1.00   A                                 2.00   B
      3.00   C                                 4.00   D
      5.00   F                                 8.00   not applicable
      9.00   missing value

 Variable: INFMAG        Label: Farm Magazine
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                1.00   yes
      8.00   not applicable                    9.00   missing value

 Variable: GMAG          Label: Farm Magazine Grade
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      1.00   A                                 2.00   B
      3.00   C                                 4.00   D
      5.00   F                                 8.00   not applicable
      9.00   missing value

 Variable: INFRAD        Label: Radio
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                1.00   yes
      8.00   not applicable                    9.00   missing value

 Variable: GRAD          Label: Radio Grade
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      1.00   A                                 2.00   B
      3.00   C                                 4.00   D
      5.00   F                                 8.00   not applicable
      9.00   missing value

 Variable: INFTV         Label: Television
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                1.00   yes
      8.00   not applicable                    9.00   missing value

 Variable: GTELV         Label: Television Grade
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      1.00   A                                 2.00   B
      3.00   C                                 4.00   D
      5.00   F                                 8.00   not applicable
      9.00   missing value

 Variable: INFCLTR       Label: Commercial Newsletter
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                1.00   yes
      8.00   not applicable                    9.00   missing value
```

```
 Variable: GCLTR          Label: Newsletter Grade
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      1.00   A                                 2.00   B
      3.00   C                                 4.00   D
      5.00   F                                 8.00   not applicable
      9.00   missing value

 Variable: INFPUB         Label: Commercial Publications
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                1.00   yes
      8.00   not applicable                    9.00   missing value

 Variable: GPUB           Label: Publication Grade
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      1.00   A                                 2.00   B
      3.00   C                                 4.00   D
      5.00   F                                 8.00   not applicable
      9.00   missing value

 Variable: INFCONS        Label: Paid Farm Consultant
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                1.00   yes
      8.00   not applicable                    9.00   missing value

 Variable: GCONS          Label: Consultant Grade
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      1.00   A                                 2.00   B
      3.00   C                                 4.00   D
      5.00   F                                 8.00   not applicable
      9.00   missing value

 Variable: INFODEAL       Label: Seed, Chemical Dealer

Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                1.00   yes
      8.00   not applicable                    9.00   missing value

 Variable: GDEAL          Label: Dealer Grade
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      1.00   A                                 2.00   B
      3.00   C                                 4.00   D
      5.00   F                                 8.00   not applicable
      9.00   missing value

 Variable: INFEXBL        Label: Extension Bulletins
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                1.00   yes
      8.00   not applicable                    9.00   missing value
```

```
 Variable: GEXBUL        Label: Extension Bulletin Grade
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      1.00   A                                 2.00   B
      3.00   C                                 4.00   D
      5.00   F                                 8.00   not applicable
      9.00   missing value

 Variable: INFXLTR       Label: Extension Newsletters
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                1.00   yes
      8.00   not applicable                    9.00   missing value

 Variable: GEXLTTR       Label: Extension Letter Grade
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      1.00   A                                 2.00   B
      3.00   C                                 4.00   D
      5.00   F                                 8.00   not applicable
      9.00   missing value

 Variable: INFXMTG       Label: Extension Meetings
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                1.00   yes
      8.00   not applicable                    9.00   missing value

 Variable: GEXMTG        Label: Extension Meeting Grade
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      1.00   A                                 2.00   B
      3.00   C                                 4.00   D
      5.00   F                                 8.00   not applicable
      9.00   missing value

 Variable: INFXAGT       Label: Talks with Extension Agent
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                1.00   yes
      8.00   not applicable                    9.00   missing value

 Variable: GEXAGT        Label: Extension Agent Grade
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      1.00   A                                 2.00   B
      3.00   C                                 4.00   D
      5.00   F                                 8.00   not applicable
      9.00   missing value

 Variable: INFFARM       Label: Other Farms
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                                1.00   yes
      8.00   not applicable                    9.00   missing value


 Variable: GFARM         Label: Other Farmers Grade
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
```

```
      1.00   A                              2.00   B
      3.00   C                              4.00   D
      5.00   F                              8.00   not applicable
      9.00   missing value

 Variable: INFTLXT       Label: Teletext or Videotext
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                             1.00   yes
      8.00   not applicable                 9.00   missing value

 Variable: GTLXT         Label: Teletext of Videotext Grade
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      1.00   A                              2.00   B
      3.00   C                              4.00   D
      5.00   F                              8.00   not applicable
      9.00   missing value

 Variable: RECINFO       Label: Best Month to Receive Info
Value labels follow   Type: Number  Width:  2  Dec: 0     Missing:    99.00
      1.00   January                        2.00   February
      3.00   March                          4.00   April
      5.00   May                            6.00   June
      7.00   July                           8.00   August
      9.00   September                     10.00   October
     11.00   November                      12.00   December
     88.00   not applicable                99.00   missing

 Variable: ONLYINST      Label: Likely to See Insert
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
       .00   no                             1.00   yes
      8.00   not applicable                 9.00   missing value

 Variable: AGE           Label: Age
Value labels follow   Type: Number  Width:  3  Dec: 0     Missing:     9.00
      8.00   not applicable                 9.00   missing value

 Variable: EDUC          Label: Years of Formal Schooling
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      1.00   1-8 Years                      2.00   9-11 Years
      3.00   12 Years                       4.00   13-15 Years
      5.00   16 or more Years               8.00   not applicable
      9.00   missing value

 Variable: INCOME        Label: Income
Value labels follow   Type: Number  Width:  1  Dec: 0     Missing:     9.00
      1.00   under $20,000                  2.00   $20,000 to 39.999
      3.00   $40,000 to 99,999              4.00   $100,000 to 199,999
      5.00   $200,000 or more               8.00   not applicable
      9.00   missing value
```