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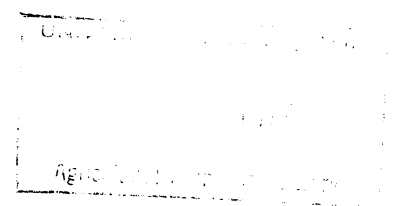
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INTERFACING RESEARCH AND EXTENSION IN  
INFORMATION DELIVERY SYSTEMS

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## INTERFACING RESEARCH AND EXTENSION IN INFORMATION DELIVERY SYSTEMS

One of the more recent computer applications in agricultural economics is the information delivery system. These systems are more than just another new "computer program" or "computer model". They are specially designed for computerized information delivery and analysis.

The emergence of computerized information systems is having a profound impact on the conventional roles of extension and research economists. Traditional relationships between extension, research, and clientele groups are being altered. The way in which these relationships change is directly related to the type system developed and the implementation methodology utilized. In this regard, the profession is confronted by two important sets of issues: (1) the development and implementation of information systems, and (2) the interface between extension, research and clientele groups.

### ISSUES IN DEVELOPMENT

Recently, Chapman, et al., surveyed extension, directors and found fourteen information systems in use or under development. The most well-known of these systems include the Computerized Management Network (CMN) from Virginia, Today's Electronic Planning (TELPLAN) from Michigan, and the Minnesota Analysis and Planning System (MAPS). Though many questions and issues surround the development of these and related systems, several issues are of fundamental importance: the choice of technology, the selection of software components, research support for extension, and assumptions about user needs.

### Batch Versus Interactive Technology

Presently operational systems can be broadly classified into categories: (1) batch oriented systems, and (2) interactive terminal oriented systems. These categories differ not only in the kind of hardware and software that is needed, but also in the kind of human support that is required. Information and programs available in a batch oriented system are most often available for access only by those who possess a degree of programming skill. While batch systems can be designed for direct user access by clientele, more often a person with specialized skills in operating the system will act as an interface between the computer and the user. This is the organization of systems such as MAPS, ISEIRD (Illinois), and WILLIS (Illinois) (Chapman, et al.).

Interactive terminal systems are normally designed for direct access by the user clientele and may appear to involve less personnel support. However, the demands placed on the adequacy of the software contained in an interactive system are substantial. The software writer must anticipate all possible user responses, and systematically lead the user out of situations where he cannot be reasonably expected to bail himself out. Well-designed interactive software generally does not require any programming or other computer skills on the part of the client. This approach has been used by DISK (Kentucky), TELPLAN, CMN, and FACTS (Indiana) (Chapman, et al.). An interactive system may require more total personnel support than a batch oriented system but allows the computer to be taken to the user, rather than the user to the computer.

### Selection of Data and Programs

Fundamental concerns and questions about the quality of data, analysis, and information have recently been articulated (Bonnen). Developers of computerized information systems have yet to seriously address the qualitative aspects primarily because quantitative problems are so imminent. While on-line disk storage space is rapidly becoming less expensive, educators and researchers cannot afford the luxury of storing data and programs that are not heavily utilized. Sporadically used information and programs can be placed in a less expensive form of storage, such as off-line disk. Extension clientele may still have access, but the time required for clientele access may increase from a few seconds to an hour. For example, the data selection approach used at Kentucky in the DISK system was to survey clientele with regard to specific needs; develop a cafeteria offering; monitor clientele use and add new components to the on-line portion of the system; and move sporadically requested data and programs to off-line storage.

### Research Support for Extension

Much computer software is developed in conjunction with research activity. Even though the problem that the software solves may be relevant to an extension audience, the software may be ill-suited to these needs because input and output may be difficult for a lay person to understand. Candler argues that the extension's software needs are more demanding than the corresponding research needs and that this explains the comparatively slow adoption of computer technology in extension.

While a research model may be used as the basis for an extension model, the amount of additional programming support and faculty time is substantial. Problems with models that would be of little concern to a researcher suddenly assume great importance to a farmer's individual farming operation. Moreover, no software can be built sufficiently fool-proof so that it operates appropriately 100 percent of the time in an educational setting. The more complex the model, the more difficult the problem of testing the software using all possible combinations of client inputs.

#### Assumptions About User Needs

Developers of information systems often assume it is possible to store and retrieve data and programs relevant to clientele ranging from university researchers, to "cost-is-no-object" corporations, to rural governments, to individual farmers. Where researchers tend to generalize relationships among data, other clientele desire specific information and programs suitable for grant applications, community surveys, or farm plans. In many instances this information is simply not available. A small community may desire information on townships or census district level; a disaggregation too small for feasible system development. And even if it were possible to store information of this nature, there are those who argue that it is not of sufficient quality to be "locality relevant information" (Hobbs).

Batch oriented systems which interface with clientele groups through a professional economist or sociologist assume time and money savings can be realized through pre-screening data or program requests

and professional assistance with completion of input forms (van Es). Thus, system personnel consult with clientele about the information or analysis request before the system is engaged.

Interactive remote systems assume that a well-designed, "fool-proof" system will allow the user to access the system, define, and re-define information needs as the interaction between user and system progresses. However, the need remains for educational programs designed to acquaint potential users with the system, the adequacy of the data, the limitations of problem-solving software, and the need for clientele feedback.

#### ISSUES IN IMPLEMENTATION

Computerized information systems, whether batch or terminal oriented, represent new technology subject to an adoption cycle. Such new technology is normally suspect until it has been proven through usage. Extension specialists need not be alarmed, for if a computerized information system is desirable, it will eventually sell itself to clientele.

##### System's Scope

One of the most basic implementation issues is the scope of an information system. Should it have a local, area, state, or national orientation? Initially, computer hardware was the costliest element of any system and as a result a national orientation would provide the least costly access to the very costly components. As computer technology has advanced, the cost of computing time has decreased but telephone charges have been relatively stable. Regional, state, area, and perhaps

even local systems are becoming more and more cost competitive as long distance telephone charges play a relatively larger role in a total systems cost. The broader based systems are likely to maintain their advantage for offering access to large information blocks (data and related software) relevant to the nation that only require a short connect time.

The logical extension of the cost argument does not preclude a national system. A centralized, all-inclusive national system is unlikely, however. A federated or decentralized all-inclusive national system, made up of compatible national, regional, and state elements linked together via leased lines and a periodic call-up system is more likely. Compatibility is the the largest obstacle to overcome, especially if the compatibility desired would include the extreme of data from one element being directly utilized in software from another.

The federated system does not require or imply the need for each state's participation. Smaller states either in terms of resources or need, could link into the federated system at its nearest element. States without their own system might contribute resources to a neighboring state and actually develop a small regional system. This is the approach followed by the AGNET system.

#### Pricing and Cost Considerations

Extension has traditionally provided programs to clientele without charge. Of course, extension programs have never been "free"--they have been funded at taxpayer expense. The key feature of a computerized information system is that it provides information specific to individual



user needs. Relative to other kinds of extension programs, the cost of providing this kind of information is comparatively high. Questions may be raised regarding the appropriateness of funding such a computerized network at taxpayer expense.

States are gradually resolving some of the price problems. Most systems will probably be funding with a combination of direct user charges and tax dollars. User charges usually do not cover cost items such as extension specialist salaries. Wages for programmers and key-punch operators may be included as is the direct cost of computer time.

#### ISSUES IN THE RESEARCH-EXTENSION INTERFACE

The conventional wisdom of the extension-research interface is illustrated in Figure 1. The ideal that knowledge gleaned from research is delivered by Extension is unmet (Scroggs, p. 888). Regardless of the imperfections of the conventional wisdom, computerized information systems are profoundly affecting the relationships in the extension-research interface. As the system becomes a delivery vehicle for educational and technical assistance, the client becomes one step removed from the educators and researchers. This is true whether the information system is basically a research-oriented system adapted to extension use (Figure 2) or an extension-oriented system (Figure 3).

#### Interfacing Research and Extension

The question of whether or not an information system would improve the situation remains to be answered. The answer hinges on the implementation and administration of the system and whether the approaches selected will change the conventional system. Can an information

delivery system access and therefore provide more of that potentially useful information, or will it only be a streamlined technique for delivering, in a more impersonal way, what is currently being offered?

Should such a system be totally implemented and administered by and for extension, the conventional interface is least affected. Extension personnel would be left with their conventional devices for extracting information from research efforts. Some "demand-pull" effect might occur if extension feels responsible for justifying the delivery system by supplementing historically offered information with more "sophisticated" software. This "extension-tool-only" approach may provide sufficient justification for the technology even without the demand-pull effect.

To accept less than the full potential from a new technology seems inefficient. Data systems established for use by both extension and research would seem to be a solution (Figure 4). Both groups would provide inputs to the information delivery system and utilize its contents. The dual implementation approach does not, however, guarantee a two-party oriented information delivery system where an interest or power imbalance exists. The extension orientation discussed previously could culminate from a dual implementation where research was disinterested or where extension exerts political power to protect "its" data system empire.

Whenever the initiative, commitment, and motivation behind any two-party educational system, where both party's contributions are important, is held by only one of the groups, complete success is unlikely. The system must be implemented and administered to motivate

researchers to provide inputs to the system that can be directly utilized by extension and conversely (see Figure 5). For example, researchers are rewarded for publishing research results but not for making a specific batch oriented computer model into a generally applicable interactive program. Similarly, extension practitioners are not rewarded for completely specifying a data set but rather for providing that portion of the data required by their clientele.

### Interfacing Extension and Clientele

The existence of an information delivery system will force some changes in the interface between extension and research, but it is also likely to have a two-way impact upon the interface between the extension research team and their clientele groups. First, traditional clientele groups will be interacting with university educators in a nontraditional framework. Information will be more readily accessible at the grass-roots. As a result, specific problem solution-generation will be redistributed away from the university and area levels toward the county and individual clients. Farmers and local bureaucrats will either be able to generate solutions to their own problems by utilizing regularly accessed data and software or receive solutions from their county agents who generated solutions from less well known "system" techniques. Secondly, the university team will face many new nontraditional clientele groups who could most accurately be described as primary clients of the information system and only secondarily extension clients.

The impact on the traditional interface will depend upon the system's structure discussed previously. The batch approach will be the

least disruptive to the client and the county level extension staff. Demand for service at the information center will likely require added permanent professional and paraprofessional information processing specialists. An interactive structure requires the most adjustment at the county level. Even after county agents accept the system and are trained on it, the end-user clientele must be acclimated to the new technology. County offices will have to adjust their resources to process system requests. Both agents and end-users will have to learn to formulate their requests to fit the system's format.

Despite the structure selected for the delivery system, extension will be faced with serving a new nontraditional clientele group. Ethical and propriety questions arise at the new interface that have little, if any, historic precedent. Enterprises such as consulting firms could conceivably acquire delivery system output, resell it directly or as a part of a larger effort, for a profit. A variable pricing approach may provide the necessary control once an acceptable user screening system is established. A pricing scheme that would vary from either zero or out-of-pocket cost coverage for traditional users to going market rate for nontraditional clientele would likely provide the control desired.

Another important interface is between the information system and bureaucrats, both state and local. A successful information delivery system useful to policymakers, would tend to increase the interdependency between extension and the bureaucracy and enhance bureaucratic support. Similarly, support for the educational effort should be enhanced at the area and state levels.

Lending institutions could tie loans to the utilization of system's management oriented software. Agribusiness supply firms might utilize the system to establish in their clients mind the need for a product. The system would not promote a specific firms products but it might provide a competitive edge. Here the caution is in the implementation. Ultimate clientele users and not intermediary organizations should shape the system's content. Objective market decisions and not product promotion is the obvious rule at this interface.

### CONCLUSIONS

There is little question that agricultural economists will be more involved with information systems in the near future. For those who are currently engaged in development or implementation of a system there is an important need to: (1) coordinate the efforts among the states, the USDA Rural Development Service, and USDA Extension Service; (2) more actively share experiences in regard to the basic questions of development, the field experiences, and perhaps most importantly, the impacts on the interface between extension, research, and clientele groups; and (3) assess the long-term viability of existing systems and the potential for a national information system.

For those seriously considering initiation of a system, some caveat emptor comments are in order: (1) an information system will have to force some changes in the interface between Extension and researchers involved; (2) there is no general agreement on the relative advantages of a batch versus remote access organization; (3) costs are extremely high in terms of equipment and personnel and will preclude

many of the smaller states from initiating their own systems; and  
(4) serious evaluations of existing systems have not been completed  
so there is little information to guide the "comparison shopper".

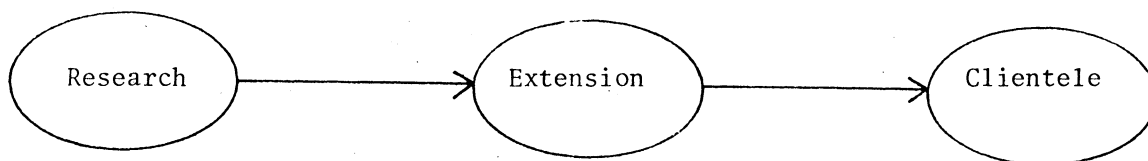


Figure 1. Traditional Research/Extension Interface

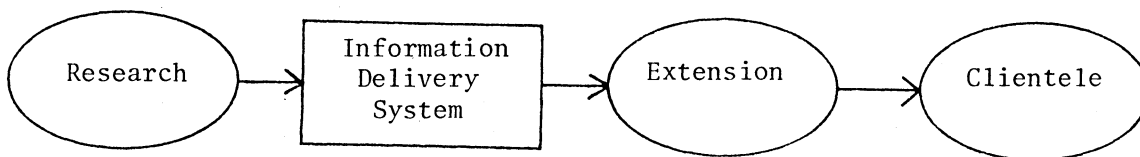


Figure 2. A Research Oriented Information Delivery System

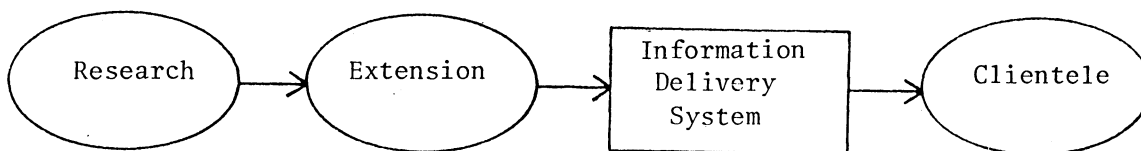


Figure 3. An Extension Oriented Information Delivery System

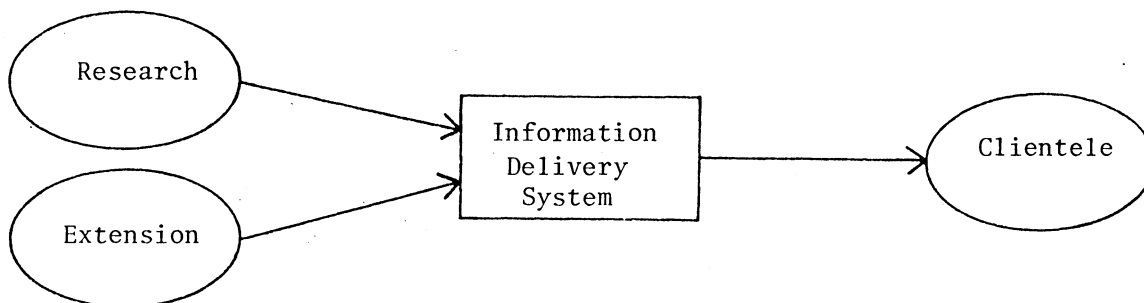


Figure 4. A Dually Oriented Information Delivery System

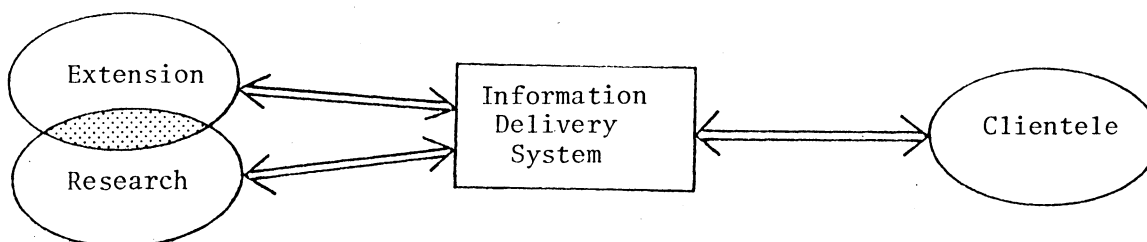


Figure 5. A Mutually Oriented Information Delivery System

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