AGNET: Management Information for Agriculture & Forestry

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Through AGNET, an agricultural computer network, farmers, foresters, and ranchers can get timely, customized information to aid them in making management decisions. Typical users have no prior experience with any type of computer, let alone a computer network.

Production agriculture and forestry have benefited greatly from technological advances during the past decade. While these advantages are likely to continue, the big breakthroughs during the 1980s are most likely to occur in the method and efficiency by which farm and forest management decisions are made. These breakthroughs will be based on the continued development and widespread adoption of computerized tools by farm and forest managers. These tools will make it possible for farmers, foresters, and ranchers to gain ready access to current information, customized data, and management decision models.

New Concepts for Agricultural Users

To serve agriculturalists and forest landowners, some universities and agribusiness firms have established electronic information systems. Most are designed for use by specially trained experts who, in turn, work with farmers, foresters, and ranchers. At the University of Nebraska, it was decided to design a computer network that could be used directly by the farmers, foresters, and ranchers themselves, as well as by agricultural specialists.

The first faltering steps were taken early in 1975 when computer terminals were installed in Nebraska to test interactive computer concepts for agricultural users. The terminals were linked to an IBM System/370 Model 145 at the Nebraska Department of Administrative Services in Lincoln.

Since then AGNET has grown to over 5,000 users in 48 states, Canada and other worldwide locations. It is available through TELENET and Datapac from nearly every major city in the world.

AGNET uses standard equipment and operating systems. Currently, it buys cycles from an IBM 3033 computer. Users can access AGNET on a telephone line through any standard terminal that operates at either 300 or 1200 baud. Most any microcomputer can access AGNET. Currently, the majority of users are accessing AGNET through a microcomputer.

Technically AGNET is an interactive system designed to deliver management tools and information to individuals and organizations concerned with agricultural production. It is
expanding to include forestry, home economics, and community resource development problems.

**Simplified Operation**

AGNET is designed around several fundamental principles, the first of which is that *AGNET users are not expected to know anything about computer operations*. In the development of AGNET, the telephone system was used as a model. When you make a telephone call, the telephone company does not expect you to know the routing or the time and frequency slicing parameters necessary for the two parties to visit and share information.

The complexities of the telephone are made "transparent," and you are able to talk without having a degree in telecommunications. Similarly, typical AGNET users have no prior experience with any type of computer. They access our system to obtain information, not to learn about computers. Therefore, we try to make the system transparent so it will not stand between the user and that information.

**Users Are Professionals and Farmers**

AGNET has two broad classes of users: agricultural specialists who advise others, and the individuals, business firms, and agencies that make direct use of the system's management programs and information services.

The first classification includes county Extension agents who service local individuals and firms with many agricultural education programs. The county agents use AGNET as one of many tools that help them carry out their mission. A farmer or rancher might contact the local agent to inquire about the best ration for 900-pound cattle using locally available feedstuffs. The agent would use the FEEDMIX program to balance a least-cost ration, at the same time using the results as a vehicle for teaching some economic and nutritional principles.

Also in this classification are experts such as agricultural economists, who might use a program like CROP-BUDGET to prepare information for general publication, or as a tool in their research programs. Agricultural educators might use the PUMP program in the classroom to teach agricultural engineering students how irrigation costs are affected by changes in water depth, application rates, or altitude.

The second broad classification of AGNET clients includes farmers, foresters, and ranchers who use the network directly for management aid, as in estimating when a particular lot of cattle will be ready for sale and what the cost of weight gain will be (using a program called BEEF), determining the cost of production for various crops (using CROPBUDGET), or estimating the economic value of land (using BUYLAND), or determining a thinning cycle for a Douglas-fir stand (using DFSIM).

**Access and Use Procedures Remain Consistent**

AGNET is not philosophically different from other user-oriented networks, except for one significant point: Many AGNET users access the system infrequently—once or twice a month or perhaps only seasonally—and use only one or two of more than 200 management and information programs in the library. During the past five years AGNET has been on five different computers, yet users access and use the network the same way they always have. Our small systems staff spends considerable time trying to ensure that what worked before works now in the same manner as when the first user first accessed AGNET. This consistency is necessary because our users are scattered, and few of them are in direct contact with the AGNET staff.

For those reasons the second fundamental
principle is that AGNET system and program documentation must be on line. While the basic concept of any AGNET program remains constant, new data, new ideas, and new options are added regularly. We inform users of program additions, enhancements, and other modifications through a one-line "banner" as they log on. The user then can obtain additional information on these changes by typing NEWS.

Within each program is a description of what the program does, how it does it, and whom to contact for further information. But the online documentation does not stop there: The user can obtain more information merely by typing HELP at any time. When a bank's loan officer, for example, uses the tax management program PLANTAX, the loan officer is in essence carrying on an electronic dialog with the program's author. The program requests information, which the user provides, but it is anticipated that the user might not know exactly what the author means by every question or what form the input data should take in every case. The HELP option allows the author to expand on the original question, do a little teaching if necessary, and even give examples of typical input.

Error Protection for User and Author

The possibility of erroneous input leads to another AGNET principle: Both the user and the program's author must be protected from errors. To illustrate, the user might enter alphabetic data when the program required numeric data, or enter fewer items than the program called for. If the program were allowed to "blow," the user might well become frustrated and discouraged. To prevent that, all data entered into any AGNET program is passed through various error-catching routines.

The program's author must also be protected from erroneous input. For example, in running IRRIGATE, the simulation program that determines irrigation times and amounts, a user might enter unrealistically high or low temperature readings, causing the program to incorrectly prescribe the timing of water applications. Such an error might result in crop damage and cause the user to distrust computers in general, and the program's author in particular. In AGNET programs, the author assigns allowable maximum and minimum values for each input. If a user enters data that exceeds those limits, the program informs the user of the limits and requests correct data.

Programs Are Localized

Since AGNET is operational over such a wide area, data bases and programs applicable in one place may not be correct for another. Therefore, we established another guiding principle: AGNET is controlled from the "bottom up," not from the "top down." Localized information is incorporated into many programs to make them more applicable to specific management problems. For example, a swine nutritionist in Washington probably would have different feeding recommendations than in Nebraska, so FEEDMIX (the least-cost ration balancing program) has data bases constructed for each partner state. In essence, the land-grant university of each state that has entered into partnership (as contrasted with general user) agreements with AGNET has control of the system as seen by its users, and bills its users directly. Those states currently are Montana, Nebraska, North Dakota, South Dakota, and Washington.

Thus, the Washington user automatically accesses Washington data. In fact, when Washington users log on, they are greeted with "WELCOME TO WASHINGTON AGNET." When they ask for a program description, they are given the name of a local specialist to contact if they have questions. Partner states can add or delete programs as conditions warrant.
This principle provides for local control and quick response to changing local needs.

Messages Also Can Be Handled

While AGNET mainly delivers management tools, the network can be used for message handling at minimal additional cost.

The MAILBOX program permits the sender to route communications to a single user or to predefined list of users. If, for example, there were a grasshopper problem in a given area, it might be necessary to advise county agents as well as farmers, foresters and ranchers in the affected area of infestation levels and spraying schedules. Information of that type can be time-critical, and MAILBOX can quickly place such information in the hands of those who need it.

During the devastating eruptions of Mount St. Helens in the spring and summer of 1980 AGNET provided a vital communications link for Washington State University Cooperative Extension. The MAILBOX and NEWSRELEASE programs were employed to transmit information to county Extension agents, the news media, and a terminal installed in the office of the Secretary of Agriculture in Washington, D.C. Department of Agriculture personnel used information from areas affected by the eruptions to coordinate disaster relief programs.

The NEWSRELEASE, ERS, FAS, and MARKETS programs provide AGNET users with a menu of timely news items prepared by specialists on specific topics, such as analyses of the USDA Cattle on Feed Report or openings and closings of futures markets. It is difficult to justify the cost of message handling as a "stand-alone" facility, but offering the service as an additional AGNET program permits it to pay its own way.

We are trying to maintain the momentum that has permitted AGNET to have grown from an idea to an operating reality by providing agricultural and forest management information on a reliable and cost-effective basis.