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Farmers and the Context of Information for Sustainable Agriculture: A Report to the Sustainable Agriculture Network

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Introduction

The sources and uses of information by farmers have served as a vital area of social research for over fifty years (Rogers, 1983). In most theoretical frameworks, access to good information is assumed to accelerate the adoption of new technologies. In the standard adoption-diffusion model, information plays different roles as people move through very general stages of an adoption process. People first gain knowledge of an innovation from some source. At this stage, information serves to make people aware of an innovation. The information need not be specific, but more general and descriptive.

If people want to pursue an innovation, their needs change. They need specific information such as how well new approach works for others, what are its strengths and weaknesses, and what resources are necessary for the innovation to succeed. At this stage, information is evaluated for its credibility or legitimacy. The decision to adopt a new technology or practice now hinges on the ability to acquire information that is credible, applicable, sufficiently detailed, is from a legitimate source, is congruent with the current farm production system, and is, to some extent, tested. In general, the extent to which an information source is knowledgeable and legitimate is determines the impact information will have.

This broad framework is a brief description of a much larger model. Research concerning the role of information in adoption usually focuses on the information sources, their credibility, and the impact the information on management decisions. Moreover, innovations are viewed as either discrete technologies or ideas, or as bundles of related technologies or ideas (Rogers, 1983). In this vein, agricultural technologies are evaluated for adoption once they are developed well enough to be communicated clearly to potential users. The model of adoption and diffusion is much more difficult to apply to innovation at the system level, and the very meaning of adoption becomes problematic in most soft systems situations (Harp, 1992).

Sustainable agriculture presents just such a quandary. In order to evaluate the process of adoption with respect to sustainable agriculture, researchers face many issues with respect to information and its uses, including:

- new ideas may in fact be old ideas re-adopted;
- one practice cannot be evaluated in isolation from a larger system of practices;
- a trial of a system-relevant practice by a farmer may eventually lead to the adoption of an entirely new system rather than just that one practice;
- the decision to change a farm system includes attention to a variety of dimensions concerning agriculture, not just congruity with the existing system and the economic payoff;
- actual production systems can easily rely on a myriad of information sources and uses, with a mosaic of practices and rationales for their use.

Pampel and van Es (1977) argue convincingly that the adoption model for commercial agriculture innovations is a poor predictor for the adoption of environmental protection innovations by farmers. This stemmed from farmers' application of different perceptions to that type of innovation. Sustainable agriculture requires a change in perception on the part of adopters. Such perceptions still require that information have elements of congruity, legitimacy, and credibility. But this broader set of perceptions form the context in which sustainable agriculture information is evaluated.

The purpose of the research is to gain insight into contexts for evaluating sustainable agriculture, how these contexts are used as filters for evaluating information, and how filters might apply to the information efforts of the Sustainable Agriculture Network.

First, the project and its scope are discussed. Second, the research subjects are profiled. Third, the frameworks for farmers' transition to a sustainable agriculture are presented. The general types of knowledge that the farmers are looking for to assist in this transition are presented. The filters that they use to evaluate specific information are then

discussed. Materials available through the Sustainable Agriculture Network are presented and the total framework is applied to them. Finally, recommendations are forwarded to potentially increase the utilization of the Network's information by farmers.

Project Description

The Sustainable Agriculture Network wants its information to achieve the maximum impact on production agriculture. With this in mind, this research has two goals. The first is to understand the context(s) within which information is evaluated by farmers and other users when they decide to try a practice or use a piece of information. Farmers described how they evaluate a new idea. What are the tests that they apply to a piece of information? What contexts or filters do they put new knowledge through to decide if it is useful or just interesting? Does the source of the information make a difference in how they perceive it?

The second goal is an evaluation of the ongoing efforts of the Sustainable Agriculture Network (SAN). The Network facilitates information exchange by supporting the networking of knowledge in many forms, including print, meetings, computer networks, a traveling showcase of sustainable agriculture practices, and a guidebook to expertise in sustainable agriculture. This evaluation examines these efforts based on how they relate to the contexts within which information is evaluated by farmers.

Project Scope

This evaluation is based on information gathered from farmers across the United States. The scope of their production systems, geographic location, and willingness cooperate with the research define the scope of this project. Cooperators were farmers seeking to make a transition to a more sustainable agricultural system and seeing themselves as having begun such a transition.

The project scope is not an exhaustive evaluation of the many and diverse production systems and farmer networks that characterize American agriculture. Rather, the scope is geographically broad. The results reported here are from focus groups in California, Idaho, Wisconsin, Kansas, and Arkansas. Within these states, a sampling of farmer networks has been constructed that incorporates many production systems.

Farmers in each of these states were asked to participate by a not-for-profit group with which they cooperated. Except in California, these not-for-profit groups participate in the W. K. Kellogg Integrated Farming Systems Program as grantees (see Hesterman and Therborn, 1994 for a discussion of this program). They are a sample of convenience, and represent a broad spectrum of such groups working in the sustainable agriculture arena. Each not-for-profit group provided access to a group of farmers that represent a continuum of producers in the transition to a sustainable agriculture.

Table 1: Not-for-profit groups providing farmer samples for focus groups and interviews.

State	Group
Arkansas	Arkansas Land and Farm Development Corporation; Appropriate Technology Transfer to Rural Areas (ATTRA)
California	California Clean Growers Association
Idaho	Palouse-Clearwater Environmental Institute
Kansas	Kansas Rural Center
Massachusetts	Connecticut River Valley Community Initiative for Sustainable Agriculture
North Carolina	North Carolina Land Loss Prevention Project
Wisconsin	Michael Fields Institute

Framework and Method

Framework: Context

A interpretationist or naturalistic framework is used to evaluate the contexts and knowledge filters through which farmers evaluate information concerning sustainable agriculture. This framework allows evaluation subjects to create an understanding on the part of the researcher by discussing what issues mean to them (Guba and Lincoln, 1989). Its focus, then, relies more heavily on connotative or tacit meanings than on denotative or explicit meanings (Guba and Lincoln, 1981; 1989). Within this framework, the interactions between the researcher and the subject are designed to produce information that is relevant to the issue at hand. The quality of data is evaluated based on this criterion of relevance. Thus, the purpose of the evaluation exercise is discovery of the processes of "meaning making" that characterize the phenomenon under study.

A frequent criticism of naturalistic approaches is that they lack generalizability. One focus of naturalistic inquiry is the discovery of the day-to-day contexts that people use to make sense of their world, described in the plain language to which people are accustomed. Accordingly, in order to evaluate the role these day-to-day contexts play in some social processes, being able to generalize is not nearly as important as being able to understand and integrate the multiple meanings that the evaluation might uncover. This focus on context negates the issue of generalizability; as Guba and Lincoln (1981:62) state: "...what can a generalization be except an assertion that is context free?"

Context is vital to understanding the transmission and acceptance of information. It is particularly important when evaluating the role of information coming from another farmer or practitioner. Nofsinger (1989:228) defines context as "...a subset of participants' general background understandings: the specific item(s) of shared knowledge that the participants collaboratively locate, access, or invoke as momentarily

relevant." When two people speak to each other about a subject in which they each know the other is well versed, each will devote less time and energy to explanation. Thus, context construction through language is more implicit than explicit (Nofsinger, 1989; Slugoski, et al., 1993). Speakers establish the level of shared knowledge during conversation; context and the level of explanation are adjusted accordingly. Shared knowledge can be either explicitly known by speakers or alluded-to during initial contact. When the level of shared knowledge is high, context is less dependent on explanation. Conversational practices will include less explicit reference to the shared knowledge. When the level of shared knowledge is low, speakers tailor their language to account for perceived differences in knowledge.

This idea about contexts can be expanded to cover communication in general, rather than conversation in particular. Context then provides the foundation for the process through which farmers evaluate information. It is their "general background understandng" and the "shared knowledge" that they "invoke as momentarily relevant" (Nofsinger, 1989:228). This issue forms the basis for much that is presented below. Examining context informs our understanding of knowledge filters and how farmers decide whose knowledge is important and useful.

Method: Focus Group and Interview

Focus groups and personal interviews are the methods applied in this evaluation. Focus groups are used for two reasons. First, they are a cost effective methodology for gathering in-depth information from a representative group of individuals about a specific topic. In this context they offer a non-threatening and participatory environment for a detailed discussion of a shared issue (Krueger, 1994; Stewart, 1990). In the case of sustainable agriculture farmers have the opportunity to provide detailed information on the contexts in which information is diffused, evaluated, adopted, or rejected. This is preferable over a sample survey because focus groups allow the participants to use

interaction and shared experiences to provide detailed information about their sustainable agriculture experiences.

Second, focus groups allow participants to explain how they feel about complex combinations of ideas and practices (Morgan, 1993). This comes about since focus groups allow for expression of personal experiences, rather than a response to a set of survey questions. In the context of sustainable agriculture, the complexity of information and management needs is well documented. It is in the focus groups that this complexity can be captured.

Personal interviews are the second choice. Interviews are necessary when either they are convenient for farmers; these can be conducted on farms, and do not necessitate a meeting at a central place. Focus groups account for almost all of the data from California, Kansas, Massachusetts, and Wisconsin. Personal interview data has been collected at all sites, but is constitutes the majority of the data from Idaho, North Carolina and Arkansas.

Research Subjects: A Profile

The research subjects were chosen solely on the criteria that, as farmers, they were seeking information, experience, and knowledge about sustainable agriculture and putting what they found to work on their farms. They are profiled below.

Production Systems

Within each geographic area, the production systems represented vary widely. Farmers described their farm and the production system that they used. This discussion included issues of concern for the producers, and the role of the family in their operations.

Arkansas

Farmers interviewed lived in the southern Delta region on the east side of the state. Production systems were based on the traditional crops of rice, soybeans, and cotton. The farmers interviewed were almost exclusively African American, and their operations small to medium in scale. All were family operations, usually with two generations working the farm at the same time, and the use of hired labor was occasional. All worked off the farm during some time of the year, and most spouses worked as well. Diversification and marketing were the key issue. The traditional crop mix was being augmented or replaced with fresh vegetables, sweet potatoes, okra, and, in one case, greenhouse tomatoes. Most of the respondents had or were presently raising livestock. The growing season is long and warm. Some crops are irrigated, and some rely on rain.

California

Farmers interviewed were stone fruit and grape producers in the Central Valley near Fresno. Peaches, plums, cherries, table grapes, and raisin grapes were the dominant crops. Operations ranged from small to moderate size. The growing season is long and warm, with all crops were under irrigation and each farm employing hired labor, especially at harvest. All but one had a spouse employed full time. Farms were family operations, but there was some concern about the lack of interest on the part of the next generation in taking over the farm. Marketing, pest control, and quality issues were dominant.

Idaho

The interviewed farmers were all dry land cereal and legume producers in northern Idaho and eastern Washington. Winter wheat, lentils, dry peas, and canola are the crops grown in this area. All production is dry land on the rolling hills of the Palouse region. Farms ranged from a few hundred acres to well over two thousand. All were capital intensive family operations with some hired labor, and off-farm employment was

common. A major concern was the long term sustainability of these operations in a global grain market. Soil conservation and fertility were other dominant concerns, along with the future of the Conservation Reserve Program.

Kansas

The farmers in this group came from all over central Kansas. They produced a great number of crops and livestock: sorghum, wheat, soybeans, corn, grass (grazing and seed), alfalfa, rye, oats, swine, feeder cattle, and cow/calf operations. Some of the farmers were irrigating, and some were dry land farming. The operations ranged in size from medium to large, and some were in urban fringe areas. Most had reduced the size of their operations during the 1980's. All operators had changed their crop mix over the last ten years, in attempts to try to avoid debt. All of the farmers used rotations, such as wheat drilled into legumes for fertility, weed control and a cutting of hay. All were family operations, with little hired labor. Income from off-farm jobs was necessary for most of the operations. Soil conservation, soil fertility, and water quality were important issues. A strong focus on the future of rural communities existed. These operators were diversifying quickly, mostly after witnessing first hand the financial difficulties of the 1980's. The future of their land currently in the Conservation Reserve Program was important to their long term decisions.

Massachusetts

Participating farmers from Massachusetts produce apples, cherries, strawberries, vegetables, sheep, and specialty crops. Trying to farm on the urban fringe was the dominant characteristic of the farms in this sample. Small towns surrounded the farms, and the metropolitan areas of Boston, Springfield and Hartford, CT provided markets. One farm was a community supported farm, three were all organic, and the orchardists all participated in the University of Massachusetts Integrated Pest Management program.

The main problems were related to pest management, organic certification, and urban encroachment.

North Carolina

The participants interviewed in North Carolina included Extension specialists from the 1890 Land Grants in North Carolina and Virginia, and tobacco farmers seeking alternative crops. The production systems involved were small, diversified operations with tobacco, livestock, row crops, and vegetables. The predominance of tobacco in the system was considered something of a liability. Access to markets, management skills, and capital availability were concerns.

Wisconsin

Farmers in the Wisconsin sample have operations with hogs, feeder cattle, dairy herds, corn, soybeans, silage, alfalfa, rotational grazing, and small grains. Included in this sample was a two-generation family operation following biodynamic principles for its 50th production season. All farms were small to medium in size, operated by families, and diversifying. Off-farm work was done by all respondents or their spouse. The ability of intensive grazing to produce beef and dairy was of acute interest. Water quality and economic diversification were other important issues.

After the farmers built a profile of their operations, they were asked to describe the general parameters of their transition to sustainability. These parameters are discussed next.

Framework for Change: Issues in the Transition to Sustainable Agriculture

All of the information reported here came from farmers making a transition from the prevailing agricultural production systems in their areas to what they view as more sustainable systems. This transition takes place within a framework built on certain issues

for the farmers. This framework explains why this transition is going on, and serves as a descriptor of the broader issues framing new ideas. Each respondent described a different set of reasons for beginning this change. Though these motivations are unique, they can be easily reduced to four general categories.

Economics

It goes almost without saying that new practices, ideas, or systems presented to farmers must be economically viable in order to be sustainable. Within this apparently obvious situation, there remains significant variation in how farmers view the issue of economics.

In Wisconsin, one farmer indicated that her economic criteria were system-wide. She could not (and would not) accept the notion that any one practice should be evaluated for its economic pay-off. She argued that only an entire system, designed to meet many goals, should be subjected to economic analysis. Partial analysis was insufficient.

A California producer echoed this sentiment. He argued that the profitability of the whole is the issue. Many alternative, non-economic, reasons drive individual practices. These are designed to fit into a whole system, and some losing propositions are balanced out by the sum of many smaller winning propositions. This was assumed to be true for any operation, regardless of type.

Other issues were also system-based. In Kansas, a rotational grazer indicated that the equipment he had left over from grain production was useless in his grazing system. His goal was to eliminate as much equipment as possible in his operation. Effectively, his economic criteria can be reduced to whether or not a new idea requires any equipment. If it does, adoption is far less likely for him.

In Arkansas, access to markets defined the evaluation of the economic return to new crops or practices. The general consensus was that growing rice, beans, and cotton was a losing proposition for any producer. Diversifying into vegetables required markets.

The farmers were just gaining access to the supermarket chains in Memphis and Little Rock. This altered their evaluation of vegetable crops. Prior to gaining this access, sales were roadside and otherwise local. This limited the economics of scale, and promised an insufficient return to labor. The supermarkets provide a steady customer base, and one that is willing to try new crops if the farmer is willing to grow them.

In North Carolina, alternative crops were discussed, but market access was the issue. Trying to find an alternative to tobacco also meant trying to find an alternative marketing strategy as well. The producers were assumed to be willing to undertake labor intensive production practices as these meshed with what they were already doing.

In Massachusetts, the economic bind is one of rising land values pushing the remaining farmers off the land. Producers had good access to excellent markets in large urban areas. Their economic pressures included a declining arsenal of adequate pest management tools in markets that were quality based.

Environment

Conflicts in the transition to sustainable agriculture are often presented as a conflict of environmental issues and economic concerns. The majority of the respondents freely indicated that these clashes happen every year. How they are dealt with this differed between farmers. With few exceptions, most stated that their goal was to construct a production system that precluded these simplistic trade-offs. In Kansas and Wisconsin, Conservation Reserve Program (CRP) lands were an issue of discussion for just this reason. One farmer in Kansas explained at great length how he was talking to other farmers in detail about grazing systems that would allow him to retain the environmental benefits of CRP, make a return on his land, and not have to produce grain. In Wisconsin, a farmer indicated that his neighbors were going to return CRP land to corn and soybeans, and that he would like to avoid this but needed alternatives.

The California group discussed the use of herbicides as a tradeoff between the total environmental cost of the chemical versus the total environmental cost of burning diesel fuel to control weeds mechanically. Some of them viewed the herbicide as the "better" alternative. The growers felt that burning the fuel had a greater overall impact on the global environment, and that the herbicide degraded very quickly.

In Arkansas, alternative crops allowed farmers to break what they saw as a cycle of dependence on expensive chemicals, while addressing their personal environmental concerns about ground water and personal safety. This closely intertwined context was best expressed in a discussion of "Uncle B." This referred to one of the primary chemical companies with field people working in the area. The interviewed farmers joked that many of their neighbors relied on "Uncle B" for all of their information. They found it interesting that farmers in the area were losing money, and the chemicals were not as effective as they once were. In addition, the respondents pointed out that the field people for the company dismissed concerns about worker safety and groundwater contamination on the part of their customers. They judged this double bind of economics and environmental issues to be unfair to producers and rural communities.

Family/Community

Closely tied to economic and environmental issues were farmers' concerns about the future of family farms and rural communities. Innovations and ideas were evaluated by these farmers within the context of their potential impact on family and community.

For the most part, they wanted to pass a "well managed, viable farm" on to their children. The issue of the family context was not solely relegated to intergenerational tenure. In California, each of the respondents told of personal reasons for seeking a non-chemical basis for pest control that revolved around the safety of their families in the orchards and vineyards. In Idaho, the long term viability of the soil was seen as a family obligation, and the failure to keep it productive was viewed as cheating children out of an

opportunity to farm. In both situations, farmers saw the long run viability as both a place to make a living and a safe place to live.

In Arkansas, keeping so-called "limited resource" farmers on the land was a primary concern. The most frequently discussed example was a family vegetable operation that supported three complete generations on the farm. The farm employed thirty people, and they were all family members. This one farm was considered the ideal type because it had succeeded in exemplifying the goals of self-sufficient families and viable farming operations in the Delta. Similar concerns were discussed in North Carolina. Most of the farms that were described belonged to multi-generational families who viewed access to and control of farm land as key to keeping their culture and community alive.

Farmers expressed a very sophisticated understanding of their role in the economies of the small towns around which they live. Farmers saw their role in the local economy as being far beyond simply "buying local." Keeping families on the land was seen as the most basic form of rural development. In general, the farmers interviewed denied the validity of the economists' assertion that bigger farms are the only future. Most of them indicated that they were making a steady, though not excessive, living. It was management intensive, but essentially viable. Thus, they concluded that others could do it as well. Many of their neighbors had gone out of business trying to farm by the conventions of the area, and the respondents did not wish to see this trend continue.

This concern for the community extended to noneconomic issues as well. In Kansas, one respondent said that farmers were "watershed managers for rest of the community" and had a related obligation to protect that resource. In return, the community had an obligation to help support family farms in their area. In Massachusetts, the very issue of open space and its value to the community was vital. Almost all of the farmers were first generation, and had started from scratch. They saw themselves as protectors of the land, in terms of both a human connection, and open space. The farmers

spoke of themselves as the last vestige of agriculture in the area. Innovations were evaluated with an eye on their potential to support community as a social entity, the local economy, and the community's environment.

These frameworks for the transition to a sustainable agriculture allow us to understand the point of view farmers bring to the evaluation of new ideas. Once these frameworks were clear, the discussion moved on to what farmers were looking for to assist in this transition process.

Types of Knowledge Being Sought

Farmers responded to questions concerning recent changes in their operations. In the focus groups, one farmer frequently described a recent innovation and this was used as a starting point for the discussion. Farmer respondents broadly seek three general categories of knowledge relative to sustainable agriculture: innovation, implementation, and systems knowledge. These correspond in a general way to the stages of information needs presented in the traditional adoption /diffusion model.

Innovation

This category is defined as knowledge that enables farmers to redefine a part of their production system to better meet their needs. This is the realm of general ideas, rather than specific practices, that address a desire to change some aspect of the farm. In general, it does not include implementation. Farmers want to know what something is, hear an argument as to why it is of benefit and what are the costs.

For example, in Idaho, a piece of equipment for subsoil tillage was designed and built by a group of farmers. They were discussing ways to better retain moisture and reduce soil loss. It was an innovation built on an existing framework from another piece

of equipment, but the intent was quite different. Innovation occurred when something was redefined to address a general issue like tillage.

In Kansas, the idea of using edible peas as a crop and green manure was discussed as an innovation. Farmers were seeking general information on the benefits of doing this. Most were not yet at the stage of discussing details because they were still looking for information. In Arkansas, whether braiding garlic for sale pays off was discussed in broad terms for some time, while the details of how to actually do it were put off until later in the discussion. Also, there was some discussion of the transition to greenhouse production and whether or not it increased or decreased financial independence for farmers. The details of how to make such a transition were not discussed until the interviewer raised the issue. In North Carolina, farmers' questions were general, but focused on discerning how much of an innovation was a new crop. They asked about production scale, labor needs relative to existing supply, and general financial returns. Similarly, the use of cover crops as a basis for biological pest control in California prompted a philosophical discussion about how they work and why they are innovative. Again, the details were discussed separately.

Implementation

Implementation knowledge provides "nuts and bolts" for translating innovations into actual practice. Farmers sought this category of knowledge when they had evaluated some innovation, and were looking into what it might take to adapt it to their farms. It is distinguished from innovation knowledge because it is not a general idea, but rather information on specifics: this knowledge is detailed, technical, and usually experiential. Farmers have already gathered and digested the innovation information, and want to see what really needs to be done.

In Arkansas, planting dates, irrigation needs, pest control, harvest methods, labor needs, and handling considerations were all viewed as being a separate form of

knowledge. The group liked to think about why to do something before seeking information on how to actually do it. But when such information is actually pursued, it is at a level of detail useful for direct application.

In North Carolina, a farmer questioned an Extension specialist following a discussion about dried flowers as a cash crop. His line of questioning was as follows: what are the capital needs, row spacing, seed sources, drying needs, marketing outlets, exact labor requirements (nature of work, timing), and soil requirements. This line of questioning occurred after the same farmer had queried the specialist very generally about the same issues just minutes earlier.

In Wisconsin, details about portable fencing technologies were discussed at length. Respondents indicated they and many of their neighbors were sold on the idea of intensive rotational grazing many years ago. Adoption did not occur until they were satisfied that the technologies available fit into their systems. Put another way, the innovation was accepted but the details of implementation were not. In recent years, advances in fencing technologies have overcome these practical barriers to implementation, and the grazing systems are being adopted rapidly.

In Kansas, an organic soybean cooperative was seeking information on how to avoid the burning of beans when in storage. At present, the demand for their product was so high that this was not an issue, but they saw it as a long term concern. They were looking for detailed information on how to store beans in small elevators without burning them and without necessitating large scale and expensive technologies. They knew what they wanted, but most of the information was applicable to large, commercial elevators. They are not in need of innovation, but rather in need of implementation information that is applicable to their specific needs.

One vital aspect of implementation that was mentioned in many different contexts was lending and finance. Many respondents indicated that lending institutions need to be educated about sustainable agriculture to a much greater degree, since in most cases they

hold the key to active implementation of any system. One Massachusetts farmer indicated that he had a very difficult time convincing a bank to make a small production loan because they had no one at the bank to evaluate his proposal. That has since changed. Many farmers noted that lenders attend schools sponsored by the land grant universities, but the discussion is usually tailored to understanding larger scale, more orthodox production technologies. The general perception was that lenders do not approve loans when they are not familiar with the production system that a farmer has in mind. Information about how such systems have been successfully applied were seen as helping overcome this hesitation, and assisting the financing of implementation.

Systems

Systems knowledge promises to change the overall production structure of the farm. It is part innovation, and part implementation. It is mostly "wholesale" change, however, based on redirecting the whole farm, or major parts of the system.

In the California system, producers began using nonchemical pest control over a decade ago. Each described making a serious decision about the future of their production system as a whole. In order to do this, they relied on one another for advice and support. They had to consider nothing less than the complete restructuring of their orchard system from the ground up. They looked for this system-level knowledge among themselves and a handful of innovators. A large part of the implementation for them was a network of support offered within their group. The pressure that comes with system-wide decisions was eased somewhat by supportive fellow farmers willing to, as one farmer put it, "talk you down" during a crisis. Knowledge of this type is diffuse, implementation knowledge must be tailored to individual farms, and experts were rare.

In Wisconsin, rotational grazing as viewed as a wholesale rethinking of the concept of pasture. One farmer indicated that the innovation for him was not in the practices themselves, but in the systematic understanding on his part that "this is not a

rocky field full of grass" but rather a system of resources that he needed to understand and use. Again, the actual transition required innovation knowledge and implementation details. However, all of the respondents agreed that large, system level changes required synthesis of ideas and approaches. Many recalled a multi-year process of reading, field days, and personal visits to other farmers before they saw how they could apply intensive rotations to their operations.

Also in Wisconsin, a discussion took place about ridge tillage and its system-level consequences. Ridge tillage was viewed as a system-level change because it required farmers to rethink how they managed soil conservation, weed control, equipment needs, etc. The fact that farmers have to leave the ridges in the field for multiple years was considered an alien idea. As a concept it was seen as system change, rather than just the adoption of a new practice. Finally, in Massachusetts, orchard integrated pest management had changed the way growers saw their orchards, as well as the valley as a an ecosystem. The learning curve was difficult; information on implementation was accessed through Extension, but developing system-level thinking processes took time.

Knowledge Filters

The previous sections of this report create a picture of what the farmers said they were trying to achieve. These goals, issues, and processes form a context for knowledge. Essentially, farmers seek information that appears to match up with the knowledge context in which they are pursuing the transition to a more sustainable agriculture. However, once they have information in hand, they must ask a more direct question: "can I actually use this specific knowledge or piece of information to change what I am doing in a manner consistent with the context(s) within which I am working?"

In order to answer that question, farmers "filter" knowledge to make sense of it. These filters are a kind of "reality check" that bring the everyday world of the farmer to

bear on suggestions and ideas in order to evaluate how appropriate they may be for adoption. Knowledge filters are applied within the transition contexts that characterize individual farms. In turn, knowledge filters cannot be separated from knowledge contexts. Rather, they constitute criteria for evaluating knowledge based on a common understanding and everyday use: they "filter out" those pieces of knowledge that are out of context. These filters are discussed below. It is important to note that they are rarely applied in a discrete manner. Usually, they came about in discussion as a whole framework. They are separated here for clarity.

Networks and Experience

The cooperating farmers in this study existed within a knowledge network made up of other farmers. These networks passed knowledge among members based on experiences. The likelihood that a piece of knowledge would be evaluated positively increased greatly if it was based on the experiences of another farmer. There remains no substitute for someone else's mistakes and successes. Farmers indicated that the most important filter was experiential, and it had to survive the scrutiny of a network of potential users with substantial experience.

On-farm testing, both formal and informal, is an example of knowledge that passes more easily through this filter. Small plot research was described in Wisconsin as "merely interesting" because it did not "map easily to my fields." In the Wisconsin case, large scale plot research, conducted to examine long term rotations, was viewed positively because it "mapped" into scale-level production decisions. It had to be farmed in order to work, rather then "controlled." In addition, the input of farmers throughout this project injected the network of interested producers into evaluation of its efficacy.

Attention to this knowledge filter is very common. Farm tours, informal discussions, popular publications, and even the use of paraprofessional farmers (in Arkansas) all met the challenge of experiential knowledge filters. The concern raised by

the respondents was that much of the research that they were exposed to did not incorporate this issue at the outset. Thus, in the minds of the farmers, the results required additional evaluation to "correct" for this lack of experiential content.

In the experiences of the respondents, being able to talk with another farmers throughout the production season about some new approach allowed them to evaluate an idea as it was being implemented. The incremental building of understanding as the new idea went through planning, planting, growing, harvesting and evaluation was deemed the pinnacle of how to evaluate something new. Farmers across all of the groups stated strongly that this was the best system for them to decide about new approaches. In Wisconsin, the weekly tours of the large-scale research plots were praised for allowing evaluation throughout the season across years. In California, regular breakfast meetings allowed growers to update and communally evaluate practices throughout the season. In Massachusetts, twilight farm tours were used by Extension IPM to orient growers to how others were addressing production problems as the season progressed.

Vision and Face

Closely tied to the experiential filter is one loosely termed vision and face. This was the consistent request from the farmers that information and new knowledge be delivered with a visual component and a face representing experience.

They valued the act of seeing something for themselves, and having the practitioner there to validate the nuts and bolts of implementation. This was discussed as being the essence of using the networks that the farmers had at their disposal. Farm tours were seen as the most likely place to see this filter at work, but they were discounted because questions were limited by time and access to the farmer. Vision and a face were mentioned in all of the groups and interviews, and cut across all of the production systems. This filter is based on an assumption of context sharing. Being able to see the operation and the farmer provide the "alluded-to" knowledge base necessary to steer

communication toward specific production issues. It appears to reduce the need for context explication and explanation. As one farmer in Arkansas said, "farming is still a human activity, ...for now" and this facilitates the communication of knowledge.

Source

An idea from another farmer was still viewed as coming from the best source. The bias is simply the assumption that the farmers have thought about something in a practical sense. However, the type of knowledge was important in determining which source was best. For innovation and system ideas, other farmers were assumed to be better sources. Farm-level implementation information like planting rates and equipment settings were also deemed acceptable if coming from someone with practical knowledge. However, highly technical implementation questions such as chemical efficacy, variety evaluation, and crop-specific management questions were best when addressed by nonfarmers in the person of university, Extension, or private consultants. When farmers assumed a questioned required formal research to answer, they went to particular sources for that information. Research conducted by private firms, most notably chemical companies or anyone with something to sell, were viewed as poor sources. Within the context of sustainable agriculture, the information issue was not a lack of sources, but a lack of detailed information. Production information was becoming available from many popular and not-for-profit sources, but testing, economic analysis, the evaluation of long-term implications were less common.

Science and Scientists

In California, the term "white coat effect" was applied to the question of science and scientists. As a knowledge filter this was a paradox. Even though most of the respondents stated a preference for farmer-tested ideas, they also expressed a belief that if these ideas were passed through a research design by scientists, usually employed at Land

Grant Universities, then their validity was increased by the "white coats" giving their blessing. This was not a blanket endorsement for science and scientists as the only source of knowledge that would pass this filter.

Many respondents were cynical about the scientists with whom they have had contact. The "white coat effect" extended only to those scientists willing to evaluate new approaches with an open mind. Many farmers recounted stories about university personnel claiming publicly that sustainable agriculture was misguided. One issue that was raised repeatedly was that researchers are not rewarded for trying longer term experiments with whole systems. Thus, farmers were deemed better since they were able to assess the long term risks of new systems.

On the other hand, when motives are not in question, science is always taken seriously. In California, Massachusetts, and Idaho, farmers agreed that some of their experiences were in fact less valid than experimental evidence. They were willing to try new approaches based solely on their experiences because there is often no ongoing research into systems similar to theirs. However, when research is applicable, this is a valid filter that is accepted willingly.

Risk and Risk Sharing

Risk permeates every action farmers take. New ideas are evaluated for their risk just like any other issue on the farm. As a knowledge filter, risk and risk sharing are closely tied to experiential issues. If an innovation or idea was tried by a farmer, and it succeeded, that farmer's risk-taking was seen as validating the innovation. Experience reduces risk. In addition, risk being shared by a group of farmers trying something and then assessing its pros and cons together to arrive at a consensus endorsement was seen as an acid test. Farmers from the Idaho group were testing a black medic varieties as a cover crop and viewed themselves as sharing the risk among themselves. The issue of sharing extends to farmers evaluating what they are willing to try on their own. If a strategy is

available that reduces risk while producers try something new, then the knowledge filter opens up to more ideas. Cost sharing is a good example. If risk to the operator was reduced, the respondents indicated that they would try almost anything in good faith.

Always Looking.....

The final knowledge filter is constant innovation. As it was said, "..we're always looking." The filter works by seeing ideas as starting points. The degree to which individual farmers can modify, improve, or extend an idea adds to its acceptance. One farmer had spent time as an equipment dealer, and described this evaluation in simple terms. Nobody wants to buy a black box. His most vivid memories were having delivered new equipment to farms, and seeing the cutting torch, welding machines, and tools already set out to begin the custom modifications. The respondents all considered themselves to be innovators, and asserted that they could recognize useful ideas when they saw them. In addition, they asserted a right and a capability to evaluate ideas for themselves. The more flexible and expandable a new idea is, the more they like it and are willing to try it.

How Do These Contexts and Filters Work?: Farmers Evaluate S.A.N.

None of these filters plows new ground with respect to the adoption of innovations. They do offer a framework for evaluating the materials of the Sustainable Agriculture Network. The guide to expertise, SANET, and printed materials are discussed below, followed by a set of ideas. It should be kept in mind that these ideas were synthesized from farmers' comments made in context of their information needs and uses. Many of their ideas imply that SAN produces information, rather than making information more available through the network. It proved very difficult to separate these ideas during the focus groups. Thus, the suggestions of farmers concerning the form and

content of information should be digested in this light. The more detailed recommendations that follow assume the function of SAN is that of an information facilitator and multiplier.

Guide to Expertise

This guide is an excellent method for addressing the needs of the farmers interviewed for this research. None of the respondents in Massachusetts knew that the guide existed, but all enthusiastically responded to the idea, and their not-for-profit contact agreed to obtain copies for them. Those who knew about the guide used it. They also indicated that they cast their inquiries over a much larger geographic area than just their states. One individual had used a contact in the guide to find information in Finland about pruning maple trees for veneer. An Arkansas grower had found information from California and Florida on biological control in greenhouses.

This guide touches on contexts and filters in a couple of ways. First, it constitutes, in and of itself, a network. By including farmers along with other experts, it works like a network. Second, people in the guide self-identify with the very transition that the farmer-user is trying to achieve. This addresses the risk/risk sharing needs. Third, respondents indicated that it was vital to have a contact person. Having personal information and the knowledge that you could actually call or write for help was seen as key. "All that I need is a phone number" was a common statement. Knowing that these people were a source with experience was viewed as a powerful idea.

The respondents made a variety of suggestions that match current efforts by SAN:

- *have the guide on a computer database*: Few of the farmers liked or would readily use a computer. But they did not hesitate to volunteer the county extension office or the non-for-profit as a source of key world searches.

- *get more farmers*: Recognizing that placement into the guide was voluntary, farmers requested that the net of involvement be cast much wider to include ever more producers.

- *place one in every extension office*: The question was raised that if S.A.N. was financed through U.S.D.A., why was the guide not a mandated information source for every county extension office? The implication was that it would be used if available there.

SANET

Few of the farmers had themselves ever accessed SANET. However, every group either had received information from their Extension personnel or not-for-profit, or claimed to know someone who had. This information was in the form of questions that received answers. It was seen as a resource different from the guide to expertise.

- Questions of narrow or broad scope could be asked.
- It was seen as the best chance at finding answers to really specific, technical questions because of its potential access to the research community.

Nonetheless, SANET was not viewed as a farmer-friendly item. It addressed the issue of technical knowledge being sought from scientist sources. It does lack the experiential basis due a perception that it is only for scientists.

Printed Materials

All of the farmers indicated that they used printed materials to a great extent, mostly in the form of magazines and newsletters. In Wisconsin and Kansas, farmers were familiar with the cover crop materials made available by SAN. In general, they worried that much of what they read was dated and far too general to be useful. The profiles of specific farming ideas, such as those published in New Farm magazine, were the most often mentioned as being more useful. The reason was that these profiles passed through all of the knowledge filters at once. One respondent even set out his thought process when he reads such a profile:

- I see where the farm is in the country to get the growing season;
- I see if the production system has livestock in it;
- How long has this farmer been working on this system?
- Does it involve new technologies?
- How does it pay: how are costs cut or revenues increased?
- What are the benefits to the land?
- I look for a discussion of pitfalls and failures.

If all of these issues are addressed, this respondent said that he would go so far as to call the Extension office in the town mentioned in the article to get information about the system.

When asked how to make better use of limited reading time, two specific suggestions came forward. These reached across all of the groups and both involve using the reach of S.A.N. to marshal information. First, they suggested that short descriptions, perhaps both sides of a single page, with details of some practice, approach, or system be made available immediately following each production season. Attaching this to a

computerized guide to expertise was suggested. The idea was that a list of such "hot sheets" as they were termed would let people pick and choose. Or a collection could be placed in extension offices for copying. Pictures always help, but the suggested information was more details about how changes were made, detailed implementation discussion, pros and cons, and results. The focus was on farmers detailing what they tried and discussing how it worked.

The second suggestion concerned S.A.N. placing articles in newsletters and regional farm publications on a regular basis, such as a monthly column. One version of this idea was that some issue or practice could be chosen at the beginning of the year and an "innovation update" could be done three or four times a year. This would allow the readers to follow the ups and downs of implementation, and allow for the discussion of details as they were applied. In Massachusetts, the IPM newsletter was considered current information and is closely read. Overall, a suggestion was made that S.A.N. advertise its wares in newsletters and regional magazines to the greatest extent possible.

Other Media Suggestions

Farmers in the focus groups and interviews had additional suggestions for delivering information they could to put to use quickly. Many of the farm groups suggested two particular technologies: video and satellite. [1]

Video

Farm tours take time, and visiting individual farms outside of the local area takes even more time. The suggestion was made that video could be used to detail production

[1] This suggestion is not without its critics. Abbott and Yarbrough (1992) argue that inequitable access to microcomputers, VCR's, videotext/teletext, and satellite receiving dishes actually increased between 1982 and 1989. It is difficult to assess this issue at this juncture but suggestions will be made to possible address this concern.

practices throughout a season, with commentary from an "expert" to accompany the narrative of a farmer. These address multiple issues at once. They are visual, and can show the situation in as much or as little detail as is necessary. The farmer takes part in the presentation of the system to satisfy the experiential needs of the viewer. The video can take the time to analyze the outcome of the displayed system in terms of many contexts to which farmers say they pay attention.

Two additional corollaries were presented. First, these tapes could be set up in a library in county extension offices. This would provide easy access to them. In some sense, this could address issues of equal access. This would also provide a framework for the second corollary. A suggestion was made that videos would be a lot more informative if the farmer and the expert were available following the viewing. No one suggested that this be in person. Nationally or regionally timed conference calling was suggested. Letting the viewer ask specific questions was seen as the main plus that made video really useful. Creating a database of previously asked questions and their answers was also suggested. If this was in print an index would allow viewers to cross-reference their questions ahead of time. An alternative would be to provide contact information for both the farmer and the experts so that questions could be directed by individual viewers.

Satellite

The second main suggestion in this area concerned the use of satellite technologies. Closely related to video in context, this was seen as a real-time alternative to tape. Beam the tour of the farm on tape to central locations, and establish a live link to the farmers and experts. This was likened to the President's "town meetings" in that some questions could be answered and contact information provided. This suggestion was given the additional validation of fitting into the farmers' perceptions that this technology was what Cooperative Extension wanted to do anyway. Thus, it was assumed to be more acceptable to that organization. Again, using the existing structure of Extension can

provide access to a wider audience that expecting adoption of satellite technology to occur on the farm before it can be used for information transfer.

Finally, within the context of these suggestions, endorsements were strong. One Arkansas farmer said that he would actually drive the forty miles to the county extension office if the tape or broadcast actually allowed him to ask questions of the farmer he was seeing. This ability to have a live link to the producer on the tape, even if it was only a conference call was the attractive component to this approach.

Considerations and Recommendations

This section presents the synthesis of all information gathered in this research. The overarching suggestion is directional: SAN needs to push its products down the information channels further into the local level, whether this is the local Extension office, cooperative, not-for-profit, or other organization. As many of the statements below reflect, this might be done within existing organizational channels, while strengthening the role of the local organization.

Considerations of content that address the implementation of farmers' experiences and suggestions are offered. Specific recommendations to the Sustainable Agriculture Network are then presented.

Content

The most crucial consideration with respect to the content of information made available by SAN is one of mission. The Sustainable Agriculture Network does not do research, then disseminate its findings. Rather, SAN facilitates information exchange. In this role, SAN can only facilitate what is available. Knowledge filters and context suggest that changes need to be made to the content of sustainable agriculture information in

general. Much of the change that farmers suggested directly dealt with this issue as well. The Sustainable Agriculture Network can have an impact on the format, if not the content of available information. Yet, the constraint remains: SAN cannot rewrite all information, nor can it move beyond offering suggestions as to how information can be packaged differently.

Consideration #1: Much of the available information comes from Cooperative Extension and Experiment Station efforts at Land Grant Universities (LGU's). Many of the farmers interviewed here indicated that even if the LGU in their state had information on sustainable agriculture, most of their information was too general. In addition, LGU's are increasingly seen as the providers of information and training to private sector providers, rather than to farmers directly. All of this aside, the LGU remains the largest source of information available.

Recommendations:

◊ Provide a guide to indexing LGU information to better reflect the types of decisions being made. For example:

- production: soil, water, crop, rotations, ...
- management: decision support, finance, lending, costs containment, ...
- marketing: niche, new markets, processing, alternative uses....
- systems: transition plans, aspects and dimensions of systems, successes...

- impacts: economic, social, ecological impacts of sustainable agriculture...
- philosophy: stories about why people make these changes.....

◊ Realizing that LGU information is not the primary source of information for many categories because it is not specific enough, request farmer anecdotes from local personnel that reflect more specific, local knowledge. This might be done when updating the guide to expertise. Perhaps it is already done in some states.

◊ Increase the use of local extension offices as network nodes. It is unrealistic (and unfair) to assume that CES and the universities have all of the answers. An idea frequently mentioned had local Extension simply arranging contacts between parties. Suggest to LGU's that CES might broker contacts within the area, and across areas using the guide to expertise. This is more easily facilitated with the guide to expertise being computerized. This also places the responsibility of information gathering on the user, but keeps CES involved. This has two benefits:

- Extension is simply providing network assistance and can more easily distance itself from necessity of endorsing information;
- This will expose Extension personnel to people, ideas, and systems that they might not otherwise encounter.

◊ The Sustainable Agriculture Network already has a role in the regional S.A.R.E. research and education processes. Much of the S.A.R.E. results are disseminated through SAN. Seek an agreement that will allow SAN to include guidelines for information content and form with S.A.R.E. contracts. This is not a contractual obligation, but rather a set of suggested guidelines for making the presentation of information more useful. Make this distinction well understood.

Consideration #2: Other groups and institutions have nonproprietary information that can be made available. Not-for-profit (NFP) groups, cooperatives, commodity boards and commissions all have information. Moreover, this information may be more specific or local than LGUs' information. Farmers discussed the issue of information credibility and legitimacy throughout this research. One strong commonality across groups and individuals emerged. Farmers appeared to apply their own criteria to information, and are willing to use their experience and skills to evaluate something on their own. Endorsement was a key when science was involved, but science cannot test every idea. These sources of information may allow end users to question its credibility (salespeople are an obvious example), but farmers want to decide for themselves.

Recommendations:

◊ Forge stronger links with information providers outside of LGU's and government. Not-for-profits often have experiences that can be used to localize information for farmers in their area. Some respondents indicated that certain NFP's were not credible sources. So be it: another farmer may garner something from that source. A similar logic applies to cooperatives and other groups.

◊ Create a set of information guidelines for content and format. Invite NFP's, cooperatives, and others to provide information for use by SAN.

◊ Create a category of information for ideas that are not tested, approved, and endorsed. This is not an anarchy of ideas, but rather a free market: SAN can set the rules by setting up guidelines ahead of time.

Form

Considerations and recommendations about the form information might take will address current SAN products first, then focus on other ideas drawn from this research.

SANET

Consideration: Most respondents viewed SANET as technologically feasible, but unattractive for their own use. Many farmers owned computers, but used them (if at all) for financial purposes. Almost all of the respondents who had an opinion about computer networks said they would not use them. As with so many situations in life, only one respondent (in Massachusetts) had any actual experience with wide area networks like SAN. Again, the role that Cooperative Extension plays might enhance the outreach of SAN, and raise the profile of CES.

Recommendations:

◊ SANET should be marketed more vigorously as a medium to acquire answers to short and long term questions by acquiring contacts within a network. Using the local structure of CES was a suggestion. Rather than having the local Extension professional not have anything to offer, at least they could log on and ask the network for assistance.

◊ Make it obvious that SANET is a networking tool, and not simply a database. Information contacts are the most likely outcome, not a specific recommendation.

◊ Offer a more detailed explanation about what the network is for, and how it can be used. Target this at local NFP's, cooperatives, and Extension offices. Give examples or testimonials that portray SANET as a tool for opening up information horizons. However, do not shy away from discussing the fact that there are sometimes fierce rhetorical battles, but that is all part of the information flow.

◊ Create user profiles, if possible, that can be used at a later date to follow up on selected queries for promotional purposes. How have people put the contacts or information from SANET to use? Did it work? Is SANET getting the credit?

◊ With an emphasis on its network structure, blanket CES contacts with SANET information, asking them to mention it in newsletters for more than one edition. Farmers wanted to impress upon their local Extension people that this was available. If people see SANET in an Extension newsletter, the door is opened to its increased use.

◊ Make use of the press release to get SANET profiled in regional farm magazines at least once each year. One respondent indicated that he allowed a stack of magazines to accumulate all year, then read them all between

Thanksgiving and Valentine's Day. Time the release so that information comes out in the fall for potential winter use.

Directory of Expertise

Consideration: This is the most powerful product that SAN has at this time. One of its main strengths is that is a prefabricated network that assists people in tracking down their own information. In this sense, it replicates the search behavior that most of the respondents had to use to get where they are today.

Recommendations:

◊ Keep expanding the search for contacts. Cooperation from local extension people and NFP's might help push the collection of contacts into the farming community to the maximum extent.

◊ Seek out retired or semi-retired farmers. They are a powerful repository of knowledge, and a few in any given area might be willing to be profiled in the directory.

◊ Having the directory on a computer database allows searches by expertise, area, etc. This needs to be heavily advertised. Making the expertise topical is attractive to farmers looking for information on a specific crop or practice.

◊ Find a technique to insure that these are in every CES office in the United States. To the extent that this occurs, it needs to be advertised in newsletters, etc. Again, this allows CES to facilitate information exchange.

◊ In the same vein, work with NFP's and cooperatives to make sure that the guide is in those hands as well. Similarly, advertise this fact in newsletters and other information sources. Push the availability as far as you can find customers.

◊ Find a way (press release, advertisement) to place the directory in national and regional farm magazines and newspapers. Focus on its networking aspects. Use success stories and endorsements to focus on how the directory is best used. This would coincide well with an endorsement from CES in the state.

◊ Investigate the possibility of expanding the Canadian participation. In areas like dry land cereal crops and orchard crops, this was suggested as an excellent source of information.

Printed Materials

Considerations: SAN cannot acquire all printed materials on sustainable agriculture and disseminate them. But, as stated above, SAN can make suggestions with respect to content and format for materials produced by other organizations. In the short run, this may not have any impact. However, as research and education about sustainable agriculture continue to grow, a set of useable, well informed general guidelines concerning what to talk about and in what format is a powerful tool.

Recommendations:

◊ Construct guidelines for information content and format. The "hot sheet" suggestion made by respondents here is an example. Recreate the filters used by farmers when they read about sustainable agriculture. If these exist already, SAN should make use of them.

◊ Increase focus on farmer success stories with attention to both system and technical implementation needs, including contacts. Even if information is general, having a farmer opinions included and contact information available helps focus the interested reader, who can then pursue more information.

◊ Suggest that follow-up information to be gathered. Did something work over time? What did it take at each stage of the production season? What surprises and pitfalls were encountered? What might be done differently? How was it evaluated? Look for a mix of scientist/expert and farmer in follow-up information.

◊ Always include contact information. This may require that researchers, professionals, and farmer cooperators be contacted and permission granted to include them as a contact. This is important for the validity issues surrounding printed material. It is vital to information acceptance and multiplication.

◊ If possible, recreate the traveling showcase of practices as printed material for use by others. Respondents liked the idea, but were very aware of the limitations of the actual showcase in terms of visibility around the country. Reproducing it in print was a suggestion.

◊ Try to push form and content guidelines and suggestions down into local Extension offices. Respondents often stated that what Extension knows is often not written down, and needs to be in a format that they find useful. Maybe SAN can suggest how to best do this.

Additional Ideas

Finally, considerations and recommendations that are a direct result of ideas put forward by the respondents are presented below. Again, SAN does not produce information, but organizes it and facilitates its exchange. With this in mind, the following focus on how SAN might expand that role.

Video/Satellite

Consideration: Video and satellite are difficult to separate because they are intertwined as message and medium. Most of the farmers willing to use these technologies were willing to do so within the context of a centralized organization. This means that they might be willing to go to the county Extension office to view a video tape, or to see a satellite broadcast. They were not, however, going to invest in a satellite dish of their own. This is a distinction that is often overlooked in discussions of the adoption of this technology (see Abbott and Yarbrough, 1992). But, the farmers were willing to adopt Extension's satellite dish.

Recommendations:

◊ Create a library list/bibliography of current video resources as a tool to sponsor the use of this medium. Just knowing what is available and where to get it is important. Make this available for discussion groups (see below).

◊ Create another set of guidelines for information content and format for the production of future video products pertinent to the adoption of sustainable agriculture.

- ◊ In those guidelines, emphasize the role that farmers play in adding credibility and legitimacy to the context and content of a video product. In addition, encourage the use of farmers and scientists together.

- ◊ Communicate with Extension that this is a medium from which they can benefit. Many Extension offices have satellite downlinks, and a VCR. This presents an opportunity for Extension to attract clientele who do not view them as a good source of sustainable agriculture information, and perhaps to educate their more usual clientele.

- ◊ Create a pamphlet or set of suggestions for setting up a video series about new ideas. Get this out to Extension, NFP's, cooperatives, etc., and encourage them to obtain a video library and invite their cooperators in once a month, week, etc., to view a video.

- ◊ Connect existing winter schools, public issues education efforts, and other Extension activities that use satellite with information about similar efforts in sustainable agriculture. As the number of satellite applications expand, these efforts can be used to "advertise" upcoming sustainable agriculture broadcasts. These efforts also make the technology more familiar to end users.

- ◊ To the extent possible, suggest the use of farmer respondents in video production. Live links to farmers are not necessary, but the inclusion of farmers should always include contact information.

Facilitating Local Education

Consideration: The respondents offered many ideas concerning local education efforts. Many of these involved better ways to acquire or produce information, such as local research plots directed by farmers and worked by contract with a researcher. Of these many ideas, two that might benefit from experience and tools of SAN are the idea fair, and the local reading group.

Recommendations:

◊ Idea fairs: Create a set of guidelines for establishing local fairs to expose farmers and others to what is actually going on in their area. The idea is not new, but SAN holds a unique position in the information network that would allow it to suggest information sources, and a structure for local groups to use easily. The strength of the idea fair, from the point of view of SAN, is that guidelines can serve to ease the frustration of organizing the effort. Getting such a set of guidelines out to Extension offices, not-for-profits, cooperatives, consumer groups, and others can serve to germinate the idea.

◊ Local reading groups: These are occurring around the country at this time. What SAN might offer is two fold:

- Guidelines for setting up a reading group. Suggest ways to get people involved, organizational strategies, form, and processes necessary to focus the agenda of the group.

- SAN can suggest general bibliographies for larger issues, and contacts for materials on more detailed topics. In addition, the existing materials from SAN can be used, most notably the guide to expertise.

Bibliography

The references provided below represent most of the literature used to inform this evaluation. Some of these have been cited directly. Others provided background information or research context.

Abbott, Eric A., and J. Paul Yarbrough. 1992 "Inequalities in the Information Age: Farmers' Differential Adoption and Use of Four Information Technologies." *Agriculture and Human Values* IX(2): 67-79.

Batte, M. T., G. D. Schnitkey, G. D., and E. Jones. 1990a "Sources, Uses, and Adequacy of Marketing Information for Commercial Midwestern Cash Grain Farmers." *North Central Journal of Agricultural Economics* 12(2):187-196.

_____. 1990b "Farm Information Use: An Analysis of Production and Weather Information for Midwestern Cash Grain Farmers." *Journal of Production Agriculture* 3(1):76-82.

Bultena, G. L., and E. O. Hoiberg. 1986 "Sources of Information and Technical Assistance for Farmers in Controlling Soil Erosion." *in Conserving Soil: Insights from Socioeconomic Research.* Steven B. Lovejoy, Ted L. Napier, (eds.). Ankeny, Iowa: Soil Conservation Society of America.

Carlson, J. E., and J. F. Guenthner. 1989 "The Information Patterns of Idaho Potato Growers." *American Potato Journal* 66(8): 471-487.

Ellworth, L. 1990 "Getting Good Marketing Information to Farmers: It Might Mean Listening to Them First." *Choices* 5(3):36-37.

Ford, S. A., and E. M. Babb. 1989 "Farmer Sources and Uses of Information." *Agribusiness* 5(5):465-476.

Guba, Egon G., and Yvonna S. Lincoln.1981 *Effective Evaluation: Improving the Usefulness of Evaluation Results Through Responsive and Naturalistic Approaches.* San Francisco: Jossey-Bass Publishers.

_____. 1989 *Fourth Generation Evaluation.* Newbury Park, CA: Sage.

Harp, Aaron J. 1992 "Science and Legitimation: The Case of Integrated Pest Management." Unpublished Ph.D. Dissertation, Pennsylvania State University.

Hesterman, O. B. and T. L. Therborn. 1994 "A Comprehensive Approach to Sustainable Agriculture: W.K. Kellogg's Integrated Farming Systems Initiative." *Journal of Production Agriculture* 7(1), January-March.

Howard, W. H., Blake R. W., and Knight, T. O. 1992 "Estimating the Effectiveness of Extension Information Systems Using Farm Trials and Subjective Probabilities." *Agricultural Economics: The Journal of the International Association of Agricultural Economics* 7(1):77-91.

Ikerd, John E. 1993 "The Question of Good Science." *American Journal of Alternative Agriculture* 8(2): 91-93

Korsching, P. F., and T. J. Hoban. 1990 "Relationships Between Information Sources and Farmers' Conservation Perceptions and Behaviors." *Society and Natural Resources* 3(1):1-10.

Krueger, Richard R. 1994 *Focus Groups: A Practical Guide for Applied Research.* Newbury Park, CA: Sage.

Lockeretz, William. 1991 "Information Requirements of Reduced-Chemical Production Methods." *American Journal of Alternative Agriculture* 6(2): 91-93

Morgan, David L. 1993 *Successful Focus Groups: Advancing the State of the Art.* Newbury Park, CA: Sage.

Nofsinger, Robert E. 1989 "Collaborating on Context: Invoking Alluded-to Shared Knowledge." *Western Journal of Speech Communication* 53(2):227-241.

Pampel, F. and J. C. vanEs. 1977 "Environmental Quality and Issues of Adoption Research." *Rural Sociology* 42(1):57-71.

Patrick, G. F., Ortmann, G. F., Musser, W. G., and Doster, D. H. 1993 "Information Sources of Large-Scale Farmers." *Choices* 8(3):40-41.

Reisner, Ann. 1992 "Tracing the Linkages of World Views, Information Handling, and Communications Vehicles." *Agriculture and Human Values* IX(2): 4-16.

Rogers, E. M. 1983 *Diffusion of Innovations*. 3rd Edition. New York: Free Press, 1983.

Slugoski, B. R., M. Lalljee, and R. Lamb. 1993 "Attribution in Conversational Context: Effect of Mutual Knowledge on Explanation-Giving." *European Journal of Social Psychology* 23(3):219-238.

Stewart, David W. 1990 *Focus Groups: Theory and Practice*. Newbury Park, CA: Sage.

Walter, Gerry. 1992 "Communication and Sustainable Agriculture: Building Agendas for Research and Practice." *Agriculture and Human Values* IX(2): 27-37.

Walters, D. T., D. A. Mortenson, C. A. Francis, R. W. Elmore, and J. W. King. 1990 "Specificity: The Context of Research for Sustainability." *Journal of Soil and Water Conservation* 45(1): 55-57.

Focus Group Interview Guide

Introduction

Introduction of interviewer and each respondent (first names only).

Background and Ground Rules

I would like to thank you all for taking the time to come to this discussion. I would like to spend the next hour asking you questions about how you evaluate new information on agricultural practices. I want to focus on what goes on in your minds when someone tells you of some new approach to some aspect of your farming operation.

There is no hidden agenda for this discussion. I would like you to be free to share your thoughts and opinions. The only ground rules to remember are that there no right or wrong answers to any of these questions and I ask that you speak one at a time. Everything that you say will be totally confidential and reported anonymously. Finally, just try to think of this tape recorder as just an extension of my brain, so I can better remember the discussion.

Does anyone have any questions?

2.3. Discussion Questions

2.3.1. Practices, Changes, Information

First, I would like to get an idea about your operations.

- Let's begin by going around the table and telling me a little bit about your farm, such as what crops you've been growing over the last few years.

  INDIVIDUAL INTERVIEWEE RESPONSES

- Have any of you made any major changes in your farming practices over the last few years?

  INDIVIDUAL INTERVIEWEE RESPONSES

- Are you thinking of new practices or ideas for the near future?

  INDIVIDUAL INTERVIEWEE RESPONSES

- Is there anything that I've just asked you that I should ask differently?

2.3.2. Information Sources

I'm going to make a grid of the practices or ideas that you've just told me. Let me know if I get it about right.

[Moderator recalls practices or ideas mentioned.]

- Would you like to add anything?

INDIVIDUAL INTERVIEWEE RESPONSES

- Where did you get the information you needed to design the changes in your operation?

INDIVIDUAL INTERVIEWEE RESPONSES

- Where will you look for information for new ideas?

INDIVIDUAL INTERVIEWEE RESPONSES

- What kind of information would you like to have but can't find from these sources?

INDIVIDUAL INTERVIEWEE RESPONSES

Finally, what form of information, such as print versus video, did you find most useful?

INDIVIDUAL INTERVIEWEE RESPONSES

2.4. Conceptual Mapping

Let's assume that you've collected all of the information you can about new practices or approaches. You are going to sit down and sift through all of this information. Let's assume that it, in general, all looks like it might be what you need.

2.4.1. Source/Method

Please look back at ideas and practices that we've discussed. Let's go through the list again, but I would like you to think about it differently.

When you're evaluating information, how important is the source?

INDIVIDUAL INTERVIEWEE RESPONSES

Why or why not?

INDIVIDUAL INTERVIEWEE RESPONSES

When you're trying to figure out if information is useful, do numbers from things like field trials make a difference?

INDIVIDUAL INTERVIEWEE RESPONSES

Why or why not?

INDIVIDUAL INTERVIEWEE RESPONSES

2.4.2. Relevance

Let' keep with the theme of evaluating information for new ideas or practices. I would like you to think about what makes information useful to you. By this I mean, what is it that makes information usable?

- How do you decide that something will be modified to fit into your operation?

  INDIVIDUAL INTERVIEWEE RESPONSES

- What are the most important factors in this decision?

  INDIVIDUAL INTERVIEWEE RESPONSES

- How well do you think the information source you now use address these factors?

  INDIVIDUAL INTERVIEWEE RESPONSES