NEW MEDIA APPLICATIONS FOR AGRICULTURAL AUDIENCES IN THE AGE OF ACCOUNTABILTY

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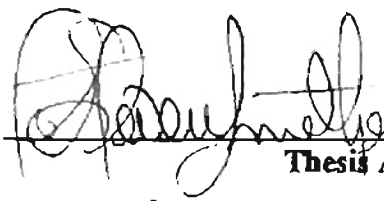

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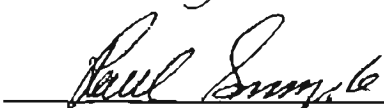

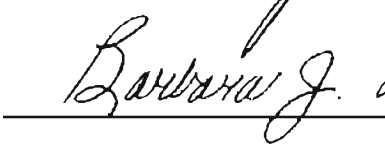

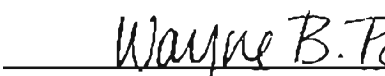

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So rarely is an individual as privileged to work with as many outstanding, dedicated professionals as I have been during the course of this investigation. Most certainly, my sincerest appreciation goes out to my advisor and mentor, Dr. Steven Smethers. His insight and encouragement have helped make this publication possible, while enabling me to grow both personally and professionally. To my other committee members, Dr. Barbara DeSanto and Dr. Paul Smeyak, my thanks goes out as well.

Opportunities are often presented in ways that are least expected, and sometimes even pose some risk in exploring them. Such may be said for my initial employment with the Oklahoma Agricultural Experiment Station. Since that time, I have been involved in several different projects-- all of which have meaningfully contributed to my current work. For Dr. D.C. Coston's "bold and daring" decision to include me in the development of Oklahoma Dividends, my words of gratitude cannot quite express my thanks.

Oklahoma Dividends is in every way a collaborative effort. Through Dr. Coston's leadership, a number of individuals have played a role in the database's development. Among them, I would like to acknowledge Harry Mapp, Robert Keating, Kathy Conry, Kevin Gragg, and Todd Johnson. A special note of personal thanks also extends to those individuals at Oregon State University, particularly Gwil Evens, and to the state agricultural organizations, who have also made this study possible.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figure Page

CHAPTER I

INTRODUCTION

General

In the latter half of the 1990s, the term "accountability" has come to signify several, often diverging, interpretations of answerability when addressing performance and responsiveness. This is especially so for public institutions, which have historically enjoyed virtually unchallenged federal appropriations up until the end of the Cold War.[1] Today's accountability environment, however, is much more demanding in the public nonprofit sector, namely for land-grant universities.

Passage of the Morrill Act in 1862 established a new type of public institution designed to educate the working class in the agricultural and mechanical arts- the land-grant college or university. A key component of the land-grant system is the agricultural experiment station program created by the Hatch Act of 1887 to conduct research on improving production practices. The Cooperative Extension Service was later established in 1914 by the Smith-Lever Act to disseminate information gleaned from the experiment station's research to both agricultural and urban audiences. Agricultural activities conducted through the land-grant system have had a long-standing reputation of serving the public good, and are generally funded accordingly.[2]

Status of agricultural divisions at land-grant universities has over the years implied several types of federal and state support.[3] In more recent times, however, competing interests and fewer resources have had a negative impact on the availability of these appropriations.[4] In 1965, government investment in research and development was

about 2.2 percent of the gross domestic product, whereas in 1997 that figure dropped to 0.8 percent.[5] Agricultural research and development support has fallen by 1.8 percent within the last three years.[6] In addition to funding issues, social and environmental concerns have also increasingly dotted the accountability landscape.

Performance audits or reporting mechanisms (mandated or otherwise) are often used in the handling of accountability issues as are other various communications techniques. To better manage accountability, the Division of Agricultural Sciences and Natural Resources (DASNR) at Oklahoma State University has developed several "accountability tools." New media technologies have been used to design one such tool known as "Oklahoma Dividends," an electronic database that stores, sorts, and retrieves information about agricultural research and extension projects.

Background

Electronic communications technologies made possible through computers and on-line services offer promising new ways to disseminate large amounts of information that can be specially tailored to specific audiences. The potential of new media in the handling of accountability issues was recently explored at the Accountability Systems Workshop October 2-4, 1997 in Minneapolis, MN. Workshop participants totaled 280 agricultural educators, communicators, and administrators representing 44 agricultural divisions of land-grant universities.

The interest in the Accountability Systems Workshop indicates that the desire to understand and better manage accountability is widespread and salient. Of the management options presented, the "accountability system" seemed to be highly favored with 16 representative systems on display- all tapping into the potential of new media.

The concept of an accountability system originated at Oregon State University in 1992 with the development of Oregon Invests. It has since been used as a model for other systems, including Oklahoma Dividends. Accountability systems can best be described as "systematic, flexible, and accessible database(s) tailored to communicating with key decision makers and general audiences."[7] These new media applications can present different levels of information with text, color, still pictures, video, and audio while offering flexibility through search engines.

Oklahoma Dividends' construction centers on taking advantage of the capabilities new media present in order to provide meaningful information for a diverse number of audiences. Carrascal, Pau, and Reiner argue that the overall aim of "hypermedia" should be to give the end user ultimate control.[8] This may be accomplished through the use of different information formats (as described above) presented within an associative structure made up of navigational pathways. While interface design will be expanded upon in proceeding sections, it is important to understand these basic concepts to grasp the nature of Oklahoma Dividends.

As indicated, Oklahoma Dividends is designed to be a significant part of a larger effort to convey to stakeholders the value of Oklahoma agricultural research and extension. Its general intent is to give a more holistic account of "what we do" and the outcomes of these activities in terms of economic, social, and environmental consequences. Originally designed as a presentation tool, the possibility of making Oklahoma Dividends available on-line is currently being explored.

In activating Oklahoma Dividends, users are directed to the "Main Menu." Here, a search may be initiated using the database's four search engines; each individually

capable of querying projects by key word, department affiliation, geographic impact, and cooperator association, respectively. Direct access to the economic, social, and environmental consequences for all database projects is also provided through the Main Menu in addition to "help" information. As in all database layouts, navigation is made possible via buttons and user-specified selection criteria, such as key words and check boxes. Pictures, graphics, and colored text are also added to the majority of layouts as a means of enhancing visual appeal and information depth.

For each project showcased in Oklahoma Dividends, there is a series of inter-connecting layouts that contain specific and increasingly complex levels of information. The "Main Layout" of each project explains the overall research problem or educational objectives while providing a description of the approach and results to date. In addition to this textual description, a "Project Highlights" box features simplified, bulleted items to enhance the database's capacity as a presentation tool.

Perhaps the most dramatic expansion of Oklahoma Dividends' application as a presentation tool is the digital movies of selected projects, accessible via the Main Layout. These 30-60 second Quick Time Movie clips feature research and extension personnel expressing the relevance of their work for Oklahomans today and in future generations. Along with these video clips, other types of project information are also accessible through the "Main Layout's" navigational buttons.

Users can navigate to the "Project Details" layout where a more in-depth description of each project exists. This layout also contains information explaining how project techniques and applications are applied in the classroom and a listing of

cooperators (research institutions, federal agencies, companies, and agricultural organizations), who have made project contributions.

Another addition to Oklahoma Dividends is a set of "effects" layouts that textually describe the economic, social, and environmental consequences of each project as realized by the citizens of Oklahoma. Related layouts explain how the research results or extension materials are disseminated to clientele, both in general and by county. "Appendix A" contains several examples of Oklahoma Dividends layouts.

Statement of the Problem

A major obstacle in the current handling of accountability issues is the fundamental lack of knowledge on how to manage accountability through the use of new media applications. Accountability, in today's terms, generally refers to a wide spectrum of expectations, the specifics of which are not often entirely understood.[9] Financially austere times and demands for social and environmental responsibility challenge public institutions to devise more efficient methods of garnering greater accountability with the publics they serve. Providing meaningful information through communication channels appropriate to targeted audiences is likely to be a key ingredient for future success.

Purpose of the Study

Accountability systems are highly experimental communication tools that promise considerable advancement in information dissemination and the handling of accountability issues. Although preliminary observations suggest these new media applications can be effective in this regard, no formal research has been conducted. It is not known whether the information conveyed in Oklahoma Dividends is meaningful to

targeted audiences or even relevant to DASNR's accountability environment. Further research is required to justify and, if appropriate, guide the database's continued development.

The purpose of this study is to evaluate the effectiveness of Oklahoma Dividends in managing accountability issues. This will require an investigation into the types of information relevant to targeted audiences in preserving accountability, and whether Oklahoma Dividends is considered to be a useful, credible source. In addition, the study will measure the usefulness of the database as a presentation tool and explore the possibilities of making a version available on-line. An analysis will also be provided which compares traditional communication channels to accountability systems, on-line or otherwise.

Research Objectives

Through this research, the following questions will be answered:

1. How do new media technologies, such as Oklahoma Dividends, rate in garnering a greater sense of accountability among state agricultural practitioners?
2. What is the overall effectiveness of Oklahoma Dividends as an electronic communications tool for group presentations?
3. How useful would an on-line version of Oklahoma Dividends be for individual Oklahoma farmers in retrieving information now and in the next five years?
4. From which communication channels do Oklahoma agricultural practitioners prefer to receive information?
5. How might Oklahoma Dividends be better constructed to more completely fulfill information needs and accountability requirements?

Methodology

In coordination with the Oklahoma Agricultural Experiment Station, a series of one pilot study and three extended focus groups was conducted from April through June 1998. Participants were selected based on their affiliation with state agricultural organizations targeted for involvement in this study by the Experiment Station Director. These targeted organizations represent Oklahoma's top agricultural commodities (beef and wheat), and include state affiliates of the Farm Bureau, Farmers Union, Cattlemen's Association, Cattlewomen's Association, Beef Industry Council, Wheat Commission, and Livestock Marketing Association.

A pilot study focus group of representatives from the above organizations was held on February 20, 1998. The purpose of this pilot study was two-fold: gauge first impressions of Oklahoma Dividends and solicit assistance in conducting the remaining part of the study. After expressing favorable attitudes toward the database, pilot study participants agreed to help coordinate additional focus groups. Freedom was given to these organizational contacts in selecting study participants and setting meeting times and dates.

The following state agricultural organizations agreed to coordinate extended focus groups for the main part of this study: Farm Bureau, Farmers Union, and Cattlemen's Association. The Farm Bureau opted to organize a focus group of members from its Young Farmers & Ranchers affiliate. Likewise, the Cattlemen's Association scheduled a focus group session during one of their Junior Cattlemen's meetings. And, in drawing

from older members, the Farmers Union elected to have a county advisory group serve as focus group participants.

Each focus group met for approximately two hours. Participants were first asked to fill out a questionnaire designed to measure attitudinal perceptions toward the Division of Agricultural Sciences and Natural Resources. Several other questions also helped determine information preferences and general computer use. A demonstration of Oklahoma Dividends, specially tailored to fit the interests of individual focus groups, was then given, followed by focus group discussion. Common themes and differences within and between focus groups were identified and analyzed in relation to the research objectives.

Rationale and Theoretical Framework

Accountability

In its most narrow interpretation, accountability involves answering to a higher authority in a bureaucratic or organizational chain of command.[10] This rendition is likely to be based on the route word, *account*, meaning to be answerable for in terms of providing an explanation or cause of that has worth, standing, or importance.[11] Traditionally, being "accountable" in the public sector requires reporting actions and performance through a clearly defined mechanism as per an explicit mandate.

Contemporary perspectives have expanded the notion of accountability to include not only performance reporting to higher authorities, but also to the public at large.[12] This broad conception is preempted by the popular usage of the term, which associates accountability with obligation. Cooper argues that these two terms are technically

distinct. Whereas accountability in his view assumes the traditional definition of answering to a superior, obligation entails "a responsibility for something."[13] Obligation, then, rests in attaining a certain level of performance or an intangible objective like "public trust."

Public trust, according to Kearns, is bestowed to organizations, which fulfil implied promises to constituencies by pursuing stated missions in good faith.[14] Within the accountability environment, maintaining public trust is often indistinguishable, although theoretically separate, from acting in the public interest. Kearns notes that "public interest" is not an easily defined term, but generally involves diverse perceptions and values regarding public needs and priorities.[15] It is conceivable, then, for organizations to pursue public interest in ways that violate regulatory or bureaucratic definitions of public trust, thus complicating the accountability arena.

Additional complications within the accountability environment may also be found between the application of accountability and ethics. Again, the conflict lies within the interpretation of terms. Whereas accountability traditionally refers to following orders, ethics is primarily concerned with decision making that coincides with accepted and *defensible* moral codes that establish right from wrong.[16] Kearns suggests that organizations must make ethical choices in accordance with personal, professional, organizational, and social norms in preserving public trust.[17]

Broader conceptions of accountability, based on contemporary public perception, suggest that formal oversight and public scrutiny are both salient within the accountability environment. Romzek and Pubnick advance this interpretation in submitting that "accountability involves the means by which public agencies and their

workers manage the diverse expectations generated within and outside the organization."[18] Managing public expectations implies that organizations can take *proactive* steps in response to the accountability environment by taking "strategic steps," possibly including accountability systems.

Kearns provides a theoretical framework from which organizations can strategically manage accountability. His strategic approach is built on the following assumptions:

1.) Accountability...is the obligation of public and nonprofit organizations to serve a higher authority-public trust-which is the ultimate source of their mandate, authority, and legitimacy,

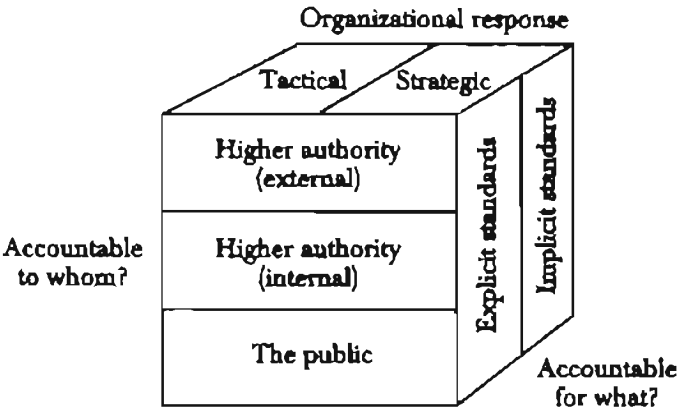
2.) While standards of accountability often are formally codified...they are also defined by implicit expectations of taxpayers, clients, donors and other stakeholders,

3.) Standards of accountability (explicit or implicit) are dynamic components of any organization's strategic environment, and

4.) Standards of accountability should be continuously monitored and incorporated into the organization's strategic management process.[19]

Based on the above assumptions, Kearns' "strategic management approach" to dealing with issues of accountability encompasses the many dimensions contemporary definitions put forth. As he suggests, "a public dialogue about accountability often is hindered because the term means different things to different people."[20] In understanding and managing accountability, Kearns offers a "map" that is representative of its various complexities. As shown in Figure 1., "The Accountability Cube" reveals tactical and

strategic options available for organizations to better manage the accountability environment.



Source: Kevin Kearns. Managing for Accountability (San Francisco: Jossey-Bass Inc. Publishers, 1996).

Figure 1. The Accountability Cube

The framework presented in the "Accountability Cube" suggests that the accountability environment of any organization contains at least two dimensions: a set of accountability standards, explicit or implicit, and an organizational response, tactical or strategic.[21] As implied, explicit standards, codified by laws and regulations, stipulate performance reporting through a clearly defined mechanism. Implicit standards are alternatively based on public expectations and ethical standards rooted in various moral codes.

Organizational response to these types of accountability standards are defined as tactical, a reactive response to claims of standards infractions, and strategic, proactive measures taken to influence the accountability environment. Kearns offers four specific strategic approaches: Legal Accountability, Negotiated Accountability, Discretionary Accountability, and Anticipatory Accountability.[22]

Specific to this proposed research, Discretionary and Anticipatory Accountability will be discussed in full. Legal and Negotiated Accountability involve reactive organizational responses specific to bureaucratic regulations and implicit public standards, respectively. These management options, however important to be aware of, are not entirely related to the development of accountability systems, and will therefore not be discussed further.

In dealing with an accountability environment devoid of identifiable claims of dissatisfaction, the Discretionary Accountability approach may be employed.[23] Although external pressures may be present, managers, using this approach, have great latitude in proactively influencing accountability issues. Self-defined and self-enforced norms and standards of professional practice can be applied to the development of communication tools. Kearns identifies annual reports and information technology, like management information systems, as examples. Furthermore, he stresses the importance of seeking meaningful input from organizational stakeholders.

Like Discretionary Accountability, Anticipatory Accountability is a proactive approach, but focuses on preparing the organization for emerging changes in explicit standards.[24] Kearns urges organizations, using this strategic approach, to manipulate the accountability environment by shaping compliance standards.

Approaches outlined in Kearns' framework for Strategic Management Accountability may be employed separately or in any other configuration. The important implication is that organizations should proactively manage accountability issues. The key to better management may lie in the empowerment of external constituencies.

Paul maintains that "the effectiveness of accountability mechanisms will depend on whether influence of the concerned stakeholders is reflected in the monitoring and incentive systems of service providers."[25] Broader standards of accountability, as Kearns' strategic management approach suggests, require organizations to consider stakeholders when developing management practices.

Osborne and Gaebler maintain that organizations must be "less rule oriented and more mission focused."[26] They suggest that a new framework of accountability must include mechanisms to empower citizens to play a more meaningful role in the accountability environment. Although a detailed explanation of these mechanisms was not provided, this would seem to demand that public officials embrace a deeper commitment to educate their stakeholders.

Diffusion of Innovations

New perceptions of accountability suggest organizations endeavor to develop more efficient means of educating stakeholders. Accountability systems seek to do this using new media including computers and, in some cases, on-line services. How successful these technologies are in managing accountability issues may be explained using diffusion of innovations theory.

Communications researcher Everett Rogers defined diffusion as "the process by which an *innovation* is *communicated* through certain *channels overtime* among the members of a *social system*."[27] An innovation is an idea, practice, or object that is perceived as *new* by an individual, group, or organization. In this case, the social system is the agricultural community, which primarily includes producers, businesspersons, legislative decision-makers, experiment station researchers, and extension specialists.

Boundaries are created within the social structure of a system that determine the extent an innovation will diffuse.[28] Additionally, the rate of diffusion itself can also be determined by the characteristics of a social system, including a shared set of norms or commonly held values.[29] Rogers explains that these norms define a range of tolerable behavior and serve as a guide or standard for members of a social system. An important factor in the rate of diffusion is its compatibility with the existing social system.

In addition to the social structure of a given system, there are at least five other identifiable factors that can effect the rate of adoption. All relating to characteristics of innovations, these factors include compatibility, relative advantage, complexity, trailability, observability, and reinvention. Yet, even when an innovation has obvious advantages, its widespread adoption among the members of a social system usually takes years.

Identifying the stages of the diffusion process becomes critical in determining, in this case, whether computer communication is a viable method of disseminating information. To some degree, it might even be applicable to how favorably perceived Oklahoma Dividends will be as an electronic presentation tool. Rogers suggests that there are five stages in the diffusion process: knowledge, persuasion, decision, implementation, and confirmation each defined as follows:

1.) Knowledge (*awareness*) occurs when an individual is exposed to the innovation's existence and gains some understanding of its uses and how it functions.

2.) Persuasion occurs when an individual forms a favorable or unfavorable attitude toward the innovation. At this stage, the person

develops an *interest* in the innovation and seeks to gain additional information while considering general benefits.

3.) Decision occurs when an individual engages in activities that lead to a decision to adopt or reject the innovation. During this *evaluation* stage, the potential adopter mentally weighs the pro and cons of an innovation, gains additional information, and decides to try it.

4.) Implementation occurs when an innovation is put to use, either by experimentation or actual practice. In the Implementation or *trial* stage, the potential adopter determines how well suited the innovation is for his or her particular situation through experimentation.

5.) Confirmation occurs when an individual seeks reinforcement of the adoption decision. It is at this stage when *adoption* of the innovation takes place. However, rejection is also likely at this time.

Communication channels play a fundamental role in the diffusion of innovations. It is important to note that during each stage in the diffusion process certain communication channels might become more influential than others. Lionberger argues that research findings warrant the tentative ranking of the following sources by frequency of use for each stage in the diffusion process.[30]

TABLE I

RANK ORDER OF INFORMATION SOURCES BY STAGES IN THE DIFFUSION PROCESS

Stages in the Adoption Process				
AWARENESS Learns about a new idea or practice	INTEREST Gets more information about it	EVALUATION Tries it out mentally	TRIAL Uses or tries a little	ADOPTION Accepts it for full-scale and continued use
1. Mass media—radio, TV, newspapers, magazines	1. Mass media	1. Friends and neighbors	1. Friends and neighbors	Personal experience is the most important factor in continued use of an idea
2. Friends and neighbors mostly other farmers	2. Friends and neighbors	2. Agricultural agencies	2. Agricultural agencies	1. Friends and neighbors
3. Agricultural agencies, extension, vo-ag, etc.	3. Agricultural agencies	3. Dealers and salesmen	3. Dealers and salesmen	2. Agricultural agencies
4. Dealers and salesmen	4. Dealers and salesmen	4. Mass media	4. Mass media	3. Mass media 4. Dealers and salesmen

Source: Herbert F. Lionberger. Adoption of New Ideas and Practices (Ames: Iowa State University Press; 1960).

One study that supports Lionberger's ranking of information sources for each stage in the adoption process is that of Gross and Ryan's in 1940 on the diffusion of hybridized corn. During the 1940's, the agricultural revolution was in full swing. Every thing from new harvesting equipment to chemical pesticides was being introduced into agricultural production systems to help increase production capacity. Gross and Ryan sought out to characterize innovation adopters and suggest ways to manipulate the diffusion process.

Hybrid seed corn was the result of 20 years worth of genetic research at Iowa State University. Compared to traditional seed corn, hybridized varieties promised higher yields while being more drought resistant and better suited for mechanical

harvesting. In fact, from when it was introduced in 1927 to 1947 nearly every farmer had switched to growing hybridized corn despite dissimilarities with traditional varieties.

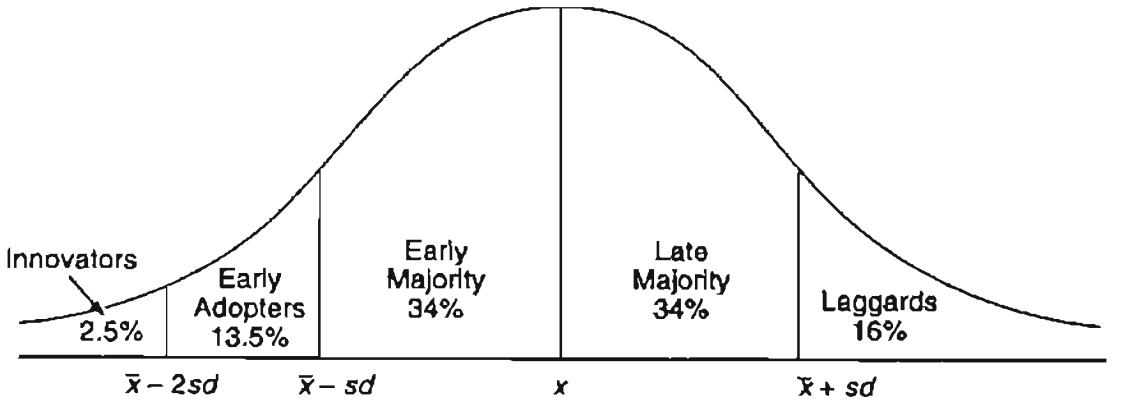
Gross and Ryan focused on answering four basic questions about how hybridized corn diffused throughout Iowa producers: 1.) What factors played a part in the farmer's decision to adopt, 2.) How did hybridized corn come to the farmer's attention, 3.) How long did it take between awareness and action, and 4.) What sort of pattern did the diffusion of an innovation exhibit overtime?[31]

Answers to these questions were found by interviewing 259 corn producers from two farming communities, one in Jefferson County and the other in Grand Junction County. Each farmer selected to participate had been growing corn prior to the introduction of hybridized corn. Therefore, every one in the study had had the opportunity to adopt the new seed.

Gross and Ryan concluded that the adoption of an innovation depends upon some combination of interpersonal ties and frequent exposure to the innovation.[32] In the case of hybridized corn, adoption was found to be on a *gradual* and almost *experimental* basis. A complex relationship was found between the time and degree to which various interpersonal and media sources were active as channels of information and influences in the decision-making process.[33] As indicated, Lionberger's ranking of sources illustrates these trends. Also of importance in Gross and Ryan's study, different groups or types of subjects were found to adopt hybridized corn at different times.

In 1963, Rogers included the patterns, processes, and types of people who adopt innovations into his typology of the diffusion process, including the stages in the

diffusion process as discussed above. Most importantly, Rogers identified the differences between the types of people who adopt innovation.



Source: Rogers, Everett. Diffusion of Innovations. 4th ed. (New York: Free Press, 1995).

Figure 2. The Relationship Between Types of Adopters Classified by Innovativeness and Their Location in Time and Space

Figure 2 illustrates the different types of adopters in the diffusion process. Innovators are active information-seekers about new ideas.[34] They are often characterized as being venturesome, eager to try new ideas, and risky. Early Adopters are "respected by their peers...more integrated [into] the social system...opinion leaders."[35] Likewise, the Early Majority interact frequently with their peers yet may deliberate for some time before completely adopting an idea and rarely leads the diffusion process.[36] Skeptical and prone to require peer pressure, the Late Majority tends to adopt new ideas just after the average member of a system.[37] Laggards are last type of adopters in the diffusion process, and are generally the isolates in a system and suspicious of change.

Significance of Study

Accountability is a concept with many dimensions. It is likely that public organizations are familiarized in managing the traditional accountability environment through performance audits and other formal reporting mechanisms. However, there seems to be a fundamental lack of knowledge on how to manage contemporary accountability issues. Kearns' Strategic Management Approach provides insight into coping in today's accountability environment, but leaves organizations to develop viable communications tools without any specific guidance.

The findings and recommendations of this research can help serve as a guide for organizations seeking to better manage accountability through new media applications. Communications research is needed to construct messages that are meaningful to external audiences. Additionally, viable methods of dissemination need to be identified. Key to this is determining what stakeholders think about accountability and, consequently, which types of information they prefer. This study will also help determine whether computers and on-line services are appropriate communication mediums for agricultural audiences.

Study Limitations and Assumptions

Oklahoma Dividends is a prototype database, containing only about 10 percent of the agricultural research and extension projects conducted by the Division of Agricultural Sciences and Natural Resources. This presents significant limitations to the research. Participants may not be able to conceptualize what the database will be able to offer beyond the development phase. Focus group discussion may therefore present only

limited feedback. It could be assumed, however, that when properly explained most study participants will understand and be able to imagine the "end product."

Another limitation to this study is that not every focus group can be coordinated in the same exact way. That is, demonstrations of Oklahoma Dividends differ according to which group is being addressed. This again relates back to the fact that Oklahoma Dividends is a prototype. Including at least three projects relevant to each focus group into the database before individual sessions were held helped compensate for this limitation.

Outline of Remainder of Study

In Chapter II, a topical review of the literature on computers in agriculture is used to help explain factors associated with predicating the acceptance of Oklahoma Dividends. Specifically, communications studies on computer adoption and information preferences of agricultural practitioners are presented. Plus, studies on visual literacy and interface design provide recommendations on the development of on-line services and electronic presentation tools.

Chapter III includes a description of the research methodology used in this study. The data collection plans and methods of analysis are outlined.

Chapter IV reports the findings and analysis of the data.

Chapter V includes a brief summary of the study. Conclusions are stated and recommendations made to implement the findings of this study. Opportunities for further research are also defined. This chapter also includes a brief conclusion to this thesis.

CHAPTER II

LITERATURE REVIEW

General

Throughout this chapter, a topical review of the literature on computers in agriculture will be presented. Chapter II will include a historical background of computer technology with respect to agricultural communities. Various theories and associated studies on the adoption of computers and information preferences of agricultural audiences will be explored. Additionally, commentary on visual literacy and interface design will provide additive indicators for the acceptance of on-line services and electronic presentation tools.

Fusion of Computer and Communications Technologies

The first manifestations of computer technology in the early 1950s were primarily used for projects commissioned by the U.S. Department of Defense. Spanning across the expanse of several average-sized rooms, these large assemblages of electronic circuit banks and wires preformed rapid, often complex, calculations. Additionally, large amounts of data could also be complied, sorted, and stored.

Early on, computers, although functioning in many of the same respects as contemporary systems, were stand-alone. Data transfer between geographically isolated computer systems involved the physical transportation of source through postal mail only to be re-coded once it reached its destination.[38] Stallings describes the computing environment prior to the communications era where "the typical computer was large and

expensive."[39] Computer technology did become commercialized in these formative years, but only large companies and universities could afford private mainframes.[40]

As computers became more powerful and demand for their use grew, batch operating systems gave rise to a new hybrid that allowed for many operations to be completed at once. These "time-sharing" users in the 1960s accessed terminals that were in close proximity to the computer. But soon the demand for remote terminal access infused computer technology with public telephone systems. Digital data could then be converted into analog signals and transmitted across pre-existing telephone lines. The dawn of the Information Age had begun.

By the 1970s, computer communications technology made it possible to access information housed in remote computer systems directly and in real-time. According to Wang, Gopal, and Tung, "The marriage of computers and communications revolutionized computer applications and created new market segments."[41] These advancements helped create computerized reservation systems for the airline, car rental, and hotel industries, electronic fund transfer systems for the banking industry, and data interchange systems for interconnecting companies, among others.

Within a relatively short time frame, the expansion of computerized technologies throughout the business sector gave rise to what may be considered the greatest catalyst for wide-spread computer adoption: the personal computer or PC. The desktop computer was only about a thousandth the size of its mainframe predecessors, but likewise limited in terms of its data processing power. Although supply-side competition to market PCs ensured some consumer choice, the cost of early models was generally beyond the means

of most households.[42] Furthermore, it was not until consumer demand for PCs grew that improvements in software applications and data storage were made.

Around 1980, the personal computer age had begun as "user friendly" interfaces and "killer apps" expanded the utility of the PC and its market audiences.[43] Operating systems driven by menus and graphical icons eliminated the need for users to learn complex computer codes or languages. Innovations in data storage lead to the advancement of more sophisticated computer applications for word processing, accounting, publishing, and much more. At this time, however, there were few agricultural software programs.[44] Yet, as PCs became more powerful, advancements in computer communications technology steadily increased.

Computer communications were primarily text-based up until the mid-1980s. Databases maintained by both public and private enterprise provided a wealth of written information on a vast number of topics accessible via a telephone connection.[45] In agriculture, the first series of databases, often called "expert systems," were made available to help producers make more effective management systems.[46] Videotext and teletext systems were also in use. However, in recognition that computerized information types could be expanded to better entertain and educate users the concept of multimedia quickly diffused.[47]

Multimedia is an art-world term, often credited to designers Charles and Ray Eames, that describes the fusion of media such as painting, sculpture, photography, music, and video.[48] Within the computer world, it is used broadly to describe almost any combination of media, ranging from simple text and graphics to Eames' vision.[49] Key to understanding multimedia for the PC is that users have the opportunity to interact or

respond to information presented in ways that potentially increase understanding.[50] Yet, exact standards of interactive multimedia have not been set nor is there any agreement on how much "interactivity" is needed to benefit the learning process.[51]

Information delivery systems realized through multimedia applications have been widely adopted in the areas of marketing, education, and personnel training.[52] Grenoble-O'Malley explains that this particular outgrowth signifies notable change within the communications industry. She asserts while discussing contemporary publicity and information campaigns that what was previously considered the "province of the printed word" has now been taken over by the use of visual formats. Other dramatic industry-wide changes may also be prevalent. Preece and Shneiderman, for example, conclude in their history on multimedia development that, "the distinction between developers and users is becoming increasingly blurred."[53] This is perhaps the most evident within the boundaries of "cyberspace."

American science-fiction writer William Gibson first coined the word cyberspace in his 1984 novel, *Neuromancer*, to define a computer-generated landscape that characters enter by "jacking in." Gibson's vision of this three-dimensional representation of a complex, computerized information network was drawn from watching players at video arcades. Since the release of *Neuromancer*, cyberspace has come to be associated with the millions of interconnected personal computer systems known as the Internet.[54]

The Internet, or "Net," has often been referred to as the world's fastest-growing communications medium. Its origins date back to 1969 when the U.S. Department of Defense's Advanced Research Projects Agency inaugurated ARPANET, a small net work of high-speed super computers designed to withstand military attack. Throughout

the 1970s and early 1980s, ARPANET's popularity grew amongst government agents and scientists. By 1984, as the number of personal computers increased the Internet grew beyond the purview of the military and research institutions into the business world.

Today, approximately 30 to 40 million people in more than 160 counties have some form of Internet access.[55] However, in contrast to its formative years, no one owns the Internet, and no single organization controls it. Instead, a vast wealth of information on virtually every possible topic is supplied through private and public sources. While "surfing the net," for example, agricultural users can access the World Wide Web (www) to find "sites" featuring regional weather reports, hourly market information, agricultural news, pesticide spray advisories, and much more. Additionally, services like electronic mail and discussion groups allow agriculturists to consult experts around the world when faced with problems or concerns.

With new users logging on daily, one estimate projects that Internet use will expand by least a hundred fold by the year 2001.[56] Nonetheless, whether Gibson's vision of cyberspace will be realized remains to be seen. Newly released Internet access systems, such as Web TV, which sell for about $300, each may indeed increase the number of Internet users by decreasing access costs. But will computer tools become as common on the farm as the socket set? Furthermore, will producers (especially those who have no interest in computers) perceive benefits in interacting with multimedia presentations during group meetings?

The evolution of the computer has been primarily dependent on the demand for new applications and technological advancement. Agricultural applications and the number of dedicated users have been increasing overtime, yet at a rate slower than earlier

estimates had predicted.[57] It has been suggested that because agricultural communities traditionally resist change, not all producers will be computer users or desire any form of digitized information.[58] However, as discussed in the following section, societal influences over the last few decades may be working to dramatically transform the agricultural landscape.

Agricultural Communities & Societal Influence

Diffusion theory asserts that characteristics of social systems standardize which values and behavioral norms become accepted amongst affiliated members.[59] Therefore, as Rogers suggests, the structure of a social system directly influences the rate of diffusion for any given innovation. Social systems, however, are by no means static. Even agricultural communities in the U.S. have experienced times of transition, and are likely to undergo change in future years.[60]

In characterizing agricultural communities overtime, Allen and Dillman propose a framework for understanding changes in the agricultural landscape. In its simplest form, the model posits three distinct "eras" of social and economic organization and their relative strengths overtime. This framework may help place the potential for new media adoption in its the proper context by illustrating what influences social systems have on the adoption rates of innovations. Additionally, future trends may be explored.

Theory of Social Organization & Group Norms

At the onset of the Industrial Revolution, a mass exodus of rural citizens flooded urban areas in search of new, more promising employment opportunities. Farm and rural populations dwindled as industrialization and urbanization advanced throughout the

country.[61] Though not as strong as in years past, agrarian traditions do still continue to flourish in rural America.

Like other groups, farmers observe complex standards of social organization. In early childhood, individuals are taught social values and expectations through interactions with parents, teachers, and others.[62] It is through this process of socialization that behavioral norms or rules of individual action and interplay are internalized. Conformity to these standards depends on the group status of the individual, their willingness to conform, and how apparent deviant actions may be.[63]

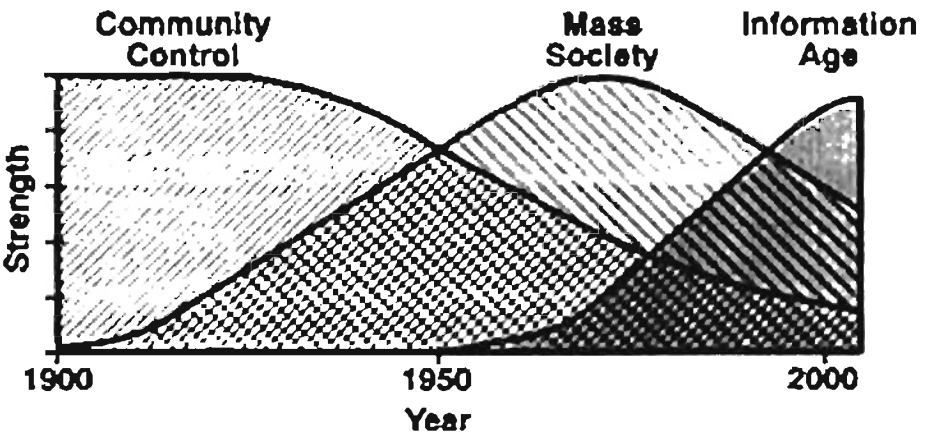
The American farmer has often been characterized as independent, self-sufficient, and conservative. Thomas Bender, a historian who studied New England communities from the seventeenth to nineteenth centuries, found most rural settlements "remarkably undifferentiated" where "it was difficult to draw a line between family and community, private and public."[64] Allen and Dillman's previously described model may be used to help further explain characteristics of agricultural social systems, namely within the context of technology adoption.

A Framework for Understanding Agricultural Community Change

In recent years, there has been a growing concern that the sense of community once shared by citizens in America's cities is fading. Some individuals blame the advancing information age.[65] Personal ties to family, friends, and neighbors are also of particular importance in rural life, but may likewise be threatened by external forces. Can a meaningful sense of community exist within rural towns and villages of the United States as we approach the twenty-first century?

Allen and Dillman's observational study of Bremer, WA, a wheat-growing community located on the Palouse Plains, answers the above question with a conditional "yes." According to their model, which characterizes general changes in American agriculture since the 1900s, influences of mass-society and the emerging information age can vary the amount of community control imposed on individual decision making.[66]

The predominance of forces consistent with the community-control, mass-society, and information age eras are expected to differ among agricultural communities. Additionally, Allen and Dillman suggest it is reasonable to expect some individuals to embrace ensuing change, or reject it passionately. Furthermore, "seemingly contradictory behaviors may be accounted for by people's efforts to adopt to the simultaneous and also contradictory expectations associated with each era."[67] Figure 3 illustrates the relative strength of Allen and Dillman's three eras of social and economic organization in U.S. society.



Source: John Allen and Don Dillman, Against All Odds: Rural Community in the Information Age, (San Francisco: Westview Press, 1994) 29.

Figure 3. Relative Strength of the Three Eras of Social and Economic Organization in U.S. Society

At the beginning of this century, families and immigrants connected by nationality settled into rural America to cultivate the land. Prior to the development and widespread use of modern transportation and communications technology, these farmers were largely confined to their communities. Allen and Dillman distinguish this time in history as the community-control era.[68] Attributes of communities (small size, shared interests and behaviors, and the lack of population turnover), cultivated homogeneity amongst members through the process of socialization. "Community becomes an umbrella social group influencing people to do the same things and not to do others, because that's what the 'community' expects of them."[69]

Under the pressures of community-control, individuals are likely to observe local traditions. This is evidenced in several different ways. Particular to this study, how one goes about farming is contingent on what crops and production practices are endemic to the area. As Allen and Dillman point out, "To try something totally new places farmers in a position to be embarrassed in front of neighbors."[70] Similarly, when there were production problems, talking them over with local friends and neighbors was the preferred course of action.

In the 1920s, technological marvels vastly improved the production and distribution capacity of virtually every American industry. Agriculture was no exception. Mass-production offered consumers once unimaginable supplies of high quality goods, including foodstuffs. To fulfill ever-increasing demands, new technologies and practices had to be indoctrinated into rural life. As indicated in Ryan and Gross' diffusion study on hybridized corn, this occurred slowly over many years.[71] Allen and Dillman's model characterizes this point in history as the mass-society era.

Notably so, hierarchical social structures largely replace community-controls when forces of mass-society become more prevalent in agricultural social systems. The government and other outside institutions, therefore, command greater influence on farming practices.[72] This is perhaps best evidenced by the popularity of agricultural subsidies once offered by the USDA's price-support system.[73] Requirements for participation obligated farmers to grow government-specified crops, and only a certain number of acres could be cultivated. Technological adoption, likewise, was primarily brought on by the efforts of the extension service and other external change agents, who were gaining credibility as information sources.

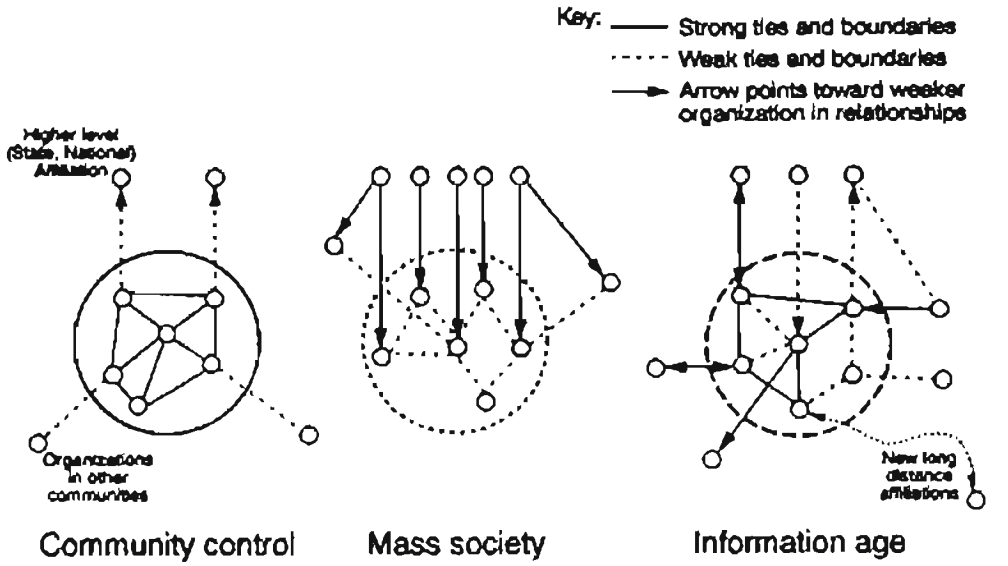
Advancements in computer and communication technologies are expected to be the next forces of change to dramatically redefine the agricultural landscape. In the emerging information age era, knowledge will play an increasingly vital role in the efficiency of production agriculture as time, energy, labor, and other resources become secondary production inputs.[74] Naisbitt suggests that a result of the advancing information age will be the "optional society."[75] It encompasses the idea that people will no longer be compelled to develop uniform, era-specific orientations.

Significant changes are reportedly occurring throughout the stages of food and fiber production from input supply to retail. Boehlje and Schrader predict that as agriculture enters the twenty-first century, focus on the production of general commodities will shift to supplying end-use markets with component specific commodities.[76] This transformation of the agricultural industry is expected to result in the development of two specific grower segments, traditional and industrialized.

Traditional growers are expected to operate in much the same fashion as family farmers do today, where the industrialized segment will likely adopt a manufacturing or "produce-and-then-sell" management mentality. Under this new paradigm, the variable production of commodities, including alternative and specialized crops, will require grower access to specialized information. As Rhodes explains, it is unlikely that the farmer down the road will have had the experience to offer sound advice.[77]

In recent years, there has been a dramatic growth in knowledge of the chemical, biological, and physical processes involved with agricultural production.[78] Those who can sort through and use this knowledge are expected to gain a significant competitive advantage through increased production capacity. Computers and, consequently, the Internet are already providing some growers with timely access to such information, yet the implications of the information age era are at this time difficult to project.[79]

In accordance with Naisbitt's notion of an "optional society," Allen and Dillman's model suggests agricultural communities will have greater latitude in decision-making activities during the information age era. Figure 4 outlines the general patterns for strength and direction of linkages between local communities and outside organizations in the three eras.



Source: John Allen and Don Dillman, Against All Odds: Rural Community in the Information Age, (San Francisco: Westview Press, 1994) 29.

Figure 4. General Patterns for Strength and Direction of Linkages between Local and Outside Organizations in the Three Eras of Social and Economic Organization

Linkages outlined above represent the dominance of external and internal forces in Allen and Dillman's eras of social and economic organization. Notably, as agricultural communities enter the information age, it would seem that hierarchical power structures lose direct control over individual decision-making. Only at certain levels might they be influential.[80] It is also important to note that the ties and boundaries illustrated in Figure 4 signify the efficacy of communication channels. In later eras, it t would appear that an increasing amount of information flows more freely both within and between social systems.

The trends projected above as well as the others described earlier may have a direct impact on the adoption of new media technologies and, consequently, their effectiveness in managing issues of accountability. However, these predictions still remain speculative. Additional research is needed to better understand the dynamics of agricultural audiences, specifically in terms of their innovativeness and propensities.

Relevant Communication Studies

Computer technology, virtually non-existent five decades ago, has diffused rapidly since its inception and is considered of major strategic importance in several industries, namely business.[81] Advancements in communications software and other applications have created new market segments throughout the 1980s and 1990s. In 1997, computer technology accounted for nearly two percent of the U.S. gross national product. Yet, the magnitude of the computer's effect on the agricultural industry still remains undetermined.

Successful Farming magazine predicted in 1983 that 80 percent of American farmers would be using personal computers to assist them in farm management by 1990. The first national study conducted in June 1997, however, revealed that of nearly 34,000 agricultural operations, representing all sizes and types, only an estimated 31 percent owned or leased computers.[82] Notably, "farm business" was reported as the most cited computer use. Yet, this sharp contrast between expectation and reality suggests identifying factors in computer adoption is critical to determining whether new media applications will serve as effective communication tools.

In the early 1980s, computer technologies were made available for individual use, and the so-called personal computer age began. At first, U.S. hobbyists, who simply loved technological gadgets, were the first users of home computers, due to the overall complexity of the innovation.[83] Rogers, Daley, and Wu found that a period of six to eight weeks of extreme frustration characterized subsequent users.[84]

Despite improvements in user interface, the perceived complexity of home computers was, and may still be, an important negative force in the rate of adoption. For

agriculturists, in addition to complexity, the lack of relevant software also seemed to restrict adoption rates.[85] Software applications were generally business-oriented early on and tended to interest urbanites more often.

A 1988 National Telecommunications and Information Administration report challenged LaRose and Mettler to determine whether rural residents would indeed be behind in the information age. Two possible contingencies for rural communities were advanced. The optimistic scenario suggested that *eventually* rural residents would realize economic and social benefits promised by modern advancements. In the less favorable forecast, an inadequate telecommunications infrastructure would result in the loss of economic development. LaRose and Mettler focused on characterizing differences in information technology use and socioeconomic factors between rural and urban residents to determine the likeliest outcome.

A large-scale survey of seven geographically and demographically diverse rural and non-rural areas was conducted in 1988. Four types of communities were distinguished on the basis of a factor analysis using county telecommunications and demographic data. Community types, as described below, were recorded for each of the participants and used to identify "rural residents," individuals living in areas with populations of 3,000 or less.

LaRose and Mettler categorized community types into the following schema. Relatively isolated and sparsely populated townships inhabited by older individuals were noted as *eroding communities.* Districts marked by educated, prospering residents engaged in the exchange of retail goods and services became known as *rural commercial centers.* Active farming regions where large proportions of older residents are still

gainfully producing agricultural commodities were classified as *traditional farming communities*. And, finally, towns where high proportions of residents commuting to find employment, while a few live on farms, were distinguished as *bedroom communities*.

Data were collected in two phases. First, a telephone survey using random-digit dialing was administered to 1,400 adults, age 18 or older. Respondents were asked questions about employment, demographics, and familiarity with telecommunications and computer technology. Approximately 45 percent of the eligible households (148 rural residents, 298 non-rural residents) contacted completed the survey, and 512 individuals participated in the second phase of the study- the follow-up mail survey. Questions regarding use of, attitudes toward, and experience with telecommunications and computer technologies were completed and returned.

LaRose and Mettler found no significant demographic differences in terms of gender, age, employment, and income between rural and non-rural residents.[86] However, the trends are in the same direction as those typically found: individuals from rural areas were older, less educated, and had lower incomes than residents in urban areas.[87] Remarkably, there were no significant differences in respondents' use electronic technologies.[88] Plus, demographic variables were found to be poor predictors of use.

Complementary to demonstrating an equal likeliness for having jobs that require substantial information manipulation, respondents reported similar average exposure rates to telecommunications and computer technology. Specific to the study at hand, 38 percent of the urban residents reported some use of PCs, whereas 37 percent of rural residents explored the technology. Modem use was also comparable (16 percent of rural residents and 12 percent of non-rural residents).

It is noteworthy that respondents may have had an equal chance of receiving formal computer training in high school and college.[89] This may indicate that influences of perceived complexity in rates of computer adoption are lower than previously thought for rural and urban types, and perhaps more equalized. LaRose and Mettler's findings suggest that urban and rural residents may equally fare in the information age based on attitudes.[90] Although respondents did note that operating computers required special skills, there was strong agreement that learning them was worthwhile for personal and professional advancement.

Despite the overall willingness to use information technologies, wide disparities were evident among the seven communities surveyed.[91] This is *not* to say that rural/non-rural residence successfully predicts likeliness of use. Instead, a multiple regression analysis revealed that a combination of age and farm occupation was negatively related to adoption. Specifically, older farmers were the least interested in information technologies. Based on population characteristics and exposure rates, "Rural commercial centers may be the best prospects for integration into the information society; traditional farming and eroding communities are poorer prospects."[92]

Most rural residents, according to Allen and Dillman's model, are likely to "live in three eras," the degree to which depends on the specifics of the social system. Hence, age as a strong predictor of computer use may explain why some agricultural communities might prove more successful in the information age than others. As mass society and information age forces become more prevalent, they are increasingly incorporated into the behavioral norms of young people until change is widespread.

Hence, innovations and those of similar type become more *compatible* with social systems.

In addition to LaRose and Mettler's study, other researchers have found age to be a significant determinant in the adoption of new media. A study conducted from 1982 to 1989 revealed that in Iowa and New York, farmers 35-44 years old were the most likely age group to own personal computers.[93] Only the subsequent age group, individuals 45-55 years old, had consistent, yet significantly smaller increases in computer adoption.

Notably, age influences on adoption rates were found to be curvilinear based on income. Abbott and Yarbrough attributed this relationship to the idea that younger farmers could not afford computers, while older ones viewed them as less useful. Affects of age were previously considered to be the outcome of education; through acquired knowledge younger farmers would realize benefits computers more readily than older individuals.[94] This does not necessarily explain why farmers under the age of 35, in realizing the potential value of computers, would not adopt computer technology.

As indicated above, farm size (measured by income) was also identified as a factor in individual innovativeness in Abbott and Yarbrough's 1982-1989 study.[95] Farm sales of $100,000 or more were consistently associated with greater adoption of computers in all three time periods. In a subsequent study, Abbott and Yarbrough concluded that, "the number of farm-based computer applications used triples for those in the $200,000 and higher group."[96] Additionally, the difference in hours of use per week was also more than triple between low and high-scale farms.

Scale or complexity of the farm was also noted as a diffusion factor in Iddings and Apps 1990 study, when 18 farmers in south-central Wisconsin and northeast Kansas

participated in extensive personal interviews.[97] As one large dairy farmer explained, "It used to be when I had 40 or 50 cows I could keep a lot more information in my mind. [Now]...I've got to depend on the computer as a memory source." This suggests that farm size or amount of available capital must be above a certain level for an innovation to pay off.

Computers may offer large-scale farmers, who can afford computers, a *relative advantage* over traditional practices. Likewise, Abbott and Yarbrough argued that "the scale of a farming operation determines the potential benefit that might be derived from the use of new technologies."[98] In their 1990 study, 70 percent of high-scale farmers perceived greater benefits (modest or substantial economic gain) from the use of computers compared to half of the farmers with incomes of $100,000 to $199,000. For the low-scale farmers, only one third perceived any gain.

It is important to note that Abbott and Yarbrough also attributed positive perceptions of computer benefits with education levels and management abilities.[99] Their findings suggest that the accumulation of knowledge and skills is necessary in "envisioning" how innovations could be of value. This, in many respects, could be a function of gaining a relative advantage.

Notably, increased education levels and "management orientation" test scores were positively correlated with farm scale. Plus, they served as moderate predictors of computer use, which counters LaRose and Mettler's findings.[100] Twenty percent of farmers with some college experience or a degree had already adopted a computer by 1989. Furthermore, 29 percent of participants with the highest management orientation scores had a computer, compared to only 6 percent of those in the lowest score group.

A separate investigation conducted in Nebraska the same year as Abbott and Yarbrough's first study supports the above findings that age, education, and farm scale determine individual computer adoption.[101] Notably, 52 percent of computer adopters were under the age of 45, compared to 37 percent of non-owners. Plus, the number of individuals with post-secondary schooling or training was considerably higher in the adopter group. Yet, Schmidt et al.'s argument that a conceptual link exists between the perceived relative advantage of computers and gross farm income is perhaps the most remarkable.

The Schmidt study found that while 69 percent of computer owners had gross incomes of above $100,000, only 38 percent of non-owners did.[102] Perceived benefits of use also followed a similar trend. This indirectly lends support to Abbott and Yarbrough's conclusion that large-scale farmers perceive greater economic benefits from computer use than do farmers with smaller operations. It is important to note that, though contrary, LaRose and Mettler's findings may be more representative of the reality.

When talking with farmers in 1990, Iddings and Apps noticed a possible inconsistency in farmers' views on management that contradicted contemporary assumptions.[103] Interviewees affirmed the need for better farm management in order to increase profitability. However, automating management practices was given a low priority for fear that too much time would detract from the "hard work" necessary in making a profit. Iddings and Apps' finding that agricultural operators cite "the lack of time" as a major barrier to computer adoption parallels the 1991 findings of Taylor, Hoag, and Owen.[104]

In the advent of more reasonably priced computers, Findlay et al. decided to identify whether previously identified constraints on computer adoption in limited-resource farmers were still observable. Their 1993 study of 152 farmers in southern Alabama confirmed, in part, Abbott and Yarbrough's findings. When participants were asked to give reasons for not using computers on the farm, 40 percent cited cost and 21 percent indicated lack of technical knowledge as the main factors.[105]

These results may not *necessarily* indicate an inability to conceptualize the value of computers.[106] In fact, 61 percent of the participants surveyed believed computers could be effectively used in making "important management decisions." Yet, while 49 percent of the respondents had a high school education or less, low exposure rates suggested levels of perceived complexity might be high. Only 13 percent said they would give computer use some thought and eight percent would use one on a trial basis. However, 58 percent indicated a willingness to learn more about the technology.

It would seem from Findlay et al.'s findings that farmers would more readily adopt computers if convinced of a strategic economic advantage. As evidenced in Taylor, Hoag, and Owen's 1991 study, participant's believed that benefits of computer use simply did not justify financial and logistical costs until they attended training seminars.[107] Similarly, Iddings and Apps noted that the lack of information about agricultural software applications posed as the most significant barrier to adoption, and was easily removed for many of the study participants.[108] Rates of adoption found in early studies as well as more recent ones put these apparent knowledge deficiencies in the proper perspective.

Researchers' first efforts to characterize rates of computer adoption were considered "preliminary." Especially, in earlier years, expectations were tempered with the realization that there were few agricultural-specific computer applications available. In Abbott and Yarbrough's 1982-1989 study, rates of computer adoption were low and generally linear, rising between one to two percent per year to a total of 15 percent.[109] Of the 748 Nebraska farmers surveyed in Schmidt et al.'s 1989 study, only 25 percent had reported some kind of business-related computer use.[110] Most other studies conducted in the 1980s found rates of computer adoption similar to those described above, with some observable differences among states.

Later investigations in the 1990s revealed noticeable increases in computer use, often characterized by the production of new agricultural software and the growing popularity of the Internet. It has been argued that *Ladder-type* or "step-change" diffusion effectively demonstrates how expanding the functionality of computers creates new market segments, and will be used to help explain the stated-above trends. Typified as product invention, ladder-type diffusion is, in essence, the discontinuity of an old practice, or the emergence of a brand new product that provides functionality never realized before.[111] Incidentally, the adoption of computers in agricultural audiences prior to the convergence of computers and communications technology may be defined as *incremental innovation* or "product improvement."[112]

In some respects, ladder-type diffusion is representative of *re-invention* on a larger scale. But, as contrived by diffusion theory, incremental innovation is uni-dimensional, and its market impact captured through gradual performance-to-price improvements.[113] Ladder-type innovation, in contrast, is independent of price and can

break boundaries of old markets by attracting new groups of users. Wang, Gopal, and Tung's empirical study asserts that at least a 60 percent increase in demand for computers can be attributed to new products and services realized through communications technology.[114]

It is not definitively known whether communication technologies have made a significant impact on the number of agricultural computer users. In fact, a 1993 study of 216 New Jersey farmers revealed that regardless of production type, age, and years of farming experience, individuals of *all* income categories least preferred digitized information. However, in mirroring earlier studies, Travernier et al. concluded information technology could be used to reach certain types of individuals, surprisingly mid-income and specialized production farmers.[115]

While the above study suggests adoption of computers is restricted, no effort was made by Tavernier et al. to determine exactly how many participants knew about available technologies or had the necessary access to them. Plus, it should be noted that at the time of the investigation, Internet use had not yet reached the "critical mass" stage.[116] A later national study in 1997 found that of 9,400 New Jersey farms surveyed, 31 percent had Internet access.[117] This suggests preferences for digital information and, consequently, computer technologies might be on the rise.

Important to understanding the diffusion of any innovation is the concept of *critical mass*, which occurs when a sufficient number of individuals have embraced an innovation so that rates of adoption become self-sustaining.[118] Rogers explains that the rate of adoption for interactive media often displays this distinctive quality: individuals have little use of such technologies unless others connect into the system. For example,

interest in the USDA Sustainable Agricultural Network's electronic mail groups was marginal until a sufficient number of experts and other participants made the service worthwhile.[119]

Direct evidence, which supports the notion that a critical mass of agricultural Internet users is forming or will even guarantee the future application of new media, remains non-existent. Instead, several case studies preformed in recent years indicate numbers of adopters are increasing at the community level as the result of group interaction. Nebraska's Community Internet Navigator Program is one representative example.

The result of a cooperative effort between the University of Nebraska and community officials, CINP enables rural communities to improve their level of economic activity through better Internet access.[120] Its basic concept is simple: the increased availability of information on the World Wide Web can give users a distinct competitive advantage. Participation in the program took on the form of being in a computer club, with a university student (generally a member of the community) leading various training sessions and general meetings. Since its inception, the concept of CINP has spread throughout Nebraska. Several new programs now serve rural communities.[121]

Observations suggest community-based efforts to foster computer use are generating added interest in digital technologies. It is likely that increased computer knowledge coupled with the opportunity to both observe and experiment will reduce perceptions of complexity for potential adopters while demonstrating the relative advantage of use. This type of antidotal evidence suggests a critical mass of agricultural computer users is building, particularly because it is starting at the community level. In

this respect, it is also notable that computer technologies and the Internet are quickly entering rural classrooms and 4-H programs.[122]

Is the promise of more efficient communication through the application of computer technologies as elusive as ever? Evidence provided in this study suggests that while earlier audiences were narrowly defined, it may become increasingly easier to reach a more broad range of individuals. Computer use seems to be expanding, but not universally. Plus, as Mangold points out, "Farmers...realize the information age is not about tools that...transform or transfer information. It's about information."[123]

A case in point is the 1997 National Agricultural Statistics Service study, which indicates variable rates of computer adoption throughout the U.S. agricultural industry.[124] Nationally it would appear that computer adoption is on the rise. Of the 34,000 farms surveyed, an estimated 31 percent had computer access. However, a state-by-state break down reveals computer use ranges widely from 22 percent in Mississippi to 68 percent in Utah. Notably, farm access to computers in Oklahoma compares with the national average, and 9 percent are reportedly connected to the Internet. A more recent study, however, suggests these estimates may be low.

In assessing future application of the Oklahoma Mesonet, an on-line service that provides current weather information, Lucius, Kenkel, and Carlson found that 71 percent of the 85 producers surveyed had access to a computer. Most users, however, admitted to only using it occasionally. Internet use was reportedly higher than rates found in NASS' study; twenty five percent of the respondents utilize Internet services. Respondents did reveal some working knowledge of the Mesonet and its benefit to Oklahoma producers.[125]

Although the Mesonet and NASS studies illuminate the adoption rate of computer technologies for Oklahoma producers, relatively little is yet known. What current factors influence individual decisions throughout the diffusion process? Are there any significant obstacles for communicators to overcome in promoting new media applications? Additional research is required to answer the above questions as well as others that surface in evaluating the effectiveness of Oklahoma Dividends.

Communication Channels and Information Preferences

Information technologies offer new ways for communicators to disseminate information to wider, more diverse audiences. One important question to ask, however, is how do new media compare with traditional communication channels. The answer seems to be mixed. While Internet use is growing, it would seem that farmers still continue to prefer information from traditional sources.

When personal computers were first made available, LaRose and Mettler suggested "virtual social distance" would play a significant role in an individual's willingness to accept information technologies.[126] Virtual social distance refers to the degree in which individuals are willing to accept information technologies as a substitute for interpersonal interaction. Studies often depict rural residents as especially reliant on interpersonal information sources in comparison to other social groups.[127] Thus, as the daily routine becomes more automated, farmers may be at a distinct disadvantage.

Contrary to expectation, rural residents in LaRose and Mettler's study did not seem resistant to the new "information age culture." Instead, they were just as willing to use technologies for daily tasks as urban respondents. For example, 45 percent of the rural residents were willing to get daily news via computer as compared to 50 percent of

the urban residents. It should be noted, however, that virtual social distance was found to predict use; the greater individuals resist automation the less likely they are to adopt information technologies.[128] This may suggest that while farmers are not necessarily resistant toward the use of information technologies, such behavior is simply uncustomary.

Ford and Babb's 1988 study of 2,537 farmers in Indiana, Illinois, Iowa, and Georgia suggests traditional communication channels are the preferred sources of information for the general farming population. Farm magazines, other farmers, and family/friends ranked the highest overall and seemed to be used with the greatest frequency. University and government agency information did receive some use. Yet, only a few farmers used commercial farm services, brokers, consultants, and computer databases.[129]

According to Ford and Babb's findings, virtual social distance may play a greater role in predicting actual use than previously suggested. Personal, service-oriented information was predominately favored over written forms of communication for input purchasing and finance. Publications were noted as useful for making product sales and cropping decisions, but only one-third of the respondents reported periodic use. Notably, public information sources were the least depended on.[130]

Results presented above are consistent with those previously found, with one significant exception: county extension agents were rarely consulted.[131] Ford and Babb note this distinction and, in fairness, point out that a sizable amount of information marketed by the private sector may have its origins in the land-grant system. It was suggested in 1996 that private information providers, through new communications

technology, might better fulfill clientele's needs for flexible information formats and more open access.[132]

Recent advances in computer technology may generate new opportunities for agricultural communicators in reaching a more broad range of individuals. In 1993, Tavernier et al. tested this assessment by measuring farmers' propensity to use new media. Mail surveys were received from 216 New Jersey farmers of different crop types, income levels, years of experience, and age.[133]

On average, subjects preferred to receive farm-related information through direct communication. Interest was also expressed in receiving print media as a secondary source of information, and, to a lesser degree, broadcast channels were also named as sometimes useful. Computer-mediated communication was only reported as having value for a minority of farmers, who tended to be older in age and less economically secure. The general conclusion was that regardless of socio-economic factors, farmers commonly think alike with respect to all communication channels.[134]

Predicting farmers' information preferences, however, might not be as simple as Tavernier et al. suggest. Abbot and Yarbrough found that "those who already use conventional farm information resources the most are the ones most likely to adopt yet another information source."[135] Contrary to popular opinion, they argue that communicators should not expect to reach previously uncontacted audiences through new media. It is not readily apparent, however, whether digital information adopters still rely on traditional communication channels.

In examining farmers' use of videotext from 1987-1988, Abbott concluded that "new technologies compliment rather than replace existing information sources."[136]

However, Schmidt et al.'s 1989 study of computer use among farmers in Nebraska suggests some individuals may become increasingly reliant on new media. When examining the use of marketing information, traditional communication channels were found to be the dominant source, but electronic information seekers seemed less likely to use them.[137]

New trends in farmers' information preferences led Miller, Elliot, and Gamon in 1989 to characterize which types of digitized information were most frequently retrieved. A total of 56 Subjects were asked to rate the importance of 13 specific types of information available to them via the AgriData Network using a five-point scale. Analysis revealed that commodity information (market prices and reports) was viewed as the most important followed by agricultural news (national, state, and local as well as weather information) and outlook projections. Overall farmers tended to limit their use of on-line information to the broad area of up-to-date market news.[138]

Despite past advancements, little is currently understood about farmers' information preferences and the relative usefulness of new media, particularly in Oklahoma. State studies identified during the course of this investigation were conducted before the inception and subsequent growth of on-line services and, therefore, only focus on traditional modes of communication. Nonetheless, the findings of this research are still revealing.

Based on the premise that farmers require multiple information sources, Keating attempted to ascertain which communications channels were the most used for eight types of decision making. A total of 696 Oklahoma farmers, identified as being involved in some type of alternative enterprise, were surveyed from August to February 1989.

In acquiring general information about alternative agricultural enterprise, a majority of respondents preferred other farmers. Extension agents, fact sheets, newsletters, and other publications were also rated favorably, followed by area specialists, farm publications, grower organizations, manufacture/supplier representatives, newspapers, county personnel, and buyer/processor representatives, respectively. Information channels used by the greatest number of respondents were also consistently identified as leading sources when age, education, and farming classification were considered.[139]

Contrary to what might be expected, communication channels identified as the "most useful" in each of the eight management phases did not *necessarily* compare to those selected in receiving general information. When making legal/tax and financial decisions, most farmers preferred professional consultants. Other farmers were, however, widely identified as preferred sources in the remaining categories: overall decision-making/planning, purchasing seed or raw material, acquiring specialized equipment, selecting production practices, harvesting, and marketing.[140]

In 1992, while determining the most effective means of disseminating agricultural health and safety information, Oskam also noted trends in the information preferences of Oklahoma farmers. In particular, mass media channels were identified as a practical means of disseminating safety information based on general and topic-specific preferences. Television, magazines, newspapers, and radio were, respectively, targeted. Important to note is that, depending on the topic, certain communication channels were favored over others. This may be an important point to consider in determining what types of information may be best suited for Oklahoma Dividends.[141]

Wanjohi's 1993 readership survey of *Agriculture at OSU* is also enlightening in that it establishes how farmers might receive information about DASNR. Not surprisingly, farmers chose the Cooperative Extension Service as the most useful source in comparison to other various traditional direct and mass modes of communication. Other print publications, newspapers, friends and family, and, lastly, broadcast media were also noted in finding out about DASNR activities.[142]

Another relevant factor to the Oklahoma Dividends project found in Wanjohi's study concerns which types of information farmers would like more of. Most importantly, agricultural research was indicated to be the most interesting and desirable topic.[143] Additionally, among the participating legislators, topics related to economics and environmental issues were of considerable interest. The results of this study suggest that agricultural research and environmentally related information provided in Oklahoma Dividends may be of particular interest to external audiences.

Will using digital information become a regular part of the farmer's daily routine? Some studies suggest certain segments of the farming population do recognize advantages in adopting new media over traditional sources. It seems likely that, at least for some farmers, new modes of information transfer will compliment, rather than replace, existing ones. As Keating suggests, multiple information sources may play different roles throughout the farm management process. It is important to determine which communication channels are most preferred by Oklahoma farmers, and whether use of new media might present added advantages for the Cooperative Extension Service in disseminating information.

Visual Literacy and Interface Design

In recent years the term "literacy" has undergone a notable transformation in the field of education.[144] Literacy has traditionally signified those cogitative skills associated with the use of written language. As applications of image-based media become increasingly prevalent within today's society, there is a growing realization that people are becoming more accustomed to inputting these forms of information. Visual literacy suggests that messages are most effective when presented in such ways as to stimulate a variety of senses.[145]

Visual literacy entails the layering of information through combinations of pictures, words, graphs, charts, video and other elements. This new pathway to literacy allows communicators to more effectively transmit messages, and, hence, serves as the rationale for Oklahoma Dividends' interface design.

New media provide communicators with the opportunity to use different levels of information in order to facilitate greater understanding. Carrascal, Pau, and Reiner explain that in providing these "information units" users (or audiences) benefit from an enriched, non-sequential, customized connection that is more adapted to "the way human beings think." This is primarily done through the organizing information into well-defined, self-meaning, independent, and coherent units or concepts called "nodes."[146]

Nodes contain specific types of information that can be presented in various forms as long as individual elements are grouped together within a delineated area. Generally, for multimedia presentations, the number of nodes on a given layout is determined by the size of the view screen. No conditional limitations were specified for the number of nodes on a single web page. Carrascal, Pau, and Reiner do, however, note that regardless

of application type, individual nodes can be provided on a single layout or a series of layouts connected via "links."[147]

Links provide an associative connection between two or more nodes. A textual description or visual cue may be used to define what type of associative relationship has been established. Carrascal, Pau, and Reiner argue that the transfer of knowledge becomes increasingly accelerated as users realize enhanced information accessibility through the navigational opportunities made possible by links.[148] This represents one of the key advantages to using multimedia over traditional forms: individuals with diversified interests can easily build upon concepts at different levels of detail while deselecting non-useful information.

Navigational freedom does present users with certain advantages, but too much may result in confusion and, ultimately, disuse. As found in Gordon and Lewis' 1992 study of hypermedia in the classroom, users can become easily lost in a complex web of relatively unstructured information.[149] Making multimedia "user friendly" requires the developer to find an appropriate balance between ease of information access and application versatility throughout all phases of construction.

Individual components that make up the layouts of different multimedia applications are often referred to cumulatively as the "interface design." Relevant to this investigation is the fact that experts on multimedia development often agree that certain elements within the interface design should be treated the same for both presentation and individual-driven applications. Prior to providing these general recommendations, however, it should be noted that relatively little formal research has been conducted on this subject.

The persuasive power of visual aids in presentations is well noted. For example, 3M's 1986 study on the use of visual aids revealed that presentations accompanied with visuals proved more effective in persuading audience members to take a desired course of action.[150] Although this study was done using overhead transparencies, it is still valid in demonstrating the effectiveness of visual aids and, therefore, reinforces the use of electronic presentation tools. 3M study's findings may even be applied to interactive multimedia, particularly promotional sites.[151]

Color, white space, and typeface are important components of interface design, and have been associated with the persuasiveness or effectiveness of information transfer. Color focuses attention, speeds searching, and reveals organization and pattern to aid users in processing information more effectively. Keyes, however, recommends that color should be used *sparingly* to retain the benefits of differentiation without causing distraction.[152]

Exactly how much color is used (as part of featured element or the background) will depend on how the information is visually structured.[153] What should the audience's attention first be drawn to? Navigational links or buttons? Key textual information? It is important to note that research shows like-color elements are often perceptually grouped together regardless of their location.[154] But, regardless of what decisions are made, legibility should be the principle factor that guides color applications.[155]

As with color applications, the way information is visually structured also determines the use of white space. Research suggests that fewer features, especially type, more effectively aid in reader comprehension.[156] Berlyne's argument that "People have a

cognitive limit to the amount of visual cueing they can absorb before cues become distracting visual overload" supports this conclusion.[157]

Determining the appropriate amount of white space for a given layout is often contingent on user ability as well as differentiating key elements within the layout. Additionally, Keyes argues that white space plays a significant role in the effectiveness of type in terms its of readability. Space in between letters and words functions to aid in comprehension, while enhancing the attractiveness of a layout. Hence, the selection of typeface is critical to effective interface design.[158]

Many type and design experts contend that serif typefaces are more legible than sans serif faces because the extra lines added by the serif help guide the eye through the text. Due to screen resolution and how type is displayed in computer-mediated formats, serif typefaces might not be appropriate. A comparative study was launched in 1997 to determine the legibility of digitized serif and sans serif fonts using recall scores.

A total of 78 college students were selected to read one of two computerized forms. Each form featured either sans serif or serif fonts and both included 12 point and 14 point sized-excerpts. Multiple tests were administered to measure recall. Notably, Geske found that the optimal type for computer mediated communication was 12 point and that the choice of font made little difference.[159]

Important to note about Geske's findings is that, especially in terms of point size, they may only apply to the typeface legibility of individual-driven multimedia. As Mason suggests, interface design should be *slightly* modified for presentation purposes: developers must take into account the fact that layouts are displayed as well as enlarged through projection systems. Additionally, whereas the use of color, pictures, and

graphics is highly recommended for presentations, Mason cautions that these elements should be used more sparingly.[160]

The above discussion on multimedia interface design has been included to provide a general knowledge of the philosophy underlying Oklahoma Dividends' construction. This research seeks to build upon what research is available on the topic through feedback from focus group participants, which will, consequently, help guide the database's future development.

Summary

As agriculture advances into the twenty-first century, it seems apparent from Allen and Dillman's model and other expert opinion that several dramatic changes are taking place. The "hard work" paradigm associated with traditional farming communities may well be reciprocated with a management driven mindset built on knowledge acquisition. Unlike past "eras," communities now seem to have a greater variety of choices in the information age.

Computers may well play an increasing role in improving production efficiency by connecting farmers with real-time data and expert opinion. However, at this time, there do seem to be significant obstacles for communicators to overcome in promoting new media applications. As a result of the innovation's cost, complexity, or both, only a segment of the farming population seems active in considering adoption.

Research on Oklahoma farmers' use of computers and communications technologies is scant. A few studies do suggest some individuals recognize benefits in adoption, but little is known about what influences individual decision-making. Hence, predicting future use of new media remains speculative, at best. Without such

knowledge, realistically evaluating the effectiveness of Oklahoma Dividends becomes problematic.

In the summer of 1990, Decker and Yerka issued a call to identify "accountability requirements" of stakeholders at local, state, and federal levels and then build them into program evaluation activities.[161] No research of any kind relative to accountability issues could be found during the course of this investigation. If accountability systems are to have any impact on improving the image of agricultural divisions at land-grant universities, further exploration must be pursued.

CHAPTER III

METHODOLOGY

Overview

Chapter III will outline the two-pronged research approach implemented during the course of this study. Investigative techniques selected to satisfy objectives stated in Chapter I will be briefly reviewed in terms of their general strengths and weaknesses. Furthermore, a description of the research methods used for each stage in the data collection process will connote how the accountability requirements of Oklahoma farmers were determined. Specifically, basic procedures of the pilot study will first be reviewed and then applied to the principal course of the investigation. Added explanation will be provided for the later stage of this study. Information gleaned from both research phases will provide data on how issues of accountability might be managed through the use of new media applications.

Research Approach

Because so little is known about managing accountability issues through producer involvement, a flexible, open-ended means of exploring the topic in-depth needed to be employed for this study. Research methods available to communicators include two distinct types, quantitative and qualitative. Whereas the first measures individual components of a given phenomenon, the latter enables the researcher to evaluate circumstances holistically to better understand attitudes and behavior.[162] Furthermore, due to the exploratory nature of this project, there was no need for statistically reliable data that could be generalized to the larger population. Hence, a qualitative research strategy, known as an extended focus group, was selected.

Focus groups are fundamentally a way of listening to people by means of a well-defined, moderated discussion.[163] They can vary in size and composition, but are usually composed of approximately 4 to 12 participants *purposively* selected according to the goals of the research.[164] Exactly how many participants should attend each focus group session will primarily depend on the diversity of opinion needed. It is also important to note that focus groups are conducted in a series of sessions, each involving different subjects. A single focus group study can consist of several dozen groups, but a minimum of three groups is recommended.[165]

As a qualitative research method, focus groups draw upon three fundamental strengths: 1) exploration and discovery, 2) context and depth, and 3) interpretation. Each of these "strengths" can be put into their proper context by examining Morgan's four basic uses of focus groups. For "problem identification," researchers are able to rely on focus groups' capacity to explore what is poorly understood. Plus, when the emphasis is

on discovery, relatively unstructured, open-ended focus group discussions may also be of value for "planning" purposes. Additionally, the utility of focus groups has also been employed for "implementation" and "assessment" purposes, particularly for the context, depth, and interpretation of participant feedback.[166]

Morgan stresses that how focus groups are used will inevitably depend on the aims of the research, and because of their "adaptability" they can serve many intentions. The four basic purposes of the research method, problem identification, planning, implementation, and assessment, can correspond to either many aspects of a project or a single purpose. "The value of focus groups is that they offer...a variety of options that can be used for many different purposes."[167]

In the case of this investigation, elements of each "purpose" have been integrated into the research design. As indicated, little is known about the accountability requirements, computer use, and information preferences of Oklahoma farmers. So, exploring needs and opportunities through problem identification was essential. Likewise, in terms of planning, measuring the effectiveness Oklahoma Dividends entered into this investigation as did the need for implementation and assessment: how the database should be made available and what would be the probable result.

It should be noted that extended focus groups entail all of the above, with one exception: the use of a questionnaire. Before focus group discussion begins, participants are asked to answer a few written questions that may be considered "sensitive," depending on their nature. For example, not all respondents may want to reveal attitudes toward the Division of Agricultural Sciences and Natural Resources (DASNR). Being in the minority tends to silence alternative views. Furthermore, it was theorized that having

participants quickly indicate information preferences and general computer use in the questionnaire prior to each focus group session would save valuable time for discussion.

Research Design

In coordination with the Oklahoma Agricultural Experiment Station, a pilot study and three extended focus groups were held from April through June 1998. Participants were purposively selected based on their affiliation with state agricultural organizations targeted for involvement in this study by the Experiment Station Director. Contacts within these associations were asked to participate in the pilot study and, then, coordinate extended focus groups around member meetings. It was hoped that identifying subjects in this manner would counter problems associated with geographical isolation, while still ensuring a moderately representative sample of Oklahoma farmers.

Agricultural organizations involved in this study represent the state's top commodities (beef and wheat), and include state affiliates of the Farm Bureau, Farmers Union, Cattlemen's Association, Cattlewomen's Association, Beef Industry Council, Livestock Marketing Association, and Wheat Commission. Although all of the organizations stated above were represented in the pilot study, only the first three could participate in the main part of this investigation.

The pilot study focus group was conducted on February 20, 1998, using professional staff from targeted agricultural associations. In addition to recording reactions toward Oklahoma Dividends, the researcher asked participants to help coordinate extended focus groups around upcoming meetings. Specific requirements were set on who could participate and how large focus groups should be.

The exploratory nature of this investigation and the consequent irrelevancy of statistically reliable data allowed for the use of nonprobability sampling techniques. Desirable characteristics of subjects were identified, based on research objectives, as being closely associated with beef or wheat production, having an implicit understanding of state agricultural issues, and holding an organizational leadership position. Since input from younger subjects was necessary to assess the future application of Oklahoma Dividends, emphasis was placed on including some individuals age 35 and under. Without making this request, an overwhelming majority of study participants would likely exceed 55 years in age.[168]

Three of the seven organizational contacts were logistically able to identify appropriate study participants and coordinate focus groups. Each extended focus group met for approximately two hours. Participants were first asked to fill out a questionnaire designed to measure attitudinal perceptions toward DASNR, informational preferences, and general computer use. A demonstration of Oklahoma Dividends, specially tailored to fit the interests of individual groups, was then given, followed by focus group discussion. Data, in the form of participant discussion, were collected by a tape recorder and used to identify common themes and differences within and between focus groups.

Pilot Study

In order to meet the research objectives, it was determined that the most effective means of gathering feedback from Oklahoma farmers would be through state agricultural organizations. Not only would a modest number of knowledgeable farmers be affiliated with these groups, but members also tend to meet frequently throughout the year. Assistance was solicited from targeted associations in conducting extended focus groups,

which, consequently, resulted in the opportunity to evaluate the relevance and effectiveness of the research design.

A pilot study focus group was conducted on February 20, 1998, using the professional staffs from the state Farm Bureau, Farmers Union, Cattlemen's Association, Cattlewomen's Association, Beef Industry Council, Livestock Marketing Association, and Wheat Commission. Participants were selected based of their communications and lobbying responsibilities in addition to a recommendation made by the Experiment Station Director.

After demonstrating Oklahoma Dividends, focus group discussion was held on how useful the database would be for Oklahoma farmers and what sort of an impact might it have on legislative decision making. Questions asked during the pilot study (see "Appendix C") focused on computer use within the agricultural industry and Oklahoma Dividends' construction. Participants agreed that new media would become increasingly important for agricultural audiences, as would accountability issues. A more detailed report of the findings may be found in Chapter IV.

Testing the research methodology during the pilot study revealed that the prepared questions were appropriate and could be effectively used during focus group discussion, with two exceptions. First, asking about DASNR's overall performance could be a sensitive subject for some study participants, and, secondly, discussing individual computer use took too much time. It was determined that a short survey instrument would counter these problems. Hence, the research design was slightly modified to incorporate the use of extended focus groups.

Selection of Subjects

Two methods of nonprobability sampling (purposive and snowball) were combined in the selection of participants for the main part of this investigation. This unique approach was developed to involve individuals who were closely associated with beef and/or wheat production, knowledgeable about state agricultural issues, and held some form of organizational leadership position. In this respect, subject selection resembled purposive sampling; participants with explicit defining characteristics were chosen to achieve a specific analytical objective.[169] These types of focus group participants, in having a working knowledge on the needs of state agricultural communities, would be most suitable to initially evaluate Oklahoma Dividends.

Since a complete list of individuals meeting the above selection requirements could not be identified, state agricultural organizations, representing beef and wheat production, were targeted by the Oklahoma Agricultural Experiment Station Director. Specific contact persons, selected because of their communications and lobbying responsibilities, were then asked to assist in selecting study participants. This snowball or chain referral sampling technique enabled the researcher to draw upon the expertise and networking of organizational insiders.[170] Conditions were set on who could be involved, and a request was made to limit the size of each forthcoming extended focus group to between 4 and 12. Some freedom was given to the organizational contacts in setting meeting times and dates.

The following three organizations were able to schedule extended focus groups: Farm Bureau, Farmers' Union, and Cattlemen's Association. The Farm Bureau opted to organize a focus group of members from its Young Farmers & Ranchers affiliate,

specifically those individuals involved in coordinating group activities. Likewise, the Cattlemen's Association included a focus group session during one of their Junior Cattlemen's leadership meetings. In contrast, the Farmers' Union elected to have an older advisory group serve as focus group participants.

Research Instruments

A five-question survey instrument was developed based on recommendations made during the pilot study. It was unanimously believed that extended focus group participants may not want to openly share their perceptions of DASNR. Instead, it was feared that those in the minority might either agree with opinions held by the majority or remain silent. A more anonymous means of questioning was, therefore, adopted. Additionally, it was thought that the use of the questionnaire would reserve valuable discussion time for topics other than outlining informational preferences and personal computer use.

Survey questions (see "Appendix D") focused on the following topics: 1) perceptions of DASNR, 2) information preferences, and 3) general computer usage. As noted in Chapter I, stakeholder accountability is bestowed to organizations, which fulfil implied promises to constituencies by pursuing stated missions in good faith.[171] Therefore, survey questions measured familiarity with DASNR's mission (see "Appendix A") and the overall degree to which participants felt it was being fulfilled. Inquiries were also to determine the order in which communication channels were preferred in receiving information and how extensively computers and communications technologies were used.

In addition to the survey, extended focus group questions (see "Appendix E") were prepared to help keep discussion centered on predetermined topics. Most of the

questions were tested during the pilot study and modified, as per suggestion. It is important to note that about a third of the focus group questions complimented survey questions, while the remainder probed into how new media could be used in managing issues of accountability.

After demonstrating Oklahoma Dividends, focus group discussion was initiated with questions concerning general views on accountability. Secondly, participants were asked to gauge the impact computers have on Oklahoma agriculture both now and within the next five years. Focus group discussions concluded with questions concerning database construction and relative usefulness.

Data Collection and Analysis

Each focus group discussion was tape recorded and used as the primary data in this study. Common themes and differences within and between focus groups were discussed and analyzed as they related to the research questions. Individual comments were added when appropriate to add depth to the analysis. Responses to the questionnaire were analyzed using descriptive statistics. Recommendations for managing accountability issues through new media applications were developed based on the findings above.

Limitations

Qualitative research methods do have several disadvantages, which play into the limitations of this research project. The most significant is that the findings of this study cannot be generalized to the total population. Study participants were *purposively* drawn into this investigation and, therefore, represent only a small segment of Oklahoma

farmers. This is especially so because of the limited sample size and sampling technique used, although some compensation was made to include both young and old subjects. As Wimmer and Dominick suggest, qualitative research has "interpretational limits."[172]

The nature of sampling techniques used in this study may have drawn in certain types of individuals, who are unique to the average Oklahoma farmer. It is possible that study subjects were more keyed into accountability issues through their involvement in state agricultural organizations. For similar reasons, they may also be more active information seekers and tend to adopt innovations more rapidly. It was assumed that serving in a leadership position would tend to dictate subjects' knowledge and behavior.

Organizational contacts' referral of study subjects and assistance in coordinating focus groups also presents another disadvantage to this investigation. Even through the compliance of subject selection criteria, their efforts introduced an unknown variable or element of uncertainty. Until the time in which focus group sessions were held, it was somewhat unclear as to what the outcomes would be. Furthermore, since someone other than the researcher made initial contact with study subjects, the importance of attending sessions may not have been fully emphasized. The expertise of organizational contacts did add certain value to this research, however.

Limitations to this study may also be found within the characteristics of focus groups themselves. Because focus groups are controlled discussions, the skills of the moderator are important. This appointed individual must know when to probe further and when to keep participants from straying from the topic. Attempts were made to highly structure discussion by developing specific focus group questions that were asked during each session.

Another disadvantage to focus groups, in general, relates to group dynamics. "Some groups become dominated by a self-appointed leader, who monopolizes the conversation and attempts to impose his or her opinion on other respondents."[173] This possibility factored into using a survey instrument to limit the number of sensitive topics that were openly discussed. Plus, the moderator used questioning techniques to encourage feedback from all subjects.

Summary

The two-pronged research approach outlined above identified accountability requirements, informational preferences, and general computer use of farmers as well as their attitudes toward Oklahoma Dividends. Whereas these results cannot be generalized to the total population, they can be used to more holistically understand new media applications for agricultural audiences in managing accountability issues. Additionally, the pilot study and three extended focus groups generated data that can be applied to Oklahoma Dividends' future development.

CHAPTER IV

ANALYSIS OF DATA

Introduction

Chapter IV will disclose results gleaned from the pilot study and extended focus groups conducted during the course of this investigation. The central goal of the two-pronged research approach was to increase the knowledge on managing accountability issues through the use of new media applications. Specifically, feedback from state agriculturists was required to evaluate whether Oklahoma Dividends conveyed meaningful information relevant to targeted audiences in preserving a state of answerability.

This chapter identifies the accountability requirements of Oklahoma agriculturists participating in this study. Both survey and extended focus group questions reveal how subjects defined "accountability" and suggest whether DASNR has adequately fulfilled its mission. Written inquiries also determined the order in which subjects preferred to receive information and how extensively computers and communications technologies were used. Extended focus group discussion complements this nominal data by giving it context and depth. Subjects' responses to various verbal inquiries illustrate Oklahoma Dividends' usefulness as a presentation tool and on-line service.

The findings of this research effort, whether part of the main study or not, yielded data pertinent to satisfying the objectives of this research. A detailed account of the pilot study focus group and the three extended focus groups is, therefore, provided. Individual comments and survey responses will be featured within each report to add depth to the

analysis in Chapter V. Additionally, a brief description of those state agricultural groups participating in the main study is included prior to the respective reports.

Pilot Study Focus Group

A pilot study focus group was conducted in Oklahoma City, Oklahoma on February 20, 1998, using professional staffs from the following state agricultural organizations: Farm Bureau, Farmers Union, Cattlemen's Association, Cattlewomen's Association, Beef Industry Council, Livestock Marketing Association, and Wheat Commission. Participants served as communicators and lobbyists for their respective organizations. With 10 individuals present, several of the organizations had more than one representative.

Presentation of Oklahoma Dividends took on a slightly different form than in the extended focus groups. Although the functionality of the database was demonstrated using search engines and project layouts, it was referred to more often as a communications tool than individual-driven application. This strategy seemed to be effective in gathering "expert" opinion on the informational needs of Oklahoma farmers and corresponding relevance of Oklahoma Dividends in managing accountability.

From the onset of focus group discussion, participants seemed more keyed into the general purpose of Oklahoma Dividends than expected. When asked for initial impressions, it was well noted that the database did offer potential in educating producers about the benefits of DASNR's activities. Important to note is that several subjects associated being "accountable" with fulfilling the DASNR mission. As one individual stated, "The more information you [DASNR] can get out about the value of your research and extension programs, the more support you will receive from Oklahoma producers."

There was considerable indication that added efforts should be made to enhance information dissemination practices. Most participants felt that they lacked a complete understanding of what research and extension efforts were taking place in their respective areas of interest. Meeting occasionally with extension educators throughout the state seemed to play a significant role in informing focus group participants about DASNR activities. The same was said for members of the participants' respective organizations.

A general consensus was quickly formed that Oklahoma Dividends could become an effective communication tool in filling possible information gaps, particularly if additional projects were included into the database in a timely manner. This seemed emphasized by subjects' interest in gaining individual access to the database for the purposes of "keeping current." Some individuals even expressed interest in presenting Oklahoma Dividends during meetings with farmers.

Notably, information that answered the question "what have you done for us lately" also seemed pertinent to improving production efficiency. It was for this reason that participants believed individual access was important. There was a strong consensus that younger farmers would become increasingly reliant on computer communication technologies in up coming years. Moreover, all but two of the organizations represented maintained web sites and used e-mail. Those participants whose organizations did not *yet* have a strong "Internet presence" felt disadvantaged. Remarkably, participants spent most of the time discussing the possibility of making Oklahoma Dividends available on an individual basis.

The overall design of Oklahoma Dividends was generally felt to be visually appealing, especially with regard to the QuickTime movies. For each project showcased

during the presentation, participants requested that the video clips be shown promptly. A number of individuals noted that the still photographs nicely accented database layouts. Most everyone agreed that the database's effectiveness as a presentation tool was significantly enhanced by the visual elements noted above. More was considered better.

The accessibility of Oklahoma Dividends' contents also received positive reviews. Navigating between the various layouts and identifying projects using the built-in search functions appeared to be self-explanatory and simple, according to most participants. The "Word Search" function was highly favored for general use. One member of the focus group also commented that the layouts seemed to organize the project information appropriately, but did suggest that the "Project Impacts In The Classroom" information be provided in a separate layout.

Focus group discussion of Oklahoma Dividends seemed to take on a new dimension when discussing the database's potential application for agricultural producers. Participants felt that agriculturists would be primarily interested in project details and "how to" information. One individual recommended that a "recent advancements" or "progress to date" section be added. In agreement, another subject suggested such information be presented like the "Project Highlights."

Most comments on how to develop an on-line version were oriented more toward information storage and retrieval and less in terms of measuring project consequences. For example, one participant suggested that an 'Oklahoma Dividends On-line' be "tied into a broader database that links into agricultural information and sites on the Internet." It was argued that finding useful information on the Internet is often difficult and time consuming. An 'Oklahoma Dividends On-line' could become a "one stop shop" for on-

line information. Another participant suggested that extension information also be included and made easily accessible from individual projects.

There was some concern that charges for long distance telephone service and slow modem speed (under 28.8 KBPS) might deter some potential users from accessing an 'Oklahoma Dividends On-line.' Most participants, however, considered these obstacles to be minor at best. One suggestion was to reduce downloading time by presenting pictures and video as selectable objects or thumbnails. Users could then decide for themselves whether such information was worth the time and associated cost to retrieve.

In addition to posting Oklahoma Dividends on the Internet, a few participants recommended that several commodity-specific CD-ROM versions be developed. This way, certain producer types would only need deal with information relevant to their area of interest. "The added benefit of producing this type of media is that problems often experienced when accessing the World Wide Web could be avoided outright," as one participant argued. It was also suggested that a complete CD-ROM version should be made available upon paid subscription. Although this garnered the support of the majority, information inequality issues were soon brought into the discussion.

The concern was raised by two participants that some farmers might want to use Oklahoma Dividends, but could not afford computer communications technology. Lack of knowledge could, therefore, put them at a possible disadvantage. To factor out these information inequalities, it was recommended that Oklahoma Dividends be made available at extension offices and/or other relatively convenient places. All participants agreed that only a small proportion of farmers would likely use digitized information

until computer use became more of a norm. Cost and age were considered to be significant factors.

Although this study focuses on evaluating the usefulness of Oklahoma Dividends for farmers, participants did offer feedback on the database's application for state legislative leaders. The most pronounced statement when discussing this topic was that 'project consequences' were likely to have a dramatic impact on government representatives. Indirectly, producers would also be agreeable to this type of information, but only as it relates to individual circumstances.

A consensus was formed that the 'economic consequences' information may be of most value to legislative leaders. Many participants believed that a new layout, field, or special feature should be included in Oklahoma Dividends to describe economic consequences solely in terms of the state economy and/or Oklahoma consumers. It was suggested that this type of information be readily apparent in the main layout of each project record. In the same regard, the "Geographic Search" engine was also thought to be particularly effective. Showing the digitized state map with congressional districts and county names seemed to have a positive impact on participants.

Environmental consequences were also noted as being of some importance to state legislative leaders, with social impacts only playing a minor role. From the discussion, it would seem that most participants expect Oklahoma Dividends to be more effective as a presentation tool than as an on-line service when legislative audiences are concerned. This seemed to tie in to the suggestion that project consequences were best presented during group presentations, while "how to" information might better serve individuals on-line.

It should be noted that it was not the participants' intention to suggest general project information be excluded from the "presentation version." Rather, such details should be simplified and made easier to read. As one participant stated, " The appropriateness of Oklahoma Dividends varies depending on the objectives of the user." This seems to suggest that disclosing DASNR's activities and presenting related benefits is more a function of administrative users, whereas individually seeking out project information is centered on applying it to personal circumstances. Therefore, it was recommended that the "presentation tool" and "on-line service" be slightly modified to fulfill users' likely agendas.

Another reason was also offered to support the development of two main Oklahoma Dividends versions. Participants expressed significant concern about certain types of information getting into the "wrong hands" and being misunderstood. Project consequences fell directly into this category. Subjects strongly believed that administrators would need to be specifically responsible for delivering information of this kind. Hence, only the presentation version should contain specific economic, environmental, and social consequences. Mention of benefits and costs associated with adopting a certain practice should be stated in the on-line version, but with some reserve.

In summary, most participants felt they lacked a complete understanding of what research and extension activities were taking place in their respective areas. For this reason, there seemed to be a general consensus that Oklahoma Dividends can be used as an effective communications tool for managing accountability. Participants believed computers would continue to play an increasing role in agriculture, and, therefore, considered an on-line version of Oklahoma Dividends to be appropriate.

Oklahoma Farm Bureau Focus Group

Origin and Purpose. Founded in 1919 by a small group of farmers representing 30 states, the American Farm Bureau Federation is today reportedly the largest national farm organization. More than 4.7 million families in 50 states and Puerto Rico belong to the Farm Bureau- each affiliated with one of 2,800-plus county bureaus that tie into state associations. The Oklahoma Farm Bureau is one of the 50 state assemblages that, in conjunction with the national office, serve as the "voice of agriculture."

Politically active, but nonpartisan, AFBF seeks "to secure members with the benefits of united efforts that can not be accomplished by individuals."[174] The organization's philosophy is commonly regarded of as conservative, both politically and socially. Individuals are said to have a "moral responsibility to help preserve freedom for future generations by participating in public affairs and electing candidates who share their fundamental beliefs and values."[175].

Leadership opportunities at the Oklahoma Farm Bureau take on several different forms. Aside from serving on the state board and various local chapters, members ranging in age from 17 to 35 may participate in the Young Farmers and Ranchers program. This facet of the Farm Bureau organization provides training and hands-on experience intended to better equip young people as future U.S. citizens and leaders in agriculture. Members are encouraged to attend leadership seminars offered through out the year and panel discussions on hot agricultural issues.

OFB Young Farmers and Ranchers Extended Focus Group. Participants in the Young Farmers and Ranchers extended focus group, held April 20, 1998 in Oklahoma City, Oklahoma, ranged between 23 to 34 years in age. A majority grew wheat, some

produced cattle, and a few others have expanded their production activities to include "new" commodities, such as soybeans and cotton. All participants has some form of leadership role within the organization. In addition to the Young Farmers and Ranchers program coordinator, there were a total of eight subjects who participated in the focus group discussion.

Demonstration of Oklahoma Dividends was specially tailored to highlight research and extension of specific interest to focus group participants. A total of four projects were featured and several others were given brief attention. Furthermore, each feature of the database from search engine to information type was showcased in order to present Oklahoma Dividends' user flexibility and potential as a useful information source. Interest expressed during the presentation seemed reflected in the participants' undivided attention, although no questions or comments were voiced until the database demonstration concluded.

Initial reactions to Oklahoma Dividends were more favorable than expected. Without first making any inquiries about the database, several participants asked, "how can we get direct access?" Explanation that Oklahoma Dividends would be incorporated into group meetings yielded positive response. However, most OFB Young Farmers and Ranchers present appeared more enthusiastic with the idea of having individual access to the database.

A majority of the focus group participants recommended that Oklahoma Dividends be made available at extension offices through a web site and/or CD-ROM. Those sharing this view seemed eager to own a copy of the database or, at least, be able to check one out. Some interest was even expressed in accessing it directly via the

Internet. A couple of individuals, however, issued concerns that many farmers might be denied access to information since computers are not widely used and too much inconvenience is often involved in visiting extension offices.

Establishing a more equitable means of delivering Oklahoma Dividends to state agriculturists was thought best accomplished by presenting it during growers' meetings and field days. Participants reported that these events generally draw in considerable numbers of producers, including those who might otherwise be hard to reach. One individual noted, "Oklahoma Dividends would be useful at our annual meetings." All focus group participants agreed that developing computerized, accessible information systems would be "vital" for the success of future generations.

Focus group discussion indicated that the accessibility of relevant, timely information appeared to be the primary criteria upon which participants measured DASNR's accountability. Offering services such as soil testing and personal consultation emerged as additional components, and, to a lesser degree, so did conducting research. Although six of those present were familiar with DASNR's mission, the importance of its fulfillment was not specifically mentioned during the focus group discussion. Participants did, however, seem to identify with contemporary views on organizational answerability; a more active role in the accountability process was preferred. One subject explained that knowing more about how DASNR serves the Oklahoma agricultural industry would positively impact overall attitudes and opinions.

Most participants indicated that there were too many obstacles to obtaining information from the extension service and/or the "university." Complaints focused on difficulties experienced with the extension service, although there seemed to be fewer

problems associated with area research stations. While many of the OFB Young Farmers and Ranchers emphasized the value of "good" area specialists, it was widely noted that many extension personnel lacked the knowledge and skills to be "useful." Additionally, most individuals present noted that while some information is useful it is not often timely or easily accessible. As one participant noted, "Taking the time to find publications, if they even are available, is almost not worth the effort."

Questionnaire responses indicate that obtaining current information might not be as difficult as participants suggested during focus group discussion. On a scale of one to five (1 = excellent and 5 = poor), DASNR's ability to provide timely information about agricultural research received an average rating of 2.4. An average rating of 2.2 was given for disseminating timely information about extension activities.

DASNR's research and extension activities might also be more pertinent than conveyed by focus group participants. Using the same scale as above, questionnaire respondents gave DASNR favorable ratings (average score = 2.2) for conducting research applicable to the needs of the Oklahoma agricultural community. For promoting relevant extension programs, DASNR received slightly less favorable ratings (average score = 2.8). Only five of the eight participants answered questions about DASNR's general performance.

During focus group discussion, participants suggested that information channels could become more effective if producers were viewed as information seekers instead of receivers. One individual exclaimed, "I want it (information) *when* I want it and *how* I want it." A consensus was quickly formed that information channels need to service producers' many, often-diverging needs.

All young farmers and ranchers present favored the idea of having a centralized place where large quantities of information could be stored, sorted through, and retrieved almost instantly. Several subjects complained were made that hard copies of publications are generally lost soon after they are received or disregarded due to storage limitations. Those participants who had expressed interest in obtaining individual access to Oklahoma Dividends believed that the database could make them more effective information seekers. One participant stated that making Oklahoma Dividends available to farmers might reduce the number extension personnel needed.

As indicated, there appeared to be considerable expectation that computerized information will play a significant role in the success of future producers. This was emphasized by the strongly supported statement that DASNR, "[should] be looking toward the future. Oklahoma Dividends can help us as we, the younger generations, take over." Questionnaire responses indicating computer use seemed to underscore this belief.

Out of the eight participants, five used computers and, of these individuals, four accessed the Internet and three had e-mail. A show of hands revealed new media were a future possibility for the remaining three. Yet, when ranking communication channels based on preference (1 = most preferred and 5 = least preferred) the Internet received the lowest average ranking (4.1) in comparison to magazines (2.4), radio (2.1), television (3.1), and newspaper (3.1). One participant did note when completing the survey that field days offered value in acquiring useful information.

Although participants seemed to prefer traditional communication channels, many individuals expected change. It was generally believed that the cost of computers and long distance telephone service currently limited the number of producers who access

digitized information. Fewer restrictions in years to come, however, would stimulate greater adoption of new media technologies. Additionally, other predictions suggested that communication tools like Oklahoma Dividends would increase in popularity as younger individuals replaced older, more dominant producers. A few remarks implied that older audiences would even have notable difficulty in following a presentation of Oklahoma Dividends.

For many extended focus group participants, there seemed to be a growing belief that Oklahoma Dividends would appeal to different audiences in *sometimes* distinctly different ways. It was widely thought that producers would generally be more interested in the types of information that answered "what have you learned" and "what can it do for me?" In contrast, state legislators would want to know "what value does this have for my constituents and the state of Oklahoma?" Some of those present did note that there would be some similarity in interests. As one participant argued, "Folks think less of the university [DASNR] because a lot of time and money go in and so little seems to come out. The explanation of 'consequences' in Oklahoma Dividends may change this opinion."

Due to differences in audience interests, most young farmers and ranchers thought it appropriate to produce two versions of Oklahoma Dividends, one for presentations and meetings and another for individual use. This was based on a variety of reasons offered by individual participants- the most notable relating to the complexity of information audiences would require. It should be noted that "audiences" were generally defined as both identifiable groups (i.e. legislators, wheat producers, etc.) and single individuals.

Overall, Oklahoma Dividends was thought to be informative and visually pleasing, but also in need of fine-tuning and considerable expansion. Participants did not seem overly discouraged, however. Their focus was more on what the database could potentially offer. Generally, they believed Oklahoma Dividends as a presentation tool would prove most beneficial in promoting a better understanding of "what is going on and why it is important." As one individual exclaimed after the focus group, "I am happy to know this...is being done. I really had no idea "

In developing Oklahoma Dividends as an effective presentation tool, participants placed a strong emphasis on limiting the complexity of information. Several complaints were made that overall the database was too text-oriented, making it difficult, at times, to follow the presenter. This is not to say that paragraph descriptions of projects and "consequences" offered no value. Written content reportedly matched participants' information needs in terms of providing the "latest" on new/current advancements.

Problems associated with Oklahoma Dividends' "text-oriented" nature were apparently caused by too much text on single layouts and the absence of other elements to help offset what may be described as "information overload." "Project Abstract" layouts seemed to be the best liked because the audience could read the general description paragraph or scan over the bulleted items in the "Project Highlights" box. Pictures and the use of color were also said to enhance the meaning of the information conveyed and, more importantly, capture the viewers' attention. A consensus quickly emerged that the Quick Time movies were the most favored element in the database, as both accents to textual information and in humanizing projects.

Aside from visual elements, the young farmers and ranchers also took particular delight in Oklahoma Dividends' search engines. Querying the database based on audience interests generated much excitement. As one participant explained, the lag time involved in receiving answers to certain questions may be shortened if presenters had in hand greater amounts of readily accessible information. For this reason, the "Word Search" elicited the highest degree of endorsement. Notable interest in the "Geographical Search" was also expressed. Participants wanted to know what was specifically being done in relation to their counties and regional areas. Furthermore, there was resounding praise for plans to use Oklahoma Dividends when demonstrating the value of agricultural research and extension to state legislators.

Several individuals believed the "Geographical Search" state map, which outlines congressional districts, would prove particularly effective for political audiences in addition to estimates of economic consequences. The importance of social and environmental consequences was expected to vary depending on what types of issues entered the political and social spotlight.

Suggestions for fine-tuning Oklahoma Dividends as a presentation tool mostly centered on expanding the quantity and variety of visual elements. Adding more Quick Time movies to highlight project investigators and individual farmers generated unanimous agreement. Likewise, so did one individual's recommendation to use video clips in explaining project consequences.

Participants also thought Oklahoma Dividends' repertoire of graphical information could be expanded by the use of charts and graphs in explaining estimated changes in production capacity. The addition of still pictures characterizing crop diseases

and pests was also thought to have potential benefit in helping producers learn the fundamentals of making identifications at field days and growers' meetings. Everyone wanted contact information for the principle investigators and project leaders showcased in the database.

The level of information complexity recommended for an on-line version of Oklahoma Dividends calls for a much more sophisticated array of information types. As information seekers, participants demanded almost instant access to the knowledge of both *yesterday* and *today*. If only a single term could be used to describe what participants wanted in an Oklahoma Dividends on-line, it would have to be *diversity*.

Basic features of the database, including search engines and navigational pathways, offer users greater flexibility in seeking out information. This concept was rated highly with the Oklahoma Dividends evaluators, particularly in that information could be manipulated. As described by one participant, "Publications are very useful, but sometimes limited in content." Diversity, again, seems best in defining just what types of information participants want to access.

"More is better" was the general sentiment conveyed by participants when asked about what information should be included in an on-line version of Oklahoma Dividends. Participants not only wanted individual access to current database content and the purposed amendments, but also to a whole host of specialized information. Recommendations suggested producers had significant needs for knowledge that would help make them more competitive within the agricultural industry, and, therefore, more economically secure.

All young farmers and ranchers present either knew someone or were themselves experimenting with "new", often "exotic" commodities. One participant explained that, "Since the passage of the New Farm Bill increasingly more producers have expressed the desire to learn the "basics" about producing non-traditional agricultural goods." In some cases, area specialists have reportedly been able to meet such demands, but not always.

Participants believed that Oklahoma Dividends' capacity for information storage and user flexibility would help producers compete in "new" markets. Notably, several individuals called for "risk management" reports to complement experimental as well as traditional crop data. It was also recommended that statistics on variety trials for county and regional areas be added to an on-line database version. One participant, however, issued a warning that producers need information put simply, "Don't hammer us with numbers, numbers, numbers. Put statistical-type information into a nut shell."

Although concerns about income variability and market competition rated high in the minds of focus group participants, "hot political issues" also provoked significant interest and anxiety. In the words of one individual, "We need comprehensive, easy to understand information about hot political issues confronting the agricultural industry." Almost all young farmers and ranchers agreed that communication channels rarely provide enough details surrounding agriculturally related legislation, concerns, and regulation. It was argued that, "The disjointed nature of Oklahoma Agriculture poses constant threats to our vitality and that of entire state."

Oklahoma Farmers Union Focus Group

Origins and Purpose. The National Farmers Union is a general farm organization founded in 1902 to "promote and protect the interests of family farmers." Today, it is a

federation of state and regional chapters that boasts a total of 300,000 voluntary members throughout the United States. Practically every commodity and type of agricultural production ranging from traditional to alternative enterprise is represented.

Despite the many transitions, the American agricultural industry has endured, the Farmers Union's mission is considered as relevant today as it was during the turn of the century: to creatively find solutions to the challenges facing rural America. At the local, state, and national levels, educational programming and legislative activities are initiated daily to further specific, mission-based goals. The Oklahoma Farmers Union, with its 100,000 members, is actively a part of these "grassroots efforts."[176]

Serving as "The voice of family farmers" since 1905, the OFU is a network of county chapters that cooperatively "protect and serve family farms in Oklahoma." Various leadership positions throughout the organization offer members opportunities to become involved in community and state agricultural affairs. Plus, the OFU publishes monthly legislative up-dates to help continue the "efforts of a united font."

OFU Focus Group. The OFU extended focus group was conducted on May 4, 1998, at the Community National Bank in Okarche, Oklahoma. Participants ranged in age from 45 to 95 years old and were active members of the local OFU chapter. Of the four individuals present, two were full-time wheat farmers and the others had been retired from grain production for several years.

A detailed account of the OFB extended focus group would not be complete without first describing events, which occurred before the start of the session. Either directly or indirectly, the resulting impact on participants may have had some effect on their reported attitudes toward accountability issues and DASNR. Important to note is

that focus group discussion suggested each subject firmly believed "traditional, family-based agriculture" was threatened.

While waiting for the Oklahoma Dividends presentation to start, participants were outside watching large trucks filled with wheat silage pass by in intervals of about one every 4 minutes. Within 30 minutes, at least 7 had already made their way toward a distant dairy farm. The OFU farmers were quick to note their dismay. Reportedly, even at their peak production capacity, they could not match with the apparent efficiency of the "professional harvesters."

The silage-filled trucks were the topic of conversation for several minutes. Probably due to the moderator's affiliation with DASNR, participants issued several complaints about the "university's" inability to help them be better competitors. One of the older farmers noted his disapproval in a recently watched wheat video produced by the state extension service: "It didn't tell me anything I didn't know." General frustration in not being able to afford the sophisticated equipment used by the professional harvesters was also expressed.

After waiting for other participants who did not show, the demonstration of Oklahoma Dividends slowly began. Notably, the sight of the computer and video projector did not appear to interest all subjects. In fact, one of the subjects gave another a quizzical glance and then asked in a disgruntled tone, "What's all this for?"

Displaying Oklahoma Dividends' various features was done so in much the same way as in other focus group sessions. Some minor modifications were made, however, upon discovering that all participants were more or less wheat farmers. Yet, despite this compensation, the retired farmers seemed unimpressed. In addition to being easily

distracted, both frequently whispered to each other. The other two subjects seemed moderately interested in comparison.

Following the demonstration, no inquiries or comments were made regarding the database. However, when prompted, participants did enter into a somewhat lively discussion on accountability issues. A consensus quickly formed that due to insufficient capital, traditional, family farmers could not successfully compete with larger operations. As one subject explained, "Those with greater incomes cannot only afford the top-of-the-line equipment, but they can also assume greater losses when market prices are bad or the government imposes some kind of regulation."

It was also generally thought that economically well-secured individuals were in a better position to solicit the assistance of the extension service or "go looking for university information." Central to this belief was the highly regarded importance of hard work over information. Plus, most of the OFB farmers present indicated that if they did have a problem, then when they would simply go visit a relative, friend, or neighbor. Perceptions of DASNR, however, might not, in actuality, be so negative.

Questionnaire responses indicate that participants may actually think more highly of DASNR's research and extension activities than indicated in the focus group discussion. On a scale of one to five (1 = excellent and 5 = poor), the timeliness of information about research received as average rating of 2. An average rating of a 1.6 was given for disseminating timely information about extension activities. Notably, the one individual who was not familiar with DASNR's mission did not answer the accountability-related questions.

It should also be noted that DASNR's research and extension activities might be more pertinent to the general agricultural community than previously conveyed. Using the same scale as above, questionnaire respondents gave DASNR favorable ratings (average score = 2) for promoting relevant extension programs. For conducting research applicable to the needs of the Oklahoma agricultural community, DASNR received slightly lower ratings (average score = 2.6).

As indicated, many subjects did not seem particularly interested in computer communications technology. In fact, the survey revealed that only one of the subjects used a computer. Despite their lack of interest, participants did agree that an increasing number of younger farmers would likely use new media in future years. One of the OFB farmers present even noted his grandchildren's interest in the Internet.

Similar to their views on computer use in general, participants considered Oklahoma Dividends to be more useful for younger agricultural groups. This was especially true when considering whether Oklahoma Dividends should be made available on-line. Notably, survey responses from all four participants indicated that traditional communication channels were highly favored over digital media. When ranking communication channels based on preference (1 = most preferred and 5 = least preferred), the Internet received the lowest ranking (5) in comparison to magazines (1.8), newspaper (1.8), television (2.5), and radio (3.5).

Even as an electronic presentation tool, most participants did not appear entirely interested in Oklahoma Dividends. When asked whether the database would be useful during group meetings, the two oldest farmers flatly stated "No," whereas the other individuals seemed more partial. It is of significance to note that everyone agreed

university administrators might benefit in showing Oklahoma Dividends to state political leaders, or vice versa as it may be. One subject believed that the "Geographical Search" and project consequences information would be particularly effective in this regard.

Despite participants' minimal attraction toward the database, a number of comments and recommendations were made regarding its interface design and content. What seemed the most basic and widely supported was to make sure that the information contained in Oklahoma Dividends related to the "real world" and be simple. In particular, it was advised to use anecdotal-type information and more bulleted items, like the "Project Highlights."

In terms of content, QuickTime movies and pictures rated high in the opinion of most participants. Several of the OFB farmers recommended more of each should be added to strengthen Oklahoma Dividends' effectiveness as a presentation tool. It was, however, noted that a couple of the videos might be too long. Plus, someone also made the comment that the larger headings, primarily on the "Main Menu," could be easier to read.

The remaining recommendations made on improving Oklahoma Dividends tended to focus on expanding the scope of information provided. Widespread support was given for one idea to include statistics on wheat variety trials by county and "results to date" for projects in general. One participant even suggested that if an on-line version of Oklahoma Dividends is made available, then current market information should be included.

At the end of focus group discussion, participants were asked whether the development of Oklahoma Dividends should continue. Everyone said "yes," except for

one of the older farmers, who stated that, "It might be alright." It was generally believed that younger farmers would find the database more useful, and so Oklahoma Dividends might become more important in future years. To help facilitate this possible transition, one participant did suggest that training sessions be offered through extension offices.

Oklahoma Cattlemen's Association Focus Group

Origin and Purpose. Initiated in 1898, the National Cattlemen's Beef Association is the marketing and trade association for America's one million cattle producers. NCBA is a consumer-focused, producer-directed organization representing the largest segment of the nation's food and fiber industry. Its mission is to work toward: "A dynamic and profitable beef industry, which concentrates resources around a unified plan, consistently meets consumer needs, and increases demand."[177]

NCBA is an umbrella organization that oversees national beef product promotion, research, and information-related activities funded through checkoff programs in 45 states. Additionally, as a trade association, lobbying efforts are made at the federal level to protect the interests of the organization's national membership and affiliated state organizations. Although the NCBA serves as the coordinator for the above activities, it is important to note the organization does not hold its cooperative associations to following set policies.

There are 46 state organizations in affiliation with NCBA, of which the Oklahoma Cattlemen's Association is one. Founded in 1953 by cattlemen in Northwest Oklahoma, the organization has grown in membership from 500 individuals to approximately 5,000, who represent all types of beef production. The basic mission of OCA is to "protect and

serve" the Oklahoma cattle industry through educational programming, legislative action, and media relations.[178]

Community involvement and democratic values are important facets of the OCA. Grassroots efforts at the county and state level offer several opportunities for members to assume leadership positions in strengthening the industry and preserving rural life. Such programs, including those of the Junior Cattlemen's and Cattlewomen's, are offered to individuals of all ages.

OCA Extended Focus Group. On June 4, 1998, at the Payne County Fairgrounds in Stillwater, Oklahoma, the OCA extended focus group was held in conjunction with the coordinators' meeting of the annual Junior Cattlemen's Livestock Show. There were 20 participants in attendance, who ranged in age from 19 to 65 years old. A slight majority attended college, and several others were breed specialists and/or full-time ranchers.

As per standard procedure, the presentation of Oklahoma Dividends highlighted all four projects related to cattle production as search engines and other database features were demonstrated. Due to time constraints, however, information not related to the subjects' interests was disregarded. Initial interest expressed during the demonstration seemed moderate to high. Although most participants watched with undivided attention, some did seem engaged in other activities associated with the upcoming livestock show.

First impressions of Oklahoma Dividends were difficult to gauge following the presentation. There were no questions or comments, yet subjects still seemed interested and willing to continue into discussion. It should be noted, however, that engaging participants to discuss their perceptions of accountability proved quite difficult, but *only* at first.

Basic concepts of stakeholder accountability were divulged at the beginning of the focus group session to incite subjects into thinking about the purpose of Oklahoma Dividends and whether it relates to individual needs. However, when asked, "How do you define accountability," participants appeared to not understand the question. After a period of silence, the question was rephrased to "what do you expect from of a business...even if it is as simple as a restaurant." A consensus quickly formed that offering "good service" and "a good product" was fundamental in maintaining consumer satisfaction and, ultimately, accountability.

In general, subjects' expectations of DASNR and its corresponding value resembled those identified for commercial business. Central to being "accountable," it was unanimously believed that delivering "good service" and "a good product" directly related to providing effective decision-support systems. The notable exception was that production assistance must be devoid of opinion or bias. Several participants felt that although private institutions often push their agendas on clientele, public institutions should not.

Decision-support systems visualized by participants, especially full-time farmers, seemed to entail one, single key ingredient: information. As one individual explained, "Management decisions require usable, unbiased, simple information that is specially tailored to individual-specific circumstances." Effective decision-support systems were thought most effective when timely, relevant information was easily accessible through direct communication and print media. Yet, it was not entirely apparent as to whether subjects believed that they were currently being well serviced.

Many individuals did indicate that within the conditional framework for the ideal decision-support system, DASNR could provide effective assistance. However, it should also be noted that a majority of those OCA members present often found extension information to be inaccessible. In the words of one participant, "When I get of my tractor late at night, the university doors are closed."

Questionnaire responses from 15 of the 20 participants in attendance indicate that obtaining information might not be as difficult as participants implied during the focus group discussion. On a scale of one to five (1 = excellent and 5 = poor), DASNR's ability to provide timely information about agricultural research received an average rating of 2.7. An average rating of a 2.9 was given for disseminating timely information about extension activities.

As implied, subjects did not necessarily state whether information received from DASNR conformed to their specifications in terms of objectivity and relevance. Rather, comments were framed in such as way as to indicate that past experiences had, at times, resulted in some form of disappointment. Survey responses suggest, however, that DASNR's research and extension activities might be more pertinent than conveyed through this impression.

Using the same scale as above where 1 = excellent and 5 = poor, questionnaire respondents gave DASNR moderately favorable ratings (average score = 2.4) for conducting research applicable to the needs of the Oklahoma agricultural community. For promoting relevant extension programs, DASNR received slightly less favorable ratings (average score = 2.9). One widely supported comment made during the focus

group discussion may, in fact, help explain this slight discrepancy: "Extension must keep improving its effectiveness, otherwise federal funds might become harder to come by."

"Critiquing the system" through stakeholder feedback was highly favored by the majority focus group participants. A number of OCA members present argued that because DASNR is a land-grant university, all taxpayers have a right to know how public funds are being spent. Although methods of collecting stakeholder feedback were not specified, some interest was expressed in establishing county advisory committees. It was, however, stated that involvement of this kind might be perceived as "time consuming."

Despite concerns that enhancing producer involvement in the accountability process might be problematic, those OCA members present seemed willing to put forth the effort. As explained by several individuals, strengthening the Oklahoma agricultural industry was a primary reason for assuming their current leadership positions. While discussing how public institutions could be made more accountable, it is significant to note that subjects did not specifically mention DASNR's mission. Survey results did reveal that of the 17 individuals, who completed the questionnaire, 10 respondents were, at least, familiarized with it.

Guaranteeing "customer satisfaction" was a reoccurring theme throughout the extended focus group discussion, particularly as it relates to information accessibility and accountability issues. This was perhaps most evident in subjects' attitudes toward computer use and, consequently, Oklahoma Dividends. Notably, there was a considerable expectation that computerized information will play a significant role in the

success of future of producers. Enhanced access to information and the ability to manipulate and use it more effectively would be a deciding force in advancing trends.

Questionnaire responses seemed to underscore the belief that computers may play a greater role throughout the agricultural industry in future years. All 17 respondents used computers, and of those individuals, 14 accessed the Internet and 11 had e-mail. Yet, when ranking communication channels based on preference (1 = most preferred and 5 = least preferred), the Internet received the lowest average rating (4.1) in comparison to magazines (2.3), television (2.3), newspapers (3.1), and radio (3.4).

Focus group discussion tended to mirror the above survey results; subjects believed computers were a useful tool, but in many cases still preferred traditional methods. When asked to assess the computer's overall impact on agriculture, most participants appeared surprised that such a question would even be asked. In a rather matter-of-fact tone, one participant stated that, "Without the computer, it would be difficult to get *some* things done."

Notably, there did seem to be a slight difference in actual computer use between older and younger participants. Full-time farmers tended to operate accounting and management-based software, whereas college students mainly accessed the Internet when working on research-related assignments. It was evident, however, that the prospect of getting information the instant it is needed equally appealed to all subjects.

Although participants seemed to prefer traditional communication channels, many individuals expected a dramatic shift in farmers' information preferences. It was generally thought that as new media become more developed and reliable, traditional sources might become *less* important. As explained by one participant, "Multimedia

applications, like Oklahoma Dividends, represent an entirely new type of medium, which offers greater flexibility in finding information." Notably, subjects' perceptions of Oklahoma Dividends and related commentary seemed to converge around this 'central' point.

Overall, Oklahoma Dividends was thought to be informative and visually appealing, but also in need of fine-tuning and expansion. Participants were not, however, concerned about the lack of projects in the database. Instead, it was the potential for diversity that was well noted and encouraged. OCA members wanted "anything and everything" just in case they or someone else might want to "get into an alternative type of production."

Notably, due to time constraints, projects considered unrelated to beef production were *not* even shown during the demonstration. Participants seemed to draw from their personal computer use in knowing what to expect from the database, especially in terms of information storage and user flexibility. For example, when asked whether Oklahoma Dividends was well suited for group presentations, several subjects said "yes" and referred to the usefulness of past electronic presentations. Prior exposure to computer technology seemed to have a profound effect on subjects' attitudes and comments in general.

First and foremost, participants seemed to view Oklahoma Dividends as an individual-driven multimedia application. Notably, several OCA members wanted tutorials or training sessions to help them "figure out which button does what." One participant even asked, "What about a 'Dividends for Dummies'?" It was widely noted

that reducing any frustration associated with learning how to operate Oklahoma Dividends would be essential in building a user base.

Despite the above concerns, however, the database itself was not viewed as being too complicated or difficult to use. In general, participants agreed that the interface design was appropriate for either group presentations or the Internet. Navigating between the various layouts and identifying projects using the built-in search engines was thought to be self-explanatory and simple. The "Word Search" function, in particular, was highly favored. Plus, layouts were thought to be visually pleasing and well constructed. It was generally believed that the ease of use provided through the interface design would help reduce user frustration.

Oklahoma Dividends' "user friendliness" seemed to play a significant role in how participants gauged the usefulness of the database. Consequently, several recommendations were made to help enhance information accessibility. One widely supported suggestion was to use graphical icons in the main menu that either link up or search for specific types of information. Also favored was the idea of providing a "hotlist" of subjects in alphabetical order so users would not have to guess at which words would work when conducting searches. Providing users with more simplistic, less cluttered layout designs additionally gained notable support.

Participant's commentary on database content was remarkably more subdued than the lengthy and rather intensive discussion on interface design. The most profound finding was that Oklahoma Dividends did seem to adequately answer the question of "what have you done for me lately." Basic project information and economic

consequences were highly valued in this regard. But, as exclaimed by one OCA member, "More is better."

As indicated, subjects believed that Oklahoma Dividend's capacity for information storage and user flexibility would help producers compete in old and new markets alike. Enhancing the diversity of information in the database would, therefore, be "very beneficial." One suggestion was to include facts on "hot political" and "industry-specific" issues. Yet, the most pronounced suggestion overall was to increase the number of pictures and QuickTime movies. As explained by one participant, "Having a face to put with a project encourages farmers make contact."

As the focus group discussion was drawing to a close, participants were asked whether Oklahoma Dividends should continue. A conditional "yes" was put forth, providing that the database would be updated regularly. Notably, several participants agreed that Oklahoma Dividends could stand the test of time. It was their belief that the use of new media were "part of the modern way."

Cumulative Survey Findings

Survey responses from all three extended focus groups were combined to measure overall perceptions of DASNR, preferences for public information channels, and general computer technology use. Of the 32 individuals who participated in the main part of this investigation, 29 completed the pre-discussion questionnaire, although not always in its entirety. Statistical methods were not used to determine whether there were significant differences between groups since the research data cannot be generalized to the overall Oklahoma farm population. Only cumulative findings are discussed.

Questionnaire responses suggested that overall most focus group participants had some understanding of DASNR's mission and general purpose. As shown in Table II, of the 29 subjects who answered the question, "Are you familiar with DASNR's mission?" 18 indicated "Yes." In measuring how effectively DASNR's had fulfilled its mission, subjects generally gave better than average ratings. Table II reveals that on a scale of one to five (1 = excellent and 5 = poor), DASNR's ability to provide timely information about agricultural research received a cumulative rating of 2.5. An average rating of a 2.7 was given for disseminating timely information about extension activities.

As illustrated in Table II, subjects seemed to believe that overall DASNR's activities appropriately met the needs of the agricultural community. In using the same scale as above, questionnaire respondents gave favorable ratings (average score = 2.4) for conducting research which serves the agricultural industry. For promoting relevant extension programs, DASNR received slightly less favorable ratings (average score = 2.7).

TABLE II

SURVEY RESPONDENTS' PERCEPTIONS OF ACCOUNTABILITY
AS RELATED TO THE DASNR MISSION

Participating Oklahoma Agricultural Organizations	Number of Respondents	Familiarity with the DASNR Mission	Average Rating On Providing Timely Research Information	Average Rating On Providing Timely Extension Information	Average Rating On Conducting Relevant Research	Average Rating On Conducting Relevant Extension
Farm Bureau	8	5	2.4*	2.2*	2.2*	2.8*
Farm Union	4	3	2**	1.6**	2.6**	2**
Cattlemen's Association	17	10	2.7***	2.9***	2.4***	2.9***
Total	29	18	2.5****	2.7****	2.4****	2.7****

* Sample size = 5 respondents
** Sample size = 3 respondents
*** Sample size = 15 respondents
**** Sample size = 23 respondents

In addition to evaluating perceptions of accountability, the survey also revealed data pertinent to understanding subjects' informational preferences. As expected, when subjects ranked public communication channels using a one to five point scale (1 = most preferred and 5 = least preferred) traditional sources of information were most favored. As shown in Table III, the Internet received the lowest average ranking (4.2) in comparison to magazines (2.3), television (2.6), newspaper (2.9), and radio (3.1).

TABLE III

SURVEY RESPONDENTS' AVERAGE RANKING OF
PUBLIC COMMUNICATION CHANNELS BASED ON PREFERENCE

Participating Oklahoma Agricultural Organizations	Number of Respondents	Average Ranking of Public Communication Channels Based on Preference				
		Newspaper	Television	Farm or Trade Magazine	Radio	Internet
Farm Bureau	7	3.1	3.1	2.4	2.1	4.1
Farm Union	4	1.8	2.5	1.8	3.5	5
Cattlemen's Association	16	3.1	2.3	2.4	3.4	4.1
Total	27	2.9	2.6	2.3	3.1	4.2

Although digital communication channels ranked lowest overall in comparison with more traditional ones, most subjects did indicate some form computer technology use. Table IV shows the total number of participants who owned or had access to common digital information systems. Notably, of the 29 survey respondents, 23 operated computers and, of these individuals, 18 accessed the Internet, 14 had e-mail, and 11 used modems.

TABLE IV

SURVEY RESPONDENTS' AVERAGE USE OF COMPUTER TECHNOLOGY

Participating Oklahoma Agricultural Organizations	Number of Respondents	Average Number of Computer Technology Users			
		Computer	Modem	Internet	E-mail
Farm Bureau	8	5	4	4	3
Farm Union	4	1	0	0	0
Cattlemen's Association	17	17	7	14	11
Total	29	23	11	18	14

Questionnaire responses also indicated that the average frequency of computer use tended to be more regular rather than infrequent or sporadic. As illustrated in Table V, of those computer users identified in the survey, 10 reported daily use and 9 weekly use. Only 6 individuals were found to have never operated a computer.

TABLE V

SURVEY RESPONDENTS' AVERAGE FREQUENCY OF COMPUTER USE

Participating Oklahoma Agricultural Organizations	Number of Respondents	Average Frequency of Computer Use			
		Daily	Weekly	Occasionally	Never
Farm Bureau	8	3	1	1	3
Farm Union	4	1	0	0	3
Cattlemen's Association	17	6	8	3	n/a
Total	29	10	9	4	6

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

In the late 1990s, the term "accountability" has come to signify numerous, often diverging, interpretations of answerability when addressing performance and responsiveness. For public institutions in particular, traditional methods of reporting activities as per explicit, standardized mandates may no longer suffice. Instead, new perceptions of accountability necessitate organizations to involve stakeholders in acting out issues-management strategies. Agricultural Divisions at land-grant universities are no exception.

New media technologies promise considerable advancement in information dissemination, and may, consequently, prove useful in managing accountability issues through stakeholder education. This potential has been recognized by several state agricultural institutions, including the Oklahoma State UniversityDivision of Agricultural Sciences and Natural Resources. Oklahoma Dividends and several other "accountability systems" have been developed as a result, but seemed limited in terms of their overall effectiveness without the guidance of formal research.

A two-pronged study was conducted from April through June 1998 to determine whether Oklahoma Dividends could effectively met the accountability requirements of state agriculturists. Participants in the study, selected through state agricultural organizations, attended either a "pilot" focus or one of three extended focus groups. After viewing a demonstration of the database, subjects provided feedback regarding

their overall impressions on whether it could be used effectively as an electronic presentation tool and on-line service. Information preferences and computer use were also examined.

Research Objectives and Responses

This study asked a number of research questions and produced the following results:

1. How do new media technologies, such as Oklahoma Dividends, rate in garnering a greater sense of accountability among Oklahoma agricultural practitioners?

Focus group discussion revealed a widespread need for participants to receive information about DASNR's programs and relative outcomes. Most participants noted that they lacked a general understanding of what was going on in their respective area of interest. Oklahoma Dividends was seen as one useful means of finding out about "what is going on" and "how it might be important to me." Of particular significance to thus study, was the fact that several participants expressed a high level of interest in becoming involved in the accountability process. The overwhelming desire to have individual access to the database seemed related in this regard.

Perceptions of accountability did not appear to be based on DASNR's mission per se. Although a majority of questionnaire respondents indicated that they were familiar with organizational goals and objectives, the fulfillment of such was not specifically mentioned during focus group discussion. Subjects' individual expectations did, however, seem to be closely associated to the DASNR mission. Individual access to meaningful, timely information seemed to be overall the primary criterion upon which DASNR's accountability was measured. Focus group discussion revealed that most

participants believed Oklahoma Dividends could, as part of a larger effort, effectively meet farmers' needs in this regard.

Although some focus group discussion suggested otherwise, survey responses indicated that participants believed DASNR was performing a better than average job in conducting programs relevant to the needs of the agricultural community. The ability to "disseminate information in a timely manner" was also given favorable ratings. Notably, not all study subjects rated information as highly; in their view DASNR should expend more resources in helping farmers cope with market forces and maintaining traditional farming practices. All participants, however, agree that Oklahoma Dividends should continue based on its value in demonstrating the overall value of DASNR's programs.

2. What is the overall effectiveness of Oklahoma Dividends as an electronic communications tool for group presentations?

In most cases, the use of Oklahoma Dividends was considered an appropriate tool in facilitating group discussion on specific areas of interest. Notably, participants in the pilot study and all three focus groups strongly urged DASNR to make use of the database when meeting with state legislative leaders. In one focus group session, a few individuals, who were older in age than most participants (55 years old or older) strongly believed "all of the equipment" was not necessary when meeting with farmers.

Despite some negative opinion, however, many subjects noted that as a presentation tool, Oklahoma Dividends could add value to field days and grower meetings. Focus group discussion suggested that overall participants wanted more information about DASNR's activities and outcomes as a means of justifying continued

support. Additionally, it was widely believed that the presentation of such material would likely give farmers an individual advantage: a better understanding of projects and consequent discoveries would facilitate improvements in production practices. Greater access to information seemed highly relevant to accountability issues, and the use of an electronic presentation tool would help minimize potential knowledge gaps.

On average, participants rated Oklahoma Dividends' content (in terms of information types) as appropriate and effective in demonstrating the value of DASNR's activities. Based on focus group discussion, general project information and estimates of the related consequences were interesting and useful. The "Geographical Search" was also highly favored. However, what seemed to be the most effective in terms of garnering interest were the pictures and video, which reportedly served to humanize information and make it more memorable. Overall the layouts and navigational pathways were viewed as appropriate.

Recommendations for developing Oklahoma Dividends tended to focus on making the textual information easier to comprehend. The most frequent suggestion was to use bulleted items with greater frequency. Additionally, putting concepts into a visual rather than textual format garnered notable support. Plus, increasing the number of video clips in Oklahoma Dividends was highly recommended. It was generally thought that project applications were best understood when explained by research and extension personnel. Likewise, several subjects recommended that a "results to date" list be included in each project's "Main Layout."

3. How useful would an on-line version of Oklahoma Dividends be for individual Oklahoma farmers in retrieving information now and in the next five years?

In all but one session, focus group participants tended to view Oklahoma Dividends more in terms of the individual gain it presented than as an "accountability system." For this reason, support for making the database available on-line was considerable, especially among computer users. A majority of the subjects issued complaints that DASNR's methods of information dissemination and assistance were all too often slow and inefficient.

Focus group discussion strongly suggests that extension clientele are no longer contented in being information receivers. Rather, subjects seem to prefer the role of "information seeker." Based on several testimonials, successful farm management is becoming more dependent on information manipulation. Modes of knowledge transfer must therefore be flexible in the packaging and release of information. Oklahoma Dividends was predominately viewed as satisfying such provisions. Even those who did not have any personal interest in the database stated that younger farmers would probably benefit from its use.

Oklahoma Dividends' content was considered, in general, to be appropriate in fulfilling individual informational needs. In this regard, the "Word Search" function and general project information seemed to be the most favored. It was widely believed that knowing more about the value of research and extension efforts would prove useful when making management decisions. Notably, including project consequences into an on-line version of Oklahoma Dividends was not as highly rated as initially expected. Although

subjects found such information interesting, "how to" and "results-to-date" type knowledge carried more weight at the individual level.

Recommendations for developing an "Oklahoma Dividends On-line" centered on enhancing the database's "user friendliness" and "information accessibility." Exploring the possibilities of adding additional navigational pathways and information types generated notable support from most focus group participants. It was generally thought that if farmers were to gain from having individual access to Oklahoma Dividends, then every effort should be made to help facilitate their information seeking endeavors.

Notably, the types of information desired were not limited to respective traditional production practices. Instead, new trends in the agricultural industry brought on by deregulation have reportedly broadened production possibilities for many of the focus group participants. Most participants believed new media applications would continue to play an ever-increasing role in strengthening agricultural production, particularly as information manipulation becomes more vital.

4. From which communication channels do Oklahoma agricultural practitioners prefer to receive information?

Questionnaire responses indicated that traditional public communication channels were more favored by focus group participants than computer-mediated forms. Although some subjects gave the Internet favorable rankings, most individuals indicated preferences for farm or trade magazines, television, newspaper, and radio, respectively. According to focus group discussion, interpersonal communication did seem to be the most desired means of receiving information, however. Family members and neighbors

were reported to be the most reliable sources. A number of individuals did note the value in consulting with extension educators. However, there were several others who have reportedly had otherwise negative experiences. It is of significance to note that farmers may be using private information sources, such as chemical companies, with greater frequency than public ones.

Despite the fact survey responses indicated low preference ratings for Internet, the thought of having a centralized source of readily accessible, meaningful extension information appealed to a majority of the participants. Several individuals thought that an "Oklahoma Dividends On-line" would help them become more effective information seekers by reducing barriers to access. Many subjects, mostly younger in age, expressed interest in buying a computer soon.

5. How might Oklahoma Dividends be better constructed to more completely fulfill informational needs and accountability?

Participants in all but one focus group believed that because information dissemination was a critical factor in maintaining a strong sense of accountability, two versions of the database should be produced. As indicated, one should be used as an electronic presentation tool and the other for individuals to access. Recommendations for the future development of Oklahoma Dividends were directed at one version, or the other, and were included while addressing previous research objectives.

Conclusions

Based on the overall support of participants in this study, DASNR should continue in its efforts to develop and expand Oklahoma Dividends. Just as contemporary views on accountability predicted, stakeholders in this study expressed a notable desire to assume some kind of meaningful role in the accountability process. As contemporary views on accountability suggest, educational mechanisms do appear to be an effective way in garnering stakeholder confidence and support.

As Allen and Dillman suggest, information age pressures seem to be the transforming the U.S. agricultural landscape. Interest in growing non-traditional, alternative crops instead of traditional varieties offers some supporting evidence as does the wide-spread belief that use of new media is "part of the modern way." DASNR must be wary of its clientele's growing needs and act accordingly. Although computer communications technologies rated lowest in comparison with other information channels, participants believed that Oklahoma Dividends could potentially play an important role in role in the Oklahoma agricultural industry.

This investigation enabled researchers to explore accountability requirements and information preferences that were once poorly understood. It should be noted, however, that data generated in this study could not be generalized to the entire population of Oklahoma farmers. Furthermore, allowing organizational contacts to have control over selecting subjects resulted in notable discrepancies in the size of focus groups. Additional research is required to ensure research findings are indeed representative of the state producers. The research approach and consequent findings of this study can help serve as a guide and may also be of value in other areas of investigation as well.

Recommendations

Future Development of Oklahoma Dividends

A. Central to this investigation has been the question: should Oklahoma Dividends continue? Considering all participants appeared actively interested in assuming a greater role in the accountability process and favored continuance, the answer is yes. However, it should also be noted that one of the most pronounced concerns individual subjects voiced was whether the database would be regularly updated and maintained. It is highly recommended that an individual and/or a division-wide team assume the *daily* responsibility of Oklahoma Dividends' future development.

B. Oklahoma Dividends should be used to manage accountability issues on two mutually related fronts: present information on program activities and outcomes (economic, social, and environmental consequences) and provide enhanced individual access to general project information and results. Two versions of the database should, therefore, be instituted: one to serve as an electronic presentation tool and the other a clientele-driven application. Each version should contain relatively the same types of information, but with different degrees of emphasis and presentation, as will be discussed.

C. As an electronic presentation tool, Oklahoma Dividends' construction should focus on individual project descriptions and related economic, social, and environmental consequences. Most importantly, this information must be made easier for the viewing audience to comprehend. Rather than use lengthy paragraph descriptions, bulleted lists and visual representations of the information should be employed, particularly on the

"Project Details" and consequences layouts. "Pop-up boxes" could also be used to temporarily hide information from the viewer. Also relative to the database's more effective use as a presentation tool is increasing the overall number of pictures and QuickTime movies.

D. DASNR must seek to improve its current methods of information dissemination as a fundamental part of maintaining its accountability with state agriculturists. Providing an individual-driven version of Oklahoma Dividends was seen by a majority of study participants as a proactive step in helping them to become more effective "information seekers" and, consequently, production managers. Either a CD-ROM version or on-line World Wide Web site would be feasible, but the latter seems to be more practical and in line with participant expectation. Some consideration should be made to make the on-line version available through extension offices in an effort to compensate for information inequalities.

Important to consider in making Oklahoma Dividends available for individual use is that it does not seem necessary to entirely change the interface design, but only enhance its "user friendliness." It is therefore recommended that easier methods of information access, such as "hotlists," be explored and implemented. Additionally, if an individual-driven version is produced, then "help" information and training sessions must be considered. Extension agents can assist in evaluating the technical skills of various producer groups and develop subsequent educational programs. As change agents, they may also prove effective in promoting the use of the database.

Significant modification to Oklahoma Dividends in terms of content also seems unnecessary at this time. As indicated, participants expressed interest in general project

information, and, to some degree, related consequences. However, an insatiable need for more of "anything and everything" was also well noted. It is therefore recommended that project consequences be simplified and confined to a single layout. Furthermore, additional layouts should be added to expand the depth of "results-to-date" and "how to" information. Although downloading speeds may dictate exactly what types of content can be provided, some visual elements should be included.

E. Regardless of version type, Oklahoma Dividends should be a representation of the "total product." Participants did not inherently consider the Agricultural Experiment Station and Cooperative Extension Service to be two separate entities, and neither should DASNR. The database should therefore continue to feature both types of projects. Additionally, it would appear that changes in production agriculture have increased the necessity for farmers to have access to a wider range of information. An Oklahoma Dividends that contains a diverse wealth of information may be more useful than a commodity-specific version.

F. Accountability standards should be continuously monitored and incorporated into DASNR's strategic management process. As evidenced by the seemingly non-traditional views of many focus group participants, dramatic changes are likely to be taking place throughout the agricultural industry. Effectively serving the dynamic needs of Oklahoma agriculturists will require the development of more flexible organizational practices and management techniques. DASNR should instate a research program designed to regularly evaluate the accountability environment.

Opportunities for Further Research

A. This investigation into the effectiveness of Oklahoma Dividends has revealed numerous opportunities in communicating with agricultural audiences. However, data generated in the study cannot be generalized to the total population of Oklahoma farmers. Therefore, it will be necessary to conduct an additional series of focus groups using random sampling techniques to verify whether the research findings are indeed representative. In generating a more representative sample of Oklahoma farmers, it is advisable to include individuals of varying production types. Stratified random sampling techniques may be most effective in selecting the appropriate type and number of participants.

B. Relatively little quantitative research exists on computer use among Oklahoma farmers. A comprehensive diffusion study would be very reveling when assessing the overall usefulness of individual-driven multimedia applications. Questions such as "How many farmers have computers" and "What exactly are they used for" would prove invaluable to Oklahoma Dividends' future success. Researchers could also help determine what obstacles may prevent some individuals from making adoption decisions.

C. This investigation only explored basic concepts of interface design and audiences preferences. Experimental research may be used to help further understand which types of layout designs and database features are most effective in conveying information. Both stand-alone and group-based versions could be tested. The outcomes of this research would not only prove useful in developing new media applications, but they might also help establish industry-wide standards.

D. Although the findings of this study do shed some light on which types of information are important to Oklahoma agriculturists, still relatively little is known about which material is most relevant to the state's farmers. For example, what do farmers need to know in terms of making short-term and long-term decisions? In-depth interviews and broadly distributed surveys could be very useful in answering these types of questions and adding to the general understanding of informational needs and preferences. This type of research should also consider possible relationships between informational needs and preferences for certain communication channels.

E. DASNR's accountability environment includes several external audiences, of which state farmers are only one. The methods of this study have application in evaluating the accountability requirements of other groups, including legislative leaders and civic groups.

Perceptions of accountability are, by their nature, dynamic and, consequently, difficult to manage. Promoting meaningful information through communication channels appropriate to targeted audiences is likely to be a key ingredient for DASNR's continued success. New media technologies seem to offer great promise in this regard, as found in this investigation. DASNR must continue in its efforts to evaluate the needs and expectations of its various constituencies and disseminate meaningful information accordingly. Oklahoma Dividends will likely prove an effective tool in proactively managing accountability issues.

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APPENDICIES

APPENDIX A

EXAMPLES OF OKLAHOMA

DIVIDENDS' LAYOUTS


Main
1
Records:
19
Sorted
Oklahoma Dividends!
Main Menu
Searching...
Word Search
Geographical Search
Departmental Search
Cooperators Search
Anticipated Benefits...
Economic
Social
Environmental
Utilities...
Help
Interpretation
Special Features
EXIT PROGRAM
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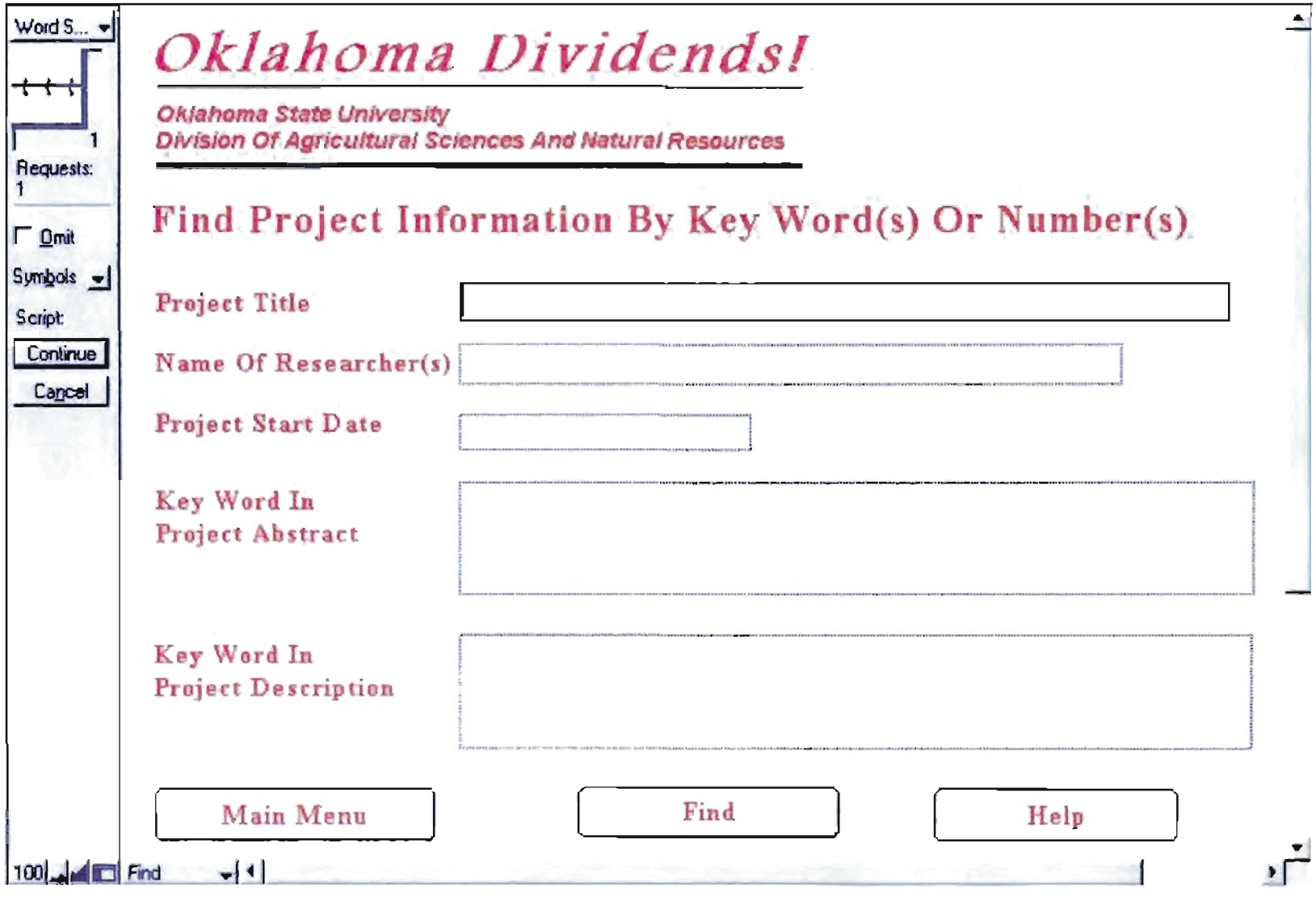
Browse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Main Menu
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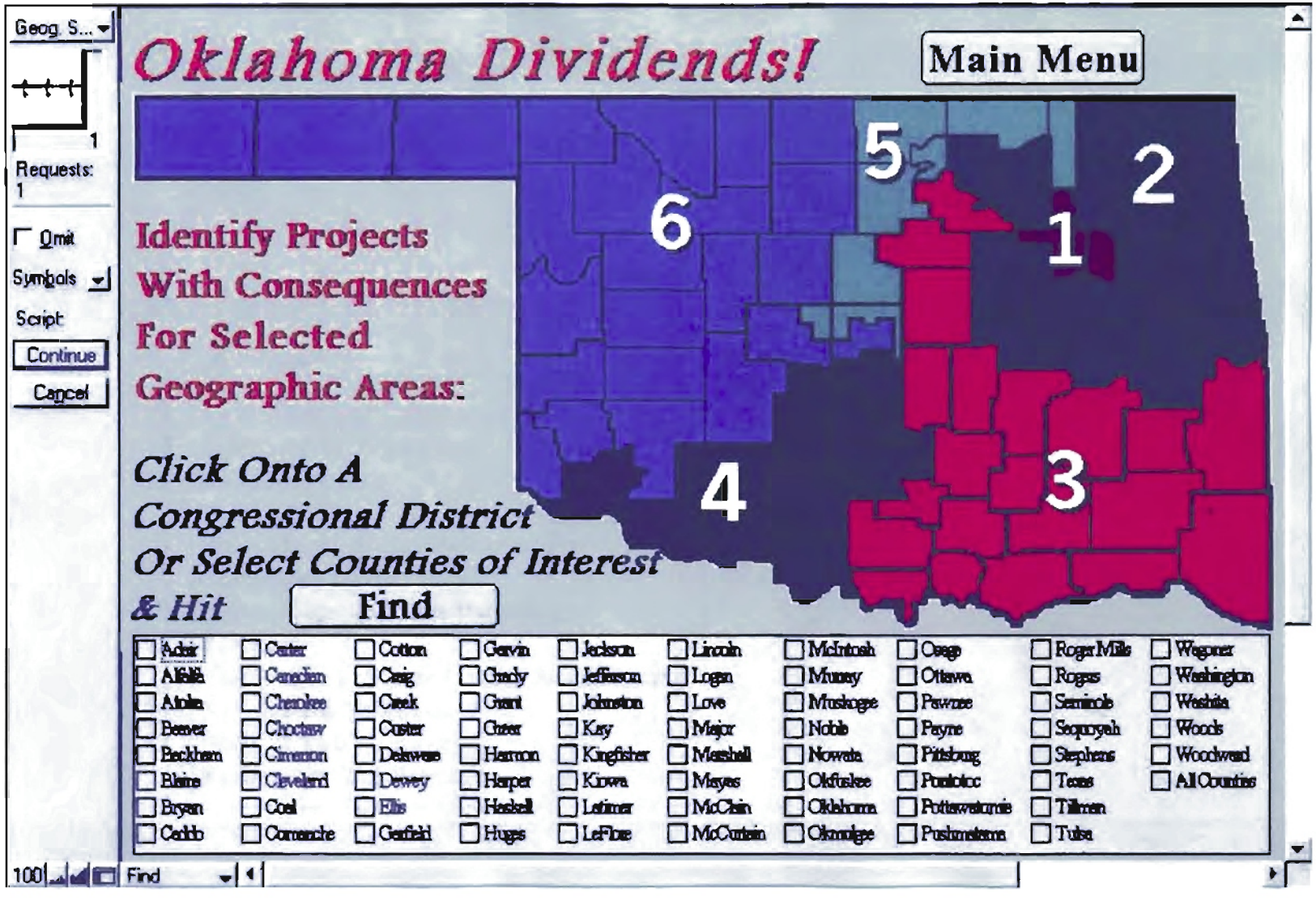
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Identify Projects With Consequences For Selected Geographic Areas:
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Adair
Alfalfa
Atoka
Beaver
Beckham
Blaine
Bryan
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Cherokee
Choctaw
Cimarron
Cleveland
Coal
Comanche
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Craig
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Custer
Delaware
Dewey
Ellis
Garfield
Garvin
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Grant
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Harmon
Harper
Haskell
Hughes
Jackson
Jefferson
Johnston
Kay
Kingfisher
Kiowa
Latimer
LeFlore
Lincoln
Logan
Love
Major
Marshall
Mayes
McClain
McCurtain
McIntosh
Murray
Muskogee
Noble
Nowata
Okfuskee
Oklahoma
Okmulgee
Osage
Ottawa
Pawnee
Payne
Pittsburg
Pontotoc
Pottawatomie
Pushmataha
Roger Mills
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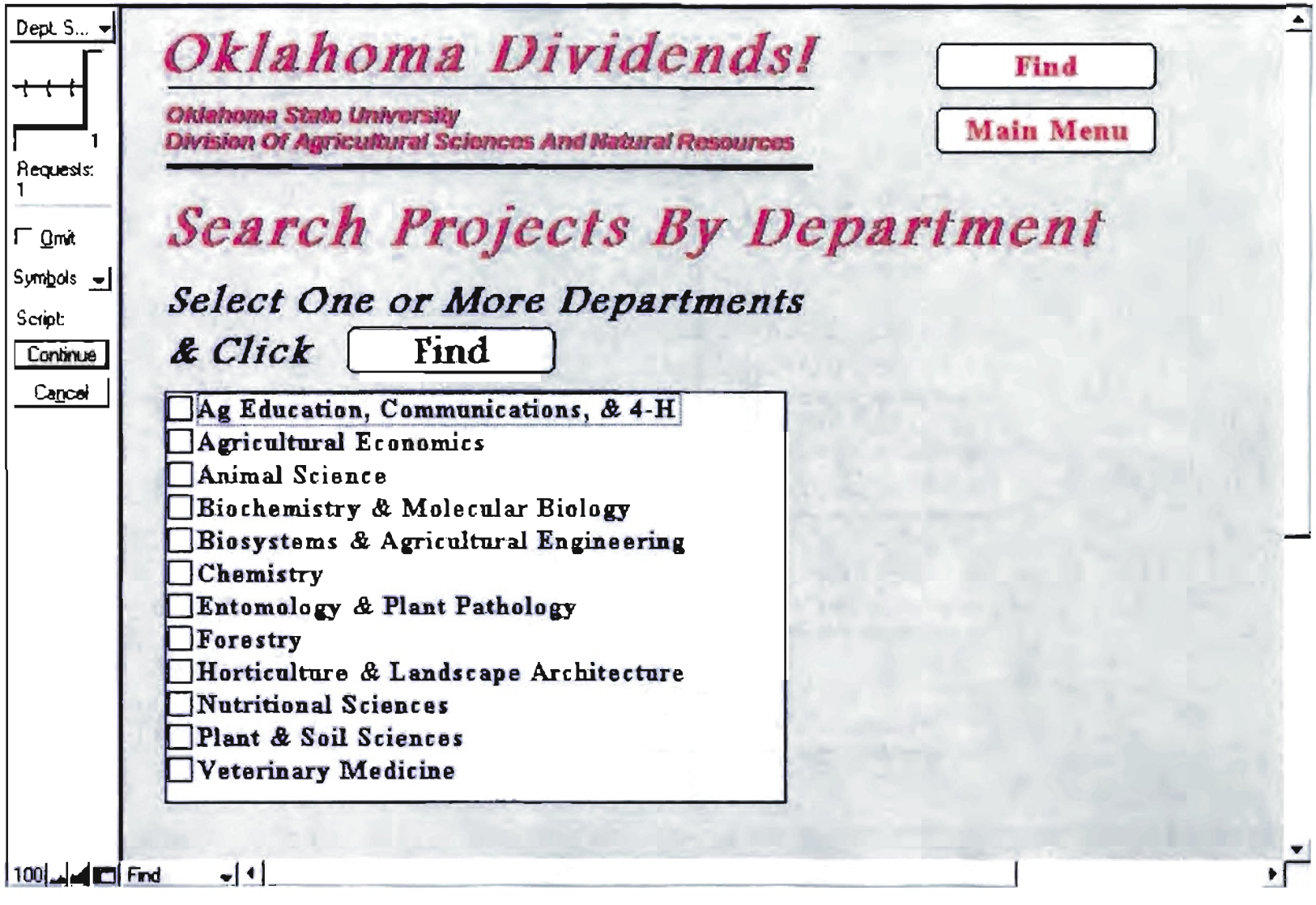
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Search Projects By Department
Select One or More Departments
& Click
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Ag Education, Communications, & 4-H
Agricultural Economics
Animal Science
Biochemistry & Molecular Biology
Biosystems & Agricultural Engineering
Chemistry
Entomology & Plant Pathology
Forestry
Horticulture & Landscape Architecture
Nutritional Sciences
Plant & Soil Sciences
Veterinary Medicine
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Division Of Agricultural Sciences And Natural Resources
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Main Menu
Search Projects by Cooperator
Identify Cooperators
Within Projects...
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A Cooperator Type
& Then Make A
Selection On The
Following Page
Academic Institutions
Agricultural Organizations
Companies & Foundations
Government Agencies
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Records: 19

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Oklahoma Dividends!

Oklahoma State University
Division Of Agricultural Sciences And Natural Resources

Pecan Oil Reduction Project

Maness, Niels	*Horticulture & Landscape Architecture*
Brusewitz, Jerry	Biosystems & Agricultural Engineering
Knight, Sue	Nutritional Sciences
Smith, Mike	Horticulture & Landscape Architecture

Project Start Date: *July 1993*

Increased pecan sales have been limited by high fat content and reductions in quality while in storage. This research focuses on developing reduced fat pecans and pecan products while designing new handling procedures and processes to stabilize storage quality. A partial oil extraction process has been developed which doubles or triples the shelf life of pecans and significantly reduces calorie content. The pecan oil byproduct has favorable nutritional benefits,

Anticipated Benefits

- Economic
- Social
- Environmental

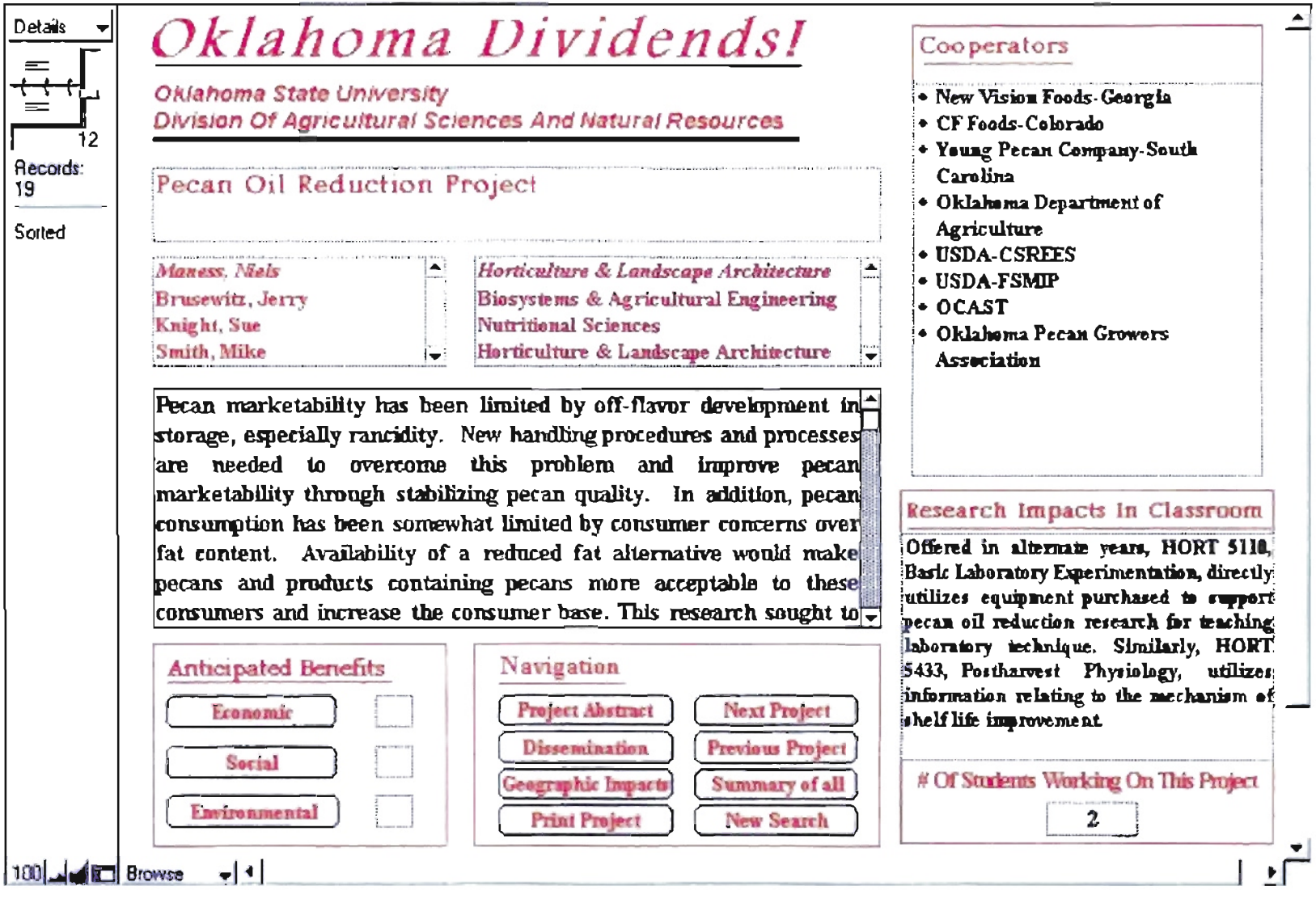
Navigation

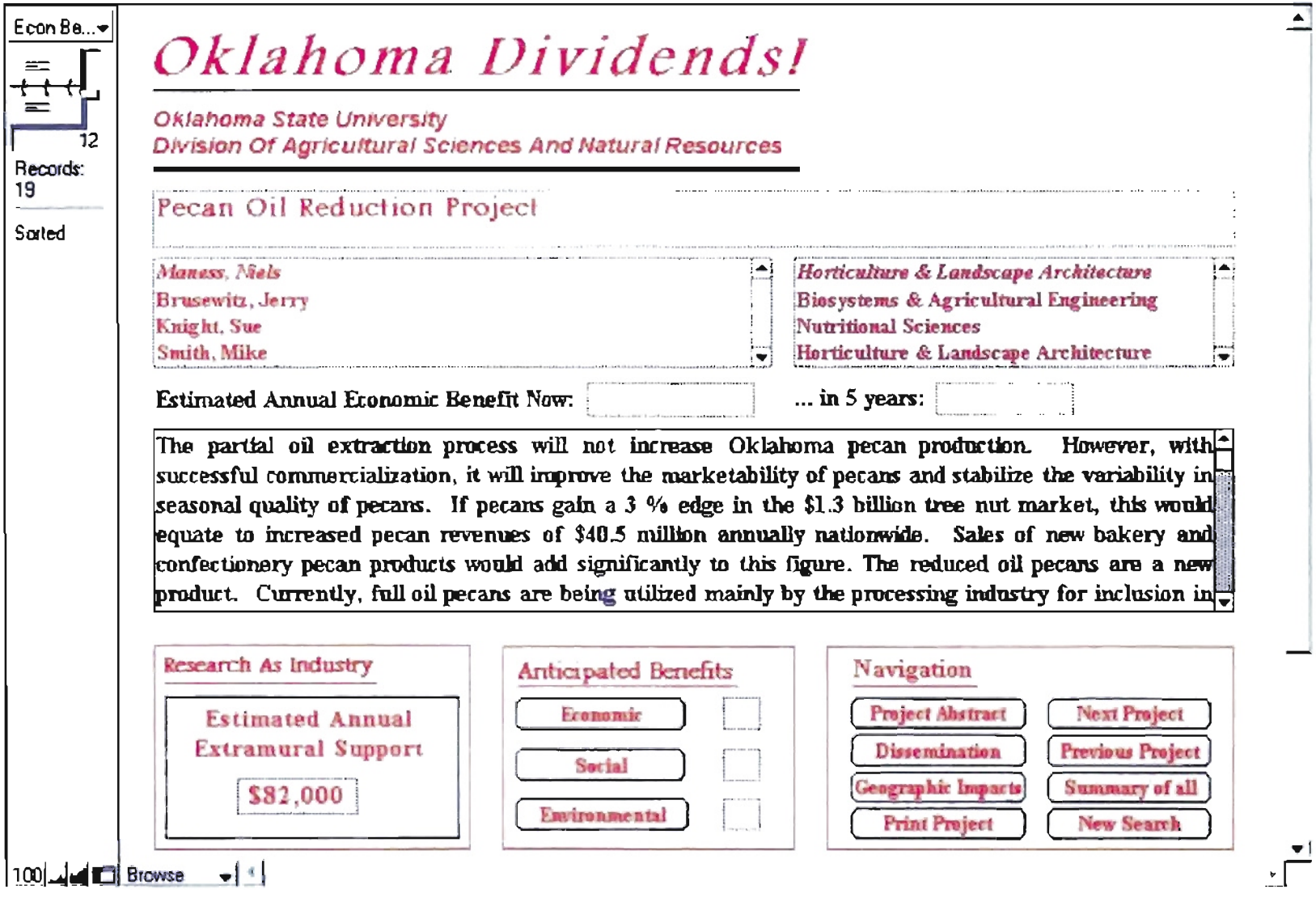
- Project Details
- Dissemination
- Geographic Impacts
- Print Project
- Show Video
- Next Project
- Previous Project
- Summary of all
- New Search

Project Highlights

- Storage quality of pecans can be doubled or even tripled through partial oil extraction.
- Reduction in high fat content may yield greater profits while providing nutritional benefits to consumers.

100 Browse


Details
12
Records:
19
Sorted
Oklahoma Dividends!
Oklahoma State University
Division Of Agricultural Sciences And Natural Resources
Pecan Oil Reduction Project
Maness, Niels
Brusewitz, Jerry
Knight, Sue
Smith, Mike
Horticulture & Landscape Architecture
Biosystems & Agricultural Engineering
Nutritional Sciences
Horticulture & Landscape Architecture
Pecan marketability has been limited by off-flavor development in storage, especially rancidity. New handling procedures and processes are needed to overcome this problem and improve pecan marketability through stabilizing pecan quality. In addition, pecan consumption has been somewhat limited by consumer concerns over fat content. Availability of a reduced fat alternative would make pecans and products containing pecans more acceptable to these consumers and increase the consumer base. This research sought to
Anticipated Benefits
Economic
Social
Environmental
Navigation
Project Abstract
Next Project
Dissemination
Previous Project
Geographic Impacts
Summary of all
Print Project
New Search
Cooperators
• New Vision Foods-Georgia
• CF Foods-Colorado
• Young Pecan Company-South Carolina
• Oklahoma Department of Agriculture
• USDA-CSREES
• USDA-FSMIP
• OCAST
• Oklahoma Pecan Growers Association
Research Impacts In Classroom
Offered in alternate years, HORT 5110, Basic Laboratory Experimentation, directly utilizes equipment purchased to support pecan oil reduction research for teaching laboratory technique. Similarly, HORT 5433, Postharvest Physiology, utilizes information relating to the mechanism of shelf life improvement.
Of Students Working On This Project
2
100
Browse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Sorted
Oklahoma Dividends!
Oklahoma State University
Division Of Agricultural Sciences And Natural Resources
Pecan Oil Reduction Project
Maness, Niels
Brusewitz, Jerry
Knight, Sue
Smith, Mike
Horticulture & Landscape Architecture
Biosystems & Agricultural Engineering
Nutritional Sciences
Horticulture & Landscape Architecture
Estimated Annual Economic Benefit Now:
... in 5 years:
The partial oil extraction process will not increase Oklahoma pecan production. However, with successful commercialization, it will improve the marketability of pecans and stabilize the variability in seasonal quality of pecans. If pecans gain a 3 % edge in the $1.3 billion tree nut market, this would equate to increased pecan revenues of $40.5 million annually nationwide. Sales of new bakery and confectionery pecan products would add significantly to this figure. The reduced oil pecans are a new product. Currently, full oil pecans are being utilized mainly by the processing industry for inclusion in
Research As Industry
Estimated Annual Extramural Support
$82,000
Anticipated Benefits
Economic
Social
Environmental
Navigation
Project Abstract
Next Project
Dissemination
Previous Project
Geographic Impacts
Summary of all
Print Project
New Search
100
Browse

APPENDIX B

DIVISION OF AGRICULTURAL SCIENCES

AND NATURAL RESOURCES'

MISSION STATEMENT

DIVISION OF AGRICULTURAL SCIENCES AND NATURAL RESOURCES' MISSION STATEMENT

The Mission of the Oklahoma State University Division of Agricultural Sciences and Natural Resources is to discover, develop, disseminate, and preserve knowledge needed to enhance the productivity, profitability, and sustainability of agriculture; conserve and improve the health and well-being of all segments of our society; and to instill in its students the intellectual curiosity, discernment, knowledge, and skills needed for their individual development and contribution to society.

APPENDIX C

PILOT STUDY FOCUS GROUP QUESTIONS

PILOT STUDY FOCUS GROUP QUESTIONS

"The Bigger Picture"- Agricultural Use Of New Media

1.) In what ways do you and your organizations use computers and on-line services?

2.) How important is having a web or Internet presence to your organization?

3.) Describe how important computers and on-line services might be for agricultural audiences now and within the next five years?

"Agricultural Information Needs"- Are They Being Fulfilled?

1.) What types of concerns and informational needs do your organizations' clientele have with regards to agricultural research and extension?

Oklahoma Dividends Questions

1.) How well does the information in Oklahoma Dividends aid in the understanding of agricultural research and extension and related benefits?

2.) Which features in Oklahoma Dividends seem most effective, least effective?

3.) How might legislative leaders benefit from Oklahoma Dividends?

4.) Would the presentation of Oklahoma Dividends at group meetings help facilitate a better understanding of DASNR's activities?

5.) What benefits might farmers/producers realize if Oklahoma Dividends was available on-line?

6.) How might Oklahoma Dividends be better constructed to more completely fulfill informational needs about DASNR research and extension?

APPENDIX D

STANDARD FOCUS GROUP SURVEY

STANDARD FOCUS GROUP SURVEY

This questionnaire is part of a thesis project conducted with the cooperation of the Oklahoma Division of Agricultural Sciences and Natural Resources (DASNR). Its purpose is to better understand stakeholders' perceptions and informational needs associated with DASNR's performance and responsiveness. Please do **not** write your name on this form.

1.) Please check the appropriate box to indicate whether you are familiar overall with DASNR's mission.

YES NO

2.) Using a scale from 1 to 5 (1=excellent...5=poor), please rate DASNR's performance on the following as related to your respective area of interest:

____ Providing timely information about agricultural research

____ Providing timely information about extension activities

____ Conducting research that serves the needs of the agricultural community

____ Promoting extension programs that meet the needs of the agricultural community

3.) Please rank the following method(s) of receiving information in the order that you prefer most (1=most preferred, 5=least preferred)

____ Newspaper

____ Television

____ Farm or Trade Magazine

____ Radio

____ Internet

____ Other, please describe_____

*** Continued on the next page

4.) Do you currently own or have access to the following? (check those that apply)

___ computer
___ modem
___ Internet (world wide web)
___ e-mail
___ FAX machine

5.) How often do you use a computer?

___ daily ___ weekly ___ occasionally ___ never

END OF SURVEY

APPENDIX E

STANDARD FOCUS GROUP QUESTIONS

STANDARD FOCUS GROUP QUESTIONS

Hello. Thank you for taking the time to join our discussion about improving accountability through stakeholder input. My name is Kelly Bantle-Stoner, and I will be gathering your impressions on the credibility and usefulness of Oklahoma Dividends, an electronic database that stores, sorts, and retrieves information about agricultural research and extension conducted through the Oklahoma Division of Agricultural Sciences and Natural Resources.

As we talk today, I want you to know there are not right and wrong answers, but there may be different points of view. Please feel free to share your point of view, even if it differs from what has been said.

Before we begin, please let me ask that no one be interrupted. Also, please keep in mind that we are just as interested in negative comments as positive ones. We are tape-recording the session so no comments are missed. We will be on a first name basis today, but in our later reports, there will not be any names associated with individual comments. You may be assured of complete confidentially.

Our session will be about an hour to an hour and a half. We will not be taking a break, but feel free to leave the room if necessary. As I ask questions please feel free to first take a moment to form your thoughts and then respond one at a time.

General Focus Group Questions will include:

1.) How do you define accountability?
2.) In which ways might computers be most beneficial to Oklahoma producers and other agriculturists?
3.) Describe how important you think computers and on-line services might be for agricultural audiences might be for agriculturists now and in the next five years.
4.) How well does the information in Oklahoma Dividends communicate what we do and why it is important for the state of Oklahoma?
5.) Which features in Oklahoma Dividends seem most effective, least effective?
6.) Would the presentation of Oklahoma Dividends at group meetings be useful?
7.) What benefits might agriculturists realize if Oklahoma Dividends was available on-line? Would an on-line version need to be constructed differently?
8.) How might Oklahoma Dividends be better constructed to more completely fulfill informational needs about DASNR research and extension?

APPENDIX F

INSTITUTIONAL REVIEW BOARD

STUDY APPROVAL FORMS

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: January 28, 1998 **IRB #: AS-98-042**

Proposal Title: NEW MEDIA APPLICATIONS FOR AGRICULTURAL AUDIENCES IN THE AGE OF ACCOUNTABILITY: A PILOT STUDY

Principal Investigator(s): Steve Smethers, Kelly Bantle-Stoner

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

ALL APPROVALS MAY BE SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING, AS WELL AS ARE SUBJECT TO MONITORING AT ANY TIME DURING THE APPROVAL PERIOD.
APPROVAL STATUS PERIOD VALID FOR DATA COLLECTION FOR A ONE CALENDAR YEAR PERIOD AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.
ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Disapproval are as follows:
This study poses but minimal risk to participants. Names or other identifiers will not be used.

As part of the conduct of the study, the reviewer feels it might be beneficial if the researchers would develop a solicitation script. In this, the participants could be informed of the nature of the study, why they were selected, what the researchers are interested in, who is sponsoring the effort, etc. They should also be reassured that the reason for tape recording is to be able to transcribe their inputs in order to cite their responses correctly and that only aggregate responses are to be used.

Signature

Chair of Institutional Review Board

Date: January 30, 1998

Cc: Kelly Bantle-Stoner

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 04-03-98 **IRB #: AS-98-054**

Proposal Title: NEW MEDIA APPLICATIONS FOR AGRICULTURAL AUDIENCES IN THE AGE OF ACCOUNTABILITY

Principal Investigator(s): Steve Smethers, Kelly Bantle-Stoner

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

ALL APPROVALS MAY BE SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING, AS WELL AS ARE SUBJECT TO MONITORING AT ANY TIME DURING THE APPROVAL PERIOD.
APPROVAL STATUS PERIOD VALID FOR DATA COLLECTION FOR A ONE CALENDAR YEAR PERIOD AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.
ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Disapproval are as follows:
The nature and protocol for this study pose little, if any, risk to those who will participate. What might be incurred is essentially negated through the use of the Informed Consent Form, which advises participants of what is to be done and how they are to be protected. It does not appear that there will be any identifiers that can be used to trace participants or their responses. Because of these precautions, the reviewer would conclude that the study qualifies as "Exempt" and should be allowed to proceed.

Signature

Chair of Institutional Review Board

Date: April 7, 1998

cc: Kelly Bantle-Stoner

VITA

Kelly Ann Bantle-Stoner

Candidate for the Degree of

Master of Science

Thesis: NEW MEDIA APPLICATIONS FOR AGRICULTURAL AUDIENCES IN THE AGE OF ACCOUNTABILITY

Major Field: Mass Communications

Biographical:

Personal Data: Born in Denver, Colorado, October 28, 1973, the daughter of Jack and Donetta Bantle. Married on August 16, 1998 to Christopher Scott Stoner.

Education: Graduated from Stillwater High School, Stillwater, Oklahoma in May 1991; received Bachelor of Science degree in Journalism and Broadcasting with an emphasis in Public Relations from Oklahoma State University, Stillwater, Oklahoma in December 1995; completed requirements for the Master of Science degree at Oklahoma State University in July, 1998.

Professional Experience: Staff Reporter, *The Daily O'Collegian*, Stillwater, Oklahoma, January 1993 to October 1994; Public Relations Intern, Southwest Medical Center, Oklahoma City, Oklahoma, June 1994 to August 1994; Marketing Intern/Lew Wentz Scholar, Student Union Marketing Department, Stillwater, Oklahoma, January 1995 to May 1995; Graduate Research Assistant, Division of Agricultural Sciences and Natural Resources, Stillwater, Oklahoma, October 1995 to Present.