DETERMINING THE RESEARCH, EDUCATION, AND EXTENSION NEEDS OF OKLAHOMA WHEAT PRODUCERS

By

STANLEY CHRISTIAN MARIGER

Bachelor of Science
Saint Vincent College
Latrobe, Pennsylvania
1991

Bachelor of Science
Utah State University
Logan, Utah
1996

Master of Science
Utah State University
Logan Utah
2000

Submitted to the faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the degree of
DOCTOR OF PHILOSOPHY
May, 2003

DETERMINING THE RESEARCH, EDUCATION, AND EXTENSION NEEDS OF OKLAHOMA WHEAT PRODUCERS

Thesis Approved:

Kathleen D. Kelsey

Thesis Advisor

James H. Leising

Mike D. Woods

James D. White

Timothy J. Bettis

Dean of the Graduate College

ACKNOWLEDGEMENTS

This study would not have been possible with out the support and intellectual contributions and support of many people and institutions. First and foremost I wish to express my gratitude to my doctoral committee, Dr. Kathleen Kelsey, Dr. James Leising, Dr. James White, and Dr. Mike Woods. Each and every member of the committee made important contributions to this research, to my Ph.D. program and to my development as a person.

I would also like to thank Mr. Barry Bloyd, of the Oklahoma Agricultural Statistics Service, who worked with us on the sample frame and follow up with nonrespondents for this study. Mr. Bloyd time and again went above and beyond the call of duty in providing vital assistance with this study.

In addition, I would like to recognize Dr. D.C. Coston Director, of the Oklahoma Agricultural Experiment Station. This research study was supported by the Oklahoma Agricultural Experiment Station through the Targeted Research Initiative Program.

Finally, I would like to thank the faculty, staff, and graduate students of the Department of Agricultural Education, Communications, and 4-H Youth Development for their support, friendship and advice over the last three years. God bless you all.

TABLE OF CONTENTS

Chapter Page

LIST OF TABLES

LIST OF FIGURES

Figure Page

CHAPTER I

INTRODUCTION

The idea of higher education for those not engaged in the classical professions such as medicine, the law, or religious ministry is a uniquely American concept (Kerr, 1931). The founding fathers of our nation, including Washington, Jefferson, and Franklin, were all proponents of higher education for average citizens, such as farmers and tradesmen (Seevers, Graham, Gammon, and Conklin, 1997). By 1850, the groundwork had been laid for the creation of the land-grant colleges officially created by the passage of the Morrill Act of 1862 (Seevers, et al., 1997). The land-grant colleges would be followed by the creation of agricultural experiment stations with the passage of the Hatch Act of 1887. The purpose of the experiment stations was to conduct research to provide an expanded knowledge base for teachers at land-grant schools and to diffuse information to farmers and ranchers. The final component of the modern land-grant system, the Cooperative Extension Service (CES), was created with the passage of the Smith Lever Act of 1914. The mission of CES has been to aid in the diffusing among the citizenry useful and practical information on subjects relating to agriculture and home economics and to encourage application of the same (Eddy, 1957). The scope of CES is the dissemination of research-based information to the land-grant clientele who are not enrolled at land-grant universities.

The research-based information provided to American farmers through the land-grant university system has allowed them to become so productive that less than two production agriculturists produce food and fiber to support the needs of more than 100 people. Now in the 21st century, the American agricultural industry accounts for more than 13 % of the gross domestic product and employs 18 % of workers in the United States (Lechtenbert, 1998).

All Americans benefit to some degree from the work conducted at land-grant universities. Historically, the land-grants and their farmers institutes provided research-based education to their students, a tradition that continues today. The agricultural experiment stations were required by law to publish periodic bulletins on the progress of their research and to present their results to the public. The Cooperative Extension Service has provided grassroots level, research-based information and educational programming to the public since 1914 (Seevers, et al., 1997). However, in recent years, the American public has become increasingly disconnected from the land-grant system in part because the majority of the American public have no direct connection to agriculture. In fact, over the last few years, even farmers, ranchers, and agribusiness people are questioning the role of the land-grant university as the focus of research has shifted from applied to basic investigation (Kelsey, Mariger & Pense, 2001).

Statement of the Problem

The failure to recognize problems among the interested public and to consider their needs in establishing research priorities is a core issue in the widening gulf between the land-grant university and its constituency. Recently, the American public has been

demanding higher accountability from land-grant universities as evidenced by declining financial support for higher education institutions where the majority of agricultural research is conducted (Altschuld & Zheng, 1995). This climate of greater accountability has created a need to gather and assess input from Oklahoma State University's interested public to better address their concerns. The state colleges land-grant universities of agriculture, state agricultural experiment stations, and cooperative extension all must take steps to identify the stakeholders and assess their needs for research-based information.

The term "stakeholder" has become popular in academia in recent years, but it has not been clearly defined for the purpose of assessing educational or research information needs. Defining appropriate stakeholders for participation in priority setting should be based on (a) *legitimate stakeholders* (b) who have *sufficient program knowledge* to contribute to the process in meaningful ways, and (c) whose self-defined *stake in the university is also high* (Greene, 1988). Further, stakeholders can be divided into three categories: beneficiaries, agents, and the underrepresented. Beneficiaries are those who benefit from the program, agents are those involved in the planning or delivery of the program, and the underrepresented are those who are harmed or are inadequately served by the program (Guba and Lincoln, 1989).

The 1998 Farm Bill (Public Law 105-185) reflects the trend for higher levels of accountability to the public. This law requires that stakeholder input be collected and considered when establishing research priorities. Section 102, item c titled "Priority Setting Process" states:

> Effective October 1, 1999, to obtain agricultural research, extension, or education formula funds from the Secretary, each 1862 Institution, 1890 Institution, and 1994 Institution shall establish and implement a process for obtaining input from persons who conduct or use agricultural research, extension, or education concerning the use of the funds.

The mandate established in the 1998 Farm Bill includes two important research priority setting criteria that must be met by land-grant institutions to continue to receive research funding from the USDA. First, the institution must develop a Plan of Work as required by the Government Performance and Results Act (GPRA). The second criteria mandated in the 1998 Farm Bill is to obtain stakeholder input when establishing research priorities. The rationale for collecting stakeholder input is to address eroding public confidence in land-grant institutions and to help ensure continued public support of funding for agricultural research (Kelsey, Pense & Mariger, 2001).

A comprehensive model for collecting stakeholder input was developed by researchers at Oklahoma State University, *A Model for Gathering Stakeholder Input for Setting Research Priorities at the Land Grant University* (Kelsey & Pense, 2001). This model utilized a qualitative methodology to collect stakeholder input from one academic department's interested public. Very detailed input from a broad spectrum of the department's stakeholders was collected, verified, analyzed, and reported to the department's faculty. A high percentage of the findings produced through this study were applicable to both departmental and individual faculty research agendas. In addition to

problem areas for stakeholders, the findings included recommendations on informational format and ways to improve communication with stakeholders.

Though highly successful, the methodology developed by Kelsey, Pense and Mariger (2001) had a serious drawback. The qualitative methodology, though streamlined, was still cumbersome due to the nature and volume of the data collected. This aspect of the model would make it difficult and expensive for academic departments to apply because it required the expertise of social science researchers trained in qualitative research methods.

Purpose of the Study

The purpose of this study was to collect stakeholder information for the Wheat Working Group (WWG) of the Plant and Soil Sciences Department at Oklahoma State University.

Objectives of the Study

Specific objectives of the study were to:

1. Determine the demographic and operational characteristics of Oklahoma wheat producers.
2. Describe the agricultural problems, challenges, and concerns of Oklahoma wheat producers.
3. Identify factors Oklahoma wheat producers consider when making production-related decisions.
4. Identify specific informational sources preferred by Oklahoma wheat producers.
5. Determine the most effective activities for establishing ongoing communication between faculty and Oklahoma wheat producers.

Scope and Limitations of the Study

The scope of this study included approximately 15,000 wheat producers in Oklahoma who were actively engaged in wheat farming for the 2000-2001 crop season.

The following limitations were noted in conducting this study:

1) The wheat production season (2000-2001) specified in the survey was a drought year, which caused many producers to reduce the acres planted in wheat. The drought also affected wheat grazing during that wheat production season.
2) The timing of the data collection, August and September of 2001, overlapped preparations for the winter wheat planting season and may have reduced the response rate of the survey.

Definition of Terms

The following terms were used as defined in this study:

Academic Unit: For the purpose of this study, the academic unit was the Wheat Working Group (WWG) faculty at Oklahoma State University.

Agriculturist: An individual engaged and/or skilled in agriculture.

Attitude Scale: A measure of the degree of favorableness or unfavorableness an individual holds towards a group, institution, construct, or object. (Ary, et al., 1996)

Chi-square (X^2): An inferential statistic that compares the frequencies of nominal measures actually observed with the expected frequencies under the null hypothesis. (Siegel, 1956)

Construct: An abstraction at a higher level than a concept used to explain, interpret, and summarize observations and to form part of the conceptual content of a theory (Ari, et al., 1996).

Content Validity: The degree to which the items in a survey represent the underlying content domain to be measured (Ari, et al., 1996).

Cronbach Alpha (α): An internal-consistency reliability coefficient that measures the extent to which the scores of the individual survey items agree with one another (Ari, et al, 1996).

Cross-sectional Survey: A survey in which the data are collected at a single point in time from a particular population (Ari, et al., 1996).

Descriptive Research: Research that poses questions about the nature, incidence, or distribution of variables. This type of research involves description but not manipulation of variables (Ari, et al., 1996).

Descriptive Statistics: Techniques for organizing, summarizing, and describing observations (Ari, et al., 1996).

Effect Size: The difference between groups divided by the common standard deviation (Wiersma, 2000).

Ex Post Facto Research: Research that tries to determine the causes for or the consequences of differences that are present among groups (Ari, et al., 1996).

External Validity: The extent to which the findings of a study can be generalized to other subjects, other settings, or other definitions of variables (Ari, et al., 1996).

Inferential Statistics: Procedures that permit one to make generalizations from the sample data to the population from which the sample was drawn (Ari, et al., 1996).

Informed Consent: The right of a subject in a research study to know the nature and purpose of the study (Ari, et al., 1996).

Institutional Review Board: A committee that determines whether proposed research meets federal and other legal and ethical standards (Ari, et al., 1996).

Internal Validity: The extent to which the survey instrument measured the variables accurately (Campbell, 2001).

Likert-type Item: A survey item similar to a Likert scale where the response options are on a continuum of strongly agree to strongly disagree.

Non-response: A situation where a person received a survey but did not return a completed instrument (Ari, et al., 1996).

Pilot Study: A trial run with a few subjects to assess the appropriateness and practicality of the procedures and data collection instruments (Ari, et al., 1996).

Population: An indefinitely large set of observations in which the researcher is interested. The members of the population all share at least one thing in common (Campbell, 2001)

Random sample: A sample drawn so that each member of the population has equal and independent chance of being included in the sample (Campbell, 2001).

Sample: A subset or part of a population to be used to make inferences about the population (Campbell, 2001).

Stakeholder: Defining appropriate stakeholders for participation in priority setting should be based on (a) *legitimate stakeholders* (b) who have *sufficient program knowledge* to contribute to the process in meaningful ways, and (c) whose self-defined *stake in the university is also high* (Greene, 1988).

Wheat producer: For the purpose of this study, wheat producers are defined as persons who plant wheat and or own land on which wheat is planted and are actively involved in the management of wheat production.

Wheat Working Group (WWG): A group composed of wheat research and extension faculty in the College of Agriculture and Natural Resources (CASNR). This group is involved with wheat research, marketing, and education.

CHAPTER II

REVIEW OF LITERATURE

This purpose of this chapter is to provide the setting and theoretical support for this study. The setting for the study was an academic unit within a land-grant university college of agriculture. Land-Grant Colleges of Agriculture (LGCA) have a unique history, structure and role in American society. This chapter opens with a brief history of the land-grant university system. The next section of the chapter focuses on the context and need for the study, specifically the relationship between the LGCAs and the public. Finally, the third section focuses on the theory underlying the study. The theoretical frame for this study lies in the literature surrounding stakeholder engagement; that is public institutions exist to serve the public good. Without input from their clientele, these institutions meet only those needs that they themselves perceive. In-order to truly engage their clientele the institution should seek input from the average citizen. The evidence supporting this idea stems from diverse bodies of literature, and several lines of scholarly work are explored.

A Brief History of the Land-Grant University

The concept of higher education for the common people, those not engaged in the traditional professions such as ministry, medicine, or the law, is part of a unique

American heritage (Kerr, 1931). Early proponents of this new idea in education included George Washington, Thomas Jefferson, and Benjamin Franklin. These historical figures all encouraged and were active participants in efforts to develop new knowledge and educate nonprofessionals, particularly in the area of agriculture (Seevers, Graham, Gammon, & Conklin, 1997). The agricultural societies founded shortly after the revolution were funded by relatively well-to-do members who could afford to experiment with various crops, animals and other agricultural inputs such as soil amendments. The popularity of theses societies continued to grow throughout the early 19th century, but they were becoming outmoded as the land in the west was cleared for farming (Seevers, et al., 1997).

The westward expansion, coupled with the new economic pressures of the industrial revolution, set the stage for reform in the educational system. Before the 19th century, methods of agricultural production had changed very little, (Herren & Edwards, 2002). The industrial revolution, which began with the first cotton mill in England in 1733, and continued with new technologies, such as the innovations in steam power made by Watt and Fulton, prompted concerns that the United States could not compete economically with the European powers (Smith, 1998). The continuing industrial and agricultural revolutions in Europe created a new reality, which required a new approach to education, (Herren & Edwards, 2002). The new paradigm of education would have to encompass advances in industry and agriculture not only to be innovative but also to be relevant (Smith, 1998). The American people were starting to realize that only through an educational system that provided access to the lower socio-economic classes, could class lines be dissolved and true democracy be achieved (Herren & Edwards, 2002).

The first agricultural schools emerged as early as 1823 and included what would become Columbia University and Harvard (Seevers, et al., 1997). However, educational leaders such a Jonathan Baldwin Turner called for changes in the classical approach to higher education. For the first time, there was a popular demand to educate the working classes (Herren & Edwards, 2002).

The blueprint for the United States land-grant university system can be traced to Turner's 1850 essay entitled *A Plan for a State University for the Industrial Classes* (Severs, et al., 1997). Many of the ideas proposed by Turner were incorporated into legislation first proposed by Representative Justin Morrill in 1857 (Herren & Hillison, 1996). This bill proposed, among other things, donation of federal land to endow at least one college in each state or territory to teach science, classical studies, and, in particular, subjects related to agriculture (Seevers, et al., 1997).

Turner and Morrill led supporters including Thomas Clemson, Ezra Cornell, and Horace Greeley in focusing the nation's attention on the need for a new type of educational institution (Herren & Edwards, 2002). These colleges were intended to provide for the practical education of ordinary citizens in the areas of agriculture and the mechanical arts (Marcus, 1986; Seevers, et al., 1997). A staunch republican from Vermont, Justin Morrill introduced a bill, based on Turner's essay, in 1859 that was opposed in a senate debate led by democrat James Mason of Virginia. Mason called Morrill's bill an extraordinary engine of mischief, a misuse of federal property, and an unconstitutional robbing of the treasury for the purpose of bribing the states (Astroth, 2000). Morrill was vigorously opposed by most Southern democrats who feared that

passage of his bill would further threaten states rights (Herren & Edwards, 2002). The bill was defeated or vetoed four times and did not win passage until several changes were written into the bill, including provisions for instruction in military tactics (Herren & Edwards, 2002; Astroth, 2000; Seevers, et al., 1997). This otherwise minor inclusion was at least in part responsible for passage of the act. The Morrill Act was finally signed into law on July 2, 1862 by President Abraham Lincoln, as a divided America entered the second year of a bloody civil war (Herren & Edwards, 2002). Ironically, the Morrill Act, which was intended to advance the interests of agriculturists, was passed by Congress at a time when representatives of the agrarian south were not only absent, but also actively in a rebellion against the government that passed it (Herren & Edwards, 2002; Astroth, 2000; Herren & Hillison, 1996).

After the end of the Civil War in 1865, land-grant colleges began to appear around the country (Herren & Edwards, 2002). From their beginnings, the Land-Grant Colleges of Agriculture (LGCA)s assumed the mandated role of educator of the common man. The early years were a struggle for the LGCAs. Finding adequate financial support and adequate material to teach to students became the focus of the early land-grant faculty (Seevers, et al., 1997; Herren & Hillison, 1996). The 1862 Morrill Act had created the LGCAs but did not provide for continuing financial support. By 1872, a bill was circulating in Congress that would provide the needed funding and extend the benefits of the land-grant schools equally to white and black students. This new act would become known as the second Morrill Act or the 1890 Morrill Act (Herren & Edwards, 2002). The Morrill Act of 1890 took 18 years to pass and contained many compromises. The compromises included a provision that allowed states to escape the

anti-racial discrimination requirement if they maintained separate institutions for black students and the new funds were divided in a just and equitable, if not equal, way between the 1862 and 1890 institutions (Herren & Edwards, 2002).

The Origins of the Agricultural Experiment Station

One of the biggest problems for the fledgling LGCA was the lack of an adequate body of knowledge from which to draw for instruction (Herren & Edwards, 2002). At this time, much of the agricultural curriculum was hands-on work at the schools' model farms (Seevers, et al., 1997). The public perception that the new schools had little to teach farmers that could not be learned through work experience resulted in low enrollments (Marcus, 1986). In addition, the very people the system was designed to help became critical of the scientific and classical aspects of the curriculum (Marcus, 1986). In an effort to address the lack of practical information to transfer to students, the model farm became the classroom and laboratory. Learning and research occurred simultaneously, providing students with both scientific fundamentals and practical vocational application. These experimental farms soon became the principal interest for farmers (Marcus, 1986). The early research efforts of experimental farms filled an important informational need for farmers, who had relied on farming techniques that had not changed in centuries (Herren & Edwards, 2002). However, the model farms were small and understaffed, due to a general lack of resources, and consequently unable to cope with the increasing demand for information (Seevers, et al., 1997).

At the urging of farmers, agricultural societies, and land-grant faculty members, particularly Seaman Knapp of Iowa, Congress passed a bill to establish an agricultural

experiment station at each of the new LGCA (Seevers, et al., 1997). The Hatch Act of 1887 formally created the Agricultural Experiment Station (Seevers; et al., 1997). The purpose of the Hatch Act was to aid in acquiring and diffusing useful and practical information on agriculture and to promote scientific investigation (Hillison, 1996). The Hatch Act provided the funding needed to expand and improve the quality and quantity of research conducted at the LGCA (Seevers, et al, 1997). However, the experiment stations were still ill-equipped to diffuse their research findings to the public.

The Historical Role of the Cooperative Extension Service (CES)

The Cooperative Extension Service was created 88 years ago with the passage of the 1914 Smith-Lever Act. This act formalized the third and final component of the land-grant system. The Smith-Lever Act mandates cooperation between federal, state, and local governments for the purpose of disseminating useful and practical information among the people of the United States (Severs, et al., 1997). In effect, the stated purpose of the Cooperative Extension Service (CES) is to distribute the results of research conducted at land-grant universities to the average citizen who was not attending a land-grant institution (Seevers, et al., 1997). However, much of the fundamental development of extension occurred before the passage of the Smith Lever Act (Sutphin & Hillison, 1999). The agricultural experiment stations were required by law to publish periodic bulletins on the progress of their research and to present their results to the public (Seevers, et al., 1997). However, there were barriers for the common farmer in utilizing the information published in those bulletins. At the time, literacy rates were far lower than they are today. In addition, there were difficulties in convincing farmers to adopt

new practices sight unseen (Herren & Edwards, 2002). Early efforts to extend the knowledge base beyond the students enrolled at the land-grant colleges included community meetings with educational lectures, correspondence courses, and non-credit on-campus and off-campus classes for farmers at congressional district schools (Sutphin & Hillison, 1999). Ideas such as mobile schools and farmers' institutes were also utilized to address the barriers between farmers and research results before the passage of Smith Lever.

In 1879 Seaman Knapp was appointed as a professor at Iowa State College and began to promote the use of demonstrations, which would prove to be effective in improving acceptance of new agricultural practices (Severs, et al., 1997). Demonstrations would become the preferred method of technology transfer for the generations of extension agents and specialists that would follow (Sutphin & Hillison, 1999).

Though demonstration was the core teaching method for early extension educators, much of the work of extension in its first four decades centered on organizing, not one-way technology transfer (Peters, 2002). The first extension workers spent most of their time organizing relationships between farmers, merchants, bankers and government experts. County extension agents worked to pull land-grant faculty, experiment station researchers and community members together to organize campaigns and initiatives to address specific problems (Peters, 2002).

Demonstrations and organizing activities were not limited to adults. Formal youth programs targeting young people in rural communities began to emerge as early as 1901

(Seevers, et al., 1997). Boys' and girls' clubs served an important function for the early practitioners of extension education. In disseminating practical, fact-based information, the youth clubs provided another conduit through which information could be delivered to their parents. Educators such as Liberty Hyde Bailey of Cornell University were strong proponents of the youth programs that would become the 4-H institution (Seevers, et al., 1997). Bailey is also credited, at least in part, with the creation of the extension service as it is known today, since he chaired the Country Life Commission that ultimately recommended a National Extension Service to Congress (Seevers. et al., 1997).

The Contemporary Role of CES

Nearly 100 years have passed since Liberty Hyde Bailey chaired the commission that recommended the creation of a National Extension Service (Seevers, et al., 1997). At the time of the Cooperative Extension Service's inception, the U.S. population that was 53% rural, and 35% of Americans were engaged in production agriculture. Today, the demographic landscape is entirely different. Less than 25% of Americans are considered rural, and less than 2% of the population are engaged in production agriculture (Seevers, et al., 1997). However, the three original program areas, agriculture, family and consumer sciences, and 4-H youth development, have remained.

Today's extension educator is expected to serve a diverse clientele ranging from the marginally illiterate to very well educated. While the original program areas remain the core of the CES, various elements are updated and replaced to meet the needs of the times (Warner, Hinrichs, Schnyder & Joyce, 1998). The CES maintains the immediacy

of its programs through its strong connection to the land-grant institutions and the resultant strong research base (Warner, et al., 1998).

Clearly, the LGCA have a long history of service to agriculturists including Oklahoma wheat producers. Farmers have reaped the benefits of agricultural research, sent their sons and daughters to be educated in land-grant classrooms, and have participated in extension education programs (Meyer, 1993). However, the relationship between agriculturists and the land-grant university is complex and continues to evolve.

The Relationship Between the Land-Grant University and the Public

From their inception, the Land-Grant Colleges of Agriculture (LGCA)s have been controversial. The establishment of LGCAs was not without considerable debate and discord. The passage of the Morrill Act in 1862 was the result of several attempts and the Civil War (Herren & Hillison, 1996).

The call for greater involvement between land-grant universities and their clientele is not solely a 20th century phenomenon. As early as the 1870s, the fledgling land-grant colleges were the targets of bitter criticism (Marcus, 1986). Many farmers of the period argued that the new schools did little more than absorb federal and state resources and provide careers for those otherwise unable to find employment. At the opposite side of the scale were agriculturists who felt that the establishment of these institutions under the Morrill Act was an affirmation of the importance of farmers and agriculture in American society (Marcus, 1986). However, they opposed any attempt by these institutions to pursue agendas not specifically related to agriculture. This led to

complaints that the college personnel had hijacked the schools for their own purposes, or that they lacked an understanding of, and sympathy for, farmers and their concerns (Marcus, 1986). Farmers did more than vocalize their concerns with the new schools. Farm organizations took their cases to state legislatures and the U.S. Congress. While farmers found little relief at the federal level, state legislatures were highly sensitive to these powerful interest groups. State legislators repeatedly interceded in the administration of the land-grant schools, often resulting in the dismissal or resignation of trustees, professors and even presidents, who were often replaced by farmers or their spokesmen. As a result of these actions, courses of study at the early land-grants were often radically changed to suit the desires of farmers and their organizations (Marcus, 1986).

Both the college faculties and farmers agreed that the purpose of these schools was to modernize American agriculture (Herren & Hillison, 1996). However, farmers and academics were at odds over the direction and future of farming as well as the mission of the schools themselves. The vocational approach to agriculture proposed by farmers revolved around labor on the school farm as the principal method of instruction. The content knowledge to be learned by the students was composed largely of the details of running a farm (Marcus, 1986). The academics resisted the idea of a purely vocational approach and favored the study of scientific principles over manual labor on the school farms. The academics argued that the farmer of the future needed to understand scientific principles and had to be receptive to scientific innovations in agriculture. The academics also stressed the importance of the land-grant schools as the training grounds for the next generation of scientific investigators. The ultimate goal of these academics was to pave

the way for the scientific advancement of agriculture through basic and applied research (Marcus, 1986). The debate between farmers and agricultural scientists continued until 1890 when the Morrill Education Act was signed into law. The act was a compromise that allowed both sides to claim victory. Farmers were pleased with the act's requirement for greater accountability at the land-grant schools through annual reports to the federal government. Academics supporting the scientific approach were pleased by the identification of physical and natural sciences and economics as areas of agricultural study (Marcus, 1986). Though the debate became less strident after 1890, the struggle for control over the curriculum and mission of the land-grant schools continued. Gradually, the farmers' political power began to wane, and in the 20th century, the power shift placed the scientists firmly in control (Marcus, 1986).

The land-grant colleges of agriculture helped ensure a plentiful food supply for Americans throughout their history (Meyer, 1993). The half-century between 1862 and 1914 saw the development of the research and extension functions of the LGCAs. As increased funding became available through the Hatch and the Smith Lever Acts, the LGCAs began to conduct agricultural research and to disseminate the results directly to farmers (Seevers, et al., 1997). The three pronged approach of teaching, research and extension had a major impact on agriculture and on American society as a whole. A new generation of better-educated farmers made great gains in efficiency, and the United States became a major exporter of agricultural products. However, between 1920 and 1970, the strides in agricultural production efficiency coupled with global changes of the 20th century resulted in unintended reversals for commercial and family farmers (Meyer,

1993). Farmers became a minority in the American population as rural youth left the farms to make a living at more lucrative urban occupations (Meyer, 1993).

The minority status of the LGCAs' traditional clientele also resulted in an uneasy status for the universities themselves (Meyer, 1993). By the 1950s, the agricultural industry had growing concerns about the dominance of urban interests in American society. As a result, agricultural groups began to evolve into politically active and sometimes militant special interests. The LGCAs were in the position of attempting to broaden their programs to serve a wider audience in the public interest while under intense political pressure from their traditional clientele to maintain the status quo (Meyer, 1993). On an individual basis, many land-grant faculty members continued to identify with the agrarian traditions of the past and had difficulty adjusting to changes in society at large. The need to serve urban consumers and the reality of the increasing interdependence of rural and urban interests were secondary to the LGCAs continued dependence on the support of the colleges' traditional clientele.

One result of the status quo stance of the LGCAs was that the general public developed a stereotypical view of agriculture, one that had a negative impact on enrollment and funding at the LGCAs. By the 1960s, it was clear to faculty and administrators that the LCGAs were publicly perceived as only concerned with farming and agribusiness. This view coupled with the emergence of the popular environmental movement placed the LGCAs at odds with this movement. Agriculture was misconstrued as a competitor for natural resources, and therefore, incompatible with conservation or environmental protection. The LGCAs had failed to make the case that agriculture was

indeed allied with conservation because it was dependent on available natural resources. This failure, led in part to the perception that the LGCAs were irrelevant for much of the American public (Meyer, 1993).

An important step in changing the mission of the LGCA occurred in 1966 when Kellogg and Knapp published *The college of agriculture science in the public service.* Kellogg and Knapp stated that there was a critical need to broaden the missions of the LGCAs to serve the general public, including urban consumers and other nontraditional clientele (Meyer, 1993).

Scholarship and the Land-grant Professor

While the debate among the faculty and traditional clients of the LGCAs continued, a second challenge emerged. Ernest L. Boyer's 1990 book *Scholarship reconsidered: priorities of the professorate* sparked a critical examination of the role of academics in serving the public (Martin, 1998). Boyer stated that scholarship had been too narrowly defined, focusing mainly on basic research. In American universities, all professors are expected to engage in scholarship, and each professor is expected to perform other assignments such as teaching and service (Weiser, 1997). The value system of an institution is demonstrated by its promotion and tenure policies. In the American higher education system, including land-grant universities, it is research which figures most prominently in the evaluation of a professor's performance (Weiser, 1997).

The values of American institutions of higher learning have undergone a shift over time. During the 18th and 19th centuries, teaching was the most highly prized role of professors (Kelsey, Mariger, & Pense, 2001). Promotion and tenure were based on a

broad definition of scholarship which included teaching, research and service. This traditional view of scholarship prevailed until the 1950s when economic and political factors such as the Cold War altered the focus of academics to empirical research and technological advancement (Kelsey, et al., 2001). As a direct result of this change in the emphasis of scholarship, there was a rapid change in the landscape of American campuses. The research professor became the dominant figure in academe, and scholarship became largely defined as research (Kelsey, et al., 2001). Research and resulting peer-reviewed publications became the gold standard of scholarship (Kelsey, et al., 2001). Because of the emphasis placed on research, university faculty members began to regard teaching and service as activities that offered little chance for reward and competed for time and resources that could otherwise be devoted to research. This trend was evidenced in Kelsey's finding that the longer research professors held their faculty positions, the more they emphasized research over teaching and extension (Kelsey, et al., 2001). Moreover, this study found that a faculty member's research focus tended to shift over time from applied research, which directly serves stakeholders, to basic research (Kelsey, et al., 2001).

The shift from a teaching and service emphasis to a highly focused research and publishing agenda also has had a negative effect on the public perception of LGCAs. Fueling the publics' dissatisfaction and mistrust of LGCAs are widely held perceptions that faculty are focused on research and funding rather than teaching or service. Faculty are seen as introspective, only communicating their research findings to other academics, and that they are overly specialized, focusing on discipline-based areas of study that are not relevant or responsive to real problems (Weiser, 1997).

Wheat producers in Oklahoma, like all traditional clients of the LGCAs, are continuing to enjoy significant assistance from the land-grant universities through education, extension and research programs. However, they often perceive that their needs and concerns are disregarded or unknown to university faculty and administrators (Kelsey, et al., 2001).

Theoretical Framework

It could be argued that the land-grant university's first century was an unqualified success. The land-grant university and farmers' institutes historically provided research-based education to students, a tradition that continues today. The agricultural experiment station published bulletins and reports on the progress of research and have presented their results to the public. The Cooperative Extension Service has provided grassroots level, research-based information and educational programs to the public since 1914 (Severs et al., 1997).

All Americans benefit to some degree from the work conducted at land-grant universities. However, the American public has become increasingly disconnected from agriculture and LGCAs, in part, because they have little or no direct connection with agriculture. Recently, the American public has demanded higher accountability from land-grant universities as evidenced by declining financial support for higher educational institutions where the majority of agricultural research is conducted (Altschuld & Zheng, 1995). This climate of greater accountability has created a need to gather input from stakeholders of publicly funded institutions to address their concerns.

Public research universities, including the land-grants, were established with a mission to prepare students for active participation in a democratic society and to develop knowledge for the improvement of communities. At onetime U.S. universities were concerned with education for citizenship and knowledge for society, today it appears that these institutions of higher learning have drifted away from their civic missions (Chekoway, 2001).

Over time universities and colleges have been transformed from civic institutions into powerful research engines. The transition from civic institution to research engine has resulted in major changes in their objectives, operation, research agendas, infrastructure, and external relationships (Chekoway, 2001). The changing role of the university professor from civil servant to researcher has also transformed the research agendas of individual faculty members. Professors at these institutions have turned inward, they develop knowledge for its own sake rather than social benefit (Boyer, 1990; Chekoway, 2001).The scholarly work of the faculty has been segmented into professions and disciplines without regard for the for the needs of communities and society. These transitions did not occur in a vacuum, cold war supremacy and national security drove the transition in the later half of the twentieth century through public and private institutions which support research (Chekoway, 2001). The structure in which a professor's accomplishments and performance are assessed has changed from rewarding public service to rewarding scholarship as defined as publishable research (Boyer, 1990; Chekoway, 2001; Taylor, 1997).

Research universities, including land-grants, can make a significant contribution to solving the problems facing Americans (Checkoway, 2001; Taylor, 1997). The problem according to Checkoway, is a gulf between the public and the talent and resources of the research university. The distance between the ivory towers of the universities and the communities they serve must be bridged (Taylor, 1997). Today society is calling for changes in education, research, and outreach, which will make public higher education more sympathetic and engaged with their communities (Woods, 2001).

In a public sector system, which claims to be democratic, there is an expectation that services and policies should be acceptable to key stakeholders (Thomas & Palfrey, 1996). Gathering stakeholder input helps administrators and planners in making decisions about the direction of their organization, but this is not a cause and effect relationship. The literature on public involvement shows that the inclusion of stakeholder input in the decision-making process increases stakeholder satisfaction with programs and outcomes. Thus, stakeholder support of an organization is important in meeting societal goals (Babiuch & Farhar, 1994). At a fundamental level, university administrators, faculty and researchers need to think about their stakeholders and how satisfied they are with the services currently provided and their priorities for the future (Hurst, 1994). By incorporating social responsiveness through stakeholder input, universities can address the call for accountability and outcomes in relation to public expectations (Altschuld & Zheng, 1995).

The literature regarding stakeholders role in public institutions, such as land-grant universities, describes a process which is inclusive, fair, balanced, transparent, comprehensive, and accountable (Dyer, Miller, & Leval, 1999). But deciding who is and who is not a stakeholder is often difficult. The term "stakeholder" has been a popular term used in academia in recent years, but it has seldom been clearly defined for the purpose of assessing educational or research needs. Identification of stakeholders is one of the keys to good practice (Reineke, 1991).

In the planning and delivery of any public service, there are a wide range of stakeholders, including those who are paying for the services, those who are to receive the services, those who provide the services, and those who plan and coordinate the development and delivery of the services (Thomas & Palfrey, 1996). Defining appropriate stakeholders for participation in priority setting should be based on (a) *legitimate stakeholders* (b) who have *sufficient program knowledge* to contribute to the process in meaningful ways, and (c) whose self-defined *stake in the university is also high* (Greene, 1988). Defining stakeholders is the first step in the process of assessing their priorities and integrating their input into the decision-making process. The second step in the process is to engage stakeholders in meaningful participation. Stakeholders should be included in the process as soon as they are identified (Reineke, 1991).

There is clear evidence that the effectiveness of government actions including publicly funded higher education is increased and adverse social impacts are reduced when decision makers understand how stakeholders will be effected by their actions (Babiuch, & Farhar, 1994). The input of key stakeholders should be part of virtually all

phases of the study (Reineke, 1991). However, including all stakeholders at all levels of the process is not always practical or possible. Gathering information from stakeholders regarding their research and educational needs is a practical solution to meeting this challenge. A cross-sectional survey approach allows inclusion of input from a much larger and more diverse group of stakeholders than the traditional approaches such as advisory boards or focus groups (Worthen, Sanders & Fitzpatrick,1997).

This study implemented a process for gathering stakeholder input using the cross-sectional survey design method and presented results to faculty for setting future research and education goals. If a stakeholder survey is to be successful, then researchers must think about their audience throughout the process and consider what would make the results legitimate in their eyes (Hurst,1994). A second element in planning and implementing a successful stakeholder survey in higher education is to integrate faculty expertise and input into the development of the survey instrument (Hurst, 1994).

The population in this study is Oklahoma wheat producers. Wheat is the number one agricultural product produced in Oklahoma, and wheat producers are the largest stakeholder group for the Plant and Soil Sciences Department at Oklahoma State University. Wheat producers were also identified as the most important stakeholder group by wheat working group faculty. The need for capturing input from this stakeholder group to guide the research and extension agendas of the WWG faculty is clear. The WWG faculty can only meet their commitment to civic engagement by addressing the current needs of the community they serve. In order to serve stakeholders the WWG should engage in a process in which the needs of the can be presented to the faculty.

CHAPTER III

METHODOLOGY

This chapter describes the methods and procedures used in conducting this study. This was a descriptive study aimed at identifying stakeholders and collecting stakeholder input for the Plant and Soil Sciences Department. In order to collect the relevant data which would ultimately be analyzed to address the purpose and objectives of the study, a population was identified and an instrument was developed specifically for the population of interest. The data were collected in August and September of 2001. The purpose of this study was to collect stakeholder input for the Oklahoma State University Plant and Soil Sciences Department. Wheat is the number one commodity crop in Oklahoma; therefore, wheat producers were targeted for this study.

Objectives of the Study

In order to accomplish the purposes of this study, five specific objectives were established:

1. Determine the demographic and operational characteristics of Oklahoma wheat producers.
2. Describe the agricultural problems, challenges, and concerns of Oklahoma wheat producers.

3. Identify factors Oklahoma wheat producers consider when making production-related decisions.
4. Identify specific informational sources preferred by Oklahoma wheat producers.
5. Determine the most effective activities for establishing ongoing communication between faculty and Oklahoma wheat producers.

Institutional Review Board (IRB)

In order to protect participants from potential harmful effects of research, federal regulations and Oklahoma State University (OSU) policy requires prior review and approval of all studies involving human subjects. The OSU Office of University Research Services' Institutional Review Board (IRB) reviewed this study in compliance with University policy. The study was approved and the researchers were granted permission to collect data from human subjects. On approval, the study was assigned IRB number: AG0138 (Appendix A).

The Study Population

Defining the population of stakeholders for the Oklahoma State University (OSU) Wheat Working Group (WWG) faculty presented some challenges for the research team. After meeting with the WWG faculty it was decided to focus on wheat producers only. Though many other stakeholder groups were identified by the faculty, the WWG faculty identified wheat producers as the largest and most important group of stakeholders. According to the 1997 Census of Agriculture, there were approximately 15,000 wheat producers in Oklahoma. With a clearly defined target population of

Oklahoma wheat producers it was possible for the researchers to move to the next step in the process; that was developing a sample frame.

The Study Design

This study was based on a self-administered mail survey of Oklahoma wheat producers. The study was completed in six stages including identifying a population, establishing objectives, survey development and testing, data collection, data analysis, and dissemination of the results to interested audiences. The design of the study employed mixed methods with qualitative methods being utilized in the first three stages and quantitative methods used in the remaining three stages.

Because the results were dependent on a sample survey, great care was exercised in addressing the four common sources of error associated with samples and surveys. Dillman (2000) describes the first of the four common sources of errors in surveys as coverage error. Coverage error occurs where the sample frame is incomplete or does not reflect the target population. Coverage error is often called sample bias because some characteristic of the individuals in the population causes them to be excluded from the sample. As a result of coverage error, the sample is not truly random because not every member of the population has an equal and independent chance of being selected for the sample.

The second common source of error in surveys is sampling error. Sampling error occurs when too few individuals are selected for the sample (Dillman, 2000). The third common source of error in surveys is measurement error. Measurement error occurs

when the questions on a survey are ambiguous or open to multiple interpretations by the respondents. This lack of consistency has a negative effect on the quality of the results (Dillman, 2000). The fourth and final common source of error in surveys is nonresponse error. Nonresponse error can occur when even a small percentage of the individuals in a sample fail to respond, and the non-respondents are in some way different from the respondents (Dillman, 2000).

Controlling for Coverage Error

Developing a sample frame can be a challenge to researchers. A frequently used approach to defining agricultural populations, and developing accessible sample frames, is to enlist the help of commodity groups and farm organizations to gain access to their mailing lists. This approach has presented some problems to researchers in the past where the sample was drawn from a self-selected group (members), then were found to differ from the general population defined for the study (Mariger, 2000). The constituents of these commodity groups should be examined with care to assure that any sample drawn from these sources are as representative of the target population as possible. The risk of a coverage error or selection bias is clear in using this method of developing a sample frame as broadly defined as Oklahoma wheat producers.

Rather than utilizing a private organization, this study drew a sample from the Oklahoma Agricultural Statistics Service. There are several advantages in developing a sample frame with a publicly funded agency which has access to the entire population of wheat producers. These advantages include, elimination of the self-selection bias and

uniform distribution within the sampling population, as opposed to the demographic variances found with private organizations (Mariger, 2000).

Controlling for Sampling Error

Once an appropriate sample frame had been developed, a statistically adequate sample size was determined for the target population (Krejcie & Morgan, 1970). A review of the 1997 Census of Agriculture revealed that there were approximately 15,000 wheat producers in Oklahoma in 1997. Using 15,000 as the population size, a sample of 375 was derived from the following formula (Krejcie & Morgan, 1970).

$$s = X^2 NP(1-P) \div d^2 (N-1) + X^2 P(1-P).$$

Where:

s = required sample size.

X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841).

N = the population size.

P = the population proportion (assumed to be .50 since this would provide the maximum sample size).

d = the degree of accuracy expressed as a proportion (.05).

Note that the alpha level was set at 0.05 *a priori.* The alpha level is the probability of committing a Type I error, finding a difference where none exists, expressed as a proportion. This margin for error is within the generally accepted range of 0.01 to 0.05 for social research (Pedhazur, 1997, Steel, Torrie & Dickey, 1997, Mason, 1986).

To assure the best possible results from the survey, a decision to over sample by 100% was reached. As a result, a sample size of 750 was determined as the study sample. Because Oklahoma wheat producers were not evenly dispersed throughout the state, it was decided that the sample should be stratified to better represent wheat producers. The stratification was based on the number of wheat farmers in each of Oklahoma's 77 counties. This proportional stratified random sample is recommended in cases where the characteristics of the entire population are of interest (Ary, Jacobs, and Razavieh, 1996).

Controlling for Measurement Error

The development of the survey instrument represented a significant portion of this study. The importance of developing a survey instrument that has both face and content validity as well as established reliability cannot be overstated. The development of a valid instrument required cooperation between the Plant and Soils department faculty and the researchers. Effective involvement of local faculty and staff in the assessment requires opportunities for active involvement in the process. As potential users of the results of the study, including these key stakeholders was an important step in helping them see the connection between the study and decisions (Reineke, 1991). A panel of experts was established from among OSU faculty members and extension educators to address face and content validity while reliability was established through pilot testing.

Control for Nonresponse Error

One of the most serious threats to external validity in a study based on a sample of a target population is nonresponse error. Nonresponse error occurs when those who participate in the study, in this case return a questionnaire, are different in some way than those who do participate in the study. Even if researchers compile a complete sample frame, draw a sufficiently large sample, and make accurate measurements, they will most likely still have to contend with nonresponse error (Salant, and Dillman, 1994). Salant and Dillman (1994) suggest that nonresponse error is a problem even if a small number of the individuals in the sample do not return an instrument, and these nonrespondents are different than those individuals who did return the instrument. While it is not possible to determine whether the respondents are different from nonrespondents *a priori*, it is very likely that only a fraction of those who receive a survey will complete and return it. Based on an estimate by the Oklahoma Agricultural Statistics Service, the researchers expected a return rate of between 20 and 30% (Barry Bloyd, Oklahoma State Statistician, personal communication June 27, 2001). Controls for nonresponse were integrated into the design of this research.

Control for nonresponse error was addressed through four separate procedures. First, every effort was made to achieve the highest response rate possible by using Dillman's (2000) multiple mailing approach. Three follow-up contacts with potential respondents were made after the initial mailing which contained the survey instrument (See Appendix B) and a cover letter (See Appendix C). The follow-ups included two reminder postcards (See Appendix E) and a complete second mailing, including a second

survey instrument and a second cover letter (See Appendix D). Second, several demographic characteristics of the respondents were compared to the characteristics of the population from the 1997 Census of Agriculture (Miller & Smith, 1983). No significant differences were found at the 95% confidence level. Third, a comparison was made between early and late respondents. The first 25% of the respondents were compared to the last 25% to respond (those who responded after one mailing and those who did not respond until they had been contacted four times) (Linder, Murphy & Briers, 2001). Again, no significant differences were found between the groups. Fourth, a random sample of ten percent of nonrespondents was drawn (n=50); of these, 33 were reached by telephone to complete a portion of the instrument (Linder, Murphy, & Briers, 2001). A copy of the telephone follow up instrument can be found in Appendix E. A comparison was made between the respondents and the nonrespondents age using an independent samples t-test. Respondents and nonrespondents were also compared based on their ethnicity and educational attainment using a chi square test. No significant differences were found between respondents and nonrespondents in age, ethnicity, or educational attainment at the 95% confidence level.

Instrumentation

The first step in development of the instrument utilized in this study was to interview the members of the OSU Wheat Working Group (WWG) faculty. From May 2-31, 2001, five WWG faculty members were interviewed using an interview schedule including questions about who their stakeholders were, what they would like to know

from their stakeholders, what organizations serve their stakeholders and how they communicate with their stakeholders (Table 1).

Table 1

Date of Initial WWG Faculty Interview

Faculty member	Date interviewed
Gene Krenzer	May 02, 2001
Art Klatt	May 02, 2001
Bob Hunger	May 14, 2001
Tom Peeper	May 24, 2001
Tom Royer	May 31, 2001

The interviews were tape recorded and transcribed verbatum for accuracy. Each interview was then cleaned for errors in accuracy. All faculty members were given copies of the transcripts of their interviews to review for accuracy. None of the faculty members returned a transcript for changes in content, indicating that the transcripts were accurate representations of the faculty members' thoughts (Guba & Lincoln, 1989). The transcripts of the interviews were then entered in to the ATLAS. ti ® qualitative software package for coding. The Atlas. ti ® software is essentially a database that facilitates the organization and sorting of large volumes of text and graphics for analysis by the researcher. The software allows the researcher to cross-reference text and other data into categories or codes that support and illustrate themes in the descriptive data.

There are three levels of qualitative data analysis: descriptive, conceptual, and theoretical (Miles & Huberman, 1994). The conceptual level of data is descriptive and consists mainly of primary data such as inscribed field notes or interview transcripts. At

this level, the data were arranged to form a factual account or narrative. At the conceptual level of analysis, the researcher names or categorizes the primary data; this level is commonly referred to as coding the data (Rubin & Rubin, 1995). Codes can be concepts representing a single idea, such as a specific action, event, or object. Codes can also be categories representing a concept with multiple dimensions that can be subdivided into smaller codes with multiple descriptors. Codes can also be larger concepts called themes that represent important actions or ideas across multiple individuals or incidents. The conceptual level of data analysis is one step removed from the primary data and forms the basis for the third level of data analysis, the theoretical level. The theoretical level of data analysis is the level at which hypotheses and theory are developed based on the relationship between the codes of the conceptual level of analysis. The codes developed in the analysis were then used to develop the questions for the first draft of the survey instrument.

The first draft of the instrument was circulated back to the WWG faculty members for further feed back. All of the faculty members made substantial modifications to the draft questionnaire. The faculty's recommendations were synthesized into a second draft questionnaire. Like the first draft, the second draft was circulated among the WWG faculty. Again, the faculty made a number of recommendations for the instrument. A third draft of the questionnaire was developed integrating the faculty's second set of recommendations.

Panel of experts

The third draft of the instrument was sent to a panel of experts composed of four extension educators/specialists and two faculty in the OSU Agricultural Economics department. The members of the panel were selected based on their knowledge of wheat production and producers, their expertise in questionnaire design or both Table 2. The panel of experts expressed few concerns about the questionnaire, though all of them suggested that it was too long. All of the panel's recommendations were addressed, including a strong effort to shorten the questionnaire. This fourth draft was then submitted for final review at a meeting with all of the WWG faculty.

Table 2

Panel of Experts' Area of Expertise

Panel member	Faculty position	Area of expertise
Damona Doye	Assoc Professor AGEC	Survey research
Stan Fimple	Extension Educator Ottowa Co.	Wheat production/producers
Roger Gribble	NW Area Agronomy specialist	Wheat production/producers
Ron Justice	Extension Educator Grady Co.	Wheat production/producers
Mike Woods	Professor AGEC	Survey research
Ron Wright	Extension Educator Custer Co.	Wheat production/producers

Pilot testing

Following the meeting with the WWG faculty, their final recommendations were integrated into a fifth draft, which became the pilot questionnaire. The pilot questionnaire and a cover letter explaining the study were sent to a simple random sample of 100 Oklahoma wheat producers. A total of 20 wheat producers returned completed instruments. It should be noted that a 20% response is considered the norm for this population (Barry Bloyd, Oklahoma State Statistician, personal communication, June 27,

2001). Pilot testing proved to be extremely valuable in developing the final version of the questionnaire. Examination of the pilot instruments revealed several flaws. In particular, one question that combined a series of summated scale items with a matching set of yes or no questions appeared to be a problem. Most respondents only responded to the yes or no portion of the question. Several other details in the formatting of questions also emerged as potential problems. As a result of the problems with the summated scale questions, a complete analysis of the reliability of those questions could not be completed. A partial analysis using Cronbach's alpha on groups of summated scale items that were completed suggested that the individual items were reliable and that a change in the question format, eliminating the troublesome yes or no portion, would address the problem. This result should serve to underscore the importance of pilot testing questionnaires before going to a full-scale sample study.

A final version of the questionnaire was developed incorporating all changes indicated in the pilot testing of the instrument. Working closely with the Oklahoma office of Agricultural Statistics, a proportionally stratified random sample of 750 wheat producers was drawn (Ari, et al., 1996).

The instrument

The final version of the questionnaire was the product of six drafts, with input from the WWG faculty, an independent panel of experts, the research team, and a pilot survey. A complete copy of the survey instrument can be found in Appendix B.

The first three questions in the questionnaire were designed as screening questions to identify respondents that did not fall in the target population. Question one

asked if respondents planted wheat, question two asked if respondents owned farmland where wheat is planted, and question three asked if respondents were actively involved in the management of wheat production. These screening questions were used to help the research team identify respondents as wheat producers, landlords, or persons not involved in wheat production.

Part one of the questionnaire was titled "Communication with Oklahoma State University". This section was designed to identify ways in which the respondents were connected or communicated with Oklahoma State University. Respondents were asked a series of eight questions about their connection to OSU, including whether they or a family member had attended OSU, whether they served on advisory boards, participated in research activities or communicated directly with a faculty member. Respondents were also asked about their use of extension and their reasons for not using extension if they did not. In addition, respondents were asked if a bulletin on crop production issues would be helpful. Finally respondents were asked how communication could be improved between themselves and OSU.

Part two of the questionnaire was titled "Wheat Production Operation, Problems, Decisions, and Sources of Information". Information concerning the type and size of farm operation and the research and education needs of stakeholders was collected in this section of the survey. The type and scale of the respondents' operations were determined through questions concerning acres planted, whether or not the operator considered wheat to be their principal crop, other crops they produced, and what livestock they raised, if any. In order to collect information about the production problems, a series of 41 four-

point summated scale items arranged in seven categories were posed to the respondents. The summated scale item categories included grazing, wheat diseases, insect pests, weeds, grain quality, soil fertility and other production issues. The question asked "what are your major wheat production problems?" The four-point scale was labeled not a problem, less serious problem, serious problem and very serious problem for each of the 41 items. In addition to the summated scale items, respondents were asked which of the problem categories caused them the greatest concern.

A second summated scale item was used to collect data on decision making among the respondents. Respondents were asked "what factors are important to you when making decisions about farming practices?" followed by a series of ten three-point summated scale items dealing with decision making. The three-point scale was labeled not at all important, somewhat important and very important. Finally, to collect information about the sources of information used by the respondents to get wheat production information, four questions including membership in agricultural organizations, sources of information, publications read, and sources of information other than publications were posed to the respondents.

Part three of the questionnaire did not correspond to a particular objective in this study. It was added at the request of Dr. Gene Krenzer to collect evaluation data for Oklahoma Cooperative Extension Service (OCES). Part three of the questionnaire was titled "Post Harvest Dormancy and Grazing Termination." This section of the questionnaire was designed to collect information on the effectiveness of Oklahoma Cooperative Extension Service (OCES) education programs regarding post harvest

dormancy and grazing termination. This section was composed of fourteen individual questions regarding acres of wheat planted for grain forage or dual purpose, cattle stocking rates on wheat, harvesting of grazed fields, grazing termination, awareness of post harvest dormancy, and the first hollow stem stage of wheat. In addition, respondents were asked to list varieties they avoided because of post harvest dormancy, whether it matters if you look at grazed or ungrazed wheat in determining first hollow stem, if varieties differ in terms of when they reach first hollow stem stage, and how much yield is decreased by leaving cattle on two weeks past the first hollow stem.

Part four of the questionnaire was titled "Hard White Wheat." This section of the survey developed data on the respondents' knowledge of and willingness to grow hard white wheat. Respondents were asked if they had grown hard white wheat in the past, whether they planned on growing it in the future, and what problems they perceived with the production of hard white wheat.

Part five of the questionnaire titled "Demographic Information." Demographic information was collected on the respondents' personal and operational characteristics, including gender, age, ethnicity, vocation, educational attainment, principal source of income and the county where their farm is located. In addition, information on how often they purchased crop insurance, long and short-term operating loans, the tenor of their operation and the percentage they owned, was collected.

Reliability

All of the summated scale data were analyzed using the Cronbach's alpha test. The reliability of the scale items was determined to be 0.94. This score is within the most restrictive range suggested by Ary, Jacobs & Razavieh (1996). According to Ary and others, the minimum reliability for an instrument varies depending on the purpose of the results. If the results are to be used to make a decision about a group even for research purposes, a lower reliability coefficient in the range of .50-.60 may be acceptable. Ary explains further that if the results are to be used to make decisions about individuals, a minimum standard of .90 and above should be used. The reliability of this questionnaire meets the more restrictive standard and exceeds the standards that apply to the purposes of this study.

Data Analysis

While this study was primarily a descriptive design, it was based on a sample population of wheat producers. Therefore, descriptive and inferential statistics were used extensively in calculating the confidence interval for population means and for making comparisons between groups including respondents, nonrespondents and the population. Other tests and procedures employed in the data analysis included the Chi square test as well as Cronbach's alpha reliability coefficient. The alpha level of 0.05 was set *a priori* and was used for all statistical tests and procedures. The Statistical Package for the Social Sciences (SPSS) version 8.0, computer software, was used for all statistical analyses.

This study was both descriptive and inferential Case I and Case II research. It was descriptive in that its primary purpose was to describe WWG stakeholders and to collect their input. It was Case I research in that it sought to determine whether the sample is part of the target population of wheat producers. It was Case II research in that it sought to determine if two samples were drawn from populations of equal means (Campbell, 2001). The decision rule for hypothesis testing in empirical research is shown in the decision matrix in Figure 1.

	True State of Affairs	
Action	Identical	Different
Do not reject H_0	Correct Decision	Type II Error Probability β
Do reject H_0	Type I Error Probability α	Correct Decision

Figure 1. Decision matrix (Wiersma, 2000).

Case I hypothesis testing

Null Hypothesis Ho: The sample means are equal to the population means; therefore the sample is part of the target population.

$$H_0: \mu = \mu \text{ (1997 Census of Agriculture)}$$

Alternative Hypothesis H1: The sample means are not equal to the population means; therefore the sample is not part of the target population.

$$H_1: \mu \neq \mu \text{ (1997 Census of Agriculture)}$$

Case II hypothesis testing

Null Hypothesis Ho: The mean of group one is equal to the mean of group two.

$$H_0: \mu_1 = \mu_2$$

Alternative Hypothesis H1: The mean of group one is not equal to the mean of group two.

$$H_1: \mu_1 \neq \mu_2$$

(Campbell, 2001)

Inferential statistics

Parametric inferential statistics such as *t-tests* or ANOVA have five assumptions that must be met in order to yield valid results. First, the data must be interval or ratio type measurements. Second, the sample must be random. Third the observations must be independent. Fourth, the observations must be normally distributed on the dependent variable. Fifth, there must be homogeneity of variance between groups (Stevens, 2002). The data subjected to inferential analysis in this study met all the assumptions of interval/ratio measurements, randomness, independence, normality and homogeneity of variance (Keppel, 1991).

In contrast to parametric tests, nonparametric tests require few, if any assumptions about the sample under study. Nonparametric tests assume only independence of observations, mutually exclusive categories and observations measured in frequencies to yield valid results (Ary, Jacobs, & Razaveih, 1996). *Chi-square* tests were used extensively in this study to test for differences between groups on nominal and ordinal variables (Siegel, 1956).

There are many misconceptions about the use of inferential statistics, one of the most serious misinterpretations is to equate statistical significance with practical importance (Wiersma, 2000). It is almost always necessary to include some index of effect size with the results of inferential tests. For this study, Cohen's d was calculated for *t-tests* and *Cramer's V* was calculated for *Chi-square* tests as recommended in (Warmbrode, 2001; Lowry, 2002).

Response Rate

The response to the survey was better than expected; of the 750 individuals in the sample, 32.8% (n=246) responded. Of the 246 respondents, 27 were frame errors, leaving 219 useable responses or a useable response rate of 29.2%.

CHAPTER IV

FINDINGS AND RESULTS

Objective 1

The first objective of this study was to determine the demographic characteristics of Oklahoma wheat producers. The demographics section of the survey provided useful information about these stakeholders. The survey findings provided answers to specific questions, such as the principal vocation of the WWG stakeholders and whether their primary source of income came from agriculture. An unbiased profile of stakeholders is valuable to researchers and educators in setting research and educational priorities.

Respondent Characteristics

Respondent age

Of the 219 respondents to the survey, 214 reported their age. Respondents reported ages ranging from 18 to 89 years of age (Table 3). The mean age of the respondents was 56.3 years, the median age was 55.0, and the mode was 45.0 years. The standard deviation for respondent age was 13.3 years.

Table 3

Respondent Age

Statistics	Age in years
Mean	56.3
Median	55.0
Mode	45.0
Standard deviation	13.3
Range	71.0

(n=214)

Respondent gender

Respondents were also asked to indicate their gender, 199 of the 219 respondents responded. The vast majority, 95.5% (n=209), of the respondents were male. This is consistent with the 1997 Census of Agriculture data for all Oklahoma farmers.

Respondent county

One of the critical features of the sample frame for this study was the proportional stratification of the sample based on the number of wheat producers in a given county. Of the 219 respondents to the survey, 214 reported the county or counties where their farm operation was located. Table 4 details the number of respondents from each county and the response rate for each county. As can be seen in Table 4, 65 of the 77 counties in Oklahoma were sampled. Of the 65 counties sampled, 48 returned one or more surveys. It should be noted that the 17 counties that did not have any respondents had a combined sample size of only 25 due to the low population of wheat producers in those counties.

Table 4

County Response Table

Respondents' county	Frequency	Percent	Number in sample	Percent response
Did not report county	5	2.3	0	XXXXX
Alfalfa	12	5.5	28	42.9
Beaver	3	1.4	17	17.7
Beckham	3	1.4	15	20.0
Blaine	8	3.7	29	27.6
Bryan	0	0.0	1	0.0
Caddo	10	4.6	35	28.6
Canadian	5	2.3	28	17.9
Carter	1	0.5	1	100.0
Cimarron	2	0.9	12	16.7
Cleveland	0	0.0	2	0.0
Comanche	4	1.8	15	26.7
Cotton	3	1.4	16	18.8
Craig	1	0.5	5	20.0
Creek	0	0.0	1	0.0
Custer	7	3.2	25	28.0
Delaware	0	0.0	2	0.0
Dewey	6	2.7	19	31.6
Ellis	2	0.9	12	16.7
Garfield	14	6.4	41	34.2
Garvin	1	0.5	5	20.0
Grady	4	1.8	18	22.2
Grant	10	4.6	29	34.5
Greer	3	1.4	12	25.0
Harmon	2	0.9	8	25.0
Harper	4	1.8	11	36.4
Hughes	0	0.0	1	0.0
Jackson	7	3.2	19	36.8
Jefferson	1	0.5	6	16.7
Kay	14	6.4	29	48.3
Kingfisher	10	4.6	32	31.3
Kiowa	12	5.5	24	50.0
Leflore	1	0.5	1	100.0
Lincoln	3	1.4	4	75.0
Logan	5	2.3	13	38.5
Love	0	0.0	2	0.0
Major	6	2.7	23	26.1
Mayes	1	0.5	4	25.0
McClain	2	0.9	6	33.3
McCurtian	0	0.0	1	0.0

Table 4 (Continued)

County Response Table

Respondents' county	Frequency	Percent	Number in sample	Percent response
McIntosh	0	0.0	1	0.0
Murray	0	0.0	1	0.0
Muskogee	0	0.0	3	0.0
Noble	6	2.7	17	35.3
Nowata	0	0.0	3	0.0
Okfuskee	1	0.5	1	100.0
Oklahoma	1	0.5	5	20.0
Okmulgee	0	0.0	1	0.0
Osage	4	1.8	6	66.7
Ottawa	0	0.0	5	0.0
Pawnee	1	0.5	5	20.0
Payne	1	0.5	7	14.3
Pittsburg	0	0.0	1	0.0
Pottawatomie	1	0.5	3	33.3
Roger Mills	1	0.5	11	9.1
Rogers	2	0.9	3	66.7
Sequoyah	0	0.0	1	0.0
Stephens	2	0.9	5	40.0
Texas	6	2.7	20	30.0
Tillman	7	3.2	21	33.3
Tulsa	0	0.0	2	0.0
Wagoner	1	0.5	3	33.3
Washington	0	0.0	2	0.0
Washita	13	5.9	35	37.1
Woods	6	2.7	21	28.6
Woodward	2	0.9	14	14.3

Respondents' extension district

Based on the county reported by a respondent, it was also possible to determine which extension district served that particular wheat producer. As can be seen in Table 5, most respondents, 51.9% (n=111) were located in the northwest extension district. The southwest district accounted for most of the remainder, 39.7% (n=85), with the combined eastern districts having fewer than ten percent of the respondents.

Table 5

Respondents' Extension District

Extension district	Frequency	Percent
Northwest	111	51.9
Southwest	85	39.7
Northeast	15	7.0
Southeast	3	1.4

(n=214)

Respondents' crop reporting district

Based on the respondents' county, it was possible to determine the crop reporting district for the producers' farms. Table 6 shows that most of the respondents, 92.5% (n=198) were located in districts one through five. Districts six, through nine only accounted for about 8.0% (n=16) of the respondents.

Table 6

Respondents' Crop Reporting District

Crop reporting district	Frequency	Percent
District four	67	31.3
District three	47	22.0
District two	36	16.8
District five	31	14.5
District one	17	7.9
District seven	10	4.7
District six	5	2.3
District nine	1	0.5
District eight	0	0.0

(n=214)

Respondent ethnicity

Respondents were asked to identify their racial background. Of the 219 respondents 216 answered the item. As can be seen in Table 7, the overwhelming majority of the respondents, 96.3% (n=208), were white nonhispanic. Native Americans were the next largest group at 1.9% (n=4), followed by African-Americans at 0.9% (n=2). The remaining two respondents selected bi-racial or other as their ethnicity.

Table 7

Respondent Ethnicity

Ethnicity	Frequency	Percent
White non-Hispanic	208	96.3
Native American	4	1.9
African American	2	0.9
Bi-racial	1	0.5
Other ethnicity	1	0.5

(n=216)

Respondents' primary source of income

In an effort to better understand the respondents' involvement in agriculture, they were asked whether farming was their principal source of income. Of the 219 respondents, 214 answered the item. Most of the respondents, 59.8% (n=128), indicated that farming was their principal source of income, while 40.2% (n=86) indicated that farming was not their principal source of income.

Respondents' off farm employment

To further understand the respondents engagement with agriculture, they were asked if they were employed in a off-farm occupation. All but four of the respondents

(n=215) answered the item. A majority of the respondents, 63.9% (n=140) stated that they did not have on off-farm job, while 34.3% (n=75) did report having off-farm employment.

To better understand the dynamics of off-farm employment, several statistical comparisons were made between the respondents who had off-farm employment and those who did not. For the dependent variables with scale or ratio measurements, an independent samples t-test was performed and Cohen's d was calculated for effect size. For dependent variables with nominal or ordinal scales of measurement a *Chi-squared* test was performed and *Cramer's V* was calculated for effect size.

The respondents who had off-farm employment were significantly younger with an average age of 50 years as opposed to 59 years for the group that did not have off farm employment (Table 8). The respondents with off-farm jobs also planted significantly fewer acres of wheat in the 2000-2001 season (Table 8). Farmers with off-farm employment planted 382 acres of wheat compared to 803 acres for the farmers without off-farm jobs.

Table 8

Parametric Differences Between Farmers With Off-farm Employment and Those Without

Characteristic	t	df	Significance	Cohen's d	Effect size
Respondent age	5.4[b]	183	0.000	0.8	Medium[a]
Acres of wheat planted	4.6[b]	173	0.000	0.7	Medium[a]

Note: a) Effect size interpretation (Cohen, 1988) b) Equal variances not assumed.

In addition to age and acres planted wheat producers with off-farm jobs also differed significantly on their educational attainment, retirement plans and government farm payments (Table 9). Farmers with off farm-jobs had significantly higher educational attainment with a median of an associates degree as compared with a median of some college for the full-time farmers. Table 9 also shows that respondents with off farm jobs were also significantly less likely to retire in the next five years. Only 13.0% (n=10) indicated that they intended to retire as compared with 32.0% (n=43) for the full-time farmers. Finally, significantly fewer farmers with off-farm employment collect government commodity program payments, 83.0% (n=64) as opposed to 95.0% (n=130) for the full-time farmers (Table 9).

Table 9

Nonparametric Differences Between Farmers With Off-farm Employment and Those Without

Characteristic	Chi-Square	df	Significance	Cramer's V	Strength of association
Educational attainment	16.4	8	0.037	0.3	Moderate[a]
Retirement	9.3	1	0.002	0.2	Moderate[a]
Government payments	8.1	1	0.005	0.2	Moderate[a]

Note: a) Strength of association (Rea, & Parker, 1992)

Hours spent farming per week

Respondents were also asked to estimate the average number of hours they spent farming in a week. Respondents reported spending from zero to 168 hours per week farming. As can be seen in Table 10, the mean number of hours respondents spent farming in a week was 44.8. The median number of hours spent farming was 40.0, and the most frequently reported number of hours spent farming in a week was 60.0. There

was high level of variation in the number of hours spent farming in a week as illustrated by the standard deviation of 27.5 hours per week.

Table 10

Hours Spent Farming per Week

Statistic	Hours/week
Mean	44.8
Median	40.0
Mode	60.0
Standard deviation	27.5
Range	168.0

(n=179)

Respondent educational attainment

The education level or attainment of the respondents was also investigated in this study. Respondents were asked to indicate their highest level of education from among nine choices including kindergarten through eighth grade, ninth grade through 12th grade, high school graduate, some college, associates degree, BS or BA degree, some graduate school, MS, MA, or MAg degree and Ph.D. or Ed.D. degree. The response to this item was high; 215 of the 219 respondents indicated their educational attainment. As can be seen in Table 11 the most frequently reported educational level was some college. Some college was also the median education level for the respondents. It should be noted that only 11.7% (n=25) of the 214 responses indicated an educational attainment of less than high school graduate. In fact, 36.5% (n=78) indicated that they held at least a bachelor's degree and 10.2% (n=22) indicated that they had a graduate degree.

Table 11

Respondent Educational Attainment

Educational Attainment	Frequency	Percent
K-8	6	2.8
9-12	19	8.8
High school graduate	40	18.6
Some college	63	28.8
Associates degree	9	4.2
BS or BA degree	51	23.6
Some graduate school	6	2.8
MS, MA, or MAg degree	19	8.8
Ph.D. or Ed.D degree	3	1.4
Total	215	100.0

Respondent long-term plans

The respondents' long-term plans for their wheat production operations were also a concern of this study. Two questions emerged to address this issue among respondents: 1) Are you planning on expanding your agricultural operation in the next five years, and 2) Are you planning on retiring from farming in the next five years? With regard to expansion, 212 responded to the item. Of those who responded, 65.6% (n=139) indicated that they did not intend to expand their farming operation in the next five years.

There were 213 responses to the question on retirement plans. Of those respondents, 75.1% (n=160) indicated that they had no plans to retire in the next five years. While most of the respondents are not planning on retiring it is significant to note that 24.9% are considering retiring in the next five years.

Operational Characteristics

The survey included questions about the operational characteristics of Oklahoma wheat producers. The wheat working group faculty were interested in knowing more about the nature of wheat farms in Oklahoma to better understand how to develop meaningful solutions to farmers' problems.

Respondent financial arrangements

The financial arrangements of Oklahoma wheat producers also offer some clues as to the constraints of their farm operations. Three areas emerged as points of interest in the study, including government farm payments, short-term operating loans, and long-term loans for capital items and land purchases.

One item on the survey asked respondents if they collected government farm payments in a typical year. Of the 219 respondents, 216 responded to this item; 90.3% (n=195) of those responding to the item indicated that they collect government farm payments in a typical year.

The respondents were also asked whether they typically took out short-term loans to cover operating expenses; 215 respondents answered the item. The respondents were about evenly split on this issue; 52.1% (n=112) of the respondents indicated that they regularly took out short-term loans to cover operating expenses on their operations.

In addition to the item on short-term loans, the respondents were also asked about long-term loans to cover major purchases like land or equipment. Of the 219 respondents,

215 responded to this item. With regard to long-term loans, 58.4% (n=128) reported taking out long-term loans to make major purchases.

Crop insurance

One of the major issues raised during the development of this study was the impact of crop insurance on crop production decisions among Oklahoma wheat producers. Three questions regarding crop insurance were included in the questionnaire.

In the first item, "How often do you buy crop insurance for wheat?" respondents were asked to select their response from among three alternatives: always, sometimes, and never. The response to this item was good with 216 respondents. The majority, 57.9% (n=125) indicated that they always buy crop insurance on wheat, while 20.4% (n=44) said that they sometimes insured their wheat crop and 21.8% (n=47) stated that they never buy insurance on wheat.

Respondents were also asked, "What is your principal reason for buying crop insurance?" Respondents were asked to select their response from one of two alternatives: required by lender or to reduce your risk. Of the 219 respondents, 169 answered the item. Most respondents, 88.2% (n=149), indicated that their principal reason for buying crop insurance was to reduce their risk while 11.8% (n=20) stated that crop insurance was required by their lender.

Finally, the respondents were asked whether they had collected on a crop insurance claim. Of the 219 respondents, 201 answered this item. Most of the respondents, 57.2% (n=115), indicated that they had collected on a crop insurance policy

at least one time while 42.8% indicated they had not. It should be noted that only 169 of the respondents indicated that they had ever purchased crop insurance. Based only on the 169 of those who could have collected on crop insurance, the percentage of those who did collect on crop insurance was 68.1%.

Wheat check-off

One of the areas that emerged from the development of this study was the issue of wheat check-off money collected from wheat producers when they sell their grain. Much of this money is used to support wheat research at OSU as well as promoting and marketing wheat and wheat products. There was a concern that many producers do not perceive a benefit from their participation in the wheat check-off program. This is a serious concern because participation is voluntary, and producers can opt to request a refund of their wheat check-off contributions. Respondents were asked if they believed that their wheat check-off dollars were a good investment. Of the 219 respondents, 183 answered the item. The majority, 55.7% (n=102), indicated that their participation in the wheat check-off program was a good investment while 44.3% (n=81) did not.

Respondent operation type

There are a number of ways that an agricultural operation such as a wheat farm can be organized. Common types of operations include: 1) corporations, 2) sole proprietorships (individual), 3) landlord only, 4) managed for another person (respondent is the manager), 5) partnerships or 6) sold and or turned over to another person. The questionnaire included an item that asked the respondents to indicate which of those categories best described their wheat production operation. Of the 219 respondents to the

questionnaire, 215 responded to this item. As can be seen in Table 12, most respondents, 79.1% (n=170), indicated that they were sole proprietors; that is, they operated their farms individually. Partnerships were the second most common type of operation among the respondents with 10.7% (n=23) of the respondents reporting this type of operation. Other responses included corporations at 4.2% (n=9), landlord only at 3.3% (n=7), other type at 1.4% (n=3), managed at 0.9% (n=2) and sold to another person at 0.5% (n=1).

Table 12

Respondent Operation Type

Operation type	Frequency	Percent
Individual (sole proprietorship)	170	79.1
Partnership	23	10.7
Corporation	9	4.2
Landlord only	7	3.3
Managed (respondent was hired manager)	2	0.9
Other	2	1.4
Sold to another person	1	.5
Total	215	100.0

Land ownership

The percentage of a farm operation owned by the farm operator could influence management decisions made by that operator. The questionnaire contained an item designed to gather information about the percentage of ownership of the land farmed by the respondents. Of the 219 respondents, 211 answered this item. As can be seen in Table 13, respondents reported owning from zero to 100% of the land that they farmed. The mean of the percentages of ownership reported by the respondents was 53.2%, the median ownership was 50.0%, and the most frequently reported ownership was 100%

(n=49). The high degree of variability in the reported ownership is reflected by the relatively high standard deviation of 35.0%.

Table 13

Percentage of Land Owned

Statistic	Percent ownership
Mean	53.2
Median	50.0
Mode	100.0
Standard deviation	35.0
Range	100.0

(n=211)

Acres of wheat planted in 2000-2001

Another operational characteristic of interest in this study was the acres of wheat planted by the respondents in the 2000-2001 season. The response to this item was high with 206 of the 219 respondents indicating the number of acres they planted. As can be seen in Table 14, the responses ranged from zero to 4,500 acres. The mean number of acres planted was 651.8 acres, the median was 400 acres, and the mode was 200 acres. There was a lot of variation in the responses, which was reflected in the high standard deviation of 697.1 acres. As can be seen from these statistics, half of the respondents reported planting fewer than 400 acres of wheat, and 65.0% (n=134) reported planting less than 650 acres. In contrast, only 5.0% (n=11) reported planting more than 2,000; in fact, 90.0% (n=190) reported planting 1,500 or less acres. The extreme values beyond about 2,000 acres have skewed the mean to the high side of the distribution. In cases such as this, the median offers a less biased measure of the central tendency than the mean, which is sensitive to extreme values (Campbell, 2001).

Table 14

Acres of Wheat Planted 2000-2001

Statistic	Acres
Mean	651.8
Median	400.0
Mode	200.0
Standard deviation	697.1
Range	4,500.0

(n=206)

Respondents' principle agricultural enterprise

The focus of the agricultural operation itself was among the characteristics of interest in this study. While farms can and generally do produce a number of agricultural products, generally there is one crop or type of livestock which is the major focus of the operation. Respondents were asked to indicate if wheat production was their principal agricultural enterprise. Of the 219 respondents, 211 responded to this item. Most of the respondents, 58.3% (n=123), indicated that wheat was the principal enterprise of their agricultural operation.

Other crops planted by the respondents

Most agricultural operations produce more than one product. The types of crops other than wheat produced by wheat producers was also of interest in this study. Respondents were asked to indicate the crops other than wheat that they planted by checking a box corresponding to a list of 16 common crops. Of the 219 respondents, 189 answered the item on crops. As can be seen in Table 15 alfalfa was the most common crop produced other than wheat; 33.9% (n=64) of the respondents answering the item indicated that they raised alfalfa. Other crops that were frequently indicated by

respondents included other hay 30.2% (n=57), sorghum 29.6% (n=56), sudan grass 22.8% (n=43), and soybeans 20.6% (n=39). It should be noted that 15.3% of the respondents (n=29) indicated that they did not raise any crops other than wheat.

Livestock raised by the respondents

The questionnaire also included an item regarding any livestock that might be raised on a respondents agricultural operation. Most respondents, 201 of 219, answered this item. Respondents were asked to indicate the type or types of livestock they raised from a list of twelve types of common livestock. Beef cattle were the most important species of livestock with 93.0% (n=187) of the respondents indicating that they were cattle producers (Table 16).

Table 15

Other Crops Raised by the Respondents

Crop	Frequency	Percent
Alfalfa	64	33.9
Other hay	57	30.2
Sorghum	56	29.6
Sudan grass	43	22.8
Soybeans	39	20.6
None (wheat only)	26	15.3
Oats	26	13.8
Cotton	21	11.1
Rye	18	9.6
Corn	13	6.9
Oil seed crops	8	4.2
Barley	4	2.1
Watermelons	4	2.1
Nursery/greenhouse	3	1.6
Peanuts	3	1.6
Peaches	1	0.5

(n=189)

Table 16

Livestock Raised by the Respondents

Livestock	Frequency	Percent
Beef cattle (cow calf)	154	76.6
Beef cattle (stocker)	102	50.7
Horses, mules, etc.	17	8.5
None	11	5.5
Hogs/pigs	6	3.0
Goats	4	2.0
Sheep and lambs	4	2.0
Chickens	2	1.0
Bee colonies	1	0.5
Cattle (dairy)	1	0.5
Emus/ostriches/rheas	1	0.5
Fish	1	0.5
Turkeys	0	0.0

(n=201)

Most of the respondents, 76.6% (n=154), indicated that they were cow-calf producers while 50.7% (n=102) stated that they raised yearlings/stockers. Other than beef cattle, the next most common type of livestock raised by the respondents were horses and mules; 8.5% (n=17) indicated that they raised equine stock. All other categories of livestock were reported at levels under 5.0%, and included swine at 3.0% (n=6), goats 2.0% (n=4), and sheep at 2.0% (n=4) (Table 16). It should be noted that 5.5% (n=11) respondents indicated that they raised no livestock on their farms.

Membership in agricultural organizations

Another area of interest for the wheat working group faculty was membership in agricultural organizations. A better understanding of which organizations are most popular among wheat producers has implications for disseminating information to them. The respondents were asked to indicate which organizations they belong to by checking

their responses on a list of ten organizations active in Oklahoma. Respondents were also given the option of writing in organizations that were not listed in the survey. The response to this item was good with 209 responses. Most respondents 85.1% (n=177) reported belonging to at least one agricultural organization. As can be seen in Table 17 the Oklahoma Farm Bureau was the most frequently selected response with 47.8% (n=100). Other frequently selected organizations were grain cooperatives at 46.4% (n=97), the Oklahoma Wheat Growers' Association at 26.8% (n=56), the Oklahoma Cattlemen's Association at 21.5% (n=45), and Oklahoma Farmers' Union at 21.1 % (n=44).

Table 17

Membership in Agricultural Organizations

Agricultural organization	Frequency	Percent
OK farm bureau	100	47.84
Grain cooperative	97	46.41
OK wheat growers association	56	26.79
OK cattleman's association	45	21.53
OK farmer's union	44	21.06
None	31	14.83
OK grain and stockers assn.	9	4.31
OK crop improvement assn	6	2.87
Grange	5	2.39
OK feed and seed trade assn	5	2.39

(n=209)

Objective 2

The second objective of this study was to describe the agricultural problems and challenges of Oklahoma wheat producers.

Wheat Production Problems

In order to identify the production challenges faced by wheat producers, the respondents were asked to respond to a series of 41 summated scale items in seven categories. The categories included grazing, wheat diseases, insect pests, weeds, grain quality, soil fertility, and other. The summated scale included four levels of response including not a problem, less serious problem, serious problem and very serious problem. The respondents were asked to select the response from the scale that best fit their operation. Table 18 lists the 41 wheat production problems in the survey. The majority of the wheat producers in the study considered three of the 41 problems serious. They were drought, cheat grass, and field bindweed. All of the other problems listed in Table 18 had a median response of "less serious problem" or "not a problem."

Other grain production problems

Several common wheat production problems were identified which did not fall into the other six categories. Five potential problems were identified, including low grain yield, poor stand establishment, shattering, drought, and lodging. As can be seen in Table 18 drought was identified as the most significant problem of any listed in all seven categories. The respondents found low grain yield, poor stand establishment, shattering, and lodging to be less serious problems.

Table 18

Wheat Production Problems

Production problem	n	Response in percent: Not a problem	Less serious problem	Serious problem	Very serious problem
Other problems					
Drought	183	4.9	10.9	41.5*	42.6
Low grain yield	158	24.1	40.5*	27.2	8.2
Poor stand establishment	151	30.5	46.4*	17.9	5.3
Lodging	146	45.2	38.4*	8.2	4.1
Shattering	142	53.5*	38.0	6.3	2.1
Weeds					
Cheat grass	182	9.3	17.0	40.1*	33.5
Field bindweed	163	18.4	29.4	31.9*	20.2
Wild oats	149	37.6	21.5*	24.8	16.1
Rye	154	37.0	27.3*	22.1	13.6
Ryegrass	146	39.7	31.5*	19.2	9.6
Jointed goat grass	150	46.0	26.7*	18.0	9.3
Mustards	153	30.1	35.3*	26.8	7.8
Wild buckwheat	148	47.3	32.4*	15.5	4.7
Soil fertility problems					
Acid soil	154	28.6	27.9*	34.4	9.1
Nitrogen	176	21.6	36.9*	34.1	7.4
Phosphorus	162	26.5	51.2*	20.4	1.9
Potassium	152	46.7	42.8*	9.2	1.3
Wheat diseases					
Wheat rusts	159	22.0	34.6*	34.6	8.8
Soil born mosaic virus	146	40.4	32.2*	20.5	6.8
Wheat streak virus	143	47.6	31.5*	17.5	3.5
Root rot	141	39.0	38.3*	19.1	3.5
Barley yellow dwarf virus	129	56.6*	27.1	14.0	2.3
Strawbreaker	129	62.0*	26.4	9.3	2.3
Powdery mildew	139	51.8*	33.1	12.9	2.2
Septoria leaf blotch	131	56.5*	31.3	10.7	1.5
Bunts and smuts	137	54.7*	32.8	10.9	1.5
Tan spot	137	56.2*	30.7	12.4	0.7

Note. * Indicates median response

Table 18 (continued)

Wheat Production Problems

Production problem	n	Response in percent: Not a problem	Less serious problem	Serious problem	Very serious problem
Insect pests					
Green bugs	173	12.1	42.8*	36.4	8.7
Armyworms	163	19.6	43.6*	28.2	8.6
Fall armyworms	143	30.1	41.3*	21.7	7.0
Army cutworms	144	29.2	39.6*	25.0	6.3
Russian wheat aphids	163	52.6*	35.0	8.0	4.4
Mites	137	48.2	40.1*	8.8	2.9
Bird cherry oat aphids	129	62.8*	31.0	3.9	2.3
Nematodes	130	65.4*	28.5	4.6	1.5
Grain quality problems					
High dockage	164	36.0	36.6*	18.9	8.5
Low test weight	165	33.3	41.8*	19.4	5.5
Low protein	157	48.4	34.4*	15.9	1.3
Sprouting in the head	151	70.2*	23.8	4.6	1.3
Grazing problems					
Grazing tolerance	169	40.8	39.1*	18.3	1.8
Forage production	164	42.1	30.5*	18.3	1.8

Note. * Indicates median response

Weeds

Weeds have been a problem that has plagued wheat production in the past. The WWG faculty identified eight common weed species by common name including cheat grass, field bindweed, wild oats, rye, ryegrass, jointed goat grass, mustards and wild buckwheat. As can be seen in Table 18, the respondents found all eight weed species to be problematic. However, the majority of the respondents found cheat grass and field bindweed more problematic than the rest.

Soil fertility

Soil fertility is a potential problem for wheat producers. Four factors of soil fertility were identified for this study including phosphorus, nitrogen, potassium, and acid soil. The majority of the respondents indicated that acid soil was the most serious soil fertility problem (Table 18).

Wheat diseases

Pathogens effecting the wheat plant are widespread and can be a serious problem for wheat producers. The WWG faculty identified nine common diseases of wheat that have historically been a problem for wheat producers in Oklahoma, including barley yellow dwarf virus, bunts and smuts, soil born mosaic virus, wheat streak virus, wheat rusts, powdery mildew, tan spot, Septoria leaf blotch, root rot, and strawbreaker. Wheat rusts were most frequently identified as the most serious of the wheat disease problems by the respondents (Table 18).

Insect pests

Insect pests are also potential problems to wheat producers. The WWG faculty identified eight common insect pests that have damaged wheat crops in Oklahoma over the years, including green bugs, bird cherry oat aphids, Russian wheat aphids, armyworms, army cutworms, fall armyworms, mites, and nematodes. Green bugs were the most problematic of the eight insect pests listed. Other problematic insects included armyworms, army cutworms, fall armyworms and mites (Table 18).

Grain quality

Grain quality is also a concern of wheat producers, which can be traced to wheat production problems. Four basic grain quality problems were identified in this study, including low protein, high dockage, low test weight, and spouting in the head. The respondents found high dockage, the fee assessed against the value of the grain, to be the most problematic of the grain quality issues (Table 18).

Grazing problems

Two grazing issues effecting wheat producers were identified by the WWG faculty. Grazing tolerance was defined as low grain yield on wheat after grazing. Grazing tolerance and forage production were either not a problem or a less serious problem for the majority of respondents (Table 18).

Differences in wheat production problems between crop reporting districts

The WWG faculty was also interested in weather wheat production problems differed based on the crop reporting district where the respondents farm was located. The respondents were grouped according to their crop reporting district and compared on all 41 wheat production problem variables using a *Chi Square* test. Only seven of the wheat production problems were found to differ statistically among the crop reporting districts at the 0.05 level. The seven differing production problems included barley yellow dwarf virus, strawbreaker, field bindweed, wild buckwheat, phosphorus, nitrogen, and acid soils. Table 19 details the significant findings of the *Chi Square* analysis.

Table 19

Differences in Wheat Production Problems Between Crop Reporting Districts

Production problem	Chi-Square	df	Significance	Cramer's V	Strength of association
Acid soils	39.6	18	0.002	0.3	Moderate
Barley yellow dwarf virus	37.0	18	0.005	0.3	Moderate
Strawbreaker	33.8	18	0.013	0.3	Moderate
Nitrogen	32.7	21	0.050	0.3	Moderate
Wild buckwheat	32.5	18	0.019	0.3	Moderate
Field bindweed	32.0	18	0.022	0.3	Moderate
Phosphorus	29.9	18	0.039	0.3	Moderate

Note. Strength of association (Rea & Parker, 1992)

Acid soils

Examination of the contingency table used to calculate the *Chi Square* value for acid soils in Table 19 revealed that producers in crop reporting districts four and seven found acid soils to be a more serious problem than respondents in other districts.

Barley yellow dwarf virus

Based on the median response of producers in each of the crop reporting districts, respondents in crop reporting district four found barley yellow dwarf virus to be a slightly more serious problem that the wheat producers in the other districts (Table 19).

Strawbreaker

Another wheat pathogen, strawbreaker, was found to be more problematic by respondents in crop reporting district four than by producers in the other crop reporting districts (Table 19).

Nitrogen

Nitrogen, a plant nutrient, was also found to differ as a production problem among the crop reporting districts (Table 19). Respondents in districts one, three, and six found nitrogen to be a more serious problem than producers in the other crop reporting districts.

Wild Buckwheat

Wild buckwheat, a common weed, differed significantly among the crop reporting districts (Table 19). Based on the median responses for the item, it was determined that respondents in crop reporting district four found wild buckwheat to be more problematic than the respondents in the other districts.

Field bindweed

Field bindweed, another common weed, was also found to differ as a problem among the crop reporting districts (Table 19). Examination of the contingency table used to calculate the *Chi Square* statistic revealed that respondents in district six, rated field bindweed lower as a wheat production problem than producers in the other districts.

Phosphorus

Phosphorus, a plant nutrient, also differed significantly among the crop reporting districts (Table 19). Based on the contingency table for the *Chi Square* analysis, wheat growers in crop reporting district six rated phosphorus as a more serious production problem than producers in the other crop reporting districts.

Greatest Wheat Production Concern

Part of objective two was to describe the type of wheat production problems that concerned the respondents the most. The survey questionnaire included an item which asked respondents to select the category which caused them the most concern. The categories included grazing, grain quality, insect pests, soil fertility, weeds, and wheat diseases. The response to this item was good with 207 of the 219 respondents indicating a greatest concern. As can be seen in Table 20, weeds were the most frequently cited greatest concern, 31.4% (n=65), of the respondents cited weeds as their greatest concern. Grazing was second most frequently cited identified by 29.0% (n=60), of the respondents. The other categories were selected as follows: soil fertility at 20.8% (n=43), wheat diseases at 20.3% (n=42), insect pests at 11.6% (n=24), and grain quality at 9.7% (n=20). It should be noted that many respondents selected two or more categories from the list and all responses were entered.

Table 20

Greatest Wheat Production Concerns

Category	Frequency	Percent
Weeds	65	31.4
Grazing	60	29.0
Soil fertility	43	20.8
Wheat diseases	42	20.3
Insect pests	24	11.6
Grain quality	20	9.7
Total	254	122.8

(n=207)

Objective 3

The third objective of this study was to identify what factors Oklahoma wheat producers consider when making production decisions. The WWG faculty identified ten factors impacting wheat producers' decisions on production practices. These factors included grain yield, long-term sustainability, cost of inputs, government farm payments, crop insurance, credit/interest rates, maximizing income, minimizing costs, commodity prices, and terms of lease agreements.

Important Factors Impacting Production Practice Decisions

The respondents were asked to complete a series of ten three-point summated scale items corresponding to the ten factors identified by the WWG faculty. The three responses for the summated scale items included not at all important, somewhat important, and very important. The respondents considered all ten factors to be at least somewhat important. However, the respondents median responses indicated that, as a group, the respondents considered maximizing income, commodity prices, minimizing costs, the cost of inputs, maximizing yield, and long-term sustainability to be very important factors in making decisions about wheat production (Table 21).

Table 21

Respondents' Perceptions of Factors Influencing Wheat Production Decisions

Decision making factor	*n*	Response in percent: Not at all important	Somewhat important	Very important
Maximizing income	172	1.2	16.3	80.8*
Commodity prices	178	2.8	17.8	78.3*
Minimizing costs	173	1.7	22.4	75.3*
Cost of inputs	187	2.1	23.0	74.9*
Maximizing yield	179	4.6	28.2	67.2*
Long term sustainability	159	9.4	38.4	52.2*
Government commodity program funds	165	12.7	40.0*	47.3
Credit/interest rates	161	32.3	33.5*	34.2
Crop insurance	162	30.9	41.4*	27.8
Terms of lease or agreements with landowners	160	43.1	35.6*	21.3

Note: * indicates median response

Objective 4

The fourth objective of this study was to identify specific informational sources and media preferred by Oklahoma wheat producers. The survey participants were asked to respond to three basic questions regarding the sources of information they used to solve wheat production problems. The first item was a four-point summated scale item with 16 potential sources of wheat production information. The respondents were also asked to list the three publications they most frequently used to find information on wheat production issues. Finally, respondents were asked to list the three sources of information other than publications that they used most frequently to find wheat production information.

Frequently Used Sources of Wheat Production Information

The wheat producers in the study were asked to respond to the question "how frequently do you use the 16 sources to find wheat production information." The four scale responses were labeled not at all, sometimes, frequently, and always. The item included 16 sources of information and asked the respondents to indicate how frequently they used each source of information. Table 22 shows that the most frequently used sources of information were people such as friends, family, and other farmers.

Table 22

Frequently Used Sources of Wheat Production Information

Source	*n*	Response in percent			
		Never	Sometimes	Frequently	Always
Friends/family/other farmers	175	2.3	30.9	47.4*	19.4
Businesses	171	5.3	39.2	36.3*	19.3
OSU publications	167	15.0	48.5*	25.7	10.8
OSU Extension	168	12.5	45.2*	32.1	10.1
Trade/technical journals/newsletters	156	9.6	47.4*	34.6	8.3
Newspapers	161	25.5	46.0*	21.1	7.5
Farm organizations	155	23.2	51.6*	20.6	4.5
Television/radio programs	157	28.7	47.1*	19.7	4.5
Government agencies	155	27.1	51.6*	18.1	3.2
Scientific journals	150	43.3	42.7*	12.0	2.0
Non extension faculty or staff	148	54.1*	37.2	6.8	2.0
Other universities	148	64.2*	31.1	2.7	2.0
Nobel foundation	152	63.2*	28.3	6.6	2.0
Internet	153	58.8*	27.5	11.8	2.0
Crop consultants	152	69.1*	17.8	8.6	4.6
Public library	149	87.9*	10.7	0.7	0.7

Note: * indicates median response

Business associates such as seed, chemical, and fertilizer dealers were the second most frequently reported source of wheat production information. Other sources of

information included trade and technical journals, newsletters, Oklahoma Cooperative Extension Service (OCES),and OSU publications.

Frequently used publications

One hundred and thirty two respondents (n=132) wrote in one to three written sources of information they most often read to get wheat production information. The respondents cited 40 different publications. As can be seen in Table 23, the most frequently read publications were *The High Plains Journal,* followed by *The Oklahoma Farmer Stockman, The Progressive Farmer* and *The Farm Journal* . It should be noted that the data were not adjusted for frequency of publication. While some of the publications cited by the respondents are published monthly, like *The High Plains Journal,* others are published annually like the *OSU Variety Test Reports.* The implication is an annual publication, is less likely to have been cited by respondents than more frequently published periodicals.

Frequently used non-published sources of information

Respondents were asked to list three sources of wheat production information other than publications. One hundred and fifteen respondents listed one to three responses citing 24 non-written sources of information. Table 24 shows the most frequently listed sources were family, friends, and other farmers. Other important sources included grain coops, agricultural supply dealers, and Oklahoma Cooperative Extension Service (OCES) personnel.

Table 23

Publications Used by Respondents as Sources of Wheat Production Information

Publication title	Frequency	Percent
High Plains Journal	47	35.6
Oklahoma Farmer Stockman	44	33.3
Progressive Farmer	35	26.5
Farm Journal	26	19.7
Southwest Farm Press	14	10.6
Extension Newsletter	13	9.9
OSU Variety Test Reports	10	7.6
Extension Fact Sheets	9	6.8
OK Wheat Growers Association Newsletter	9	6.8
OSU publications	9	6.8
Farm magazines	8	6.1
OSU Newsletter	6	4.6
Extension publications	5	3.8
Extension Bulletins	4	3.0
Noble Foundation publications	4	3.0
Oklahoma Wheat Commission Newsletter	4	3.0
Successful Farmer	4	3.0
Beef Today	2	1.5
Farm Bureau/Farm organizations	2	1.5
Farm Talk	2	1.5
OSU Market Report	2	1.5
Agriculture News	1	0.8
Capper's Weekly	1	0.8
Central Plains Wheat Farmer	1	0.8
Coop Newsletter	1	0.8
Furrow	1	0.8
Kansas State University variety trials	1	0.8
Major County ASC Newsletter	1	0.8
No Till Farmer	1	0.8
Oklahoma Wheat Brief	1	0.8
OSU Journal	1	0.8
OSU Wheat Management in Oklahoma	1	0.8
OSU Wheat Production Reports	1	0.8
OSU Scout	1	0.8
Other Farm Publications	1	0.8
Peanut Grower	1	0.8
Professional Wheat Grower (Opti-Crop)	1	0.8
Seed Company literature	1	0.8
Trade Journals	1	0.8
Wheat News	1	0.8

Table 24

Sources of Wheat Production Information Other Than Publications

Source of information	Frequency	Percent
Family, friends, and other farmers	68	59.1
Coop/elevator	38	33.0
Dealers farm, chemical, fertilizer, seed, and grain	33	28.7
Extension OSU	28	24.4
Internet web-sites	13	11.3
Radio	12	10.4
OSU wheat trials	10	8.7
TV	10	8.7
Myself personal knowledge and experience	7	6.1
Meetings	6	5.2
Sun Up TV program	6	5.2
Crop advisors	5	4.4
ASCS office	2	1.7
Businesses	2	1.7
Farm organizations	2	1.7
Market to Market	2	1.7
Charles Luper	1	0.9
County fair wheat winners	1	0.9
FSA	1	0.9
Kansas City board of trade	1	0.9
Noble foundation	1	0.9
NRCS	1	0.9
OTN	1	0.9
Soil samples	1	0.9

(n=115)

Objective 5

The fifth objective of this study was to determine the most effective activities for the establishment of ongoing communication between the department faculty/researchers and Oklahoma wheat producers. In order to determine the best way to communicate with stakeholders, the researchers wanted to know if and how Oklahoma wheat producers were connected to Oklahoma State University and if so, could these existing connections could be exploited for future communication? The respondents were asked a series of questions regarding their relationship to OSU including; whether they or a close family member had attended OSU; whether they serve on advisory boards or committees for OSU; whether they cooperate in research with OSU; or if they communicate directly with OSU faculty or staff members.

When asked if they were graduates of Oklahoma State University (OSU), 215 participants responded to the item. Of those 215 respondents, most, 77.2% (n=166), indicated that they were not graduates of OSU; thus 22.8% of the respondents were OSU graduates.

When asked if a close family member had attended OSU, 217 wheat producers responded to the item. Most of the respondents, 58.1% (n=126), indicated that a close family member had not attended OSU.

The questionnaire also included an item asking respondents if they serve on any advisory boards or steering committees for Oklahoma State University (OSU). Two hundred and sixteen of the respondents answered the item: 94.0% (n=203) respondents indicated that they did not serve on any boards or committees for OSU. Of the 6.0%

(n=13) of the respondents indicating that they did serve on a board or committee, 11 listed their boards or committees. Only seven of the boards or committees listed by the respondents were associated with OSU. The respondents listed serving on OSU committees and boards that included, the arts and sciences alumni board, a county alumni board, a national alumni board, the dean of agriculture advisory board, the food and agricultural products center board, and four respondents reported serving on three separate county extension program advisory committees.

The questionnaire also included a question asking respondents if they had cooperated with Oklahoma State University (OSU) researchers in research projects. Of the 215 respondents to this item 85.6% (n=184) indicated that they had not participated in research with OSU. Of the 14.4% (n=31) who indicated that they had participated in OSU research projects, 17 listed the research projects which included six test plots, four weed control projects, quail research, three surveys, soil research, and a value-added products research project.

Another question included in this section of the questionnaire asked respondents if they communicated directly with OSU staff or faculty members. Response to this item was high; 213 wheat producers answered this item. Most of the respondents, 86.4% (n=184), indicated that they did not communicate directly with an OSU faculty or staff member. Of the 13.6% (n=29) that did report having communicated directly with an OSU faculty or staff member, 21 listed the person or persons with whom they had communicated. Of the 28 persons listed by the respondents, 24 were found in the OSU Personnel Directory. As can be seen in Table 25 The most frequently listed faculty and

staff members were Kim Anderson of the Agricultural Economics department, Bob Kropp of the Animal Science department, and Tom Peeper of the Plant and Soil Science department, each of whom were listed twice.

Table 25

Faulty and Staff Contacts Listed by Respondents

Name	Department/position	Frequency
Kim Anderson	Agricultural economics/professor	2
Bob Kropp	Animal science/professor	2
Tom Peeper	Plant and soil sciences/professor	2
Jeff Baumann	Extension/educator	1
John Caddel	Plant and soil sciences/professor	1
D.C. Coston	Oklahoma agricultural experiment station/director	1
Sam Curl	College of agriculture and natural resources/dean	1
Dixie Ferrell	Extension/educator	1
Gerry Fitch	Extension/sheep specialist	1
Roger Gribble	Extension/agronomy specialist	1
Fred Guthery	Forestry/professor	1
Gerald Horn	Animal science/professor	1
Mark Johnson	Animal science/associate professor	1
Doyle Jones	Plant and soil sciences/OFSS coordinator	1
Ron Justice	Extension/educator	1
Steve Kraich	Extension/educator	1
Gene Krenzer	Extension/wheat specialist	1
Charles Luper	Research assistant	1
Dr. Margaret	Not listed in OSU directory	1
Robert Price	Agricultural education/emeritus professor	1
Dr. Scruggs	Not listed in OSU directory	1
Jim Stiegler	Plant and soil sciences/professor and head	1
Jimmy Stritzke	Extension/brush and weed control specialist	1
Lyndal Skaggs	Not listed in OSU directory	1
Gary Strictland	Not listed in OSU directory	1
Mike Webber	Extension/educator	1
Ida Fay Winters	Extension/educator	1
Ron Wright	Extension/educator	1

(n=21)

Another issue that was reflects on the communication between OSU and wheat producers is the perception and use of extension services among wheat producers. In order to better understand wheat producers' perceptions of OSU extension, they were asked to check a series of boxes related to reasons that they don't use extension as a source of information on wheat. A box indicating that extension was used as a source of wheat information was also included as an option and served as a check on the use of extension services. The respondents were asked to check all of the boxes that applied to them. In spite of the negative way in which the question was posed to the respondents, the most frequently checked response to the question was "I do use OSU Extension to get wheat production information." Of the 173 respondents who completed the item, 65.3% (n=113) checked the box indicating that they did use extension (Table 26). The most commonly checked reasons for not using extension were better information was available elsewhere and did not know about extension services, each with a response rate of 13.9% (n=24).

Table 26

Reasons for Not Using Extension

Reason	Frequency	Percent
I do use extension to get wheat production information	113	65.3
Better information is available elsewhere	24	13.9
I don't know about extension services	24	13.9
Extension is unresponsive to my needs	9	5.2
Extension is slow to provide answers	9	5.2
Extension information is out of date	7	4.0
Extension agent is too busy	6	3.5
Extension agent is not a wheat specialist	5	2.9

(n=173)

Other reasons for not using extension included slow to provide answers, and unresponsive to client needs, and extension is slow to provide answers each with a response rate of 5.2 % (n=9).

This section of the survey also included a question asking respondents if a weekly bulletin on crop production issues would be helpful. One hundred and ninety five participants responded to the item; most of these respondents, 66% (n=129), selected the yes option, indicating that a weekly bulletin would be helpful to them.

Finally respondents were asked, "how could communication between you and OSU be improved?" This open-ended question required the respondent to write in his or her answer. Dillman (2000) states that, open-ended questions typically receive a lower level of response that closed-ended types, 80 of the respondents wrote an answer to this item. Five basic themes emerged from the statements written by the respondents including communication is OK as is, I don't know how to improve communication between OSU and myself, information needed, information dissemination, and OSU is only interested in big farmers, or they are unapproachable.

Some of the respondents, 16.3% (n=13), felt that communication between themselves and OSU was adequate and either recommended no improvement or stated that no changes were needed. Responses in this category ranged from "I have no problem at all" to "I could communicate with OSU more, I have no problem with them." It appears that the 13 wheat producers in this category were satisfied with OSU in terms of communication.

It should be noted that five wheat producers indicated that they did not know how to improve communication between OSU and themselves. Basically, the responses in this category were very short consisting of "don't know" or words to that effect.

Some of the more substantial answers to this question were requests for various types of information. Thirteen of the eighty responses were requests for information which could be further divided in to specific types of information, including applied or production information, commodity market information, local variety trial results, and information about OSU faculty, services, and research.

Four of the respondents requesting information specifically noted a need for applied production type information, including forage values for grass varieties, timely production schedules for wheat, current production methods and current information on wheat seeds adapted to Oklahoma.

One of the respondents requesting information, specified information relating to trends in the wheat market: " be more informative about price movements in the wheat market."

Two other respondents requesting information perceived a need for more local wheat variety plot results. This could be interpreted in two ways: first, there should be more test plots in different locations around the state or that the results from the current test plots are not being disseminated well enough.

Seven of the 13 respondents requesting information were interested in information about OSU faculty, services, and research projects. Three respondents requested

information on programs and publications for wheat producers. Two other respondents wanted information about faculty members specifically their specialty or research area and contact information. Finally, one respondent requested information on wheat research results.

The majority of the respondents to this item, 56.3% (n=45), commented about ways that OSU could better disseminate information to wheat producers. The comments included 13 regarding extension, 23 regarding mailings, five regarding the mass media, and four regarding the Internet.

With regard to extension, two of the respondents suggested meetings were an effective way to disseminate information to wheat producers. Seven respondents stated that more personal contact was needed between wheat producers and extension personnel. Two respondents commented that up-to-date fact sheets were needed to improve communication with OSU. One respondent suggested that county extension staff need to be more timely in getting information to wheat producers. Finally, one respondent praised the local agricultural educator for being helpful and responsive.

Most of the comments (n=23) about way to disseminate information focused on direct mailing of information. Seven of the respondents indicated that they preferred to receive information from OSU via some type of direct mailing. However, 16 of the respondents made comments about a crop production bulletin; most (n=8) stated that the bulletin should be monthly, three suggested a regular interval for the bulletin, two suggested a biweekly bulletin, and three thought that a weekly bulletin would be a good idea.

Five of the respondents commented on mass media approaches for disseminating information, including articles in local and major newspapers (n=2), publishing in *The Wheat Farmer* or *The Oklahoma Farmer Stockman* (n=2), or expanding the Sun Up program on public television to half an hour.

Finally four respondents suggested that OSU should use the Internet to disseminate information to wheat producers. One respondent was very specific suggesting that OSU should have a web-site like the Kansas Wheat Markets Page. Two others simply suggested posting research results and updates to a web-page or sending them via an email list-serve.

The last category of responses were misconceptions or negative perceptions about OSU. Three responses fell into this category. Two respondents stated that OSU is not interested in helping small operations, and one respondent felt that OSU is unapproachable.

Triangulation

In an effort to assess the validity of the findings of this study, another source of stakeholder input was examined. The Oklahoma Wheat Growers' Association (OWGA) serves as an advocate for wheat producers; 26% of the respondents in this study were members of this organization. The 2002-2003 State Commendations and Resolutions of this organization were examined to identify consistencies and inconsistencies with the study findings. There were many strong parallels between the critical issues identified in the resolutions and the findings of this study. The findings of this study and the

resolutions were consistent in areas including long-term sustainability, best management practices, wheat pasture and dual purpose wheat, agricultural credit and interest rates, and crop insurance. The findings of this study and the resolutions were also consistent in identifying the need for greater dissemination of research results and the need for more wheat test plots in Oklahoma.

In addition, the resolutions identified the wheat check-off program as an area of concern. OWGA strongly supported the check-off program, but only 56% of the respondents in this study thought it was a good investment. The resolutions also identified karnal bunt as a production problem for producers, but the findings of this study did not support that conclusion.

Overall the OWGA resolutions supported the findings of this study, providing independent evidence that the study design and methods were sound and produced good results.

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

The purpose of this chapter is to present a summary of the study, as well as conclusions, implications, and recommendations based on the findings of the research.

Purpose of the Study

The purpose of this study was to collect stakeholder information for the Wheat Working Group of the Plant and Soil Science Department at Oklahoma State University. The input from wheat producers is to be utilized by the department's faculty, researchers, and extension educators for setting research, education, and extension priorities.

Objectives of the Study

Based on the research questions implied by the purpose of this study, the following specific objectives of the study were established:

1. Determine the demographic and operational characteristics of Oklahoma wheat producers.
2. Describe the agricultural problems, challenges, and concerns of Oklahoma wheat producers.

3. Identify what factors Oklahoma wheat producers consider when making production-related decisions.
4. Identify specific informational sources preferred by Oklahoma wheat producers.
5. Determine the most effective activities for the establishing ongoing communication between faculty and Oklahoma wheat producers.

Scope of the Study

This study was based on a random sample of wheat producers in Oklahoma. The author makes no claims or inference beyond the population of Oklahoma wheat producers. Readers may note certain parallels between the findings of this study and other populations, but they should exercise caution in interpreting or extending these findings to other groups.

Summary of Methods and Procedures

This study was a descriptive design with data collection via a self-administered mail survey. There were approximately 15,000 Oklahoma wheat producers in the population according to the 1997 Census of Agriculture. A proportionally stratified random sample based on the population of wheat producers in each of the state's 77 counties was drawn (Ary, Jacobs, & Rasavieh, 1996). A sample size of 375 would have been adequate at the 95% confidence level (Krejcie & Morgan, 1970); however, it was decided to take a 100% over sample of the population (n=750) to address a predicted low response rate of about 20%.

A draft of the survey instrument was circulated among the Wheat Working Group (WR) faculty as well as to a panel of experts comprised of researchers experienced in surveying agricultural populations and extension educators and specialists who work extensively with the state's wheat producers. Both the WWG faculty and the panel of experts expressed satisfaction with the face and content validity of the instrument.

The instrument was pilot tested with a random sample of wheat producers (n=100). The data from the 20 returned surveys were analyzed, and revisions were made to the instrument. The revised instrument was then mailed to the sample of 750 wheat producers. The reliability of the instrument was determined using Cronbach's alpha (Ary, et al., 1996). The reliability coefficient for the instrument was 0.94 for all scale items.

The mail survey used a modified tailored design method (Dillman, 2000). Mailings included an initial mailing that contained a survey, cover letter, and postage-paid return envelope. A reminder postcard was mailed one week later. A second survey, cover letter, and postage-paid return envelope followed one week later to nonrespondents. Finally, a second reminder postcard was mailed to all nonrespondents. A 29.2% useable response rate was achieved with this procedure.

Control for nonresponse error was addressed through four separate procedures. First, the effort was made to achieve the highest response rate possible by using Dillman's (2000) multiple mailing approach. Second, several demographic characteristics of the respondents were compared to the characteristics of the population from the 1997 Census of Agriculture (Miller & Smith, 1983). No significant differences were found at the 95% confidence level. Third, a comparison was made between early and late respondents. The

first 25% of the respondents were compared to the last 25% to respond; that is, those who responded after one mailing and those who did not respond until they had been contacted four times (Lindner, Murphy, & Briers, 2001). Again, no significant differences were found between the groups. Fourth, a random sample of ten percent of nonrespondents was drawn (n=50); of these, 33 were reached by telephone to complete a portion of the instrument (Lindner, et al., 2001). A comparison was made between the respondents and the nonrespondents' age and the proportion of land they owned using an independent sample *t-test*. Respondents and nonrespondents were also compared based on their ethnicity and educational attainment using a C*hi Square* test. No significant differences were found between respondents and nonrespondents on any of the variables at the 0.05 alpha level.

Major Findings of the Study

The survey collected a wealth of information about the attributes and characteristics of Oklahoma wheat producers as well as the specific problems and challenges they face. This study also identified the sources of wheat information used most frequently by wheat producers to solve production problems as well as the ways they communicate with Oklahoma State University.

Average Oklahoma wheat producers are white males, about 56 years of age, who do not plan to retire in the next five years. Wheat producers are more likely than not to be full-time farmers who earn all their income from farming. Oklahoma wheat producers work about 45 hours a week most weeks. They are well educated, having attained at least some college education, and many have even an earned a bachelor's or a master's degree.

The typical wheat producer's farm is individually operated as a sole proprietorship, and they own over half of the land they farm. During the 2000-2001 crop season, Oklahoma wheat producers planted an average of 652 acres of wheat. Over 90.0% run cattle on their farms, either as cow-calf pairs or stocker feeders grazing their young wheat. Oklahoma wheat producers tend to collect government commodity program payments, use short-term loans to finance their operations, and use long-term loans to cover land and equipment purchases. They buy crop insurance and have collected on a policy at least once in the past.

Oklahoma wheat producers find cheat grass, field bindweed, and drought to be their biggest challenges in farming. They are most interested in maximizing income when making wheat production decisions; however, commodity prices, minimizing costs, the costs of inputs, maximizing yield, and long-term sustainability are other significant factors they consider in their production-related decisions.

Oklahoma wheat producers consult friends and family most often for information to solve their wheat production problems. Business associates such as seed suppliers, grain elevator operators, and chemical and fertilizer dealers are also consulted when they need information. The publications they most often read for wheat production information are *The Oklahoma Farmer Stockman, The High Plains Journal,* and *Progressive Farmer.*

Less than a fourth of the typical wheat producers are alumni of Oklahoma State University. However, over half of the wheat producers had close a family member who

attended OSU. They serve on advisory boards and steering committees for OSU infrequently. They participate in OSU-sponsored research activities occasionally. Just over half of the wheat farmers in this study communicate with the Oklahoma Cooperative Extension Service on a regular basis.

Conclusions

A thorough examination, analysis, and interpretation of the findings of this study supported the following conclusions:

1) The number of Oklahoma wheat producers is in decline. The findings on the age and retirement plans for these producers indicate that, older framers who are ready to retire are not being replaced by younger farmers.

2) Oklahoma wheat producers vary in terms of their demographic and operational characteristics based on off-farm employment.

3) Oklahoma wheat producers are dependent on financial resources outside of their control. Analysis of the findings indicated that that the majority of Oklahoma wheat producers require loans and government payments to produce wheat. Commodity program requirements as well as the terms of loans have an impact on the management of wheat operations in Oklahoma.

4) Oklahoma wheat producers buy crop insurance as a hedge against crop failure. The finding that 72.0% of Oklahoma wheat producers insure their wheat crop at least some of the time. The most common reason for insuring wheat was found to be to reduce risk, thus it can be said that these producers are willing to give up some profitability to avoid the possibility of a total loss.

5) Agricultural organizations such as grain cooperatives, Oklahoma farm bureau, Oklahoma farmers' union, and the Oklahoma wheat growers' association present an opportunity to form partnerships to gather input from and to disseminate research based information to wheat producers.

6) Cattle production is driving wheat production in Oklahoma. Nearly all of the wheat producers in Oklahoma are raising beef cattle in conjunction with wheat.

7) The greatest wheat production challenges or problems in Oklahoma are the control of cheat grass and field bindweed. The analysis of the data showed that out of 41 potential problems only these two invasive weed species were serious problems for Oklahoma wheat producers.

8) Economic factors are most important to Oklahoma wheat producers when they are making production decisions.

9) Oklahoma wheat producers are most often getting information about wheat production from other farmers and businesses like grain elevator operators, seed suppliers, and chemical dealers.

10) The three publications, *The High Plains Journal, The Oklahoma Farmer Stockman, and Progressive Farmer,* are an effective conduit for disseminating information to Oklahoma wheat producers.

11) Oklahoma wheat producers have few direct connections to Oklahoma State University (OSU).

12) Oklahoma Cooperative Extension Service is the most effective means of disseminating research based information to wheat producers. OCES reaches 65% of wheat producers with wheat production information.

13) A weekly crop bulletin would be well received by Oklahoma wheat producers if it was made available at no cost.

Recommendations

The following recommendations for the Wheat Working Group were developed from the conclusions of the study:

1) Extension educators and specialists should consider that a significant proportion, 34.2 %, of Oklahoma wheat producers have off-farm jobs. This growing group of producers are, on average, younger and better educated that the average wheat farmer. The characteristics of this group should be considered when scheduling and developing targeted educational programs for these wheat producers.

2) Ninety percent of Oklahoma wheat producers receive government commodity program payments. Researchers and specialists should consider potential changes in the structure of those payments and the impact on Oklahoma wheat producers and production practices.

3) Most wheat producers indicated that both long- and short-term loans were regularly taken out to cover production expenses, land, and equipment needs. Researchers and extension educators should consider interest rates and the potential return on investment when making recommendations about wheat production practices. Producers are more receptive to incremental changes that delay capital investments, are carried out over a number of seasons, or practices that can be implemented on a trial basis (Rogers, 1995).

4) Given the heavy reliance on long- and short-term loans among Oklahoma wheat producers found in this study, agricultural lenders have a significant impact on the adoption of new practices. Agricultural lenders should be targeted for dissemination of research findings. Providing research results and information on the latest practices and their benefits will facilitate lending policies that promote sound and profitable production practices.

5) Most wheat producers, 93.0% of the respondents, were cattle producers as well as wheat producers. The WWG should make the beef-on-wheat production system the first priority in wheat research, education, and extension programs in Oklahoma.

6) Many respondents, 44.0%, did not consider their participation in the wheat check-off program to be a good investment. This is a voluntary program where participants can ask for a refund and over 20% do. A strong effort should be made to raise awareness of the benefits of the program among wheat producers by demonstrating how the funds are used to help producers. For example presentations, meetings, and field days are all opportunities to discuss how OSU is using their check-off dollars fund research that generates a greater impact for the farmer through research and education programs.

7) Weeds were consistently cited as the most serious production problem faced by the respondents. The control of weeds in wheat, particularly, cheat grass and field bindweed should continue to be a research and education priority at OSU.

8) Given the importance of economics in decisions about wheat production, researchers and educators should continue to consider the costs and benefits of

new production options and present their recommendations in economic terms whenever possible.

9) Knowing that this population prefers to receive information through personal contacts, researchers and educators should communicate research findings through farm-related businesses and opinion leaders who will implement innovations for others to observe. The best way to get information to people is to put that information where they tend to look for it (Pounds, 1985).

10) The WWG should disseminate research finding in publications such as *The Progressive Farmer, The Oklahoma Farmer Stockman,* and *The High Plains Journal.*

11) The finding that ten percent of the respondents did not know about extension programs and that 14.0 % thought that better information was available from other sources indicates a need to raise awareness of OCES and the quality of their education programs. Extension educators and specialists should develop effective marketing strategies for raising awareness among these potential clients.

Implications

1) The major implication of this study for the WWG faculty was the importance of the beef-on-wheat production system in Oklahoma. Beef is driving much of the wheat production in the state. Farmers and ranchers are selling land, labor, capital, and management by proxy through wheat sales. However, low prices on the wheat market combined with rising costs for inputs make supplementing returns from wheat production a necessity. In Oklahoma there is not enough precipitation in

the summer months to double crop wheat with corn, soybeans, or other crops. In order to compete with farmers in other regions Oklahoma producers are grazing cattle on winter wheat (Kim Anderson, personal communication, March 6, 2003). The economic importance of cattle in wheat production system in Oklahoma demonstrates the need to reconceptualize what a wheat operation is in Oklahoma. The implication of this finding for the Wheat Working Group (WWG) is the need to adjust their priorities from topics like hard white wheat to duel purpose varieties that better serve the needs of the beef-on-wheat producer.

2) The conclusions of this study also imply other changes, such as expanding the membership of the WWG to include expertise in cattle production and agricultural economics, should be considered by the group to help refocus the program at OSU.

3) The findings of this study also have implications for the Oklahoma Cooperative Extension Service (OCES). It was concluded that extension continues to be the best link between OSU researchers and wheat producers. However, the conclusion that clients prefer grater contact with extension (Kelsey, Pense, & Mariger, 2001; Obahayujie & Hillison, 1988) implies that OCES agents and specialists are not getting enough contact with wheat producers.

4) The expressed need for demonstrations of wheat practices, particularly in the area of beef-on-wheat production practices and the control of cheat grass and field bindweed, should be a priority for OCES. Oklahoma wheat producers appear to function as what Rogers (1995) calls late majority adopters. The implication is that this group must see their peers using a new technology or practice before they

will seriously consider adopting it. The findings of this study should be noted by extension administrators when making decisions about the staffing, structure, and priorities of OCES.

Recommendations for Further Study

The following recommendations for further research were based on the questions raised by the findings of the study:

1) This study was a relatively simple and cost effective method to collect input from a large cross-section of stakeholders. In order to maintain prolonged engagement with stakeholders, the Wheat Working Group (WWG) faculty should repeat the study at regular intervals.

2) This study was effective in meeting the specified objectives and purpose proposed to the WWG. Collecting stakeholder input helps ensure that research, extension, and education programs are responsive to the needs of their target audiences (Dyer, Miller, Leval, & Bird, 1999). The basic model for collecting stakeholder input presented in this study should be implemented in other academic units at land-grant universities.

3) It is thought that much of the information available on wheat production in the southern plains of the United States that is available from sources other than OCES or OSU, originated from research conducted at Oklahoma State University (Gene Krenzer, personal communication March 8, 2002). This fact should be tested through a through content analysis of "non-OSU" wheat production information available in the region. The list of publications to be analyzed should

include; *The High Plains Journal, The Oklahoma Farmer Stockman, The Progressive Farmer*, and *The Southwest Farm Press*.

4) Further research is needed in the area of production trends among wheat producers in Oklahoma. The finding that 93% of the wheat producers in Oklahoma are also cattle producers raises the question of whether Oklahoma wheat producers are raising wheat for forage for cattle, or raising cattle to take advantage of winter forage from their wheat crop. The central question is what is more important beef or grain? It has been stated that the future trend will be towards forage and eventually very little wheat will be harvested for grain (James White, personal communication, February 27, 2003). Future research should focus on answering the question of the importance of wheat for grain and the future of wheat grain versus wheat forage in Oklahoma.

REFERENCES

Agricultural Research, Extension and Education Reform Act of 1998, Pub. L. No. 105-185, 7 USC 7601, 112 Stat. 523 (1998). [available: www.reeusda.gov/part/areera/].

Altschuld, J. W. & Zheng, H. Y. (1995). Assessing the effectiveness of research organizations: An examination of multiple approaches. *Evaluation Review, 19*(2), 197-216.

American Psychological Association. (1994). *Publication Manual of the American Psychological Association*. (4th ed.). Washington, DC: American Psychological Association.

Ary, D., Jacobs, L., & Razavieh, A. (1996). *Introduction to research in education.* (5th ed.). Ft. Worth: Holt, Rinehart, and Winston, Inc.

Astroth, K. A. (2000). Justin S. Morrill - father of the land-grant colleges: a book review. *Journal of Extension 38*(5). Available: www.joe.org

Babiuch, W. M, & Farhar, B. C. (1994). *Stakeholder analysis methodologies resource book.* Golden, CO: National Renewable Energy Laboratory.

Boyer, E. L. (1990). *Scholarship reconsidered: priorities of the professorate.* Special report. Princeton, NJ: The Carnegie Foundation for the Advancement of Teaching.

Brookfield, S, D., (1986) *Understanding and facilitating adult learning.* San Francisco: Jossey-Bass Publishers.

Campbell, J. (2001) *Elementary statistical methods in education: REMS 5953 course notes.* Stillwater, OK: Oklahoma State University.

Checkoway, B. (2001) Renewing the civic mission of the American research university. *The Journal of Higher Education 72*(2). p125-146.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.) Hillsdale, NJ: Lawrence Erlbaum Associates.

Creswell, J. W. (1994). *Research design qualitative and quantitative approaches.* Thousand Oaks, CA: Sage Publications.

Dillman, D. A. (1978). *Mail and telephone surveys: The total design method.* New York: Wiley.

Dillman, D. A. (2000). *Mail and internet surveys: The tailored design method.* New York: Wiley and Sons.

Dyer, James., Miller, Robert., Leval, Kim., & Bird, Elizabeth., (1999*). In the eye of the stakeholder; who sits at the agricultural research decision-making table?.* Available [On-line] http://www.csare.org/dyer.htm

Eddy, E.D., (1957). *Colleges for our land and time: the land-grant idea in American education.* New York, NY: Harper and Brothers.

Greene, J. G. (1988). Stakeholder participation and utilization in program evaluation. *Evaluation Review, 12*(2), 91-116.

Guba, E. G., & Lincoln, Y. S. (1989). *Fourth generation evaluation.* Newbury Park, CA: Sage Publications.

Herren, R. V., & Edwards, M. C. (2002) Whence we came: The land-grant tradition - origin, evolution and implications for the 21st century. *Journal of Agricultural Education 43*(4). [In Press].

Herren, R. V., & Hillison, J. (1996). Agricultural education and the 1862 land-grant institutions: the rest of the story. *Journal of Agricultural Education 37*(2). 26-32.

Hillison, J. (1996). Agricultural education and cooperative extension: the early agreements. *Journal of Agricultural Education 37*(1). 9-14

Hurst, P. J. (1994). *Enhancing strategic planning through campus surveys. AIR annual forum paper.* (Report No. HE027637) Paper presented at the 34th annual forum of the association for institutional research. New Orleans, LA. May 29. (ERIC Document Reproduction Service No. ED373651).

Kellogg, C. E., & Knapp, D. C. (1966). *The college of agriculture: science in the public service.* New York, McGraw-Hill.

Kelsey, K.D., Mariger, S.C. & Pense, S. L., (2001) Serving stakeholders at a land-grant university: Forestry professors present their view ten years after Boyer. *Journal of Southern Agricultural Education Research. (50)*2.

Kelsey, K. D., & Pense, S. (2001). A Model for Gathering Stakeholder Input for Setting Research Priorities at the Land Grant University. *Journal of Southern Agricultural Education Research. (50)*2.

Keppel, G., (1991) *Design and analysis a researcher's handbook.* (3rd ed). Upper Saddle River, NJ: Prentice Hall.

Kerlinger, F. N., (1986) *Foundations of behavioral research* (3rd ed.). Fort Worth: Holt, Reinhart and Winston, Inc.

Kerr, W. J. (1931) *The spirit of land-grant institutions.* Paper presented at the 45th annual convention of the association of land-grant colleges and universities, Chicago, Ill.

Krejcie, R. V., & Morgan, D. W. (1970). *Educational and psychological measurement.* Danville, IL: Interstate Printers and Publishers.

Lechtenbert, V.L. (1998). *Priorities for agricultural research, education, and economics: Advice to USDA for FY 2000 budget.* Washington, D.C.: National Agricultural Research, Extension, Education, and Economics Advisory Board.

Leedy, P., D., Newby, T., J, & Ertmer P., A. (1997). *Practical research planning and design.* (6th ed.). Upper Saddle River, New Jersey: Merrill.

Linder, J. R, Murphy, T. H, & Briers, G. E, (2001) *The handling of nonresponse error in agricultural education*_NAERC 2001 New Orleans La.

Lowry, R. (2002) *VasserStats* Web-site Available [On-line] http://faculty.vassar.edu/lowry/VassarStats.html

Marcus, A. I. (1986) The ivory silo: farmer-agricultural college tensions in the 1870s and 1880s. *Agricultural History 60*(2).

Mariger, S.C. (2000). *Determining the agricultural health and safety needs of Utah farmers and ranchers based on a survey of Utah farm bureau members.* Utah State University, Logan, UT. Unpublished Masters Thesis.

Martin, K. (1998). Scholarship revisited. *Issues of teaching and learning newsletter issue 0298.* Available [On-line] http://www.csd.uwa.edu.au/newsletter/issue0298/.

Marsh, G. R., (1996) *Textbook of geriatric psychiatry.* Washington D.C.: American Psychiatric Press.

Mason, R. D. (1986) *Statistical techniques in Business and economics.* (6th ed) Homewood, IL: Irwin Publishing.

Merriam, S. B., & Caffarella, R. S., (1999) *Learning in adulthood: a comprehensive guide* (2 ed.). San Francisco: Jossey-Bass Publishers.

Meyer, James, H. (1993) The stalemate in food and agricultural research, teaching, and extension. *Science 260.* 881&1007.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook.* (2 ed.). London: Sage Publications.

Miller, L. E., & Smith, K. L. (1983). Handling nonresponse issues. *Journal of Extension, 21* (5), 45-50

Obahayujie, J., & Hillison, J. (1988). Now hear this. *Journal of Extension 26*(2) [On-line] Available: www.joe.org

Patton, M.Q. (1985). Extension excellence in the information age. *Journal of Extension 23* (2), [On-line]. Available: www.joe.org

Pedhazur, E. J. (1997) *Multiple regression in behavioral research explanation and prediction.* (3rd ed) New York: Harcourt Brace College Publishers.

Peters, S. J. (2002). Rousing the people on the land: the roots of educational organizing tradition in extension work. *Journal of Extension. 40.* (3) [On-line]. Available: www.joe.org

Pounds, D. (1985). Putting extension information where people will find it. *Journal of Extension 23*(4) [On-line]. Available: www.joe.org

Rea, L. M, & Parker, R. A. (1992). *Designing and conducting survey research.* San Francisco: Jossey-Bass.

Reineke, R. A. (1991). Stakeholder involvement in evaluation: suggestions for practice. *Evaluation Practice 12*(1), 39-44.

Rogers, E. M. (1995) *Diffusion of innovations.* (4th ed) New York: The Free Press.

Rogers, E. M., & Beal, G. M., (1958) *Reference group influence in the adoption of agricultural technology.* Ames, Iowa State University.

Rubin, H.J., & Rubin, I.S. (1995) *Qualitative interviewing: the art of hearing data.* Thousand Oaks, CA: Sage Publications.

Sallant, P., & Dillman, D. A. (1994) *How to conduct your own survey.* New York: John Wiley & Sons, Inc.

Seevers, Graham, Gamon, & Conklin. (1997). *Education Through Cooperative Extension.* Delmar Publishers, Albany NY.

Siegel, S. (1956) *Nonparametric statistics for the behavioral sciences.* New York: McGraw-Hill.

Smith, S.H. (1998). *Extending Justin Morrill's vision for the 21st century: Access, innovation, technology, and student learning experience.* United States Department of Agriculture, Higher Education Programs, Justin Smith Morrill Memorial Lecture. [On-line] http://www/reeusda.gov/serd/hep/morrill98.htm

SPSS 8.0, (1997). *SPSS 8.0 graduate pack for windows* [Computer Program] Chicago, Ill: SPSS Inc.

Steel, R. D., Torrie, J. H., & Dickey, D. A. (1997). *Principles and procedures of statistics a biometrical approach.* (3rd ed) New York: McGraw-Hill.

Stevens, J., (2002) *Applied multivariate statistics for the social sciences.* (4th ed). Mahwah, NJ: Lawrence Earlbaum Associates, Publishers.

Sutphin, C. M. & Hillison, J. (1999). History of extension work in Virginia prier to smith-lever. *Journal of Extension 37*(6). [On-line]. Available: www.joe.org

Thomas, P., & Palfrey, C. (1996) Evaluation: stakeholder-focused criteria. *Social Policy and Administration 30*(2) 125-142.

Taylor, H. (1997) No more ivory towers: connecting the research university to the community. *Journal of Planning Literature 11*(3). 327-332.

Warmbrod, R., J. (2001) Conducting, interpreting, and reporting quantitative research. Research pre-session NAERC 2001 New Orleans La.

Warner, M. E., Hinrichs, C., Schneyer, J., & Joyce, L. (1998). From knowledge extended to knowledge created: challenges for a new extension paradigm. *Journal of Extension. 36.* (4) [On-line]. Available: www.joe.org

Weiser, C. J. (1997) Faculty scholarship and productivity expectations: an administrator's perspective. *HortScience, 32.*(1) p 37-39.

Wiersma, W. (2000). *Research methods in education an introduction.* (7th ed). Needham Heights, MA: Allyn & Bacon.

Woods, M. D. (2001). *An analysis of institutional engagement: perceptions of faculty, staff and administration in the college of agriculture at Iowa state university.* Unpublished doctoral dissertation, Iowa State University.

APPENDICES

APPENDIX A

IRB APPROVAL

Oklahoma State University
Institutional Review Board

Protocol Expires: 5/22/2002

Date : Wednesday, January 15, 2003 IRB Application No AG0138

Proposal Title: A MODEL FOR IMPLEMENTING STAKEHOLDER INPUT INTO DIVISION OF AGRICULTURAL SCIENCES AND NATURAL RESOURCE RESEARCH PRIORITY SETTING ACTIVITIES

Principal Investigator(s) :

Kathleen Kelsey
466 Ag Hall
Stillwater, OK 74078

Stanley Mariger
464 Ag Hall
Stillwater, OK 74078

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s) : Approved **Modification**

Please note that the protocol expires on the following date which is one year from the date of the approval of the original protocol:

Protocol Expires: 5/22/2002

Signature

Carol Olson, Director of University Research Compliance

Wednesday, January 15, 2003
Date

Approvals are valid for one calendar year, after which time a request for continuation must be submitted. Any modifications to the research project approved by the IRB must be submitted for approval with the advisor's signature. The IRB office MUST be notified in writing when a project is complete. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board.

APPENDIX B

SURVEY INSTRUMENT

Wheat Producer Survey

Directions: Please answer the following questions by circling or checking the most accurate response.

1) Do you plant wheat? Yes No

2) Is wheat planted on farmland you own? Yes No

3) Are you actively involved in the management of wheat production? Yes No

Part 1: Communication with Oklahoma State University

4) Are you a graduate of Oklahoma State University? Yes No

5) Have your parents or children attended Oklahoma State University? Yes No

6) Do you serve on an advisory board or steering committee for OSU or County Extension? Please list the committees or boards you serve on: Yes No

_____

7) Do you cooperate in research activities with OSU? Please list research activities: Yes No

_____

8) Do you communicate directly with OSU faculty members? Please list your contact person: Yes No

_____

9) Is there a reason for not using the Oklahoma Cooperative Extension Service to help you solve your wheat production problems? (Please check all that apply)

Extension agent is too busy [ ]
Extension agent is not a wheat specialist [ ]
Extension information is out of date [ ]
Extension is unresponsive to my needs [ ]
Extension is slow to provide answers [ ]
Better information available elsewhere [ ]
I don't know about Extension services [ ]
I do use extension [ ]
Other reason (please specify):

_____

10) Would a weekly bulletin on crop production issues be helpful to you? Yes No

11) How could communication between you and OSU be improved?

(Please write your answer here)

Next page ⇒

Part 2: Wheat Production Operation, Problems, Decisions, and Sources of Information

12) How many acres of wheat did you plant in the 2000-2001 season? _____Acres

13) Is wheat production your principle agricultural enterprise? Yes No

14) Do you plant any other crops besides wheat? (Please check all that apply)

Alfalfa	[ ]	Rye	[ ]
Barley	[ ]	Sorghum	[ ]
Corn	[ ]	Soybeans	[ ]
Cotton	[ ]	Sudan grass	[ ]
Nursery/Greenhouse	[ ]	Watermelons	[ ]
Oats	[ ]	None	[ ]
Oilseed crops	[ ]	Other crop (Please list):	
Other hay	[ ]		
Peaches	[ ]	_____	
Peanuts	[ ]		

15) Do you raise livestock? (Please check all that apply)

Bee colonies	[ ]	Hogs & pigs	[ ]
Cattle (cow calf)	[ ]	Sheep & lambs	[ ]
Cattle (stocker)	[ ]	Turkeys	[ ]
Cattle (dairy)	[ ]	None	[ ]
Chickens	[ ]	Other livestock (Please list):	
Emus/Ostriches/Rheas	[ ]		
Equine (horses, mules, etc)	[ ]	_____	
Fish	[ ]		
Goats	[ ]		

16) Do you belong to any agricultural organizations? (Please check all that apply)

Grain cooperative	[ ]	OK Grain and Stockers Association	[ ]
Grange	[ ]	OK Wheat Growers Association	[ ]
OK Cattlemen's Association	[ ]	None	[ ]
OK Crop Improvement Association	[ ]	Other organization (Please list):	
Oklahoma Farm Bureau	[ ]		
Oklahoma Farmers' Union	[ ]	_____	
OK Feed & Seed Trade Association	[ ]		

Next page ⇒

17) What are your major wheat production problems? (Please circle the most appropriate response at the right)		Not a problem	Less serious	Serious	Very serious
Grazing	Grazing tolerance (low grain yield after grazing)	NP	LS	S	VS
	Forage production	NP	LS	S	VS
	Other (list please):	NP	LS	S	VS
Wheat Diseases	Barley yellow dwarf virus	NP	LS	S	VS
	Bunts and smuts	NP	LS	S	VS
	Soil-borne mosaic virus	NP	LS	S	VS
	Wheat streak virus	NP	LS	S	VS
	Wheat rusts	NP	LS	S	VS
	Powdery mildew	NP	LS	S	VS
	Tan spot	NP	LS	S	VS
	Septoria leaf blotch	NP	LS	S	VS
	Root rot	NP	LS	S	VS
	Strawbreaker	NP	LS	S	VS
	Other (please list):	NP	LS	S	VS
Insect pests	Greenbugs	NP	LS	S	VS
	Bird cherry-oat aphid	NP	LS	S	VS
	Russian wheat aphid	NP	LS	S	VS
	Armyworm	NP	LS	S	VS
	Army cutworm	NP	LS	S	VS
	Fall armyworm	NP	LS	S	VS
	Mites	NP	LS	S	VS
	Nematodes	NP	LS	S	VS
	Other (please list):	NP	LS	S	VS
Weeds	Cheat grass (and other Brome species)	NP	LS	S	VS
	Wild oat	NP	LS	S	VS
	Jointed goat grass	NP	LS	S	VS
	Ryegrass	NP	LS	S	VS
	Rye	NP	LS	S	VS
	Field bindweed	NP	LS	S	VS
	Wild buckwheat	NP	LS	S	VS
	Mustards	NP	LS	S	VS
	Other (please list):	NP	LS	S	VS
Grain Quality	Low protein	NP	LS	S	VS
	High dockage	NP	LS	S	VS
	Low grain test weight	NP	LS	S	VS
	Sprouting in the head	NP	LS	S	VS
	Other (please list):	NP	LS	S	VS

17) Continued What are your major wheat production problems? (Please circle the most appropriate response at the right)		Not a problem	Less serious	Serious	Very serious
Soil fertility	Phosphorus	NP	LS	S	VS
	Nitrogen	NP	LS	S	VS
	Potassium	NP	LS	S	VS
	Low pH (Acid soil)	NP	LS	S	VS
	Other (please list):	NP	LS	S	VS
Other	Low grain yield	NP	LS	S	VS
	Poor stand establishment	NP	LS	S	VS
	Shattering	NP	LS	S	VS
	Drought	NP	LS	S	VS
	Lodging	NP	LS	S	VS

18) Of the following problem categories, which cause you the greatest concern (please check only one)?

Grazing [ ]
Grain quality [ ]
Insect pests [ ]
Soil fertility [ ]
Weeds [ ]
Wheat Diseases [ ]
Other (please list):

_____

19) What factors are important to you when making decisions about farming practices? (Please circle the most appropriate response at the right)		Important		
		Not at all	Somewhat	Very
a.	Maximizing yield	NI	SI	VI
b.	Long term sustainability	NI	SI	VI
c.	Cost of inputs	NI	SI	VI
d.	Availability of government commodity program funds	NI	SI	VI
e.	Availability of crop insurance	NI	SI	VI
f.	Availability of credit (interest rate)	NI	SI	VI
g.	Maximizing income	NI	SI	VI
h.	Minimizing costs	NI	SI	VI
i.	Commodity prices	NI	SI	VI
j.	Terms of lease/agreement with land owner	NI	SI	VI
k.	Other: Please list	NI	SI	VI

Next page ⇒

20) What sources of agricultural information do you use to solve your wheat production problems? (Please circle the most appropriate response at the right)	Frequency			
	Always	Frequently	Sometimes	Not at all
a. Oklahoma Cooperative Extension Service (OSU Extension)	A	F	S	N
b. OSU Publications	A	F	S	N
c. Non Extension OSU Staff or Faculty	A	F	S	N
d. Nobel Foundation	A	F	S	N
e. Other Universities	A	F	S	N
f. Trade/Technical journals/Newsletters	A	F	S	N
g. Scientific journals	A	F	S	N
h. Friends/Family/ Other farmers	A	F	S	N
i. News papers	A	F	S	N
j. TV/Radio	A	F	S	N
k. Government agencies	A	F	S	N
l. Farm organizations	A	F	S	N
m. Businesses, seed suppliers, equipment dealers, and chemical dealers, etc.	A	F	S	N
n. Private consultants/Crop advisors	A	F	S	N
o. The Internet	A	F	S	N
p. Public library	A	F	S	N
q. None of the above	A	F	S	N

21) Please list the three publications you use most often to find wheat production information:

a) _____

b) _____

c) _____

22) Please list three sources of wheat information that you use most often other than publications:

a) _____

b) _____

c) _____

Next page ⇒

Part 3: Post Harvest Dormancy and Grazing Termination

Directions: The following questions will help the OSU Extension Service evaluate its education programs regarding *post harvest dormancy* and *grazing termination*. Please answer the following questions by circling the most appropriate response or by filling in the blank.

23) How long have you been producing wheat in OK?		Years
24) Wheat planted for grain only	Acres	Date planted
25) Wheat planted for forage only	Acres	Date planted
26) Wheat planted for forage plus grain	Acres	Date planted
27) What stocking rate did you use on wheat during the winter of 2000-2001:		Head/Acre
28) What stocking rate did you use on wheat during the winter of 1999-2000:		Head/Acre
29) Did you harvest grain from the grazed fields last year?	Yes	No
30) How did you determine when to terminate grazing on your wheat fields that you harvested for grain?		
31) How well can you explain what "post-harvest dormancy" means (circle one)?	Very well - Partially - Not at all	
32) How well can you explain how to determine first hollow stem (circle one)?	Very well - Partially - Not at all	
33) List the wheat varieties you avoid planting because of post-harvest dormancy:	1. 2. 3.	
34) Does it matter if you look at grazed or ungrazed wheat when determining first hollow stem?	Yes	No
35) Do varieties differ in when they reach first hollow stem?	Yes	No
36) How much does it decrease yield per acre if you leave the cattle grazing two weeks past first hollow stem on wheat to be harvested for grain? (circle one):	10% 20% 30% 40% 50% More than 50%	

Next page ⇒

Part 4: Hard White Wheat

37) Have you ever planted a hard white wheat variety in the past? Yes No

38) Do you plan to produce hard white wheat in the next five years? Yes No

39) What are the problems associated with hard white wheat that prevent you from producing it? (Please check all that apply)

Disease resistance	[ ]	Low Yield	[ ]
Lack of adapted varieties	[ ]	Sprouting in the head	[ ]
Lack of economic incentives	[ ]	Other (Please list):	
Lack of information	[ ]		
Lack of a local market	[ ]	_____	

Part 5: Demographic Information

40) Age:_____ Years 41) Female [ ] Male [ ]

42) My farm operation is located in: _____County, OK

43) I consider myself:

White, non-Hispanic	[ ]	Asian	[ ]
Hispanic	[ ]	Pacific Islander	[ ]
Native American (American Indian)	[ ]	Bi-racial	[ ]
Black, African American	[ ]	Other (please specify):	

44) Is farming your primary source of income? Yes No

45) Are you employed off the farm? Yes No

46) How many hours per week do you spend farming? _____
Hours

47) Education:

Grade school (K-8)	[ ]	Some graduate school	[ ]
Some high school (9-12)	[ ]	Masters degree (M.S., M.A., M.Ag.)	[ ]
High school diploma or GED	[ ]	Doctoral degree (Ph.D. or Ed.D.)	[ ]
Some college	[ ]	Other degree (specify)	
Associates degree	[ ]		
Baccalaureate degree	[ ]	_____	

48) Are you planning on expanding your agricultural operation in the next five years? Yes No

49) Are you planning on retiring from farming in the next five years? Yes No

50) In a typical year do you collect government farm payments? Yes No

Next page ⇒

51) Does your farm regularly require short-term loans to cover operating expenses? Yes No

52) Does your farm operation have any long-term loans to cover land or equipment? Yes No

53) How often do you buy crop insurance for wheat? Always Sometimes Never

54) If you buy crop insurance what is your principle reason? Required by lender Reduce your risk

55) Do you collect on crop insurance policies? Yes No

56) Do you believe that your wheat check-off dollars are a good investment? Yes No

57) Which of the following arrangements most accurately describes your operation? (Check only one)

Corporation [ ]
Individual (operate by yourself) [ ]
Landlord only [ ]
Managed (you are a hired manager)[ ]
Partnership [ ]
Sold or turned over to another person [ ]
Other (Please list):

58) Of the land that you farm, what percent do you own? _____%

Thank you for your valuable time!

Please return the survey in the enclosed postage paid envelope. Your responses will impact how OSU serves stakeholders in the future by informing faculty of your needs for information and educational programs.

If you would like a copy of the findings from this study please send a postcard or email with the message "Wheat Stakeholder Study" and your mailing address to:

Dr. Kathleen D. Kelsey
Oklahoma State University
466 Agricultural Hall
Stillwater, OK 74078
(405) 744-5129
kelseyk@okstate.edu

Results can be expected by June 2002.

APPENDIX C

FIRST MAILING COVER LETTER

July 20, 2001

Dear Oklahoma Wheat Producer:

We are conducting a study that will help the OSU Wheat Improvement Team better understand your needs for research and information as a wheat producer.

It is our pleasure to invite you to participate in this important study. You are one of only a small number of randomly selected people that are being asked to fill out the enclosed survey. Filling out this survey will ensure that OSU researchers and extension faculty are adequately serving wheat farmers across Oklahoma.

The information gathered will be used to plan future research and educational programs that address your wheat production problems and concerns. Please be assured that your responses are completely confidential, that your participation is strictly voluntary, and that there will be no harmful effects caused by participating in this study. The data will be collected using code numbers that cannot be traced back to you so your privacy is protected.

We know that you are busy and that your time is valuable; however, the information you provide is very important and will make a difference in the way Oklahoma State University serves you in the future.

Pilot testing indicated that it should take you about 15 minutes to complete the survey. If you have questions about the study or need assistance in completing your survey please call or email us. Thank you in advance for your cooperation!

Sincerely,

Christian Mariger
Research Associate
(405) 744-6942
mariger@okstate.edu

Dr. Kathleen Kelsey
Project Director
(405) 744-5129
kelseyk@okstate.edu

APPENDEX D

SECOND MAILING COVER LETTER

September 13, 2001

Dear Oklahoma Wheat Producer:

If you have already mailed in your survey, **Thank You**! We appreciate your time.

If not, won't you please take a few minutes to answer the questions on the enclosed survey so that the Wheat Improvement Team from Oklahoma State University can better understand your needs for wheat production information and service?

You are one of only a small number of randomly selected farmers who are being asked to fill out the enclosed survey. Your voice counts! By filling out the survey you will help OSU researchers and Extension faculty to better serve all wheat farmers in Oklahoma.

The information gathered will be used to plan future research and educational programs that address your wheat production problems and concerns. Please rest assured your responses are **completely confidential**, that your **participation is strictly voluntary**, and that there will be **no harmful effects** caused by participating in this study. The data will be collected using code numbers that cannot be traced back to you so your **privacy is protected.**

If you have questions about the study or need assistance in completing the survey please call or email us. Thank you in advance for you cooperation

Sincerely,

Christian Mariger
Research Associate
(405) 744-6942
mariger@okstate.edu

Dr. Kathleen D. Kelsey
Project Director
(405) 744-5129
kelseyk@okstate.edu

APPENDIX E

REMINDER POST CARD

Dear Oklahoma wheat producer:

Last week, a questionnaire seeking your opinion regarding your wheat production information needs was mailed to you. You were one of a small number of wheat producers selected to participate in this study.

If you have completed and returned the questionnaire, please accept our sincere thanks. If you have not filled out your questionnaire please take a few minutes to complete and return it today. We are especially grateful for your help. We believe that your responses will be very useful to OSU wheat researchers in improving their services.

If you did not receive the survey, or you have any questions about this study, please call (405) 744-6942 or email me at mariger@okstate.edu I will be happy to send you another survey or answer your questions.

Sincerely,

S. Christian Mariger
Research Associate

Kathleen D. Kelsey
Assistant Professor

APPENDIX F

TELEPHONE INSTRUMENT FOR NONRESPONDENTS

Code #_____

Wheat Producer Survey

Part 1: Relationship to wheat production

1) Do you plant wheat? Yes No

2) Is wheat planted on farmland you own? Yes No

3) Are you actively involved in the management of wheat production? Yes No

Note: if a respondent answers yes to any one of the above questions please continue on to the rest of the survey!

Part 2: Wheat Production Problems and Decisions

4) How many acres of wheat did you plant in the 2000-2001 season? _____Acres

5) What factors are important to you when making decisions about farming practices? (Please circle the most appropriate response at the right)	Important		
	Not at all	Somewhat	Very
l. Maximizing yield	NI	SI	VI
m. Long term sustainability	NI	SI	VI
n. Cost of inputs	NI	SI	VI
o. Availability of government commodity program funds	NI	SI	VI
p. Availability of crop insurance	NI	SI	VI
q. Availability of credit (interest rate)	NI	SI	VI
r. Maximizing income	NI	SI	VI
s. Minimizing costs	NI	SI	VI
t. Commodity prices	NI	SI	VI
u. Terms of lease/agreement with land owner	NI	SI	VI
v. Other: Please list	NI	SI	VI

6) Of the following problem categories, which cause you the greatest concern (please check only one)

Grazing	[ ]
Grain quality	[ ]
Insect pests	[ ]
Soil fertility	[ ]
Weeds	[ ]
Wheat Diseases	[ ]

Other (please list):_____

Part 5: Demographic Information

7) Age: _____ Years 8) Female [ ] Male [ ]

9) I consider myself:

White, non-Hispanic	[ ]
Hispanic	[ ]
Native American (American Indian)	[ ]
Black, African American	[ ]
Asian	[ ]
Pacific Islander	[ ]
Bi-racial	[ ]

Other (please specify): _____

10) Education:

Grade school (K-8)	[ ]
Some high school (9-12)	[ ]
High school diploma or GED	[ ]
Some college	[ ]
Associates degree	[ ]
Baccalaureate degree	[ ]
Some graduate school	[ ]
Masters degree (M.S., M.A., M.Ag.)	[ ]
Doctoral degree (Ph.D. or Ed.D.)	[ ]

Other degree (specify)_____

#2

VITA

Stanley Christian Mariger

Candidate for the Degree of

Doctor of Philosophy

Dissertation: DETERMINING THE RESEARCH, EDUCATION, AND EXTENSION NEEDS OF OKLAHOMA WHEAT PRODUCERS

Major Field: Agricultural Education

Biographical:

Personal Data: Born in Salt Lake City, Utah On December 21, 1967, the son of Stanley G. and Barbara A. Mariger.

Education: Graduated from Perkiomen School, Pennsburg, Pennsylvania in May 1986; received a Bachelor of Science degree in Business Management from Saint Vincent College, Latrobe, Pennsylvania in August 1991. Received a second Bachelor of Science degree in Range Science and a Master of Science in Agricultural Systems from Utah State University, Logan Utah, in May 1996 and May 2000, respectively. Completed the requirements for the Doctor of Philosophy degree with a major in Agricultural Education at Oklahoma State University in May, 2003.

Experience: Worked in the automotive and agricultural equipment industries as a mechanic, service writer, and parts manager in Maryland, Washington D.C. and Utah. Worked in cattle and small grain production in Utah and Idaho. Employed by Utah State University as a lab technician and then as a research assistant. Employed by Oklahoma State University, Department of Agricultural Education, Communications, and 4-H Youth Development as a research associate, 2000 to 2003.

Professional Memberships: Society for Range Management, American Association of Agricultural Education, Association of International Agricultural and Extension Education, American Evaluation Association.