PERCEPTIONS OF

CONSERVATION RESERVE PROGRAM PARTICIPANTS TO

ENVIRONMENTAL QUALITY IN THE OKLAHOMA PANHANDLE

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LIST OF FIGURES

1.1: Dust Bowl in Oklahoma Panhandle 2

1.2:Map of Oklahoma showing CRP program activity between 1992 and 2002 5

1.3: Total enrollments in the Conservation Reserve Program in acres by county in February 2003 5

1.4: Map of Oklahoma showing the Panhandle region 8

3.1: Informative research analysis template 27

3.2: Informative research analysis outline for proposed study 28

3.3: Screenshot of Survey Logfile 33

4.1: Pie Chart showing percentage distribution of CRP land ownership 35

4.2: Pie Chart showing re-enrollment preferences 36

4.3: Bar chart showing vegetation ownership in CRP farmland 37

4.4: Pie chart showing age groups of CRP participants 39

4.5: Bar Chart showing Level of Educational Attainment 40

4.6: Bar Chart showing soil erosion preference among CRP participants 42

4.7: Bar chart showing re-enrollment preferences towards air quality 43

4.8: Bar Chart showing Preference Towards Improved Water Quality 45

4.9: Bar Chart showing preference to changes in wildlife population 46

4.10: Bar Chart showing preference to improved scenic quality of farmland 48

4.11: Bar Chart showing preference towards future income potential 49

4.12: Stacked bar chart showing USDA's attention to environment and CRP participant's perceptions 50

5.1:Water guzzler used on a CRP farmland in Texas County 71

LIST OF TABLES

1.1: Annual CRP payments in Oklahoma 9

4.1: Ownership types of CRP farmlands..... 35

4.2: CRP Re-enrollment preferences 36

4.3: Vegetation type of CRP farmland..... 37

4.4: Age Groups of CRP Participants 38

4.5: Education Levels of CRP Farmers in Oklahoma Panhandle 40

4.6: Number of Farmers Ranking the Environmental Benefits 41

4.7: Re-enrollment preferences towards control of soil erosion 42

4.8: Re-enrollment preference and Improvement in Air Quality..... 44

4.10: Re-enrollment and Wildlife Habitat improvement 46

4.11: Re-enrollment and improvement in Scenic Quality of Farmland..... 47

4.12: Re-Enrollment preference and future income potential..... 48

4.13: Perceptions of CRP Participants to USDA's environmental attention 49

4.14: CRP Participants perceiving adequacy in attention from USDA on environmental benefits..... 51

4.15: CRP Participants perceiving more than adequate attention from USDA on environmental benefits..... 52

4.16: CRP Participants perceiving inadequate attention from USDA on environmental benefits 53
4.17: CRP Land Ownership comparing National Survey 55
4.18: Ownership of CRP acres comparing National Survey 55
4.19: Correlational analysis (Pearson's) between enrollment factors with Ranked CRP acres 58
4.20: Correlational analysis (Pearson's) between re-enrollment factors with Ranked CRP acres 59
4.21: Correlational analysis (Pearson's) between enrollment factors with ranked CRP Years 61
4.22: Correlational analysis (Pearson's) between re-enrollment factors with Ranked CRP Years 62
4.23: Comments and suggestions of CRP Participants 63

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TABLE OF CONTENTS

I. INTRODUCTION 1

BACKGROUND 1
PROBLEM STATEMENT 6
PURPOSE STATEMENT 6
RESEARCH QUESTIONS 7
STUDY AREA 7
SCOPE AND ORGANIZATION OF STUDY 9

II. REVIEW OF THE LITERATURE 11

OVERVIEW 11
GEOGRAPHY OF THE OKLAHOMA PANHANDLE 11
SOIL BANK PROGRAM 12
CONSERVATION RESERVE PROGRAM 13
1990 Farm Bill 14
1996 Farm Bill 15
2002 Farm Bill 16
Conservation Reserve Program in Oklahoma 16
STUDIES ON PERCEPTION OF FARMERS 18

III. METHODOLOGY 24

OVERVIEW 24
SAMPLING PROCEDURE 24
INSTITUTIONAL REVIEW BOARD (IRB) 25
QUALITATIVE RESEARCH 25
SELECTION OF RESEARCH METHOD 26
INFORMATIVE-RESEARCH ANALYSIS 27
UNIVARIATE DESCRIPTIVE ANALYSIS 29
CONTENT ANALYSIS 29
SURVEY INSTRUMENT 30
Organization of Survey Instrument 31
Administration of the Survey 32
Survey Document Analysis 32

IV. RESULTS AND DISCUSSION 34

OVERVIEW 34
FARM OWNERSHIP 34
CRP RE-ENROLLMENT PREFERENCE 35
VEGETATION COVER 36
DEMOGRAPHIC CHARACTERISTICS 38
Age Groups 38
Level of Educational Attainment 39
ENVIRONMENTAL BENEFITS AND RE-ENROLLMENT 41
Improved Control of Soil Erosion 41
Improved Air Quality 43
Improved Water Quality 44
Positive Changes in Wildlife Populations 45
Changes in Scenic Quality of Farm or Landscape 47
Potential Future Income 48
USDA'S ATTENTION TO ENVIRONMENTAL BENEFITS 49
Concurrence in Conservation Preferences 50
COMPARISON ANALYSIS WITH NATIONAL CRP SURVEY 54
CRP Land ownership 54
CRP Acreage Type 55
STATISTICAL ANALYSIS 56
Explanation of Variables 57
Number of Acres in CRP as a Dependent Variable 58
Number of Years in CRP as a Dependent Variable 61
CONTENT ANALYSIS 63
Selected Comments 64

V. SUMMARY AND CONCLUSIONS 67

OVERVIEW 67
PARTICIPATION AND ENROLLMENT CHARACTERISTICS 67
Environmental benefits perceived by CRP participants 69
FUTURE RESEARCH RECOMMENDATIONS 72
Limitations and future scope 73
Recommendation to Policy Makers 75

REFERENCES 77

APPENDIX A. INSTITUTIONAL REVIEW BOARD APPROVAL 85

APPENDIX B. SURVEY COVER LETTER 87

APPENDIX C. SURVEY INSTRUMENT 89

CHAPTER I

INTRODUCTION

BACKGROUND

In recent past, soil erosion problem has gained attention in the Great Plains region of the United States. President Roosevelt addressed the problem energetically in the 1930s through legislation and congressional acts. This decade was marked by dust storms in Texas, Oklahoma, Colorado and Kansas which resulted in serious losses in crop and farm revenue and created massive farmer unemployment (TEP, 2005). Donald Worster comments that the Dust bowl was "*primarily the work of man, not nature*" (Worster 1979; as cited in Koppes 1980). Poor agricultural practices and a lack of sustainable agriculture contributed to top soil being away swept by the strong winds of the Great Plains.

The Oklahoma Panhandle was the 'epicenter' for the dustbowl (Figure 1.1). Worster (1979) comments that Cimarron County, Oklahoma was one of the worst hit; wheat production fell from an average of 13.1 bushels per acre in 1920s to 0.9 bushels per acre in the 1930s. Due to the evident effect of the Dust Bowl, the Panhandle region has been under the supervision of the United States Department of Agriculture (USDA) for more than 50 years. In 1956, USDA declared a large region of the Great Plains, including the Panhandle of Oklahoma, as a draught disaster area. Leading agricultural geographers including Brochert (1971) and Hart and Mayda (1997) have produced

pioneering work in studying the geographical and cultural implications of the dust bowl in the Panhandle.

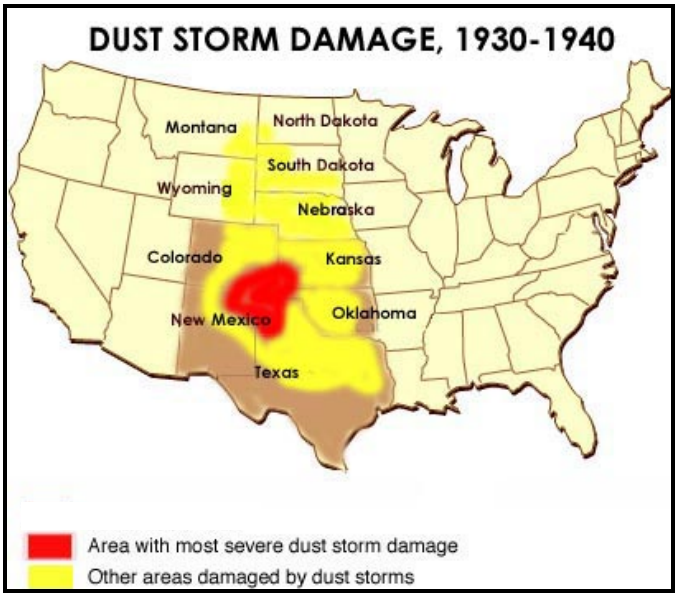


Figure 1.1: Dust Bowl in Oklahoma Panhandle (Source: United States Food Securities Act online)

Since the 1930s, the U.S. government has implemented policies to arrest soil erosion through crop rotation, contour plowing, and the extension of reserving marginal lands that are unsuitable for crops into pasturelands. In April 1935, the United States Congress passed the Soil Conservation Act that initiated the Soil Conservation Service; this agency was within the jurisdiction of the USDA that managed the CRP. In the 1970s, the demand for farm commodities inspired United States to develop and implement crop-subsidy incentives which would later encourage farmers to cultivate plants from "fencerows to fencerows" (TEP, 2005).

Schwedtmann (1995) notes that the U.S. government has attempted to reduce soil erosion through: (1) conservation farming practices and (2) land retirement and set-aside programs. Despite the fact that these programs have been implemented extensively across

the nation, there has been little attention to understand the attitudes of the participants in these programs. Farming practices motivated by conservation is heavily dependent on a rental payment mechanism that helps farmers meet subsistence. Annual U.S. governmental reports indicate that these payments have worked well in helping farmers to convert tracts of highly erodible land into vegetative cover. However, the land retirement and set-aside programs are directed towards enhancing and managing soil quality over a longer period of time.

Birdwell (1982) confirms that there exists a certain conservation ethic of stakeholders towards soil erosion. This was one of his results in the doctoral dissertation investigating the conservation ethics of farmers for the Deer Creek Watershed at Southwestern Oklahoma. Only in recent years have these types of studies gathered attention from the USDA. Jagger (1986) notes that long-term and long-range voluntary programs over a larger farm are more economical and result in less slippage in retiring production as compared to a part-time retirement system. Jagger's thesis is supported by comparison of the 1982 and 2002 Census of Agriculture, specifically in the proportion of farm acres in Oklahoma that are rented by part owners and tenants. The percentage of part ownership has decreased from 40% in 1982 to 29.4 % in 2002 (NASS, 2002). This supports the fact that farmers are moving into full time ownership that is able to attract longer commitment and better subsistence through rental payments from federal government.

Land retirement policy is among the several conservation programs that have been initiated by the U.S. government in recent years. The first land retirement policy was adopted in 1956 and this was done with the soil bank program which enrolled over

28 million acres of valuable cropland for a total cost of $2.5 billion. This was especially a major investment back in the 1950s (Laylock 1991).

Dorries (1957) at East Texas State College (currently, Texas A&M University Commerce) was one of the first scholars to analyze the effect of the soil bank program on farmers. In that, Dorries commented that farmers in the soil bank program had alternative options in their program participation. This was based on the economic benefits and long term conservation improvements. The researcher believes that this program can be seen as a precursor for the Conservation Reserve Program (CRP), launched almost 30 years later.

The CRP was originally seen as a program that would restore productivity of farmlands that were earlier stripped of their economic and agricultural value due to the dust bowl. In recent years, however the CRP has moved into focusing on wildlife and other income potential.

The CRP was passed under the 1985 Food Security Act by the US Congress. The clause pertaining to the program read as follows:

> *"...the Conservation Reserve Program is part of an overall Environmental Conservation Acreage Reserve Program…for the conservation and improvement of soil, water and related natural resources, including grazing land, wetland and wildlife habitat, on farms and ranches. The Conservation Reserve Program is voluntary and provides farmers the opportunity to receive annual rental payments for taking highly erodible and other types of land out of production and applying soil and water conservation measures…"* [1]

In Figure 1.2, the relative distribution of CRP tracts in the U.S. as of February 2003 is shown. When this is compared with Figure 1.1, the relationship with dustbowl lands and high CRP enrollment areas is evident. Also, it should be noted that the Panhandle region has the highest cumulative enrollment of CRP in the state of Oklahoma (see Figure 1.3).

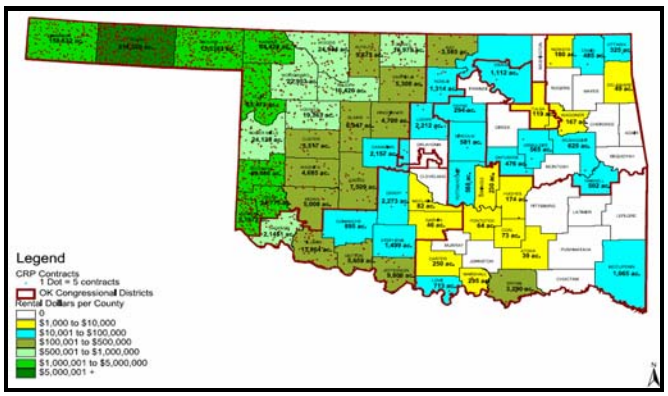


Figure 1.2: Map of Oklahoma showing CRP program activity between 1992 and 2002 (Source: Natural Resources Conservation Services)

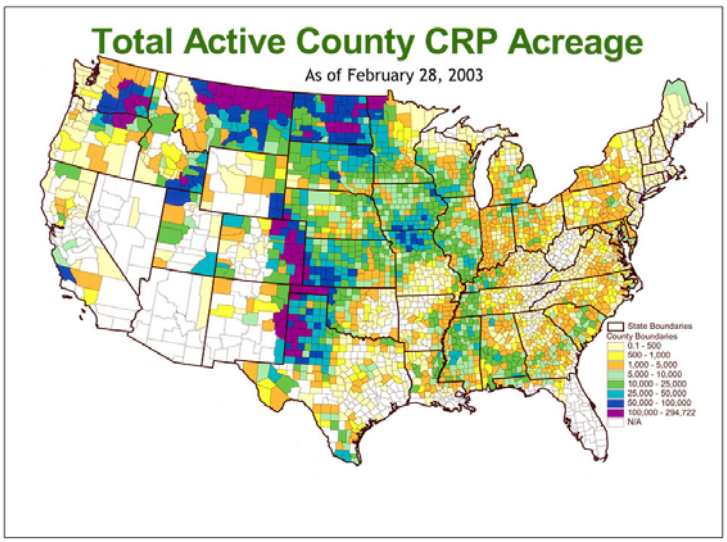


Figure 1.3: Total enrollments in the Conservation Reserve Program in acres by county in February 2003 (Source: U.S. Department of Agriculture)

Farmer's perception and stakeholder view on public agricultural policies are therefore very critical to evaluate federal conservation policies such as the CRP. Recent studies on perception have given important information on conservation evaluation. For example, Daugbjerg et al. (2005) has brought light on international conservation policies in his study on federal agricultural support schemes and the perception of farmers' in European countries. In that, he notes that there has been a renewed interest among

European government to provide improved conservation subsidies to farmers. Therefore, in United States and specifically in Oklahoma, a comprehensive study to evaluate farmer's perception on federal policies is necessary. This is especially important with rising concerns of soil conservation and the shift in agricultural practice as a conservation based activity. Also, the CRP contracts for more than 28.7 million acres are scheduled to expire between 2007 and 2010 (Johnson and Stephenson, 2005) and a major discussion in the 2007 Farm Bill would be to address the future of the CRP.

Using a computerized query executed through the USDA's National Agricultural Statistical Service database in the last 100 years, the total number of farms has decreased from 192,000 to 83,500 farms. The acreage of farmland has also reduced from 37.5 million acres in 1950 to 33.7 million acres in 2004 (NASS, 2005). The decrease in these values could be attributed to either in change in federal policies or changes in farmers attitudes and perception on agriculture.

PROBLEM STATEMENT

The problem that gives rise to the study is to identify perceptions of CRP participants to environment in light of the 2007 United States Farm Bill.

PURPOSE STATEMENT

The purpose of the study is to identify perceptions of CRP participants in the Oklahoma Panhandle through survey research and compare them with related studies in the U.S.

RESEARCH QUESTIONS

This study poses the following questions to the research community pertaining to the CRP in Oklahoma Panhandle region:

(1) What are the factors that motivate the CRP participants in their enrollment decisions?

(2) What are the differences in the perceptions of CRP participants to the various environmental benefits?

(3) How do the CRP participants evaluate the USDA's attention to environmental benefits?

STUDY AREA

The three counties of the Oklahoma Panhandle (Texas, Beaver and Cimarron counties) were selected for the survey (See Figure 1.4). The mailing addresses of the CRP participants were provided by the Farm Service Agency (FSA) offices in the respective counties. Support was also rendered by the USDA office in Stillwater, Oklahoma and the Oklahoma State University geography department. The Oklahoma Panhandle was also known in vernacular culture terminology as "no man's land" and "neutral strip" before claimed by Oklahoma in 1890. Following its cessation to Texas in 1850, the Panhandle was not claimed by any other state until it became part of the Oklahoma territory. The Panhandle is bordered by Kansas, Colorado, Texas and New Mexico and the average annual temperature is lowest in the state, with averages around 55 degrees Fahrenheit (OCS 2002). Doerris and Morris (1960), who wrote one of the best documented articles on the Oklahoma Panhandle reported that the region was bustling with agricultural productivity, with improved mechanization of farms, irrigation and scientific

conservation practices. Ulyess-Richfield Complex and Clay loam are the major soil types in the region (Kochenower and Edwards 2005).

The vegetation in the Panhandle is largely short grass with short bunch and Gama grass dominating the landscape (Doerris and Morris 1960). The CRP is the largest agricultural program administered in Oklahoma by the U.S. government. The state of Oklahoma has over one million acres enrolled in CRP out of a total of 34 million acres monitored all across the nation.

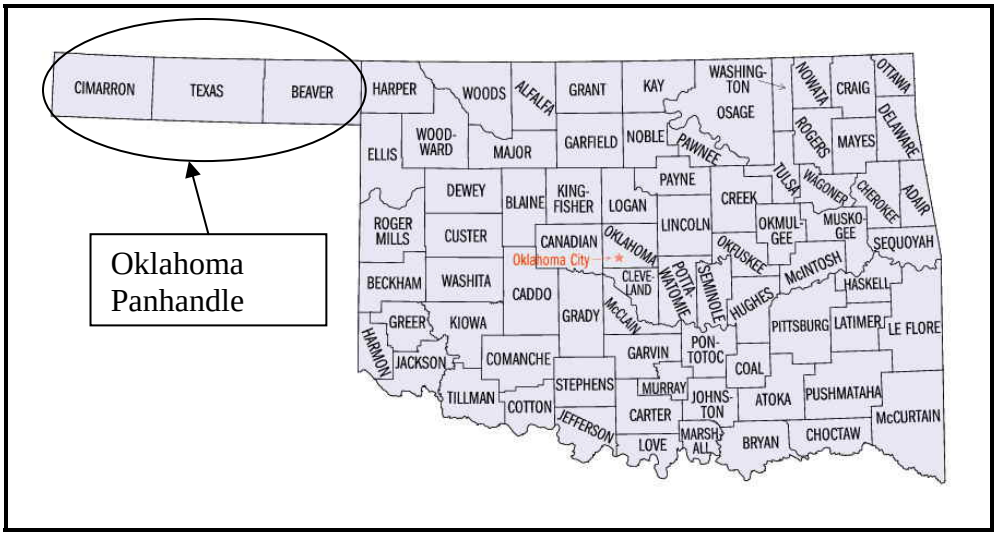


Figure 1.4: Map of Oklahoma showing the Panhandle region

The average CRP rental payments contribute to over $33.4 million to the state's farm economy, making it a crucial economic opportunity for farmers and Oklahoma's agricultural productivity (USGS, 2005). From what was predominately a beef and wheat state, Oklahoma has come a long way in sustaining other agricultural practices such as crops and livestock that have grown dramatically. In this regard, poultry and swine have become the second and third largest agricultural industries and the state is one of the top

states in their production (ODA, 2005). Hart and Mayda (1997) reported that between 1992 and 1996, an astonishing two million new hog farms were added to Texas County alone, four per cent of the total national output. Table 1.1 shows the distribution of CRP payments across the various counties in Oklahoma. It is evident that the Panhandle counties receive the highest payments in the state.

Table 1.1: Annual CRP payments in Oklahoma

Rank	Oklahoma Counties	CRP Annual Payment between 1995 and 2005 (in U.S. Dollars per acre)
1	Texas	63.086
2	Cimarron	40.377
3	Beaver	35.691
4	Ellis	16.169
5	Harper	15.486
6	Beckham	15.204
7	Harmon	14.405
8	Greer	11.782
9	Woods	9.723
10	Tillman	8.603

SCOPE AND ORGANIZATION OF STUDY

The broad scope of this research is to identify the attitudes, beliefs and perception of CRP farmers in Oklahoma Panhandle. In the following discussion of the research, comprising of four chapters, the details of the same is reported through methodology, analysis and discussions of future recommendation to the CRP program.

Chapter I propose the study and the study area. The chapter also lists the research questions pertaining to the research.

Chapter II is a comprehensive review of the literature relevant to the CRP program in the nation, specifically addressing recent research in the Oklahoma

Panhandle. Some of the major themes in the chapter reflect, (1) the impact of CRP on the agricultural geography of Oklahoma, (2) a review of literature on stakeholder perception and beliefs on conservation policies, across the nation and, (3) Benefits of studying these perceptions and the importance of CRP on the agricultural productivity of Oklahoma.

Chapter III describes the methodology of the research. Insights into the development and implementation of the survey instrument and deployment of the survey to the farmers are illustrated. Some of the techniques used in the analysis, viz., content analysis, and descriptive qualitative methods are elucidated. The chapter concludes with a brief discussion on the limitations of the survey methodology and its recommendations.

Analysis of the survey data is elaborated in Chapter IV. Extensive descriptive analysis is elaborated and a detailed investigation on individual and collective perception of the farmers is explained. The chapter also ties in the results from current research to that of past literature in connecting a relevance to the study of stakeholder perceptions.

Chapter V is the concluding chapter that provides discussion of the results from Chapter IV and recommendation for future CRP policies.

CHAPTER II

REVIEW OF THE LITERATURE

OVERVIEW

This chapter reviews major literature on conservation programs and CRP studies in the US. In the last 50 years, there has been a renewed interest in conservation policy, especially in the Great Plains region. This could be due to the influence of CRP supported farmlands in this region. Within the CRP, there have been more studies on farmer perceptions during the Farm Bill years of 1990, 1996 and 2002. While participant's perception to the CRP has been studied in different regions, the present study is among the first to explore their attitudes in Oklahoma Panhandle region.

GEOGRAPHY OF THE OKLAHOMA PANHANDLE

The state of Oklahoma is one of the southern states of the "Great Plains" vernacular region with a population of 3.45 million (US Census, 2000 estimate). The Panhandle region in the northwest of the state is part of the High Plains region with leveled grasslands and is a strip of land 166 miles long and only 34 miles wide between Colorado and Kansas in the north and Texas in the south. The highest point in the Panhandle – Black Mesa, is situated 4973 feet above sea level. In the same region would one also find sudden outcrops of minerals, including sandstone and gypsums. The North Canadian

River, named Beaver River or Beaver Creek lies on its course through the Panhandle. With an average annual precipitation of 19.72 centimeters, the region is relatively moist in late September, giving the state a high yield of winter wheat.

SOIL BANK PROGRAM

The origin of the Conservation Reserve Program (CRP) dates back to 1956 as one part of the Soil Bank Act. In many respects, the original CRP was commonly referred to as the "Soil Bank (SB) Program". The SB was designed to divert land regularly used for crop production for the purposed of conservation uses. During the 1956-60 SB program, over 28.7 million acres nationwide were enrolled. Ringquist et al. (1995) comment that SB comprised of two primary elements: a small, temporary acreage reserve (provided for immediate reduction of certain surplus commodities) and the much larger and longer-term conservation reserve.

Under the SB's Conservation Reserve Program, the producers agreed for a period ranging from three to 15 years to idle a percentage of their land. In return, the USDA agreed to pay producers annual cash remuneration or rent for the idle land. This paid up to 80% of the costs needed for long-term conservation improvements on the farmer's land and included tree planting, cover crops, dam and habitat construction, etc. The primary goal of SB program was to help reduce the excess agricultural commodities. An important but secondary goal was to conserve and improve soils that were not needed for agricultural production but were primarily directed for reducing soil erosion. Over its 10-year life, the Soil Bank program diverted over 28.7 million acres to conservation practices in 306,000 farms across the nation. This was followed by two similar long-term

contract programs, the Cropland Conservation Program, authorized in 1962, and the Cropland Adjustment Program, enacted in 1965 (FSA, 2004). Despite its initial success, SB was not a permanent program. The last contracts under this scheme expired in the period between 1970 and 1976. Also, the benefits from commodity and conservation from SB were only temporary (Ringquist et al. 1995).

CONSERVATION RESERVE PROGRAM

Through the act of United States Congress in 1985, the Food Security Act was passed to address the issue of soil conservation (FSA, 2004). Title XII of the Act established the Conservation Reserve Program, or simply the CRP. Over the years, this program has been a voluntary long-term cropland retirement program, providing the participants that included farm owners, operators or tenants with per-acre annual rent plus half the cost of developing a permanent land cover that usually included grass or trees. In return, the CRP participant retires highly erodible or environmentally sensitive cropland from production for a 10 to 15 year period.

The primary objective of the CRP during the first round of signups in the 1986 to 1989 period was to reduce soil erosion on highly erodible croplands. Secondary objectives included - protecting the nation's long term capability to produce food and fiber, reducing sedimentation, improving water quality, fostering wildlife habitat, curbing the production of surplus commodities, and providing income support for farmers (FSA 2004). The initial enrollment that was established in the 1985 Act was addressed to cover between 40 to 45 million acres. By the end of the 1990 crop year, USDA had enrolled more than 33.9 million acres, indicating a phenomenal success in the initial signups.

1990 Farm Bill

In 1990, through the Food, Agriculture, Conservation, and Trade (FACT) Act, the CRP was modified significantly, adding four new features to agricultural conservation policies. Some of the modifications to the 1990 act included, (1) redirecting the CRP from the primary goal of soil conservation to that of improving environmental quality, and (2) emphasis on environmental and water quality concerns in the revised eligibility criteria of the CRP. In addition to these, the FACT also created the Wetland Reserve Program which was aimed at protecting sensitive wetlands from agricultural development. In the same year, the Water Quality Incentive Program was also initiated that provided CRP participants with incentives to implement low-impact agricultural practices on land that unevenly contributed to the non-point water pollution. Lastly, the new Act also created the Environmental Easement Program which could protect certain targeted lands in perpetuity. Thus, the 1990 Farm Bill remarkably restructured USDA's mission of "conservation" from protecting the productivity of agricultural land to protecting the environment (Zinn, 1991; Ringquist et al., 1995).

Following the 1990 Farm bill, the USDA also began ranking the CRP bids based on the environmental benefits they offered. This scale was called the Environmental Benefits Index or EBI and this set the maximum allowable rental rates based on a specific soil-based estimate of the rent earned on comparable local cropland (USDA Factsheet; Sullivan et al., 2004).

The EBI award points are calculated according to the following variables:

1. Wildlife habitat benefits (up to 100 points);
2. Water quality benefits (up to 100 points);
3. On-farm benefits from reducing Soil Erosion (up to 100 points);
4. Likely long-term benefits beyond the contact period, such as from planting trees (up to 50 points);
5. Air Quality benefits from reduced wind erosion (up to 25 points);
6. Benefits of enrollment in conservation priority areas to help improve adverse water quality, wildlife habitat, or air quality (up to 25 points).

Bidders or the farmers accumulating the most points are accepted into the CRP program. The FSA later determines the enrollment cutoff level only after it has organized all bids (Zinn, 1997). One of the major concerns of the EBI in the recent past has been the inadequacy to address environmental issues besides soil erosion reduction. The subjective nature and overemphasis on soil erosion needs to be revamped and the present study tries to address this concern. In addition to soil erosion, the EBI gives weightage to water quality and other environmental benefits. This enabled the USDA to enroll CRP farmers based on their environmental needs since the signups were now used with the soil-specific maximum rental rates. This also encouraged farmers to enroll sensitive—but highly productive—land into the program.

1996 Farm Bill

Walker et al. (2000) notes that the 1996 Farm Bill also called the Federal Agriculture Improvement and Reform (FAIR) Act of 1996 removed the government payments from certain CRP program crops and from market prices. Also, during the period between the

1996 Farm Bill and the subsequent Bill in 2002, the enrollment into the CRP was based solely on contract acreage, program yield, contract payment rate and the contract payment limit. Greater decisions pertaining to planting crops were also available in the hands of farmers who enrolled in the new farm program.

2002 Farm Bill

The 2002 Bill was the latest of farm bills introduced by USDA. This was also called the Farm Security and Rural Investment (FSRI) Act of 2002. This Act aimed at transferring funds to CRP farmers together with regulating and subsidizing production of certain selected commodities (Sumner 2003). Some of the products like fruit, tree nut, ornamental and vegetable crops, hay, and meat still remained outside scope of main subsidy programs. The FSRI Act also aimed in removing annual land idling and crop price floors and provided more emphasis on government payments. In her comments on the 2002 Act, the then United States Department of Agriculture Secretary Ann Veneman commented:

> "*As the scope of environmental concerns has expanded, a wider range of conservation options is needed to address them. Land retirement through the Conservation Reserve Program has dominated federal spending on conservation since 1985. Ninety-two cents of every dollar spent on direct conservation payments to farmers pays for rental and easement payments for idling environmentally sensitive cropland and cost sharing for management practices that enhance the environmental benefits from retired lands. However, considerable conservation activities are carried out on vast stretches of working lands*" (Veneman 2002).

Conservation Reserve Program in Oklahoma

Throughout the United States a total of 33.4 million acres are enrolled in CRP. Out of this, Oklahoma's share includes more than one million acres. Almost $40 million in

annual rent is paid annually to CRP contract holders statewide. In Oklahoma, the CRP protects over one million cropland acres primarily by reducing soil erosion and the sedimentation in streams and lakes, thereby protecting the state's ability to produce food and fiber. This in turn improves water quality and promotes wildlife habitat, therefore enhancing forest and wetland resources. Also, Oklahoma's CRP holders receive the annual rental payments in the multi-year contract that spans from 10 to 15 years. Additionally, through vegetative cover practices, a 50 percent cost-share on CRP lands for crops including wheat is available for the farmer community (NRCS, 2000).

Since 1996, with the introduction of the continuous enrollment scheme, landowners have been able to sign up for practicing certain high-priority conservation methods in order to maintain continuous CRP at any time during the year. Some of these practices have included filter strips, riparian buffers, shelter belts, field windbreaks, living snowfences, grassed waterways, shallow water areas for wildlife, salt tolerant vegetation, cross wind traps strips, and wellhead protection areas (NRCS, 2000). This is an ongoing enrollment of the CRP program. With this new scheme, landowners can enter certain environmentally sensitive land into this program anytime without national competition.

This enables the farmers to have a more sustainable agricultural practice with their needs met, regardless of signup characteristics in other states. There are over 219 contracts in Oklahoma on more than 10,300 acres enrolled through the Continuous CRP. Some of the most popular acres in this scheme include vegetation of saline sites (8,000 acres), riparian forest buffers (400 acres), and filter strips (345 acres).

STUDIES ON FARMERS' PERCEPTION

In recent past, farmers' perception and their involvement in conservation programs have been studied, especially in investigating the attitudinal and institutional variables in conservation decisions. Some of these variables have included effect of government policies and ownership type. In particular, small farmer's involvement in CRP programs has gained particular attention in the southern part of the Great Plains region (Chambers and Fosters, 1983; Kairumba and Wheelock, 1990; McLean-Meyinsse et. al., 1994). Additionally, soil erosion reduction and related conservation improvement has been among the primary concerns of farmers in these regions. Studies have also shown that that farmer's interest on soil erosion and conservation issues is tied in with potential economic and income-related issues through in-farm initiatives rather than off-farm opportunity (Korsching et al., 2001; Crosson, 1986).

Recent research has been undertaken to study perceptions and attitudes of farmers to soil conservation programs (Earle et al., 1979; Hoover and Wiitala, 1980; Ervin and Ervin, 1982). Some of the socioeconomic variables that have been commonly used in these studies have included education, farm size, gross income, age and double cropping practice as a measure of efficiency, together with net farm income as a key factor affecting soil conservation practices. While these factors are important in examining the perceptions of the CRP participants in the Oklahoma Panhandle, the researcher believes that it would be useful to compare these on a national level.

Among the several studies that have a similar approach to the present study, the survey of Alabama CRP participants (Onianwa et al., 1999) is the one that draws attention. In that, survey results indicated that education, prior land use, gender, farm

size, and farmer status were all found to significantly affect the conservation behavior of the farmers. In context to the Oklahoma Panhandle region, these variables are also used to understand the characteristics of the CRP participants. The Alabama CRP study also found that traditional regional cropping patterns had a strong influence on the choice of conservation practice adopted. This is a strong indication of the influence of folk culture practice in traditional agriculture and the researcher envisions a similar characteristic in the Oklahoma Panhandle region.

While it is important to conduct a regional study, a comparisonal study with a national focus is a useful way of studying farmer perceptions across geographic regions. In their nation-wide survey, Allen and Vandevar (2003) investigated the attitudes and beliefs of CRP participants. In that, 85 % of the participants indicated that improved soil erosion is an important conservation preference. The majority of respondents also perceived several CRP benefits, including increased quality of surface and ground water, improved air quality, and increased opportunities to hunt or maintain wildlife as part of daily activities. In the present study, a similar survey instrument is developed and used for the Oklahoma Panhandle CRP participants to observe the perceived environmental benefits.

Several theories have supported the variations in characteristics of farmer perceptions. An application of the attitude-behavior model in studying farmer's perception (Ajzen and Fishbein, 1977; Lynne et al., 1998) revealed that there are degrees of conservation beliefs among farmers in their conservation preferences. Farmers comment that "technical advances in fertilization, use of chemicals and herbicides, as well as improvements in seed can offset the adverse effects of soil erosion on

productivity," (Lynne et al. 1998) and this indicates their preference to use conservation practices to stop erosion with reliance on technology. This form of inductive reasoning helps research of this nature to simplify the understanding of specific needs of farmers in generic terms, an approach the present study undertakes.

Studies have also indicated that landowners would most likely satisfy compliance requirements in order not to forgo conservation benefits from programs (Lee 1990; Duffy et al., 1994; Walker et al., 2000). Non-participation in the farm program was viewed as an occasion to change planting patterns and expand the base of profitable crops for increasing program benefits in the future. In the southern Great Plains region, and especially in the study area of present research, this information is particularly useful in relating to the suitcase farming style of agriculture. In that, the farmer is a non-participant in agriculture and involved only during harvest and/or planting activities. These farmers are owners, but not actively involved.

In the North Dakota CRP study, Mortensen et al. (1989) revealed some interesting results. Over 40% of respondents indicated that the CRP payments exceeded their net cash farm income, and 20% of them stated that the program has enabled them to continue farming. More than 91% percent of respondents had grass cover on their farmlands. The state of North Dakota has a far higher percentage of farms enrolled in CRP than Oklahoma (See Figure 1.2), and so is the vulnerability of North Dakota to wind erosion compared to Oklahoma. Therefore the high percentage of grass cover in North Dakota is an example of the positive effect of CRP in restoring and developing grass cover. In the Panhandle of Oklahoma, there is a similar case. Higher elevation and arid environment in this region has deterred the development of grass and tree cover, this remains one of the

key priorities of the CRP. In recent years, the U.S. Department of Agriculture has improved grass cover in the Panhandle, primarily to provide sufficient wind breaks from the sweeping winds from the northern plains.

Among other environmental factors that are typically perceived beneficial to farmers, ground water quality is an important factor that influences agricultural practice in the Oklahoma Panhandle. Recent concern on the increase of hog farms in Texas County and its potential effect on groundwater is seen as one of the key factors that could influence CRP re-enrollment in the future. In a study on the farmer's attitudes on groundwater quality among 14 U.S. states (Padgett, 1989; Pease and Bosch, 1994), some general observations were made:

1. Groundwater quality is an issue of great concern to farmers, ranking slightly below profitability concerns. Health and safety concerns are expressed more frequently than environmental concerns.
2. Farmers perceived that agricultural chemicals are a major contributor to groundwater pollution. Pesticide pollution is of more concern than nitrate pollution.
3. Farmers were not convinced that there are profitable alternatives to current fertilizer and pesticide practices, and they believe that chemical use has already been reduced as much as economically feasible.
4. Farmer's preference to voluntary programs to protect water quality.

Napier and Johnson (1998), in their study of the Darby creek watershed in central Ohio, assessed the awareness of a local conservation organization towards water quality.

Their findings revealed that a small number of farmers in the watershed were aware of water quality issues. Among those who indicated that they were aware of the conservation group and its programs, some of them believed that non-governmental organizations were effective in motivating watershed farmers to adopt soil and water protection practices. Hence, there seems to be a concern among farmers and stakeholders on water quality issues.

In another study aimed at the perceptions of Iowa conservation managers towards policies, Bruening and Fritz (1992) recommend the following with regards to communicating soil and water conservation issues to the farmers:

1. Groundwater and water quality issues have a greater concern to farmers than soil conservation issues.
2. While presenting information about soil and water conservation issues, field demonstrations and county meetings are useful techniques.
3. The farmers noted that governmental agencies such as Soil Conservation Service, County Extension Service and state University specialists are most useful sources of information regarding soil and water conservation issues.
4. Farmers believed that improved communications and education are needed to ensure proper management of chemicals used in agriculture.

The above issues suit well within the present state of CRP in the Oklahoma Panhandle region. The Oklahoma State University cooperative extension station is located in Guymon, the largest city in the Panhandle. Their communication of information to the CRP and related farmers on soil and water quality benefits from conservation practices have been found beneficent over the years.

In the years following the legislation of Farm bill by the United States Congress, there has been focused research by a particular scholarly journal. The *Journal of Soil and Water Conservation* has had several studies published in the post-Farm bill years on participants attitudes and beliefs of the farmers. In many instances, the commentaries have been provided by officials and administrators from the U.S. Department of Agriculture. For instance, in the years following the 1985 Farm bill that initiated the CRP, Ribaudo et al. (1989) noted that the CRP had the potential to generate about $10 billion in natural resource benefits. In particular, revenue generated from wildlife habitat would yield the highest percentage (40%) share of benefits. This was followed by surface water quality. Soil conservation and soil productivity did not feature as the top beneficiaries of CRP in this period. In the same year, Esseks and Kraft (1989) noted the importance of marketing the CRP program by way of understanding the relationships between farmland owners' personal characteristics and their knowledge of the CRP features. However, they could foresee the difficulty in evaluating the effectiveness and desirability of the CRP from the operator's standpoint.

CHAPTER III

METHODOLOGY

OVERVIEW

The chapter deals with the methods used to collect data for the survey research that was directed to identify the attitudes and perceptions that influence the CRP participants in the Panhandle of Oklahoma. A mail-out survey was conducted on a sample of CRP farmers provided by the Farm Services Agency (FSA) officers in the Panhandle counties. The mailing was initiated in March 2005 and responses were received until May 2005.

SAMPLING PROCEDURE

A majority of the farmers in the address list were CRP farmers in the Panhandle counties, the remaining were farmers in other neighboring states. The researcher extracted only those addresses that were within the three counties. A combination of stratified and judgment sampling was used. The FSA officers employed stratified sampling when extracting CRP farmer addresses from their database (stratum being CRP or non-CRP). While in judgment sampling technique, the researcher used his judgment in selecting the sample units from the population for study. The judgment used in this study was to sort the address labels based on the location of the CRP participant in the Panhandle region. To accomplish this, the researcher listed the cities in the Panhandle region. The address labels were now sorted while selecting a Panhandle location or non-Panhandle location.

In accomplishing this task, a total of 1,008 CRP farmer addresses across the Panhandle region were extracted from the computerized address labels.

INSTITUTIONAL REVIEW BOARD (IRB)

The Oklahoma State University Institutional Review Board (IRB) protocol was employed. This was done in order to protect participants of their rights and privacy and in concurrence with federal and OSU policies. The OSU IRB is in accordance with the federal wide assurance of compliance for protection of human research subjects. The study was approved and the PIs were authorized to collect data from the CRP farmers. The IRB application number AS0537 closed its human contact and the protocol ended 09/12/2005. A copy of the IRB approval is attached in Appendix A.

QUALITATIVE RESEARCH

Alasuutari (1998) notes that in typical qualitative analysis of observed findings, two distinct phases could be identified, and sometimes these phases could overlap. These are:

Phase 1. Simplification of observations

Phase 2. Interpretation of results

In the first phase, the material such as the address list is inspected from the theoretical point of view of the project, and only the points relevant from this angle are noted. The second phase follows after conclusion of survey. According to Alansuutari (1995), the observations are classified and the researcher looks for common denominators in the data. In the present study, the variation of CRP farmer characteristics to specific questions regarding environmental factors is observed. It is important to note the two

phases are distinct from one another and sometimes a combination of both these phases can be employed based on the requirements of the study. Projects based on agriculture usually have two distinct phases of qualitative inquiry.

SELECTION OF RESEARCH METHOD

Whether a study can be based on an earlier theoretical model or not, is the first step towards selecting a research method (Routio 2005). In this regard, there are three options for the researcher:

1. Exploratory research
   (there are no studies or models to start with),
2. Expanding or refining earlier studies, and
3. Research for testing hypotheses.

The present study draws literature and past studies from CRP survey in the US and the farmer perception and expands to the body of literature with its study on the Oklahoma Panhandle. While expanding earlier studies on the CRP, new results are added that pertain to farmer perception in Oklahoma Panhandle. This is also in conjecture to Traoré et al. (1998) notes that the need for a thorough understanding of the factors that lead farmers to adopt conservation practices is important. Also, there are several studies (Ervin and Ervin1982, Lasley et al. 1990) that call for expanded research on investigating farmer's perception to conservation programs.

INFORMATIVE-RESEARCH ANALYSIS

Based on the recommendation of Routio (2005), informative research involves primarily gathering *knowledge* that includes descriptions, explanations and past studies about the object of study. Here, the researcher is not interested in re-inventing the wheel but in augmenting the present body of literature in a new study area. In the context of the present study, the researcher wishes to expand to the body of literature on the CRP farmer perceptions with new emphasis on Oklahoma Panhandle, but does not wish to make modification of the CRP program itself. Only recommendations for improving enrollment are proposed.

In an informative research study, the project is arranged as distinct phases (see Figure 3.1). First, the population for this study is selected and sampled, followed by the collection of empirical data, analysis of data, and finally assess the findings.

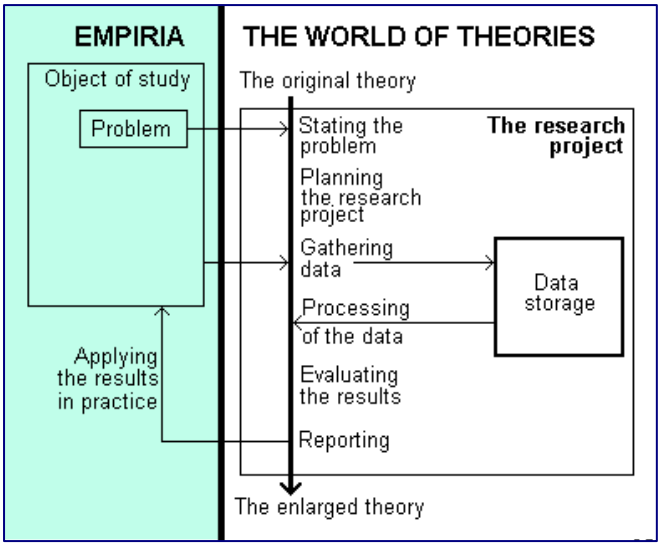


Figure 3.1: Informative research analysis template (Routio, 2005)

The adaptation of the model developed by Routio (2005) resembles steps to the present study and this is shown in Figure 3.2.

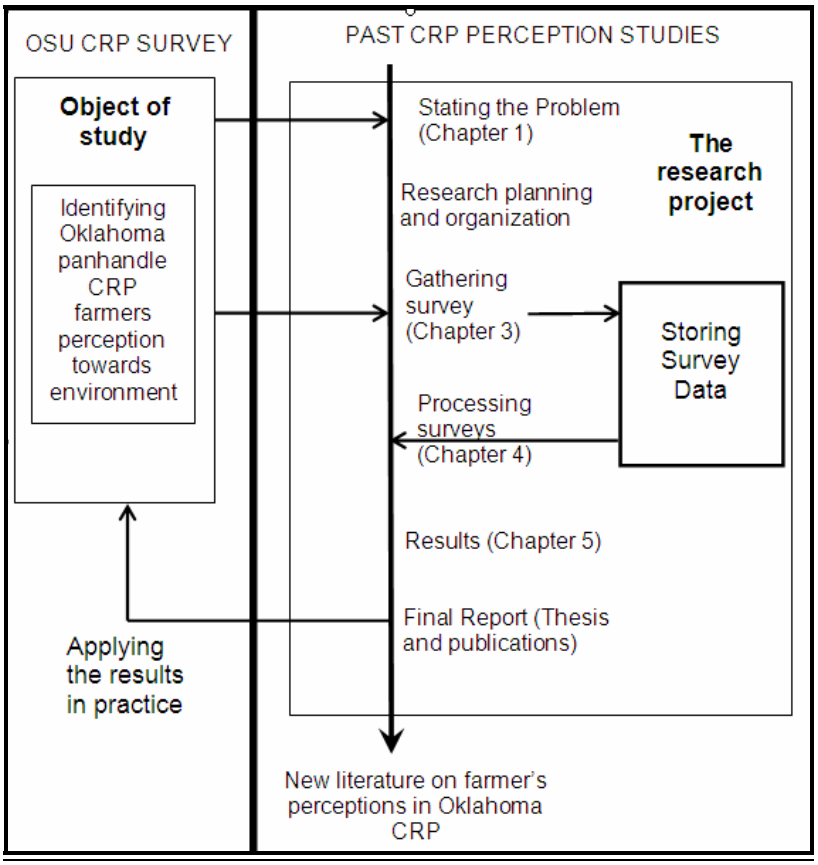


Figure 3.2: Informative research analysis outline for proposed study

This outline also serves as a rubric for the research study. Informative analysis has been used in the past to study people's perception to a common policy (Weston 1995; Lee and Leung 1999). The informative research analysis is a form of descriptive research that helps the study to report the variables of the survey.

UNIVARIATE DESCRIPTIVE ANALYSIS

In Univariate analysis, every item in the survey is looked at one at a time, to identify the variability of responses. Nardi (2003) recommends that the process of undertaking a descriptive analysis of the variables helps the research to obtain a profile of the respondents with the demographic items and descriptive data for the behaviors and attitudes measured. There are several methods perform this analysis:

1. Frequency Tables
2. Charts and Graphs

CONTENT ANALYSIS

Through past studies, content analysis has been defined as a systematic, replicable technique for compressing many words of text into fewer content-based categories using explicit rules of coding (Berelson, 1952; GAO, 1996; Weber, 1990; Stemler 2001).

There are several approaches to undertake content analysis. Krippendorff (1980) recommends that six questions must be addressed in every content analysis:

1) Which data are analyzed?

2) How are they defined?

3) What is the population from which they are drawn?

4) What is the context relative to which the data are analyzed?

5) What are the boundaries of the analysis?

6) What is the target of the inferences?

Neuendorf (2002) proposes the following steps in the process to undertake content analysis:

1. Theory and rationale:

   Defining the content information to be examined and listing the supporting theories and perspectives which make the content important to study.

2. Conceptualization decision:

   The variables involved and their definition.

3. Coding of variables:

   This includes the creation of a codebook and an explanation of the variable measures.

4. Tabulation and reporting:

   Using figures and statistics, the variables are reported.

Content analysis is used to analyze the open ended question of the CRP survey. Krippendorff and Neuendorf's models are used for content analysis of the open ended questions.

SURVEY INSTRUMENT

The structure of survey follows closely the instrument used by Allen and Vandevar (2003). The survey instrument is peer reviewed and pilot studied. In this United States Geological Service (USGS) funded survey, the authors evaluated the perceptions, attitudes and beliefs of the CRP farmers through a nationwide survey.

Prior permission was obtained through email correspondence with the Mr. Arthur Allen of USGS in Fort Collins, CO before designing the survey for the present study. In an email message to the author on May 19, 2004, Mr. Allen notes that the

USGS survey was born as a result of many conversations with farmers across the Midwest and Great Plains while visiting their farms to collect data on long-term changes in CRP grassland composition and structure. Also, Mr. Allen notes that it became obvious that many saw positive environmental and social benefits that were not being captured and reported to the USDA and other interested parties.

Assemblage of an expert panel and initial pilot study is necessary to validate a survey instrument (Dillman 1978). The researcher recognizes this deficiency in the present study. In addition to correspondence with USGS, consultation was sought from Mr. Rod Wanger, Chief of Conservation Programs at USDA-Stillwater, Oklahoma while developing the survey instrument.

Organization of Survey Instrument

The survey questionnaire had a total of thirteen questions. This comprised of twelve close-ended multiple choice questions and one-open ended question. See Appendix A for the survey instrument. In accordance with IRB protocol, an informed consent form in way of an introductory cover letter was attached to the survey form. To protect the confidentiality of the respondents, an instruction section advising respondents of a privacy guarantee was used in the beginning of the instrument.

Two questions were explicitly used to identify the ownership characteristics of the CRP respondents. Questions 3 in the survey aimed at gauging re-enrollment preferences into the CRP. Question 4 was used to identify the environmental factors that may influence this re-enrollment. Questions 2, 6 and 7 were used to identify the participation characteristics of farmers in CRP, either as number of years or acreage of

farmland. Question 8 is a follow-up on Question 4, aims in obtaining the effect of environmental benefits in the current CRP enrollment. Question 10 was used as a probe, in addition to Question 8 in understanding the farmer's perception to the attention given by the USDA on specific environmental factors. Questions 11 and 12 were used purely to understand the demographic characteristics (only age and level of educational attainment).

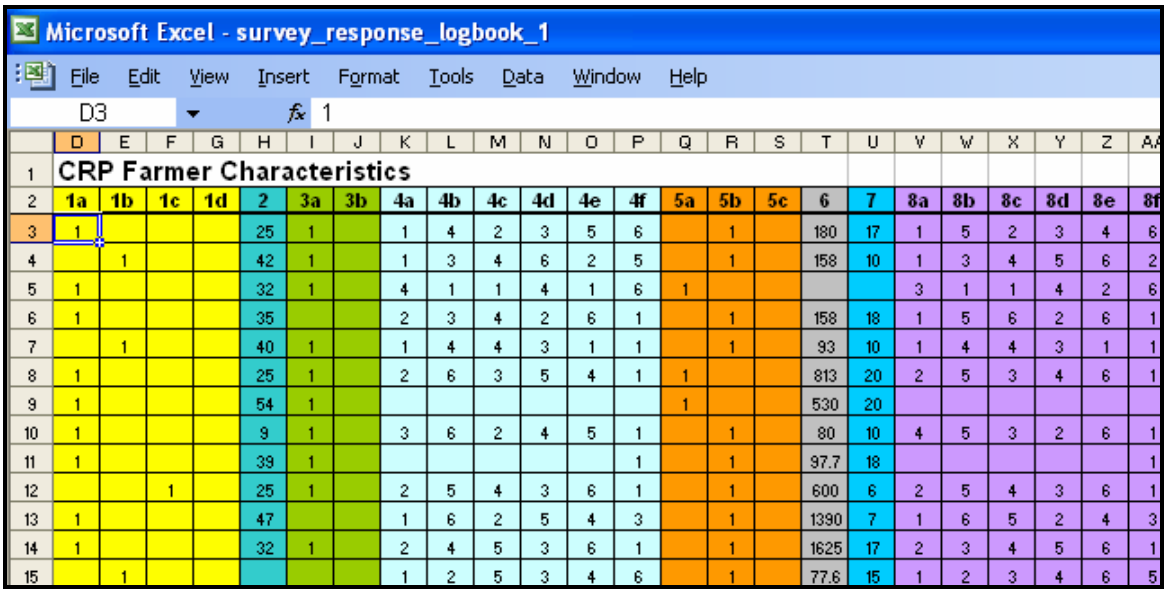
Administration of the Survey

A total of 1,008 surveys, directed to a Panhandle CRP farmer were sent. The mail out was administered in the month of March, 2005. The initial mailing was done on March 2, 2005 through the OSU Mailing Services. A formal survey methodology was not employed and the researcher recognizes these shortcomings. A response of 18.9 % with 190 responses was obtained. Among these, seven responses were found to be unacceptable, bringing the final response to 183.

Survey Document Analysis

A coding technique was developed by the researcher in order to expedite the initial processing of survey. This was done by building a Microsoft Excel spreadsheet logbook (see Figure 3.3). First, the close ended questions were arranged sequentially and numbered from 1 through 12. Next, the options within each question were further coded by using alphabets. For example, question 1 had four choices; hence there were four columns in the survey logbook (1a through 1d). Columns were arranged sequentially, using color coding was used to visually differentiate the questions from each other. In this fashion, the initial processing of survey was carried out for all the respondents,

totaling 191. A numerical value of 1 was assigned to a response to a specific choice. For example, in question 1, the ownership characteristic of CRP participants was identified. If the farmer recognized to be a owner and actively involved in farming, then a value of 1 was assigned under 1a.



Microsoft Excel - survey_response_logbook_1

File Edit View Insert Format Tools Data Window Help

D3 fx 1

	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA
1	CRP Farmer Characteristics																							
2	1a	1b	1c	1d	2	3a	3b	4a	4b	4c	4d	4e	4f	5a	5b	5c	6	7	8a	8b	8c	8d	8e	8f
3	1				25	1		1	4	2	3	5	6		1		180	17	1	5	2	3	4	6
4		1			42	1		1	3	4	6	2	5		1		158	10	1	3	4	5	6	2
5	1				32	1		4	1	1	4	1	6	1					3	1	1	4	2	6
6	1				35			2	3	4	2	6	1		1		158	18	1	5	6	2	6	1
7		1			40	1		1	4	4	3	1	1		1		93	10	1	4	4	3	1	1
8	1				25	1		2	6	3	5	4	1	1			813	20	2	5	3	4	6	1
9	1				54	1								1			530	20						
10	1				9	1		3	6	2	4	5	1		1		80	10	4	5	3	2	6	1
11	1				39	1							1		1		97.7	18						1
12			1		25	1		2	5	4	3	6	1		1		600	6	2	5	4	3	6	1
13	1				47			1	6	2	5	4	3		1		1390	7	1	6	5	2	4	3
14	1				32	1		2	4	5	3	6	1		1		1625	17	2	3	4	5	6	1
15		1						1	2	5	3	4	6		1		77.6	15	1	2	3	4	6	5

Figure 3.3: Screenshot of survey logfile

Numerical values were assigned to the non-parametric responses. In this way, a quick summary of responses were made possible. For example, in Figure 3.3, the first cell of the log book is highlighted and it corresponds to the first survey response which was processed. Thus, cell D3 in this example corresponds to a specific ownership type (owner, actively involved). This is part of Question 1 and choice a, hence coded as 1a in the logbook. Hence, D3 corresponds to 1a or owner, and active farming of CRP farm.

When this is repeated for all 191 participants, the total number of the specific ownership can be obtained by simply adding the columns with the numerical value 1.

CHAPTER IV

RESULTS AND DISCUSSION

OVERVIEW

A total of 1,008 mail out surveys were sent to the study area. A return rate of 18.94% yielded 191 respondents. About 90% of whom answered the questionnaire completely. The characteristics of the respondents are described through descriptive analysis, based on individual questions.

FARM OWNERSHIP

A majority of the participants (51.6%, N=191) were primary owners and operated the CRP farm with active involvement. They represent the core agriculturist population involved in CRP program in Panhandle. Table 4.1 illustrates the ownership characteristics. While a significant number (36%, N=191) were recognized as owners, there were not actively involved in CRP. This could be due to suitcase farming agriculture, a common practice in the Great Plains region of the US. In this, farmers commute from urban areas and visit their farmlands only during harvesting and/or planning season. Figure 4.1 shows the relative share of CRP farmland among the responded farmers (N=186).

Table 4.1: Ownership types of CRP farmlands

Ownership	Participants (N=186)
Owner operator owned with active involvement	96
Owner but not active involvement	67
Renter operator owned with active involvement	17
Trustee Owned	6

Table 4.1 shows the ownership distribution of CRP lands in Oklahoma Panhandle. When compared to the national CRP survey (Allen and Vandevar, 2003), there is a disparity. In the national survey, the percentage of owner operator/not active is 41% and owner operator/active is 56%. In present study, the corresponding percentages are 52% and 36% respectively. Hence, locally (within the Oklahoma Panhandle), there are more CRP participants who are actively participating in the CRP program. Figure 4.1 shows the graphical representation of Table 4.1.

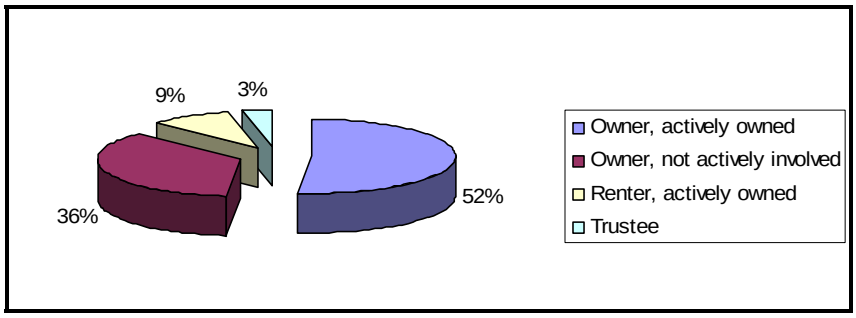


Figure 4.1: Pie Chart showing percentage distribution of CRP land ownership

CRP RE-ENROLLMENT PREFERENCE

An overwhelming (91.3%, N=162) number of participants responded that they would re-enroll again in the CRP. The next round of signups is due in spring 2006. This measure is

also a good indication that by large, the CRP has been successful in meeting the needs of the farmers, encouraging their continued participation. Table 4.2 and Figure 4.2 shows the re-enrollment preferences.

Table 4.2: CRP Re-enrollment preferences

Re-enrollment preference	Participants (N=162)
Will re-enroll in CRP	148
Will not re-enroll in CRP	14

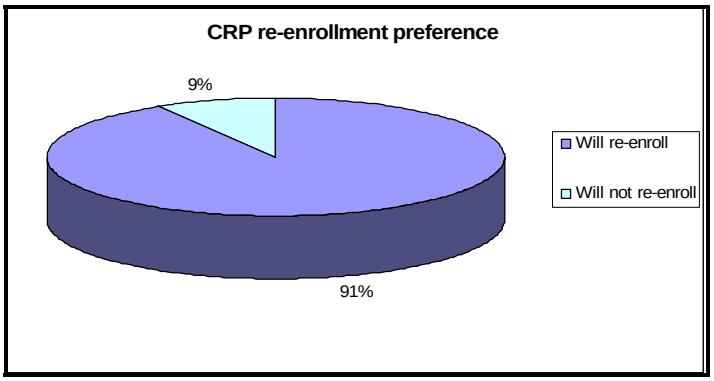


Figure 4.2: Pie Chart showing re-enrollment preferences

VEGETATION COVER

Question 3 in the survey inquired on the type of grass and vegetation cover the CRP participants owned. A majority of them (55.8%, N=179) indicated ownership of native grass type. A significant number of participants (44.1%, N=179) responded that they owned non-native grass.

Table 4.3: Vegetation type of CRP farmland

Type	Participants (N=179)	Percent of Total
Native grass	100	55.8
Non-native grass	79	44.1
Trees	0	0

Not even a single CRP participant indicated an ownership of tree cover. As one travels from East to West in the Panhandle region, there is a relative increase in elevation fewer grasses appear on the landscape. Doerr and Morris (1960) observe a similar relationship and note that grass height diminishes from East to West in the Panhandle. Also, Scrub Oak (*Quercus gambelli*), a native of West Texas and the Two Needle Pine (*Pinus edulis*), a native of lower Great Basin (New Mexico, Colorado, Arizona) are some of the non-native trees found in the Panhandle. Table 4.3 and Figure 4.3 show the characteristics of grassland ownership.

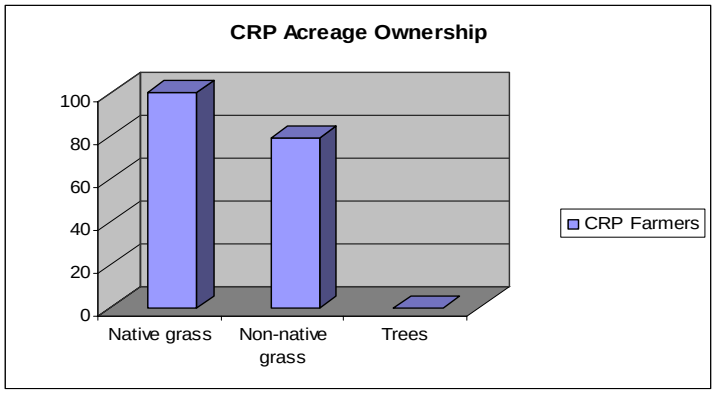


Figure 4.3: Bar chart showing vegetation ownership in CRP farmland

The present study corresponds well with the national CRP survey results (Allen and Vandevar, 2003). In that, the native grass ownership was 55.1% and non-native grass ownership was 33.1%. However, unlike in the present study, the national survey

indicated a significant percentage (13.6%) of CRP participants who had trees in their CRP farmland.

DEMOGRAPHIC CHARACTERISTICS

Age groups and level of educational attainment were the two demography based questions. These questions were placed towards the end of the survey questions as recommended by Dillman (1978). In that Dillman recommends personal as well as demographic questions to be placed at a later part of the survey instrument.

Age Groups

A high percentage (80.0%, N=180) of respondents were 55 years and above. The majority of remaining respondents (18.9%, N=180) fell in the 35 through 54 age group. Only two respondents (1.1%) were in the 20 through 34 age group. Table 4.4 and Figure 4.4 show these characteristics.

Table 4.4: Age Groups of CRP Participants

Age Group (in years)	Participants (N=180)
20 through 34	2
35 through 54	34
55 and above	144

The higher proportion of farmers in the senior age groups is indicative of the present status of CRP farms. This can also be seen as a matter of concern. Looking ahead into the future of CRP, a large number of senior participants could be retiring from active farming, forcing the middle aged participants (35 through 54 age range) to take up those

lands. Positive trends in CRP ownership (see Figure 4.1) and a re-enrollment preference (see Figure 4.2) supports an optimistic future for signups into the program.

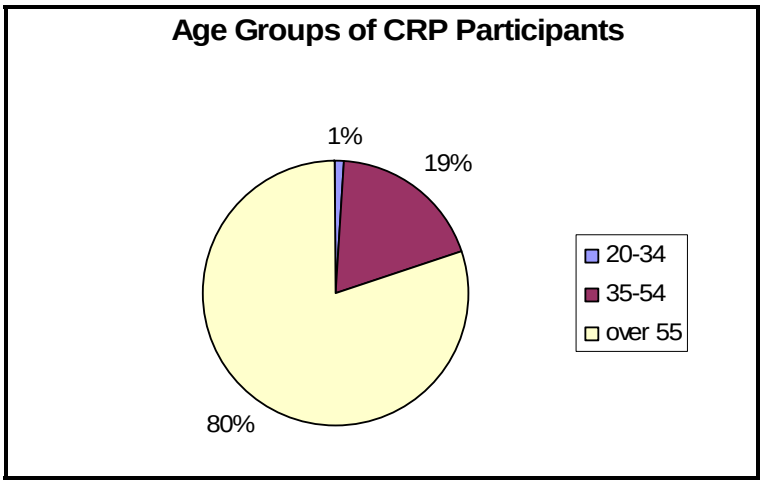


Figure 4.4: Pie chart showing age groups of CRP participants

Level of Educational Attainment

The educational level among the CRP participants was quite evenly distributed at the higher educational levels. A significant number of participants (39.1%, N=179) possessed a college degree while 29% (N=179) of them had degrees from non-professional and community colleges. Less than 6% of the respondents had lower educational levels that were less than high school. Table 4.5 and Figure 4.5 illustrate these variations. The high percentage of CRP participants in the upper age bracket can be seen as an advantage. For example, organizational management practices in business firms informs us that by cross training methods, a more experienced work force can help a newer employee body. In case of the CRP, older and more experienced farmers can help and train the new incoming farmers. In this way, the program can save time and money in new training workshops.

Table 4.5: Education Levels of CRP Farmers in Oklahoma Panhandle

Level of Education	No. of Participants (N=179)
Less than high school	7
Vocational technical school	3
High school	48
Some college	51
College degree	70

The US Census database reports that 80% of Oklahomans posses high school diploma while only 20% of them have a bachelor's degree (US Census, 2000). When this is compared with present study, there is a disparity (see Table 4.5). More participants in the Panhandle have a bachelor's degree or equivalent as compared to the state averages. One of the reasons that could be attributed to these higher percentages could be due to the influence of neighboring states. The bordering states of Texas and New Mexico have better educational incentives for farmer and agricultural owners.

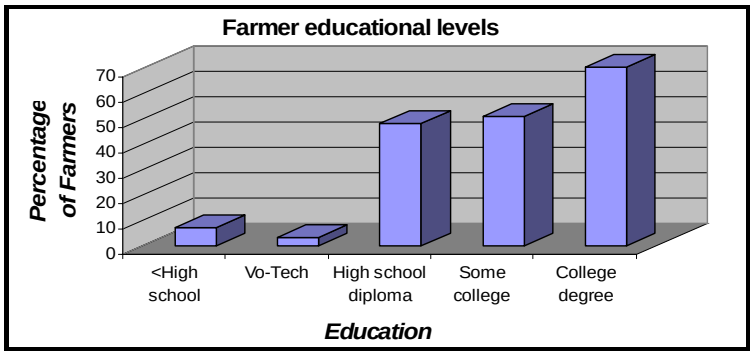


Figure 4.5: Bar Chart showing Level of Educational Attainment

The higher percentage of participants in the advanced educational level is a encouraging. This trend is especially helpful when communications from USDA on important

conservation policies needs to be disseminated among the farmer population, better educational levels allows communication to be expedited.

ENVIRONMENTAL BENEFITS AND RE-ENROLLMENT

The CRP participants were asked to rank the six environmental benefits based on their needs and preference in their next signup into the program. Specifically, ranks ranging from 1 (most important) to 6 (least important) were used. The future re-enrollment characteristics of the CRP participants were thus identified. Upon cursory overview, improved control of soil erosion and potential income level stand out with the highest level of importance (see Table 4.6).

Table 4.6: Number of Farmers Ranking the Environmental Benefits

	1	2	3	4	5	6
Improved control of soil erosion	91	51	3	6	2	4
Improved air quality	18	21	42	32	14	22
Improved water quality	19	25	35	40	22	12
Positive changes in wildlife populations	11	15	31	21	44	28
Changes in scenic quality of farm or landscape	13	11	21	15	21	63
Potential Future Income (e.g., hay production, livestock production and hunting)	94	23	8	13	15	14

Improved Control of Soil Erosion

A total of 157 farmers (84.4% of total respondents, N=186) responded to this question and a majority of them (57.9%) responded that soil erosion improvement was very

important. Table 4.7 and Figure 4.7 show these variations.

Table 4.7: Re-enrollment preferences towards control of soil erosion

Rank	Number of Participants (N=157)	% of Total
1 (most important)	91	58.0
2	51	32.5
3	3	1.9
4	6	3.8
5	2	1.3
6 (least important)	4	2.5

Reduction of soil erosion has been the primary objective of the CRP since its inception in 1985. Over the years, the supplementary Farm Bill that has modified the CRP Act, with special emphasis on conservation benefits. Consequentially, these legislations have obviously had a positive effect on the perceptions of the participants as illustrated in Table 4.7. A higher preference towards soil erosion control is representative of the future of CRP signups.

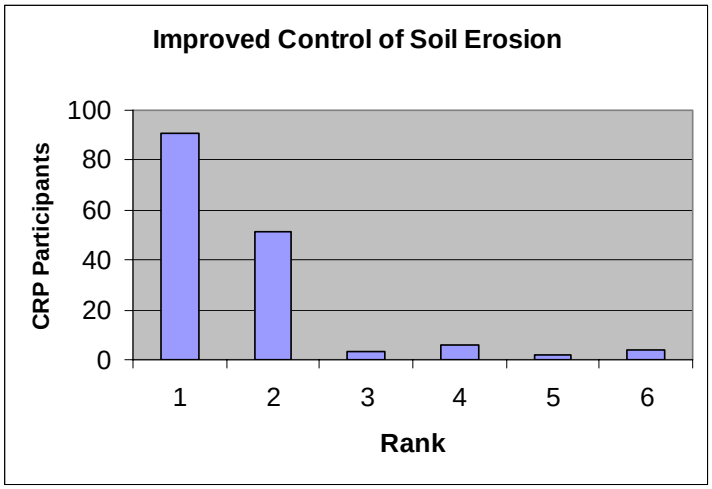


Figure 4.6: Bar Chart showing soil erosion preference among CRP participants

Improved Air Quality

Eighty percent of total survey respondents responded to the question on improved air quality as a factor influencing re-enrollment into the CRP. A significant percentage of them (49.7%, N=149) ranked air quality in the middle range. Table 4.8 and Figure 4.7 illustrate the respondent's characteristics. The development of hog farms in the Panhandle could explain the reason as to why improvement on air quality is not among the critical environmental needs of the CRP participant. Hart and Mayda (1997) indicate that in Texas County alone, between 1992 and 1997, more than 1.2 million new hogs were produced in Guymon, the county seat. This unusual demand for hog production could have had an impact on the air pollution since studies (Guo et al. 2003) indicate the increase in animal livestock have an impact on air quality in the atmosphere.

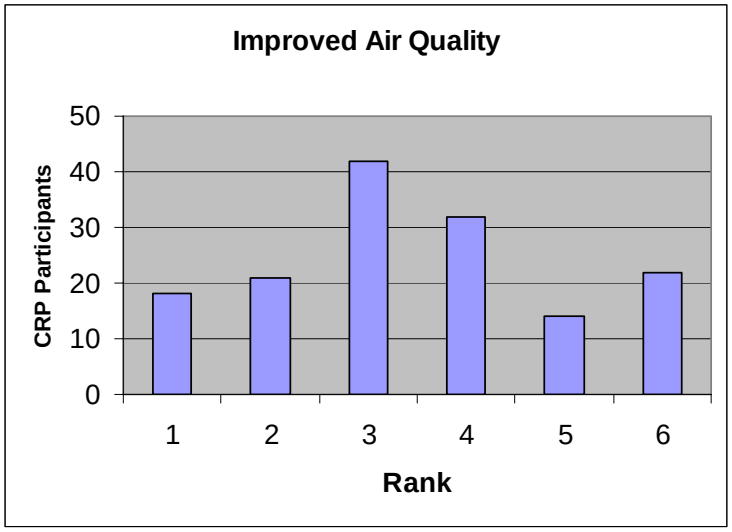


Figure 4.7: Bar chart showing re-enrollment preferences towards air quality

A higher proportion (12.1%, N = 149) of CRP participants showing least importance to air quality improvement is indicative of the EBI's emphasis on air quality. Air quality improvement carries only 25 points in the EBI sign up as against 100 points for soil

erosion improvement or that of water quality.

Table 4.8: Re-enrollment preference and Improvement in Air Quality

Rank	Number of Participants (N=149)	% of Total
1 (most important)	18	12.1
2	21	14.1
3	42	28.2
4	32	21.5
5	14	9.4
6 (least important)	22	14.8

Improved Water Quality

A total of 153 CRP participants from the survey responded to improvement in water quality as a motivating factor for re-enrollment. Nearly a majority (49.0%, Refer Table 4.6) of CRP participants responded by assigning an intermediate rank (3 or 4) of preference. Table 4.9 illustrate the respondent's characteristics.

Table 4.9: Re-Enrollment and Improved Water Quality

Rank	Number of Participants (N=153)	% of Total
1 (most important)	19	12.4
2	25	16.3
3	35	22.9
4	40	26.1
5	22	14.4
6 (least important)	12	7.8

A relatively larger (12.4%, N=153) number of participants agree that improvement in air quality is a very important re-enrollment preference. However, a significant number of participants are adequately satisfied in the water quality improvement and would comprise the middle range of ranks (see Figure 4.8). Awawdeh (2004), in his GIS-based evaluation of CRP in Texas County, notes that in agriculturally dominated regions like the Texas county, water quality is affected by soil erosion and the resulting suspended sediment load. Hence when seen across the entire Panhandle region, there is a variation of perception towards improving water quality and no specific preference to either one side (more important or less important).

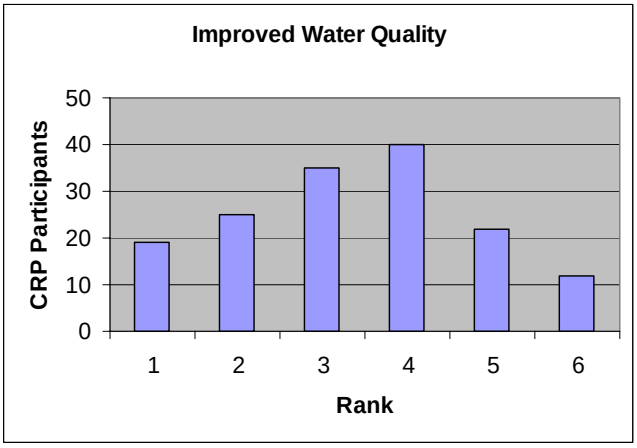


Figure 4.8: Bar Chart showing Preference Towards Improved Water Quality

Looking at Figure 4.8, there seems to be a tendency for CRP participants to emphasis less on improving water quality.

Positive Changes in Wildlife Populations

A significant number of CRP participants (48.0%, N=150) towards lower enrollment ranks respondent that positive changes in wildlife population is not important towards their re-enrollment. Table 4.10 and Figure 4.9 illustrate the variation in wild life habitat

and re-enrollment preferences.

Table 4.10: Re-enrollment and Wildlife Habitat improvement

Rank	Number of Respondents (N=144)	% of Total
1 (most important)	11	7.3
2	15	10.0
3	31	20.7
4	21	14.0
5	44	29.3
6 (least important)	28	18.7

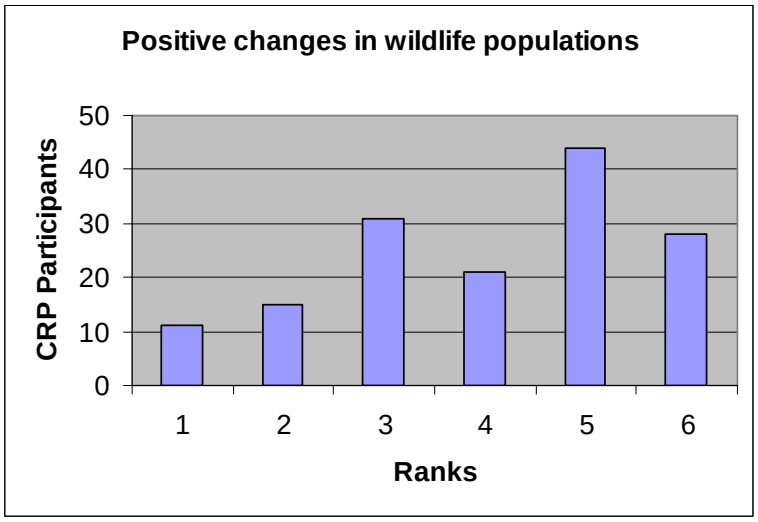


Figure 4.9: Bar Chart showing preference to changes in wildlife population

The analysis is indicative that CRP participants do not prefer or seem to have an disinterest towards a positive change in wildlife. However, several comments provided by the participants indicate otherwise. For instance, one participant indicated that there is good management of pheasant birds. Another farmer indicated that bird population has

been steadily increasing in the last few years and at times it gets unmanageable. The disparity between the ranks and the comments rendered by the participants can be attributed to the deficiency in the EBI to be more flexible. The EBI is subjective and does not allow participants interested in other conservation benefits to focus on other needs.

Changes in Scenic Quality of Farm or Landscape

A significant number of respondents (43.8%, N=144) indicated that improving scenic quality of their farmland is the least important re enrollment priority. Table 4.11 and Figure 4.10 show the characteristics.

Table 4.11: Re-enrollment and improvement in Scenic Quality of Farmland

Rank	Number of Respondents (N=144)	% of Total
1 (most important)	13	9.0
2	11	7.6
3	21	14.6
4	15	10.4
5	21	14.6
6 (least important)	63	43.8

The strong preference towards a lesser importance to scenic quality of farmland can be attributed to the physical geography of the Panhandle region. With higher elevation and more arid conditions, it is difficult to maintain a farmland with scenic quality, especially with significant investment. Figure 4.10 represents this characteristic.

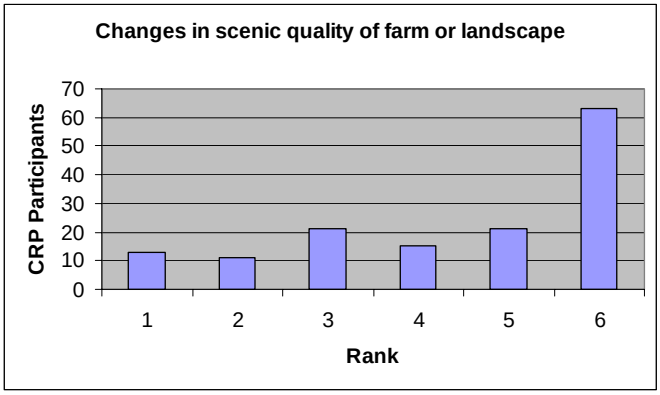


Figure 4.10: Bar Chart showing preference to improved scenic quality of farmland

Potential Future Income

A majority of the respondents (56.3%, N=167) agree that prospects of potential income motivates their re-enrollment into the CRP.

Table 4.12: Re-Enrollment preference and future income potential

Rank	Number of Respondents (N=167)	% of Total
1 (most important)	94	56.3
2	23	13.8
3	8	4.8
4	13	7.8
5	15	9.0
6 (least important)	14	8.4

The CRP participants concur that potential future income from the farmland motivates their preference for re-enrollment. This is in agreement with USDA's initial policies. When the Soil Conservation Act was passed in 1985, one of the major foreseeable advantages was future income potential. The Oklahoma Panhandle region has several agricultural prospects including sugar crops (corn) and winter wheat crop. Oklahoma

ranks second in the nation in winter wheat production.

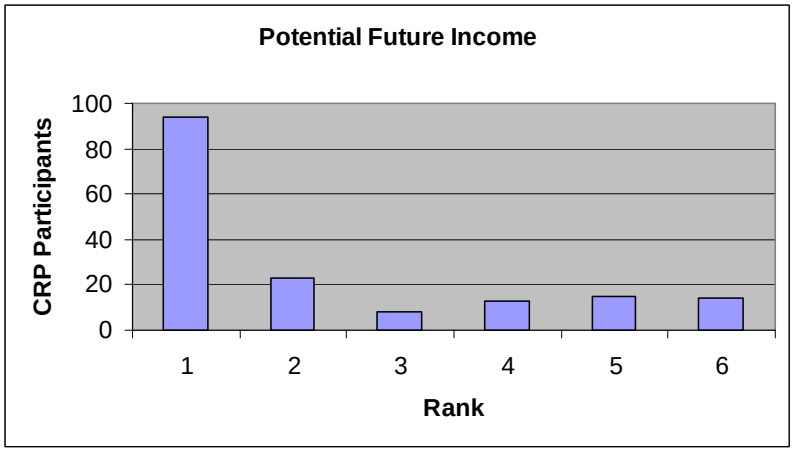


Figure 4.11: Bar Chart showing preference towards future income potential

USDA'S ATTENTION TO ENVIRONMENTAL BENEFITS

The CRP participants were enquired regarding their perception towards the environmental benefit factors. These factors are listed in the Environmental Benefits Index (EBI) used by the USDA for CRP signups. Table 4.13 shows the different environmental factors and the level of attention by the USDA.

Table 4.13: Perceptions of CRP Participants to USDA's environmental attention

Environmental Factor	Not Enough Attention	Adequate Attention	Too much attention
Controlling soil erosion	26	139	2
Improved air quality	18	117	25
Improved water quality	23	129	8
Improved wildlife habitat	16	76	73
Enhanced economy	48	103	8

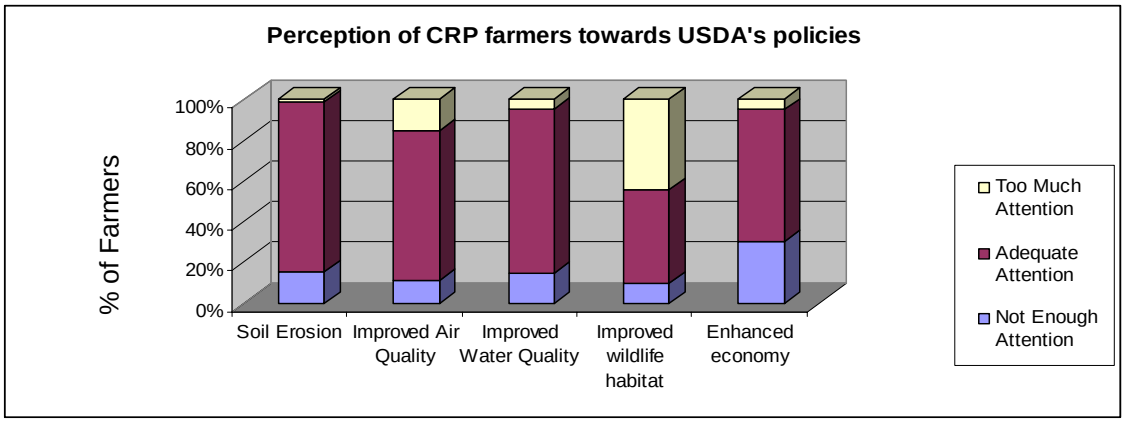


Figure 4.12: Stacked bar chart showing USDA's attention to environment and CRP participant's perceptions

This analysis agrees well with the re-enrollment decisions of the participants. In particular, their perceptions towards improvement in wildlife habitat (too much attention) and enhanced economic benefits (not enough attention) corresponds with Table 4.12.

Concurrence in Conservation Preferences

Table 4.8 was further analyzed in looking at the mutual concurrence of environmental perception. For example, how many farmers believed that adequate attention was paid towards controlling soil erosion *and* improving air quality? Table 4.9, 4.10 and 4.11 shows the concurrence to conservation preference to various degrees of attention. In that, it can be seen that overall, CRP participants are satisfied with the attention given by the USDA on soil erosion reduction. Improvement on wildlife habitat while an important environmental factor, there is no significant relationship between the soil erosion reduction benefits and wildlife habitat improvement. A similar case is true for improving scenic quality of landscapes.

Table 4.14: CRP Participants perceiving adequacy in attention from USDA on environmental benefits

Environmental Factor 1	Environmental Factor 2	Number of common respondents	% of total respondents
Controlling Soil Erosion	Improved Water quality	112	61.2
Controlling Soil Erosion	Improved Air quality	103	56.2
Improved Water quality	Improved Air quality	102	55.7
Controlling Soil Erosion	Enhanced economic benefit	93	50.8
Improved Water quality	Enhanced economic benefit	88	48.1
Improved Air quality	Enhanced economic benefit	80	43.7
Controlling Soil Erosion	Improved Wildlife habitat	67	36.6
Improved Water quality	Improved Wildlife habitat	66	36.0
Improved Wildlife habitat	Enhanced economic benefit	51	27.8
Improved Air quality	Improved Wildlife habitat	49	26.7

Table 4.15: CRP Participants perceiving more than adequate attention from USDA on environmental benefits

Environmental Factor 1	Environmental Factor 2	Number of common respondents	% of total respondents
Improved Air Quality	Improved Water quality	6	3.3
Improved Air quality	Improved wildlife habitat	6	3.3
Improved water quality	Improved wildlife habitat	3	1.6
Improved air quality	Controlling soil erosion	2	1.1
Controlled soil erosion	Improved water quality	2	1.1
Controlled soil erosion	Improved wildlife habitat	2	1.1
Improved air quality	Enhanced economic benefit	1	0.5
Improved water quality	Enhanced economic benefit	0	0.0

Table 4.15 shows the characteristics of CRP participant's perception. This shows the mutual concurrence of attitudes towards the USDA's over adequate attention to environmental benefits. For example, 3.3% or 6 CRP participants answered that improved air quality *and* improved water quality are being given too much attention from the USDA.

Table 4.16: CRP Participants perceiving inadequate attention from USDA on environmental benefits

Environmental Factor 1	Environmental Factor 2	Number of common respondents	% of total respondents
Improved Air quality	Enhanced economic benefit	12	6.5
Controlling Soil Erosion	Enhanced economic benefit	11	6.0
Improved Water quality	Enhanced economic benefit	10	5.4
Controlling Soil Erosion	Improved Air quality	9	4.9
Improved Air quality	Improved Water quality	8	4.3
Improved Water quality	Improved wildlife habitat	7	3.8
Controlling Soil Erosion	Improved Water quality	6	3.2
Controlling Soil Erosion	Improved wildlife habitat	6	3.2
Improved wildlife habitat	Enhanced economic benefit	5	2.7
Improved Air quality	Improved wildlife habitat	2	1.0

Similar to Table 4.15, the above Table shows the concurrence of perceptions of CRP participants towards environmental benefits receiving inadequate attention. Here, 6.5% of the total respondents agree that improvement in air quality *and* enhanced economic benefit has received inadequate attention by the USDA. Looking closely, this makes sense. This is due to the fact that in order to improve air quality, USDA would have to come up with technologies and funds to reduce air pollution. In context to Oklahoma Panhandle, this would mean a reduction in methane emissions. If this were to happen,

long term economic benefit of CRP gets diverted into priorities other than conservation of soil and natural resources.

COMPARISON ANALYSIS WITH NATIONAL CRP SURVEY

The present study used the survey instrument developed by Allen and Vandevar (2003). In their national survey of CRP participants, several characteristics of the respondents were compared with that of the present study.

CRP Land Ownership

There seems to be a disparity between the major ownership types across the national survey and present study. While 52.0% in the national survey claim to be owners of CRP land but not active, this is true for 36% of the respondents in the present research. A majority of the ownership in Panhandle region, however, are active owners. Renters and trustees are also higher in present study (9.1%), compared to the national survey (3.1%). One of the reasons that could be attributed to the lower percentage of Panhandle CRP participants could be related to age levels. Table 4.4 indicates that there are more farmers in the 55 and above age levels than lower age groups. This could mean that the older farmers and other CRP participants could own the farmlands, but not necessarily actively involved in managing them.

Table 4.17: CRP Land Ownership comparing national survey

Ownership type	National CRP Survey	Present study
Owner but not active	52.0 %	36.0 %
Owner/operator	43.0 %	51.6 %
Renter/operator	3.1 %	9.1 %
Trustee	0.9 %	3.2 %

The higher percentage of active CRP participants in Oklahoma Panhandle can be attributed to the critical need for soil and natural resources conservation in this region. The Oklahoma Panhandle was the epicenter for the dustbowl in the 1930s. This prompted US government to create policies directed towards soil conservation. Hence, a more active involvement of farmers and conservation program participants is needed in these sensitive areas.

CRP Acreage Type

An almost equal percentage of participants in the two surveys have native grass in their CRP lands. However, there are more participants with non-native grass cover (44.1%) in present study when compared to the national survey (31.3%). A major disparity is seen in the tree ownership in national (13.6%) versus Panhandle (0%) study.

Table 4.18: Ownership of CRP acres comparing national survey

Ownership type	National CRP Survey	Present study
Mostly native grass	55.1 %	55.8 %
Mostly nonnative grass	31.3 %	44.1 %
Mostly trees	13.6 %	0.0 %

The absence of tree cover in the sample selected for the current study is a matter of concern. While tree cover is not possible in all terrains and environmental conditions, it is one of the best mechanisms to control soil erosion. Doerr and Morris (1960) also agree that increased vegetation cover through planting of trees is helpful in restoring soil quality and prevent erosion. The USDA acting through the Farm Service Agency would need to look into this specific situation. An improved tree cover would not only augment conservation practices, but would also contribute to the sustainability of the policy.

STATISTICAL ANALYSIS

To extend the scope of the analysis, a statistical analysis was carried out with the known dependent and independent variables. The purpose of this analysis is to create additional support for the descriptive analysis.

Non-parametric statistical analysis is carried out to evaluate the relationship between CRP participation and the environment. Non parametric analysis allows the user to analyze data without assuming an underlying distribution. In present study, the distribution characteristics between rankings and environmental preferences were not taken into account. In general, correlation between two variables reflects the degree to which the variables are related. Pearson’s product moment correlation (called Pearson’s correlation for convenience) is the most common measure of correlation and is used in the present study. Pearson's correlation reflects the degree of linear relationship between two variables and these ranges from +1 to -1. A correlation of +1 means that there is a perfect positive linear relationship between variables.

SPSS version 13.0 (SPSS Inc., Chicago, IL) was used to perform Pearson's correlation coefficient analysis. In this, the variables were exported from the survey logbook into the SPSS worksheet. Next, Bivariate statistics was selected under Correlation in the main menu of the software program. The variables were then loaded into the variable list and options were introduced to produce the necessary results (correlation value, significant value etc.). CRP participation can be assessed either as number of years the farmer has participated in the program or the number of CRP acres the farmer has been maintaining. These can then be treated as dependent variable in the Pearson's correlation analysis. The dependent variables can be extracted from Questions 4 and 8 of the survey, these are the enrollment or re-enrollment preference towards environmental quality. These questions pertain to the re-enrollment and enrollment preferences respectively.

Explanation of Variables

1. **RankdCRPAcr**: The CRP acres are re arranged by converting them to non-parametric ranks.
2. **RankdCRPYears**: The number of years in CRP are re arranged similar to RankdCRPAcr by converting them to non-parametric ranks.
3. **SoilErosion**: Ranks listed by participants towards soil erosion reduction
4. **AirQual**: Ranks listed by participants towards improving air quality
5. **WaterQual**: Ranks listed by participants on their preferences towards improving water quality.
6. **Wildlife**: Ranks listed participants on their preferences towards improving wildlife habitat.

7. **Scenic**: Ranks listed by participants on their preferences towards improving scenic quality of landscape and farmland.
8. **Income**: Ranks listed by participants on their preferences towards potential future income.

Number of Acres in CRP as a Dependent Variable

The CRP participation gauged through RankdCRPAcr variable is extracted from the survey logbook under CRP Acres. Since the values are in parametric quantities, they are converted to non-parametric values using a classification technique. In this technique, the CRP acres of all the 191 respondents are categorized into 5 classes. Hence, more number of years in the CRP, higher the assigned class. In this way, the parametric CRP acres variable is converted into a non-parametric RankdCRPAcr variable. This is then compared pair wise with the enrollment factors in question 4 of the survey using SPSS version 13.0 (SPSS Inc., Chicago, IL) and employing Pearson's correlational analysis (See Table 4.19).

Table 4.19: Correlational analysis (Pearson's) between enrollment factors with Ranked CRP Acres

Environmental Factor	RankdCRPAcr	SoilErosion	AirQual	WaterQual	Wildlife	Scenic	Income
RankdCRPAcr	1.000	.019	.058	.035	-.071	-.078	-.056
SoilErosion	.019	1.000	.289 **	.178 *	.045	.068	-.514 **
AirQual	.058	.289 **	1.000	.605 **	-.044	-.061	-.211 **
WaterQual	.035	.178 *	.605 **	1.000	.106	-.005	-.117
Wildlife	-.071	.045	-.044	.106	1.000	.301 **	.021
Scenic	-.078	.068	-.061	-.005	.301 **	1.000	.201 *
Income	-.056	-.514 **	-.211 **	-.117	.021	.201 *	1.000

** At 0.005 significance
* At 0.1 significance

Similarly, the RankdCRPAcr variable is correlated with re-enrollment factors (question 8 of survey). Hence, we have Table 4.20.

Table 4.20: Correlational analysis (Pearson's) between re-enrollment factors with Ranked CRP Acres

Environmental Factor	RankdCRPAcr	SoilErosion	AirQual	WaterQual	Wildlife	Scenic	Income
RankdCRPAcr	1.000	.115	.042	.006	.102	.156	-.111
SoilErosion	.115	1.000	.277 **	.225 **	.032	.039	-.481 **
AirQual	.042	.277 **	1.000	.354 **	-.038	.065	-.088
WaterQual	.006	.225 **	.354 **	1.000	.136	.019	-.113
Wildlife	.102	.032	-.038	.136	1.000	.170 *	.024
Scenic	.156	.039	.065	.019	.170 *	1.000	-.048
Income	-.111	-.481 **	-.088	-.113	.024	-.048	1.000

** At 0.005 significance
* At 0.1 significance

From Table 4.20, each factor can be compared with one another for the highest possible correlation. Further, these correlation co-efficients are re-arranged based on their values. The above analysis reveals the following characteristics of participant's perceptions in future re-enrollments:

1. Table 4.20 shows a positive correlation between preferences of soil erosion improvement and income level. From Table 4.14, it is clear that this relationship is true and over fifty percent of the respondents agree that USDA is paying adequate attention to improving soil erosion *and* enhancing future income potential from farm land.
2. The positive relationship between improvement in air quality and water quality from Table 4.20 can be supported by evidence in Table 4.14 that over fifty five

percent of CRP participants agree that USDA has been giving adequate attention to both these issues.

3. The positive correlation between wildlife habitat improvement and scenic quality in Table 4.20 makes sense as well. There has been a recent support from US government in helping states to move into Ecotourism, a tourism industry catering towards improving conservation and wildlife preserve while supporting corporate and private firms.

From Table 4.20, each factor can be compared with one another for the highest possible correlation. Further, these correlation coefficients are re-arranged based on their values. Upon observing Table 4.20, some of the salient characteristics are revealed with regards to current enrollment preferences of the CRP participants:

1. In the current enrollment, Table 4.22 reveals a high correlation between improvement in air quality and that of water quality. Table 4.15 supports this relation. In that, 6 respondents agree that improvement in air quality measures as well as water quality improvement is receiving more than adequate attention from the USDA.
2. There is a high correlation between reducing soil erosion and enhancing future income in Table 4.20. This supports Table 4.20 for re-enrollment preference. Hence, for current or future enrollment preference, a significant number of farmers are interested in improving water and air quality of the environment.
3. Wildlife habitat improvement and scenic quality relationship in Table 4.20 supports a similar relationship in re-enrollment characteristics.

Number of Years in CRP as a Dependent Variable

The CRP participation gauged through RankdCRPYear variable is extracted from the survey logbook under CRP Years. Since the values are in parametric quantities, they are converted to non-parametric values using a classification technique. In this technique, the CRP years of all the 191 respondents are categorized into 5 classes. Hence, more number of years in the CRP, higher the assigned class. In this way, the parametric CRP years variable is converted into a non-parametric RankdCRPYear variable. This is then compared pair wise with the enrollment factors in question 4 of the survey using SPSS version 13.0 (SPSS Inc., Chicago, IL) and employing Pearson's correlation analysis. Hence we have Table 4.21.

Table 4.21: Correlational analysis (Pearson's) between enrollment factors with Ranked CRP Years

	RankdCRPYears	SoilErosion	AirQual	WaterQual	Wildlife	Scenic	Income
RankdCRPYears	1.000	.045	-.061	.089	.016	-.079	.051
SoilErosion	.045	1.000	.278 **	.237 **	.031	.055	-.494 **
AirQual	-.061	.278 **	1.000	.355 **	-.038	.083	-.089
WaterQual	.089	.237 **	.355 **	1.000	.144	.032	-.126
Wildlife	.016	.031	-.038	.144	1.000	.172 *	.020
Scenic	-.079	.055	.083	.032	.172 *	1.000	-.059
Income	.051	-.494 **	-.089	-.126	.020	-.059	1.000

** At 0.005 significance
* At 0.1 significance

From Table 4.21, each factor can be compared with one another for the highest possible correlation. Further, these correlation coefficients are re-arranged based on their values.

The above analysis reveals some of the characteristics of the relationship between environmental factors. These relationships are pertinent to current enrollment by the farmers in the CRP. Following are some of its findings:

1. Soil erosion reduction and enhanced future income have the highest correlation. This tie in with the soil conservation goal of USDA and the CRP program. The 1985 Farm Bill that introduced CRP was primarily designed to help reduce soil erosion, thereby improving productivity of the land and soil, hence better income in the future.
2. Improvement in air quality and that of water quality have a high correlation. This supports a similar re-enrollment characteristic (see Table 4.24)
3. Improving wildlife habitat and enhancing scenic quality of landscape supports a similar relationship in re-enrollment decisions (see Table 4.20 and 4.22).

Table 4.22: Correlational analysis (Pearson's) between re-enrollment factors with ranked CRP Years

	Rankd CRPYrs	SoilErosion	AirQual	WaterQual	Wildlife	Scenic	Income
RankdCRPYrs	1.000	.073	.019	-.022	.096	.093	-.063
SoilErosion	.073	1.000	.289 **	.178 *	.045	.068	-.514 **
AirQual	.019	.289 **	1.000	.605 **	-.044	-.061	-.211 **
WaterQual	-.022	.178 *	.605 **	1.000	.106	-.005	-.117
Wildlife	.096	.045	-.044	.106	1.000	.301 **	.021
Scenic	.093	.068	-.061	-.005	.301 **	1.000	.201 *
Income	-.063	-.514 **	-.211 **	-.117	.021	.201 *	1.000

** At 0.005 significance
* At 0.1 significance

From Table 4.22, each factor can be compared with one another for the highest possible correlation. Further, these correlation coefficients are re-arranged based on their values.

Table 4.22 also indicates that there is a relationship between improving air quality and that of water quality. This supports findings in Table 4.20 and 4.21 which show a similar relationship. Reduction in soil erosion and enhanced income levels as the second highest correlation in Table 4.21 supports Table 4.22. Hence, current enrollment

characteristics and preferences of CRP participants are similar to the future re-enrollment decisions.

CONTENT ANALYSIS

Question 13 of the survey was open ended and it provided an opportunity for the CRP participants to express their concerns/comments on the program and their suggestions for future policy making. Forty five percent of the total respondents (N=191) provided comments. Since the study is focused on the perception to the environment, the responses were categorized based on their immediate environmental needs.

Upon analysis, these responses could be classified using the Environment Benefit Index (EBI) factors:

Table 4.23: Comments and suggestions of CRP Participants

	Environmental Factor	Number of respondents (N=85)	% of Total
1.	Control of Soil Erosion	27	31.7
2.	Improvement of Air Quality	7	8.2
3.	Improvement of Water Quality	5	5.8
4.	Improving wildlife habitat	7	8.2
5.	Enhancing Scenic quality of farmland	5	5.8
6.	Enhancing potential future income	35	41.1

It is clear from Table 4.23 that future economic impact has once again significantly weighed in as an important perception of CRP participants. Control of soil erosion follows second. These support results in earlier descriptive analysis which indicate that

soil erosion and income are two of the key environment factors that attract future enrollment and responsible for current enrollment in CRP.

Selected Comments

Comments were selected from the responses and some of them are listed under each of the six environment factors.

1. Control of Soil Erosion:
    - *"Native grass has been excellent choice. The current program has improved erosion, wildlife and allowed soil to improve"*
    - *"I think the Panhandle should be treated as a separate entity from the rest of the state because our soil is mostly sandy loam. But the prairie wind causes extreme erosion".*
    - *"Land owners want to enroll in the CRP program. It has proven itself effective in the control of soil erosion as well as to increased wildlife population"*
    - *"Land owners want to enroll in the CRP program. It has proven itself effective in the control of soil erosion as well as to increased wildlife population"*
2. Improvement of Air Quality:
    - *"The CRP program has done an outstanding job of improving the air, water quality and protecting the wildlife"*

3. Improvement of Water Quality:
    - *"We have no trouble with air quality or water quality"*
    - *"The EBI points should be designed for the area involved. For instance, in the panhandle of Oklahoma, wind erosion far outweighs water quality. Our rainfall is so much less than down state in Oklahoma. Water quality should be emphasized down state and wind erosion in the panhandle."*

4. Improving Wildlife Habitat:
    - *"…Our quail and pheasant population has increased as well as deer…"*
    - *".. To control erosion, also good for the game birds…"*
    - *"Please do not do away with the Old World Blue Stem grass. I like it. It is good, and the wild life stay in it. We even have several Prairie Chicken that have started staying in the grass."*
    - *"Blue stem makes more pasture and hay, better for wildlife, we have both. We really appreciate the program."*
    - *"I have seen more wildlife in the last 2 or 3 years than ever before. I have not charged any fees for hunting. I have had people from Tulsa and OKC hunt on my land. The wildlife includes antelopes, deer and small animals such as badgers, skunks and rodents. They take care of the balance."*

5. Enhancing scenic quality of farmland:

    - *"..I am a realtor and I had property for sale on 10 acres. The neighbors land had been over grazed, so there was a drainage problem for the neighbor's home that I was selling…"*

6. Enhancing Potential Future Income:

    - *"…for us, the CRP is a must. It has helped us meet our financial obligations..."*
    - *"Raise the price per acre to meet the economic condition with other living costs. I do not intend to ever break it out again. Let it stay in grass. We need the income to help us with our retirement and cost of living continues to get higher and higher"*

CHAPTER V

SUMMARY AND CONCLUSIONS

OVERVIEW

The purpose of the study was to identify the attitudes and perceptions of the CRP participants in the Oklahoma Panhandle region. A majority of the participants (87.6%, see Table 4.1) were owners, either actively or inactive involved with their CRP farmlands. Renters of CRP farm represented 9.1% of the total respondents while trustees accounted for 3.2% of total. A majority of them (55.8%, see Table 4.3) owned native grass, similar to the national CRP survey result (see Table 4.23). This indicates a concurrence of the grass type ownership.

PARTICIPATION AND ENROLLMENT CHARACTERISTICS

A majority of CRP participants (61.2%) who agree that the USDA is paying adequate attention in controlling soil erosion also agree that USDA is paying attention to improving water quality (see Table 4.6). CRP farmers and participants also agree that adequate attention is also given to improving air quality and enhancing economic benefit in relation to controlling soil erosion. A majority of CRP participants (56.3%, see Table 4.12) agree that potential income of farmland influences their re-enrollment preference. With regards to improving scenic quality of farmland, a significant number of farmers

(43.8%, see Table 4.11) agree that it is one of the least factors that motivate their re-enrollment choice.

The CRP was primarily designed towards controlling soil erosion and a majority (58.0%, Table 4.20) of the farmers agrees that their re-enrollment preference is guided by their interest to control soil erosion. Korsching et al. (2001) observed that farmer's interest on soil erosion and conservation issues are tied to potential economic and income-related issue is evident in the present study. In this regard, the study indicates that 50.8% of the farmers who responded that soil erosion reduction to be receiving adequate attention also agree that there is adequate attention to future income (see Table 4.14). Also, the enrollment preference indicates a high correlation between soil erosion improvement and future income potential in (see Table 4.21).

The importance of demography and soil conservation preferences has been investigated in relation to the CRP (Earle at al. 1979; Onianwa et al. 1999). These studies have indicated that higher educational levels have a direct relationship between soil conservation practices. This is because, higher the educational levels, more successful are their conservation practices. In present study, there is definitely a similar indication, but it is not conclusive. Figure 4.5 shows the presence of higher educational level (70%) among CRP participants in the Oklahoma Panhandle. These participants possess at least a bachelor's degree. This indicates that the participants have good educational background and this is important when communicating conservation policy issues. In recent years, there have been regular farm meetings between USDA policy makers and CRP participants and a good educational status is especially helpful in addressing enrollment policies and outcomes.

The age distribution of CRP participants in the present study is another important demographic indicator. The relative distribution of age group ranges among these participants is shown in Table 4.21. In that, more than 80% of the participants are in the 55 and above age group. While the older population of CRP participants might be of concern to policy makers, this can also be seen as an advantage. In the study of organizational management in business firms, cross training is seen as an effective tool for training new employees. In this, senior workers train the new recruits and in this way, the cost of conducting new training sessions is eliminated. In a similar circumstances, older and more experienced CRP participants could cross train new farmers and conservation owners. Not only would this provide the new CRP farmer with the local knowledge and expertise, but would also help him/her to get started with conservation activities at the earliest.

Environmental benefits perceived by CRP participants

There seems to be a disparity between CRP participants with regards to re-enrollment preferences. Despite results indicating good indication of a positive relationship between soil erosion and improving natural resources (see Table 4.8 and Table 4.9), improvement of water quality and air quality does not correlate well with future income potential (Table 4.15). There could be several reasons for this. First, the CRP has been developed primarily to obtain economic returns from improved soil productivity through reduction of soil erosion. With this emphasis on soil conservation, there has been no study that has established a relationship between water & air quality improvements with future income. However, this could change in the future with a more flexible

Environmental Benefits Index (EBI) list that is non-subjective and caters to CRP participants with different environmental needs. Increasing the allocation of points to air and water quality improvements and providing an avenue for helping the participants to generate revenue through indirect in-farm and out-farm opportunities are some of the future recommendations to the program. The U.S. Department of Agriculture is well aware of this fact in providing additional incentives for the participants. Consequentially, the Conservation Reserve Enhancement Program (CREP) was initiated from an environmental benefit standpoint. The CREP operational characteristics are identical to the Conservation Reserve Program, but there are two significant differences in its structure:

1. CREP is a collaborative effort between state and the federal government, unlike the CRP which is monitored exclusively by the federal government.
2. Certain specific state-level environmental issues are discussed and managed.

In recent years, two key environmental factors, viz., water and air quality have been addressed through the CREP. Also, there have been cases of direct economic benefits from CREP in improving water quality. For instance, in New York City, CREP has provided environmental benefits including alternative water, fencing and tree planting. Lamont (2005) observes that these benefits would result in total payment of over $50,000 that would go directly to the farmers and would eventually improve the quality of water supply in New York City. In the Oklahoma Panhandle, the Farm Service Agency has been encouraging farmers to earn bonus points in their EBI list. For instance, in Texas County, farmers have been awarded bonus points for installing water guzzlers that

provided better drainage of excess water in CRP tracts (Freeman, M., personal communication). Figure 5.1 shows one such water guzzler.

Figure 5.1: Water guzzler used on a CRP farmland in Texas County

(Photo Courtesy: Malinda Freeman)

A majority of CRP participants in the Panhandle perceive improvements in soil erosion to have gained adequate attention from USDA (see Table 4.14). They also agree that correspondingly, there has also been adequate attention to improving soil, water and wildlife habitat. Participants also agree that improvement in air quality as well as water quality enhancement receive too much attention (see Table 4.15). While these results indicate a definite preference in priority towards improving the environment, soil erosion reduction has maintained its importance in the conservation decisions of CRP participants.

The study also indicates that farmers perceive that the USDA has not been paying adequate attention to air quality and economic benefits (Table 4.16). This may be of

concern in future CRP signups as new environmental policies pertaining to air pollution and clean air Act are being actively legislated. In particular, the rampant growth of hog farm development is a matter of concern with respect to the quality of air in Texas County and the Panhandle as a whole.

FUTURE RESEARCH RECOMMENDATIONS

The researcher believes that the CRP has had an overall positive effect on the environment in the Oklahoma Panhandle. However, for future signups, several key areas needs to be addressed. Specifically, if a CRP participant were to improve wildlife habitat and scenic quality of their farm landscape, then soil erosion improvement would not weigh in to be as important. Hence, a revision on the EBI must be implemented whereby; the weightage of the environmental factors is customized or is as non-subjective as possible. A universal EBI would be unfair for prospective CRP enrollees to signup if they would have different environmental needs.

Analysis reveals (see Table 4.10) that there seems to be a lower expectation and perception towards improving the scenic quality of the farm landscape. Future research conducted through the USDA can help investigate these related issues for the Oklahoma Panhandle. In the U.S., there is a growing popularity to encourage ecotourism and this is seen as a viable alternative to gather additional revenue in agricultural areas. In essence, the CRP participants and USDA need to work on solutions that could improve the scenic appearance of Oklahoma Panhandle and generate revenue at the same time. Not only would this augment the future economic potential of the CRP but it would also provide a sustainable alternative to ecological preservation.

Limitations and future scope

There are two significant limitations in the current study. First, the survey methodology could have been more disciplined with a scientific approach to the mail out survey. Pre-tested validation with expert panel review and usage of mailing reminders are some of the important ancillary activities that are typically carried out in a mailing survey through qualitative inquiry. In the present study, the validation and peer-review of the national survey of Allen and Vandevar (2003) was used.

Second, the project was initially aimed towards incorporating a Geographic Information Systems (GIS) component for the visual rendition of the CRP preferences among participants. In order to accomplish this, the researcher obtained the location of the respondents through three representative variables - Farm number, tract number and CLU (common land unit) number. Many of the respondents did not complete this question; it is suspected that this question may have challenged the privacy concern of the CRP participants. Thus, in future research, location specific questions need to be specified. Once this is accomplished, the preferences to environmental quality associated with these respondents could be then linked using Join and Relate operations with the attribute tables in ArcView version 9.0 software (ESRI Inc., Redlands, CA).

The present study can aid quantitative and GIS based analysis on the CRP, the research on Texas County by Awawdeh (2004) is one such study. For instance, future research projects bridging socioeconomic characteristics with physical and quantitative aspects of conservation programs can be analyzed. With respect to CRP, the perceptions of the participants to the environmental quality can be studied in relationship to the observed environmental quality through GIS and environmental models. Again, location

is the key component to such endeavors and the importance of obtaining the same needs no further emphasis. Other resources available to locate the CRP participants include postal ZIP code GIS shape file available on the U.S. Postal Services website.

Some of the applications of using GIS in further extending this study includes the study on air quality. The development of hog farms and its corresponding effect on the environment requires special attention in Oklahoma Panhandle region, especially in Texas County (Hart and Mayda, 1997). In particular, the effect of hog farm development to air & odor quality and its corresponding perception by CRP participants to these developments can be further analyzed. In addition to this, GIS models can be developed to study the changes in air quality with regards to development of hog farms in CRP farm lands.

Other avenues of potential research in using GIS tools include network modeling. Figure 4.1 indicates that a significant percentage (36%, N=179) of CRP participants are owners but not actively involved. This trend is due to the unique agricultural practice in the Great Plains region, also called as suitcase farming. In this, farmers own lands in rural hamlets, but live in major urban areas and commute to their farmland only during harvesting or planting season. In this way, the farmer is able to earn additional income through part-time employment in urban cities. In the state of Oklahoma, the suburban regions of Enid and Sand Springs are good examples of major urban centers with a high density of suitcase farmers. Hence, in a future research, a distance to work method can be used with the help of GIS techniques to create a transport network model to investigate suitcase farmer commuting with respect to CRP farm location. A study of this nature could be potentially useful to study the farmer characteristic with respect to ownership

and the spatial characteristics of commuting. Transportation geography has seldom been applied in investigating agricultural commuting and the case of CRP farm commuting could be an useful research venture.

Recommendation to Policy Makers

In a recent publication issued by the Farm Services Agency of Texas County, it is anticipated that certain contracts that would begin to expire between September 2007 and September 2010 will be offered the opportunity to re-enroll or extend their contracts. The Agency also notes that the Environmental Benefits Index (EBI) that was used at the time the offer was originally enrolled as the basis for determining whether a contract maybe re-enrolled or extended.

The researcher believes there could be some flexibility provided in terms of the scope of the EBI. Many of the CRP participants in the survey indicate that the EBI could be customized based on the specific environmental need. As one CRP participant pointed out,

> *"..The EBI points should be designed for the area involved. For instance, in the panhandle of Oklahoma, wind erosion far outweighs water quality. Our rainfall is so much less than down state in Oklahoma. Water quality should be emphasized down state and wind erosion in the panhandle..."*

Effect on odor quality through hog farm development and the impact of wind erosion need to be addressed through flexible options in the EBI. One of the ways in customizing the EBI would be to conduct a comprehensive survey of the CRP participants in assessing their needs and preferences on the changes that could be implemented in the EBI. The specific environmental needs are expected to align with their preferred environmental

benefits. The Oklahoma Panhandle is at a unique geographical location compared to down state in Oklahoma. It would be hence useful to revamp the EBI and the CRP in the Panhandle region from a policy and environmental standpoint.

In addition to amending the EBI, policy makers acting through the Natural Resources Conservation Services (NRCS) need to tap into the benefits rendered by geospatial technologies and GIS in better understanding the needs of the CRP participants. Already, the NRCS has made the digitized soil survey maps available on their internet domain. In addition to the socioeconomic data available through the U.S. Census Bureau, the Farm Services Agency would need to incorporate some of these data through visual rendition and provide users quick access to the characteristics of CRP participants. In this way, both policy makers and CRP owners can understand the status of the program in better improving their needs and outcomes.

REFERENCES

Ajzen I. and M. Fishbein. 1977. Attitude-Behavior Relations: A Theoretical Analysis and Review of Empirical Research. *Psychology Bulletin*. 84: 888-918.

Alasuutari, P. 1995. An Invitation to Social Research. London: Sage Publications Ltd.

Allen, A.W. and Vandever, M.W. 2003. A National Survey of Conservation Reserve Program (CRP) Participants on Environmental Effects, Wildlife Issues, and Vegetation Management on Program Lands: Biological Science Report, USGS/BRD/BSR--2003-0001, 51 p.

Awawdeh, M.M. 2004. GIS-based Evaluation of the Conservation Reserve Program in Texas County, Oklahoma. Unpublished Ph.D. dissertation. Stillwater: Oklahoma State University.

Berelson, B. 1952. Content Analysis in Communication Research. Glencoe, Illinois: Free Press.

Birdwell, B. T. 1982. The relationship between farmers' soil conservation ethics and soil erosion. Unpublished doctoral dissertation. Stillwater: Oklahoma State University.

Borchert, J.R. 1971. The Dust Bowl in the 1970s. *Annals of the Association of American Geographers*. 61(1): 1-22.

Bruening, T. and R.A. Fritz. 1992. Farmer perceptions of soil and water conservation issues: Implications to Agricultural and Extension Education. *Journal of Agricultural Education*. 33 (4): 48-54.

Chambers, R. and W. Foster. 1983. Participation in farmer-owned reserve program: A decision choice model. *American Journal of Agricultural Economics*. 65: 120-124.

Crosson, P. 1986. Soil Erosion and Policy Issues. In T. Phipps, P. Crosson and K. Prices (eds.), *Agriculture and the Environment*. Washington, DC: Resources for the Future, pp. 35-73.

Daugbjerg, C., R. Tranter, P. Jones, J. Little, L. Costa, T. Knapp, M. Sottomayor, and A. Swinbank. 2005. The visibility of agricultural subsidies and market illusions in the Common Agricultural Policy: Some evidence from farmers' views in Germany, Portugal and the United Kingdom. *European Journal of Political Research*. 44 (6): 749-766.

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

Doerris, A.H. and J.W. Morris. 1960. The Oklahoma Panhandle – A Cross Section of Southern High Plains. *Economic Geography*. 36 (1): 70-88.

Dorries, W.L. 1957. How will Soil Bank Program Affect Cotton Production?. *Journal of Farm Economics*. 39 (1): 163-167.

Earle, T., C. Rose and A. Brownlea. 1979. Socioeconomic predictors of intention towards soil conservation and their implications in environmental management. *Journal of Environmental Management*. 9: 225-236.

Ervin, C. and D. Ervin. 1982. Factors affecting the use of soil conservation practices: Hypotheses, evidence, and policy implications. *Land Economics*. 58: 277-292.

Esseks, J.D. and S.E. Kraft. 1989. Marketing the Conservation Reserve Program. *Journal of Soil and Water Conservation*. 44 (5): 425-436.

Farm Service Agency (FSA), 2004. Last retrieved October 17,2005. http://www.fsa.usda.gov/dafp/cepd/12crplogo/history.htm

Guo, H., L. D. Jacobson, D. R. Schmidt and R. E. Nicolai. 2003. Evaluation of the influence of atmospheric conditions on odor dispersion from animal production sites. *Transactions of the American Society for Agricultural Engineers.* 46 (2): 461-466.

Hart, J.F. and C. Mayda. 1997. Pork palaces on the Panhandle. *Geographical Review*. 87 (3): 396-400.

Jagger, C. 1985. Addressing excess capacity in wheat production: An Economic Analysis of Long-Range Land Retirement Programs. Unpublished Ph.D. thesis. Ithaca, NY: Cornell University.

Jagger, C. 1986. Whole Farm vs. Part-Farm Voluntary Land Retirement Programs. *North Central Journal of Agricultural Economics*. 8 (1): 41-45.

Johnson, J. and Stephenson, R. 2005. Stakeholders Look at the Conservation Reserve Program through Different Windows. In Allen, A.W. and VandevarM.W., eds., 2005, The Conservation Reserve Program – Planting for the future: Proceedings of a National Conference, Fort Collins, Colorado, June 6-9, 2004: U.S. Geological Survey, Biological Resources Discipline, Scientific Investigation Report 2005-5145, 248 p.

Kairumba, J. and G. Wheelock. 1990. Farm structure and use of the conservation reserve program of the 1985 farm bill. *Southern Rural Sociologist*. 7:86-105.

Krippendorff, K. 1980. Content Analysis: An Introduction to Its Methodology. Newbury Park, CA: Sage.

Kochenower, R. and Edwards, J. 2005. Oklahoma Panhandle wheat variety trials report. OSU/DANSR/OCES --2005. 6pg.

Koppes, C.R. 1980. Dusty Volumes: Environmental Disaster and Economic Collapse in the 1980s. *Reviews in American History*. 8 (4): 535-540.

Korsching, P.F., E. O. Hoiberg, G. L. Bultena and S. C. Padgitt. 2001. Soil Erosion as a Community Issue: Public Perceptions of Off-Site Impacts. *Society and Natural Resources*, 14:67-76.

Lamont, G.L. 2005. Protecting New York City's Water Supply with the Conservation Reserve Enhancement Program. In Allen, A.W. and VandevarM.W., eds., 2005, The Conservation Reserve Program – Planting for the future: Proceedings of a National Conference, Fort Collins, Colorado, June 6-9, 2004: U.S. Geological Survey, Biological Resources Discipline, Scientific Investigation Report 2005-5145, 248 p.

Lasley, P., M. Duffy, K. Kettner and C. Chase. 1990. Factors affecting farmers' use of practices to reduce commercial fertilizers and pesticides. *Journal of Soil and Water Conservation*. 45 (1): 132-136.

Laylock, W.A. 1991. The Conservation Reserve Program – How did we get where we are and where to go from here? In *Proceedings of the Conservation Reserve – Yesterday, Today and Tomorrow.* USDA Forest Service General Technical Report. Eds. Joyce, L.A., J.E. Mitchell and M.D. Skold. Washington, D.C., 103 pp.

Lee, S.F. and Leung, R. 1999. Survey on total quality management implementation in Hong Kong. Managerial Auditing Journal. 14 (1): 71-74.

Lynne, G. D., J.S. Shonkwiler and L.R. Rola. 1988. Attitudes and Farmer Conservation Behavior. *American Journal of Agricultural Economics*. 70: 12-19.

McLean-Meyinsse, P., J. Hiu and R. Josephy. 1994. An empirical analysis of Louisiana small farmer's involvement in the conservation reserve program. *Journal of Agricultural Applications and Economics.* 26: 379-385.

Mortensen, T.L., F.L. Leistritz, J.A. Leitch, R.C. Coon and B.L. Ekstrom. 1989. Landowner characteristics and the economic impact of the Conservation Reserve Program in North Dakota. *Journal of Soil and Water Conservation.* 44 (5): 494-497.

Napier, T.L. and E.J. Johnson. 1998. Awareness of operation future among landowner-operators in the Darby Creek watershed of Ohio. *Journal of Soil and Water Conservation*. 53 (4): 353-358.

Nardi, P. M. Doing Survey Research: A guide to quantitative methods. Boston: Pearson Education Inc.

National Agricultural Statistical Service (NASS). 2005. The 2002 Census of Agriculture. Last retrieved October 2, 2005. http://www.nass.usda.gov/census.

Neuendorf, K.A. 2002. The Content Analysis Guidebook. Thousand Oaks: Sage Publications Inc.

NRCS (Natural Resources Conservation Service). 2000. Oklahoma Conservation Reserve Program Annual Report.

Oklahoma Climatological Survey (OCS). 2002. Oklahoma Normal Annual Temperature. Last retrieved October 1, 2005. http://climate.ocs.ou.edu/normals_extremes.html

Onianwa, O., G. Wheelock and S. Hendrix. 1999. Factors affecting Conservation Practice Behavior of CRP Participants in Alabama. *Journal of Agribusiness*. 17: 149-160.

ODA. 2005. Oklahoma Department of Agriculture, Food and Forestry Division. 2005. Last retrieved October 13, 2005. http://www.state.ok.us/%7Eokag/.

Padgitt, S. 1989. Farmers' views on groundwater quality: Concerns, practices, and policy preferences. Staff report. U.S. Office Technical Assessment, Washington, D.C.

Pease, J. and D. Bosch. 1994. Relationships among farm operators' water quality opinions, fertilization practices, and cropland potential to pollute in two regions of Virginia. *Journal of Soil and Water Conservation*. 49 (5): 477-482.

Ribaudo, M.O., S. Piper, G.D. Schaible, L.L. Langer and D. Colacicco. 1989. CRP: What economic benefits? *Journal of Soil and Water Conservation*. 44 (5): 421-424.

Ringquist, E.J., J.A. Lee and R.T. Ervin. 1995. Evaluating the environmental effects of agricultural policy: The soil bank, the CRP, and airborne particulate concentrations. *Policy Studies Journal*. 23 (3): 519-520.

Routio, P. 2005. Arteology: The Science of Design. University of Art and Design Helsinki. Last retrieved October 12, 2005. http://www2.uiah.fi/projects/metodi/e00.htm

Schwedtmann, C.R. 1995. Farmer’s Assessment of the Soil Conservation Attributes of the Conservation Reserve Program and Implications for Returning CRP Lands to Crop Production. Unpublished M.S. thesis. Edwardsville, IL: Southern Illinois University.

SOF, 2005. State of Oklahoma online. Last retrieved October 1, 2005. http://www.oklaosf.state.ok.us/osfdocs/sooner.html

Stemler, S. 2001. An overview of content analysis. Practical Assessment, Research & Evaluation, 7 (17). Last retrieved October 25, 2005. http://PAREonline.net/getvn.asp?v=7&n=17.

Sullivan, P., D. Hellerstein, L. Hansen, R. Johansson, S. Koenig, R. Lubowski, W. McBride, D. McGranahan, M. Roberts, S. Vogel and S. Bucholtz. 2004. The Conservation Reserve Program: Economic Implications for Rural America: Agricultural Economic Report. USDA/ERS/AER – 2004, 106 p.

Sumner, D.A. 2003. Implications of the US Farm Bill of 2002 for agricultural trade and trade negotiations. *The Australian Journal of Agricultural and Resource Economics* 47 (1): 99-122.

Traoré, N., R. Landry and N. Amara. 1998. On-farm adoption of Conservation Practices: The Role of Farm and Farmer Characteristics, Perceptions, and Health Hazards. *Land Economics*. 74 (1): 114-127.

TEP (Texas Environmental Profiles). 2005. Last retrieved October 1, 2005. http://www.texasep.org/html/Ind/Ind_2agr_ser.html.

U.S. Department of Agriculture (USDA) Factsheet. Last retrieved November 16, 2005. http://www.fsa.usda.gov/pas/publications/facts/crpebi03.pdf

U.S. Food Securities Act online. Last retrieved August 2, 2005. http://www4.law.cornell.edu/uscode/16/ch58.html

U.S. General Accounting Office (GAO). 1996. Content Analysis: A Methodology for Structuring and Analyzing Written Material. GAO/PEMD-10.3.1. Washington, D.C.

U.S. Geological Survey. 2005. Biological Activities in Oklahoma. Last retrieved October 21, 2005. http://biology.usgs.gov/cro/ScienceInYourState/Oklahoma/OK-brd.htm

Veneman, A.M. 2002. Conservation Program Implementation. *Journal of Soil and Water Conservation*. 57 (4): 80-82.

Walker, D.J., Wu, S. and Brusven, M.A. 2000. The efficiency and effectiveness of conservation compliance under 1996 farm commodity reforms. *Journal of Soil and Water Conservation*. 55 (4): 447-456.

Weber, R. P.1990.Basic Content Analysis, 2nd ed. Newbury Park, CA.

Weston, F.C. 1995. What do managers really think of the ISO 9000 registration process? *Quality Progress*, pp.68.

Worster, D. 1979. Dust Bowl: The Southern Plains in the 1930s. New York, NY: Oxford University Press.

Zinn, J. 1991. Conservation in the 1990 farm bill: The revolution continues. *Journal of Soil and Water Conservation*. 48: 45-48.

APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL

Oklahoma State University Institutional Review Board

Date:	Wednesday, November 24, 200
IRB Application No	AS0537
Proposal Title:	Identifying Farmer Perceptions to Environmental Conditions in the Conservation Reserve Program at Oklahoma Panhandle
Reviewed and Processed as:	Exempt

Status Recommended by Reviewer(s): Approved Protocol Expires: 11/23/2005

Principal Investigator(s

Aswin Subanthor
225 Scott Hall
Stillwater, OK 74078

Mahesh Rao
225 Scott Hall
Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

☒ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact me in 415 Whitehurst (phone: 405-744-1676, colson@okstate.edu).

Sincerely,

Carol Olson

Carol Olson, Chair
Institutional Review Board

APPENDIX B

SURVEY COVER LETTER

MM/DD/YYYY

Dear CRP Participant,

This survey is critical part of a research project associated with understanding the factors that influence a CRP participant to enroll in the program. Your name has been selected as a part of a sample of CRP participants in Oklahoma panhandle region. This research would help completing the project and provide you an opportunity to indicate your concerns and opinions on the CRP program for your farm land.

The most important part of the research effort is your input through the completion of the enclosed questionnaire. There are a total of 9 questions in this survey. We request you to complete the enclosed form and return it using the enclosed postage free envelope. Please note question 8 is purely for research purpose only; it would help us to better locate your CRP tract on a map.

Your cooperation in completing the enclosed form will be greatly appreciated. Please mail the responses back to me by MM/DD/YYYY.

We greatly appreciate your time and assistance.

Mr. Aswin Subanthore
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APPENDIX C

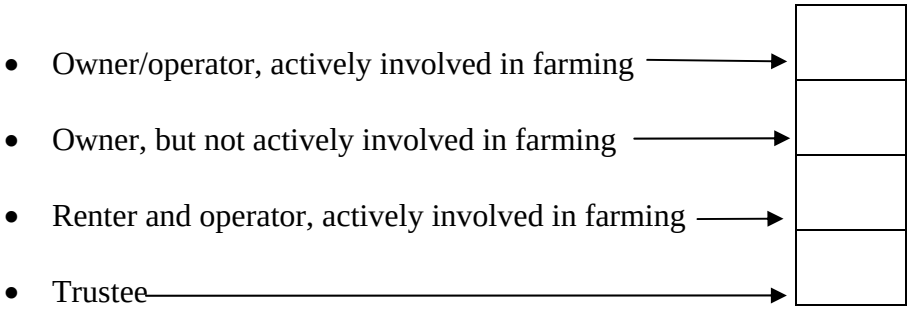
SURVEY INSTRUMENT

OKLAHOMA STATE UNIVERSITY CRP SURVEY

INSTRUCTIONS: Please answer each question on the following pages. Space is provided at the end of the survey for you to provide additional comments. Your opinion and thoughts are important to the success of this survey. Your answers and comments will remain anonymous and confidential.

In order to insure confidentiality, please do not put your name or address on the questionnaire itself.

1. Which of the following best describes your relations to the CRP? Please check the one box that most accurately describes your relationship.



2. How many years have you maintained your present farm? _____ Years.

3. Do you plan to re-enroll in the CRP program when the contract expires? (Circle One): Yes / NO

4. What would be the motivating factor for re-enrollment? Please rank the options from 1 to 6. (1=most important; 6= least important)

- Improved control of soil erosion ⟶ ☐
- Improved air quality ⟶ ☐
- Improved water quality ⟶ ☐
- Positive changes in wildlife populations ⟶ ☐
- Changes in scenic quality of farm or landscape ⟶ ☐
- Potential future income (e.g., hay production, livestock production and hunting) ⟶ ☐

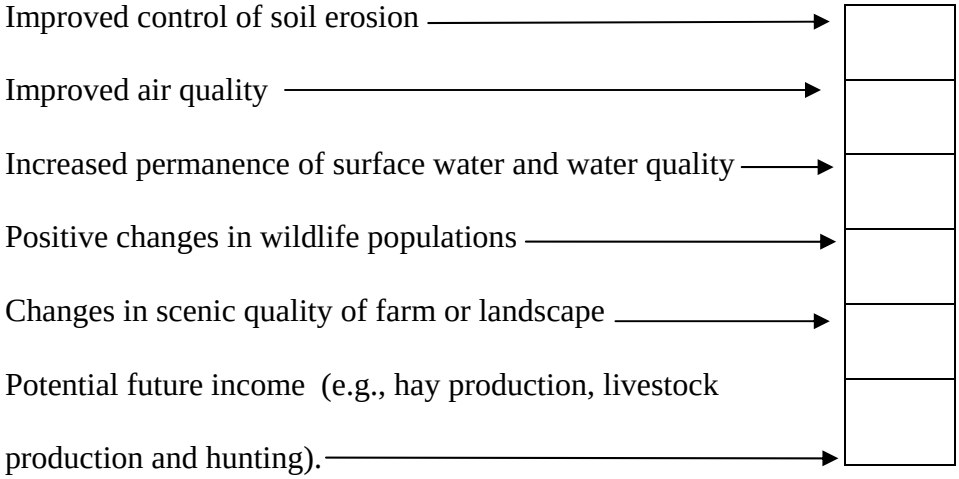
5. How would you describe your CRP acres? (Please **Check** one blank that most accurately describes the majority of your CRP acres).

- Majority non-native grass ⟶ ☐
- Majority native grass ⟶ ☐
- Majority trees ⟶ ☐

6. How many acres do you have enrolled in CRP_____ acres

7. How many years were you enrolled in the CRP program _____ years

8. For the current CRP contract enrollment, which of the following were most important for you? Please rank the options from 1 to 6. (1=most important; 6= least important)



9. Please indicate your (a.) Farm Number_____ (b.) Tract Number_____ (c.) Common Land Unit (Field Number)_____

10. Please give your evaluation of the amount of attention given to enhancing the following environmental factors in CRP enrollment. (Please circle the one number that best describes your opinion)

ENROLLMENT FACTOR	NOT ENOUGH ATTENTION	ADEQUATE ATTENTION	TOO MUCH ATTENTION
1. Controlling Soil Erosion	1	2	3
2. Improve Air Quality	1	2	3
3. Improve Water Quality	1	2	3
4. Improving Wildlife Habitat	1	2	3
5. Enhance Economic Benefit	1	2	3

11. Please indicate your age.

    a. _____20-34 b. _____35-54 c. _____over 55

12. What is the highest level of education completed by the farmer? (**Circle** Any One)

    a. Less than high school
    b. Vocational-Technical School
    c. High School diploma
    d. Some College
    e. College Degree

13. Please use this part of the survey to tell us how can the CRP be designed or administered in future years to better meet your needs:

_____

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VITA

Aswin Subanthore

Candidate for the Degree of

Master of Science

Thesis: PERCEPTIONS OF CONSERVATION RESERVE PROGRAM PARTICIPANTS TO ENVIRONMENTAL QUALITY IN THE OKLAHOMA PANHANDLE

Major Field: Geography

Biographical:

Personal Data: Born in Chennai (India), on October 4, 1979, the son of Vasudev Subanthore and Santha Vasudev.

Education: Graduated from Vidya Mandir Senior Secondary school, Chennai in May 1997; received Bachelor of Engineering in Mechanical Engineering in May 2001 from University of Madras; received Master of Science in Industrial Engineering and Management from Oklahoma State University in May 2003. Completed the requirements for the Master of Science degree with a major in Geography at Oklahoma State University in December 2005.

Experience: *Graduate Teaching Associate*: Department of Geography, August 2005 – present. *Research Assistant*: Center for Studies in Disaster and Extreme Events, Oklahoma State University, April 2005 – present; Center for Applications in Remote Sensing, August 2003 – July 2004; School of Educational Studies, January 2003 – present, School of Industrial Engineering and Management, August 2001 – May 2002. *Teaching Assistant*: Department of Geography, August 2004 – May 2005; School of Educational Studies, January 2004 – May 2004. *Intern*: Tractor and Farm Equipments Limited (India), March 1999 – August 1999.

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Name: Aswin Subanthore Date of Degree: December, 2005

Institution: Oklahoma State University Location: Stillwater, Oklahoma

Title of Study: PERCEPTIONS OF CONSERVATION RESERVE PROGRAM PARTICIPANTS TO ENVIRONMENTAL QUALITY IN THE OKLAHOMA PANHANDLE

Pages in Study: 93 Candidate for the Degree of Master of Science

Major Field: Geography

Scope and Method of Study:

The study was directed to identify the attitudes and perceptions that influence the Conservation Reserve Program (CRP) participants in the Oklahoma Panhandle. A mail-out survey was conducted from the sample of address locations of CRP participants provided by the Farm Services Agency offices in the Panhandle counties of Beaver, Cimarron and Texas. An informative research analysis methodology was adapted to identify some of the decisions and preference of participants towards environmental quality in the CRP. Descriptive statistical analysis was used to interpret the survey results. The participant's characteristics were studied towards their current enrollment and re-enrollment decisions in the program with data collected towards the end of summer 2005.

Findings and Conclusions:

A majority of CRP participants (61.2%) agreed that the U.S. government is paying adequate attention in controlling soil erosion. Results indicate that the participants agree that there is adequate attention paid by U.S. government on water and air quality improvement. The perceptions of the CRP participants in Oklahoma Panhandle favor the continuation of the Conservation Reserve Program in the region. However, re-enrollment preferences in their participation could be improved with certain modification in the Environmental Benefits Index. It is the recommendation of the study that the Index could be tuned to cater the specific needs of the CRP participants and not be totally subjective. Some of these modifications include introduction of enhanced air and wildlife quality initiatives and influence of hog farm development to air and water quality.

Advisor's Approval: _____

Dr. Mahesh N. Rao