IMPACTS OF INCREASED PLANTING FLEXIBILITY FROM GOVERNMENT PROGRAMS ON CROP ACREAGE BASE

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TABLE OF CONTENTS

Chapter		Page
I.	OVERVIEW	1
	Introduction	1
	Background	2
	Objectives	3
	Government Involvement in Agriculture	4
	History of Planting Flexibility	7
	Agricultural Act of 1970	7
	Agricultural and Consumer Protection Act of 1973	9
	Food and Agriculture Act of 1977	9
	Agriculture and Food Act of 1981	10
	Food Security Act of 1985	11
	Food Security Improvement Act of 1986	12
	Disaster Assistance Acts	13
	Food, Agriculture, Conservation, and Trade Act of 1990	13
	Review of Literature	18
	Limitations to Planting Flexibility	18
	Program Participation and Characteristics of Participants	19
	Acreage Response to Commodity Programs	22
	Originality of Thesis	25
	Summary	26
II.	DATA	28
	Program Enrollment and Use of Flex Acres	28
	National Summary	28
	Regional Summary	33
	Survey State Summary	44
	Federal Farm Program Participation Survey	47
	Introduction	47
	Survey Sample	48
	Survey Response Rate	48
	Summary of Survey	54
	Summary of Survey Responses	56
	Characteristics of Farm Operations	56
	Characteristics of Producers	60
	Summary of Crop Yields	64
	Participation in Federal Farm Programs	66

Chapter Page

Reasons for Participating in ARP 69
Reasons for Not Participating in Commodity Farm Programs 69
Importance of Sources Providing Information on Federal Farm Programs 74
Factors Influencing Crops Planted on Flexible Acreage 74
Crops Planted on Flexed Acreage 80
Conclusion 81

III. METHODS 86

Introduction 86
Procedures 86
Linear Probability Model 87
Probit Model 88
Bivariate Probit Model 89
Tobit Model 91
Empirical Estimation 93
Probit Analysis 94
ARP 94
Nonrecourse Loan 96
Conservation Reserve Program 97
Bivariate Probit Analysis 99
Participation in Optional Flex 99
Participation in 0-50-92 101
Pooled Model Estimation 101
Tobit Analysis 102
Likelihood Ratio Test 104
Test of Pooling 105
Test of Regional Dummy Variables 106
Survey Response Bias 106

IV. RESULTS 108

Probit Model Results 108
Participation in ARP 108
Participation in Nonrecourse Loan Program 112
Participation in CRP 114
Bivariate Probit Model Results 117
Participation in 0-50/92 117
Participation in Optional Flex 121
Level of Participation in Normal Flex Acres 125
Comparison of Means 129
Conclusions 135

V. SUMMARY 137

Limitations of Study and Suggestions for Future Research 138

Chapter Page

BIBLIOGRAPHY 139

APPENDIX

OKLAHOMA STATE UNIVERSITY FEDERAL FARM PROGRAM PARTICIPATION SURVEY 142

LIST OF TABLES

Table		Page
I.	National Summary of Flex Acres: 1992 Flex Acres Planted to the Following:	31
II.	Regional Summary of Flex Acres: Use of Flex Acres by Region, By Crop: Flex Acres Planted to the Following	41
III.	State Summary of Flex Acres: Use of Flex Acres by Survey State, By Crop: Flex Acres Planted to the Following	45
IV.	Response to Federal Farm Program Participation Survey	53
V.	Characteristics of Farm Operations of Survey Respondents for Oklahoma, Missouri, Tennessee, and North Dakota	57
VI.	Characteristics of Farm Operations for Survey Respondents Indicating Participation in ARP for Oklahoma, Missouri, Tennessee, and North Dakota	58
VII.	Characteristics of Farm Operations for Survey Respondents Indicating Non-Participation in ARP for Oklahoma, Missouri, Tennessee, and North Dakota	59
VIII.	Producer Characteristics of All Survey Respondents for Oklahoma, Missouri, Tennessee, and North Dakota	61
IX.	Producer Characteristics of Survey Respondents Indicating Participation in ARP for Oklahoma, Missouri, Tennessee, and North Dakota	62
X.	Producer Characteristics of Survey Respondents Indicating Non-participation in ARP for Oklahoma, Missouri, Tennessee, and North Dakota	63
XI.	Comparison of Survey and State Level Average Yields for Wheat, Corn, Barley, Cotton, Oats, Sorghum, Soybeans	65

Table		Page
XII.	Participation in Federal Farm Programs Reported By Survey Respondents for Oklahoma, Missouri, Tennessee, and North Dakota	67
XIII.	Importance of Reasons for Participating in ARP: Indicated by Survey Respondents	70
XIV.	Importance of Reasons for Not Participating in Commodity Farm Programs: Indicated by Survey Respondents	72
XV.	Importance of Organizations or Agencies Providing Information on Federal Farm Programs Indicated by: Survey Respondents	75
XVI.	Importance of Factors Influencing Crops Planted on Normal Flex Acres: Oklahoma	77
XVII.	Importance of Factors Influencing Crops Planted on Normal Flex Acres: Missouri	78
XVIII.	Importance of Factors Influencing Crops Planted on Normal Flex Acres: Tennessee	79
XIX.	Importance of Factors Influencing Crops Planted on Normal Flex Acres: North Dakota	80
XX.	Crops Planted on Normal Flex Acres: 1991, By Survey Respondents Participating in ARP	82
XXI.	Crops Planted on Optional Flex Acres: 1991, By Survey Respondents Participating in Optional Flex	83
XXII.	Crops Planted on 0-50/92 Acres: 1991, By Survey Respondents Participating in 0-50/92	84
XXIII.	Crops Planted for Harvest in 1991 by Producers	85
XXIV.	Probit Results: Participation in Acreage Reduction Program	109
XXV.	Probit Results: Participation Nonrecourse Loan Program	113
XXVI.	Probit Results: Participation in Conservation Reserve Program	115
XXVII.	Bivariate Probit Results: Participation in 0-50/92	118
XVIII.	Bivariate Probit Results: Participation in Optional Flex Acres	122

Table		Page
XIX.	Bivariate Probit Results: Level of Participation in Normal Flex Acres	127
XXX.	Comparison of Means: Oklahoma	131
XXXI.	Comparison of Means: Missouri	132
XXXII.	Comparison of Means: Tennessee	133
XXXIII.	Comparison of Means: North Dakota	134

LIST OF FIGURES

Figure		Page
1.	Examples of Planting Flexibility	17
2.	National Enrollment Summary Base Enrollment 1992	30
3.	1992 National Summary of Flex Acreage Crops Planted on NFA and OFA	32
4.	Wheat Base 1992 Enrollment Report	34
5.	Corn Base 1992 Enrollment Report	35
6.	Barley Base 1992 Enrollment Report	36
7.	Sorghum Base 1992 Enrollment Report	37
8.	Oats Base 1992 Enrollment Report	38
9.	Cotton Base 1992 Enrollment Report	39
10.	Regional Summary of Flex Acreage Crops Planted on NFA and OFA	43

LIST OF MAPS

Map		Page
1.	Federal Farm Program Participation Survey Oklahoma: Surveys Mailed per County	49
2.	Federal Farm Program Participation Survey Missouri: Surveys Mailed per County	50
3.	Federal Farm Program Participation Survey Tennessee: Surveys Mailed per County	51
4.	Federal Farm Program Participation Survey North Dakota: Surveys Mailed per County	52
5.	Program Participation Survey, Counties Represented by Responses. Missouri, North Dakota, Oklahoma, and Tennessee	55

CHAPTER I

OVERVIEW

Introduction

Federal farm policies have evolved and influenced the production of agricultural commodities. Changes in program objectives and provisions have influenced participation and planting decisions of many American farmers. The planting flexibility granted to farmers participating in federal commodity programs is often dictated by program objectives and provisions. Planting flexibility is the ability of farmers to plant the crop of their choice on the amount of acreage they desire without affecting their historic crop acreage base.

A main factor affecting planting flexibility is the decision to participate in farm programs. Farmers who choose not to participate in farm programs have complete planting flexibility. Farmers who choose to participate must comply with program guidelines. Program guidelines determine the level of acreage and the crops eligible to receive government payments.

Commodity programs were originally designed to control production and thus raise prices and increase net farm incomes. Production was controlled by limiting acreage

planted (Paarlberg). Planting inflexibility has originated from the need of government to establish payment acreage and planting restrictions required to protect established crop acreage bases. An established crop acreage base (CAB) is used for calculating land retirements, conserving use acres, and acreage eligible for deficiency payments. The crop acreage base is a five year moving average of acreage planted and acreage considered planted for harvest on the farm for wheat and feed grains. For cotton and rice, the crop acreage base is a three year moving average of acreage planted and acreage considered planted for harvest on the farm. Increased planting flexibility occurs when policy changes alter crop acreage base protection rules and allow non-base crops to be planted on crop acreage base without decreasing established base.

Background

Considerable planting flexibility was present in the farm programs of the 1970s. Growing surpluses through the 1980s led to increased restrictions on planting flexibility. As a requirement for eligibility to receive deficiency payments, the Food Security Act of 1985 forced farmers to plant the crop for which the base was established. Failure to plant this base crop would result in both a loss of future base and the loss of the deficiency payment. Agricultural policy enacted in 1991, was the first

legislation in nearly two decades which would increase planting flexibility.

Even though current federal farm programs allow some planting flexibility to participating farmers, program participation and planting flexibility decisions may not be the same for all farmers. With planting flexibility, farmers must decide to plant the base crop on the flex acres or allocate the flexible acreage to some other use.

This study examines commodity program participation in an attempt to identify characteristics that influence the participation decision, especially the decision to use planting flexibility provisions, and to identify regional differences in participation decisions.

Objectives

The overall objective of this thesis is to determine the socioeconomic characteristics that influence participation in specific federal farm programs. The specific objectives of this thesis are: (1) present characteristics of agricultural producers, both participants and non-participants in the Acreage Reduction Program, with established crop acreage base; (2) determine the socioeconomic characteristics influencing participation in the federal farm programs which specifically provide increased planting flexibility; (3) Identify participation in commodity programs that allow planting flexibility, crops planted on flexible acreage and determine if differences,

affecting participation exist among producers in different regions.

To accomplish these objectives, the following procedures will be used. Objective one will be achieved with descriptive statistics from responses to surveys mailed to agricultural producers in four states, representing four USDA production regions, who have established base acreage for program crops. Objective two will be achieved with descriptive statistics from responses to survey questions asking producers about participation in federal farm programs and with econometric models estimating the probability of participation. Objective three will be achieved with descriptive statistics of responses to survey questions asking producers about flexible acreage and with an econometric model estimating the probability of "flexing" out of the base crop.

Farm level survey data, Agricultural Stabilization Conservation Service (ASCS) data, and Census of Agriculture data will also be used.

Government Involvement in Agriculture

The federal government has been involved in U.S. agricultural production and marketing through Federal legislation since the early 1900s. Over the years, the instruments of government involvement have changed. In the late 1800s and early 1900s, the government encouraged expansion and education. This role went beyond land

settlement and dispersal of land into what became the family farm structure of agriculture.

The Homestead Act of 1862 made land available to potential farmers. The Morrill Act of 1862, Hatch Act of 1887, and Smith-Lever Act of 1914 developed education, research, and extension activities at the state level. The Smith-Hughes Act of 1917 supported vocational agriculture at the high school level (Knutson).

It was not until the depression years of the 1930s that government intervention, in the market place, occurred on behalf of farmers (Knutson). As a result of the U.S. switching from a creditor to a debtor nation in 1920, farmers were caught in a price-cost squeeze that became a critical and major element of the Depression. As a result of failed efforts to organize and control production, farmers turned to the federal government for help (Rassmussen). Government programs were designed to raise commodity prices, increase farm income, and, because of the large number of farms, relieve the national poverty problem (USDA '90a).

In 1933 the Agriculture Adjustment Act (AAA '33) was designed to restore farm purchasing power to pre-war levels. Provisions of the AAA '33 included loans made by the Commodity Credit Corporation (CCC), compliance as a requirement for program benefit eligibility, and a voluntary reduction of crop acreage. The Soil Conservation and Domestic Allotment Act of 1936 introduced a paid land

diversion program that paid farmers to shift land into the production of soil conserving legumes and grasses. In 1938 the Agriculture Adjustment Act (AAA '38) introduced payment limitations and nonrecourse loans, and required soil conservation practices as a condition for crop insurance eligibility (Rassmussen).

In addition to changes in marketing and production, changes have occurred in the structure of farms. These changes include: farm numbers, size, and population. Other changes in farm structure have occurred including: how farms of different size and type organize natural, financial, and human resources to produce food and fiber and the distribution of income and wealth that results from this activity.

Even though farm population as a percent of total population has decreased from nearly 25 percent in 1933 to less than 2 percent in 1990, policy tools started in the 1930s are still in use today (USDA 1940-91). Entering the 1990s, the U.S. farm sector will be in an improved financial situation compared with the early and mid 1980s. Small farms currently dominate in numbers, and most farms are family-owned businesses, but a few relatively large farms produce most food and fiber for the U.S. (USDA '90a).

Even though changes in federal farm legislation and farm structure have occurred over the years, consistency has remained in one aspect. That is, farmers participating in federal farm programs have had to comply with program

provisions. When federal farm programs tie program benefits to the planting of specific crops or require cropland to be idled, farmers lose planting flexibility. Historically, eligibility for federal farm program benefits has required farmers to comply with planting guidelines and enroll land in voluntary acreage control programs. "Although nonparticipating producers have complete planting flexibility, producers holding more than 90% of some program bases voluntarily choose to give up this degree of flexibility to participate in commodity programs on a regular basis" (Langley). Participation in federal farm programs is voluntary and it is important for policy makers to understand factors that influence participation in farm programs when deciding upon program objectives and provisions.

History of Planting Flexibility

Agricultural Act of 1970

The Agricultural Act of 1970 (AA '70) was approved November 30, 1970 and was in effect for the 1971-73 crops. This act introduced a cropland set aside concept and set a payment limitation of $55,000 to program participants. Participation in the set aside program was voluntary, but was required for a farmer to receive program loans, certificate payments, and purchase agreements. Land enrolled in the set aside program was to be equal in productivity to other cropland on the farm and able to

produce a crop if the program was not in effect. Once a farmer met set aside and conserving base requirements, all remaining cropland could be planted to wheat (or any other program crop) and the wheat would be eligible for loans and purchase agreements. The farm's wheat allotment (acres eligible to be planted) did not have to be planted to wheat for the participant to receive marketing certificates. At least 90 percent of the allotment had to be planted to wheat or the allotment would be reduced in future years. The farm's wheat allotment was used to compute set aside acreage and support payments (ASCS).

Provisions of AA '70 affected the previous "year to year" participation decision available to farmers. Under provisions of AA '70, current year production decisions would affect future levels of participation. Producers were given increased planting flexibility as production was not limited (with the exception of a few crops still under allotment) by allotments or marketing quotas. Specifically, a farmer could participate in the wheat and feed grain program by taking out of production a percentage of the farm's allotment of wheat or feed grain crop. The farmer was then free to plant the remaining cropland to any crop not controlled by the allotment. The allotment would be lost if not planted to the allotment crop or a permitted substitute.

Agriculture and Consumer Protection Act of 1973

The Agriculture and Consumer Protection Act of 1973 (ACPA '73), approved on August 10, 1973, was in effect for the 1974-77 crops. ACPA '73 continued the set aside program from AA '70, introduced a "target price" program for deficiency payments, allowed for prevented plantings caused by disasters, and set a payment limitation of $20,000 to program participants. Although a farm's wheat allotment did not restrict the amount of wheat that could be planted, the allotment was used to compute payments made to participants and could be reduced or lost if not protected (ASCS). When the market price was less than the target price, deficiency payments would be made to farmers based on the difference between target prices and market prices or on the difference between target prices and price support loans, whichever difference was less. Agricultural conditions during the years covered by ACPA '73 were favorable and lessened the need for government involvement.

Food and Agriculture Act of 1977

The Food and Agriculture Act of 1977 (FAA '77), approved on September 29, 1977, covered the 1978-81 crops. This act continued the set aside program started in the 1970 act, substituted national program acreage for the acreage allotment system, initiated a program allocation factor, and set a program payment limit at $40,000 for participants

(ASCS). Set aside acreage was based on current year plantings instead of a percentage of the farm's allotment. Once the set aside and NCA requirements were met, farmers could receive program benefits and plant different program crops than planted in the previous year (USDA '77). Under provisions of this act, ASCS county committees established a normal crop acreage (NCA) for farms. When a set aside was in effect, the sum of acreage planted to NCA crops and set aside from production could not exceed the farm's NCA as a condition for participants to receive program benefits. Farmers who met voluntary acreage reductions and set aside requirements would be guaranteed target price coverage on 100 percent of acreage. Otherwise, between 80 and 100 percent of the acreage would be eligible for target price protection (ASCS). Westcott and Evans noted that while the FAA '77 granted planting flexibility to program participants, "it did not control production of program crops because the restrictions were not linked to historical plantings."

Agriculture and Food Act of 1981

The Agriculture and Food Act of 1981 (AFA '81), signed into law December 22, 1981, covered the 1982-85 crops. AFA '81 continued the set aside program from previous acts, established a crop acreage base, altered NCA rules, and set payment limits at $50,000 for participants. As before, participation in the set aside was required for eligibility

for deficiency payments, price support loans, and farmer-owned reserve loans. When a set aside program was in effect, participants had to reduce wheat plantings by an announced percentage of the established crop base. This established base was based on previous plantings (ASCS). Under AFA '81, the set aside program was more specific and required diversion from a crop-specific acreage base (USDA '90b). However, a participant could increase acreage planted to program crops and remain eligible for program benefits by reducing the acreage planted to another crop (USDA 1982a).

Food Security Act of 1985

The Food Security Act of 1985 (FSA '85), signed into law December 23, 1985, further restricted planting flexibility for farmers participating in farm programs. This act continued the set aside program, changed the determination of crop acreage base, added provisions for under-planting, and set total deficiency and diversion payments at $50,000 for program participants. Acreage reductions, set asides, and/or paid land diversions were authorized for use to reduce the acreage planted to program crops. Farmers were required to enroll land in the acreage reduction program (set aside) to be eligible for loans, purchases, and payments. Crop acreage base became a five year moving average of acreage planted and considered planted from the previous years (USDA '86). Under these

base protection provisions, as under provisions of AA '70, current planting and production decisions would affect future participation levels in farm programs. The planting restrictions required to protect crop base and the resulting costs associated with regaining base or losing base when planting a non-base crop on base acreage removed planting flexibility under provisions of FSA '85 (Westcott and Evans).

At the same time, some planting flexibility was given to participants. When a set aside was in place, under-planting provisions allowed less than 100 percent of base to be planted to the base crop while still receiving deficiency payments. For example, 50/92 provisions allowed participants to plant between 50 and 92 percent of their permitted acreage to the base crop, devote the remaining acres to a conserving use or a non-program crop (any crop other than wheat, feed grains, upland cotton, ELS cotton, rice or soybeans), and still be eligible for deficiency payments on up to 92 percent of permitted acreage. Permitted acreage is the crop base minus set aside acres corresponding to the ARP level. Under this under-planting provision, crop acreage base remained protected.

Food Security Improvement Act of 1986

The Food Security Improvement Act of 1986 further altered flexibility given to program participants. This act limited crops that could be grown on 50/92 acres. These

crops included sweet sorghum, guar, sesame, safflower, sunflower, castor beans, mustard seed, crambe, plantago ovato, flaxseed, triticale, rye, experimental commodities, and other imported industrial commodities (USDA 86).

Disaster Assistance Acts

Additional planting flexibility was granted in 1988 and 1989 with disaster assistance acts passed in these years. The Disaster Assistance Act of 1988 (DAA '88) allowed program participants to plant 10 to 25 percent of permitted acreage to soybeans and sunflowers without losing crop base. The Disaster Assistance Act of 1989 (DAA '89) permitted program participants to protect crop base while planting up to 20 percent of permitted acreage to alternative crops (USDA '91).

Food, Agriculture, Conservation, and Trade Act of 1990

The most recent changes in the federal farm programs came with the passage of the Food, Agriculture, Conservation, and Trade Act of 1990 (FACTA) and the Agriculture Reconciliation Act of 1990. FACTA is a five year comprehensive program that will guide food programs until 1995. The Agriculture Reconciliation Act of 1990 (ARA '90) reduced the amount of USDA spending for the period covered by FACTA by reducing the acreage eligible for farm program payments (USDA '91). Under ARA '90, the maximum

payment acres were reduced by 15 percent. Maximum payment acres (MPA) are equal to the established crop acreage base (CAB) less any set-aside acreage and normal flex acres. Producers are given planting flexibility under two different alternatives. These flexibilities allow a farmer to respond to market signals while remaining eligible for program benefits and protecting crop base (Langley).

To establish eligibility in commodity programs to receive payments, purchases, or loans, a farmer must be in compliance with the acreage reduction program (ARP). ARP is a voluntary annual land retirement program that requires a percentage of CAB to be taken out of production. Payments are not made on ARP acres. The ARP level is based on the stocks-to-use ratio for the preceding year. For wheat and corn, the ARP level must be announced by the Secretary of Agriculture by a specified date. A second date is set so that adjustments in the ARP level can be made if the supply of the commodity changes significantly.

Planting Flexibility. One program alternative that allows planting flexibility is the triple base concept. Under triple base provisions, up to 25 percent of the established CAB may be planted to a permitted non-base crop. Assuming 25 percent of crop base is flexed, the crop base can be divided into three parts: acres in set-aside, acres flexed to a non-base crop, and acres planted to the established base crop. As a result of the Agriculture Reconciliation Act of 1990, 15 percent of the CAB will not

receive deficiency payments. This 15 percent is part of the 25 percent flexible acreage and is known as normal flex acreage (NFA). NFA is not eligible for payments but may be planted to any crop except fruits or nuts. The remaining 10 percent of the 25 percent flexible acreage has been designated as optional flex acreage (OFA). OFA is the optional acreage that is eligible for deficiency payments if the original base crop is planted. OFA may be planted to any other program crop, any oilseed, or other designated crop without losing established base acres for the program crop, but will forego any deficiency payment.

0/92. The second program alternative that allows planting flexibility is the 0/92 option (50/92 for cotton and rice). Under the 0/92 option, producers may receive payments and protect base when a portion of MPA is devoted to conserving use (CU) or planted to minor oilseeds. For eligibility in 0/92, at least 8 percent of MPA must be designated to CU or permitted alternative crop. The remaining MPA designated to CU or planted to a permitted alternative crop is considered planted to the base crop. For example, if 100 percent of MPA is planted sunflowers, the producer may receive deficiency payments on 92 percent of MPA (McCormick et al.). Producers must choose to receive either deficiency payments on the CU acres planted to a minor oilseed and forgo loan eligibility for that minor oilseed planted on the farm or forgo deficiency payments and remain eligible for minor oilseed loans. Haying and grazing

on the CU acreage is permitted except during a consecutive five-month period between April 1 and October 31.

Examples of Planting Flexibility. Some examples of planting flexibility for producers participating in ARP are given in Figure 1. The examples are demonstrated for 100 acres of crop base and a 5 percent set aside requirement. In Example A, all permitted acres (NFA and remaining base) are planted to the base crop. Payment acres would equal remaining base planted to the base crop, or 80 percent of crop base. In Example B, 10 percent of the remaining base is designated as OFA. In this example, 25 percent of permitted acres may be planted to a non-base crop without decreasing the crop base. Acres eligible for deficiency payments are, however, decreased by 10 percent and payment acres would equal 70 percent of crop base.

Examples C and D represent 0/92 options. In Example C, 8 percent of MPA is designated to CU acres. Payment acres would equal 73.6 percent of crop base. In Example D, both the CU acres and remaining base acres are planted to a minor oilseed or a permitted crop. In this example, 85 percent of crop base is planted, but payment acres only equal 73.6 percent of crop base.

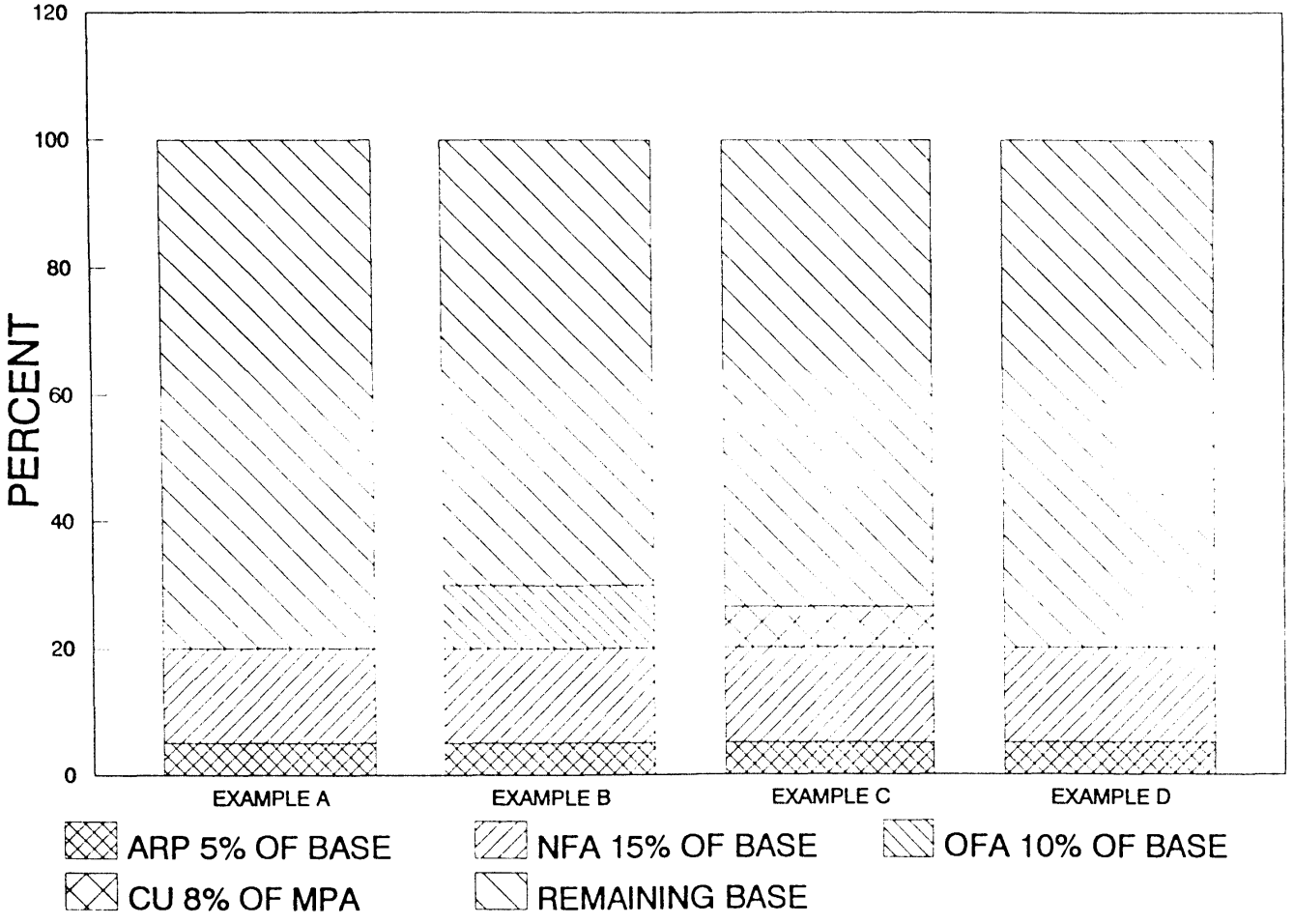


Figure 1. Examples of Planting Flexibility

Review of Literature

Limitations to Planting Flexibility

Farm legislation prior to FACTA '90 encouraged farmers to plant program crops on historical base acreage and reduced the impacts of the marketplace on planting decisions (Westcott '91). Provisions of the Food Security Act of 1985 (FSA '85) limited planting flexibility in three ways: (1) planting requirements to protect base history; (2) target prices greater than market prices; and (3) an acreage base in excess of acreage required to equate supply and demand at an acceptable price (Dicks et al.). Policy changes in FACTA stress moving towards greater market orientation in U.S. agriculture. As a result, market returns have become more important, payment acreage for program participants is smaller, and program participants receive increased planting flexibility (Harwood). Provisions of FACTA have frozen target prices for wheat, corn, sorghum, and oats at the levels reached in the last year of the time period covered by FSA '85 (USDA 91).

The previous need to protect the allotment history reduced the level of planting flexibility. FACTA classified base acreage in such a way that gives increased planting flexibility and allows farmers to protect base history and receive program benefits (Langley).

Program Participation and Characteristics of Participants

Participation in farm programs is voluntary. Farmers have demonstrated continued interest in participation as indicated by ASCS enrollment reports. However, not all agricultural commodities are eligible for government payments.

Changes in federal farm policy and the changing structure of agriculture have affected program participants and farms that receive government payments. To enable policy makers to forecast farmer responsiveness to the program, it is important to understand factors that influence the voluntary participation decision. Previous research has analyzed commodity programs and program participation. This research has analyzed producer and farm characteristics of both participants and non-participants.

Vermeer studied participants and non-participants in the Feed Grain Program of 1961. As part of this analysis, eight areas of Ohio, Minnesota, Iowa, Kansas, and Texas were studied. Vermeer reported that participants operated larger farms, had a feed grain base that was a larger percent of total cropland, and had a larger proportion of land in crops than non-participants. The impacts of land ownership on participation were not clear. One measure indicated participation was greater among tenant operators. However, there were economic advantages for both tenants and landlords involved with participation. For different areas

within the same state, owned land as a percent of total farmland was both more and less for participants. With the exception of participants in Texas and west-central Ohio, participants raised less livestock than non-participants. Characteristics concerning farm operator age and years of living on the farm were similar for both participants and non-participants. Also, farmers who had participated in previous farm programs were likely to continue participation in the Feed Grain Program.

Under provisions of FAA '77, Kramer and Pope analyzed the economic incentives influencing a grower's decision to participate or not participate in commodity programs. This study used stochastic dominance analysis which performs well when there is a finite, and hopefully small, number of crop choices (such as those delineated by field boundaries in irrigated agriculture). The impacts of alternative program features and farm size are studied utilizing the entire probability distribution of participant and nonparticipant net returns. "Stochastic dominance allows the ranking of probability distributions for different classes of risk attitudes." For a representative Kern County, California field crop farm, this study concluded that risk attitudes may affect the participation decision. Also, expectations about prices and yields affected the participation decision.

Chambers and Foster studied participation in the Farmer Owned Reserve program (FOR) under the Food & Agriculture Act of 1977. Because the farmer could choose to either

participate or not participate, the decision criterion suggested using a dichotomous choice model. In this analysis, a farmer would join FOR if the utility of participation was greater than utility of non-participation. For this study, the following were suggested as factors that affect the participation decision: the farmer's ability to dry and store grain, size and type of farm operation, alternative uses for the grain, the farmer's age, and dependence on grain sales as a direct source of income.

Chambers and Foster used similar variables for both corn and wheat models. The signs of the coefficients for both models were consistent with expectations. This study concluded that policies aimed at affecting expected profits seemed to be the most practical.

Perry et al. stated "Government program participation decisions heavily influence the crop mix decisions on many farms in the United States." Using provisions of FSA '85, Perry et al. presented a mixed-integer programming model that could be used for farm level decision analysis. The model was designed to maximize net present value of present and future returns from crop production and program participation. For a case study on a Texas cotton and grain sorghum farm, Perry et al. concluded that "resource levels and base acreage restrictions had a major effect in these (annual crop mix) decisions." Also, payment limitations did not influence the participation decision.

Johnson and Short examined the recipients of program benefits caused by compensational policies directed toward producers of specific commodities. These commodity programs have used supply control, price support, and direct payments for land diversion, as well as domestic and foreign food programs to influence commodity marketing and farm income. From previous research, Johnson and Short reported that participants in the Southeast, on average, operated farms larger in acreage, harvested more acreage, accounted for more sales from crops, existed as family-owned or individual businesses, had more sales volume and machinery assets, and used more production inputs than non-participants.

Acreage Response to Commodity Programs

The need to protect allotment history has led to a reduced level of planting flexibility. Harwell and Strickland gave three points to consider when deciding to protect allotment history: current profit from protecting history, profit in future years when the allotment of an unprotected crop is reduced or lost, and the treatment of allotments in future farm programs. Further, the size of program payments, amount of crop base, and the relative profitability of alternative competing crops would affect the opportunity cost of protecting cropping history (Harwell and Strickland).

Brooks et al. examined land quality and program participation. When a farmer is deciding whether to

participate or not participate in farm programs, land allocation among crops and uses will be constrained by program provisions. This study noted differences among producers that distinguished participants from non-participants studied in other works. These differences included risk attitudes, base acreage, and dispersion of price expectations among producers and that farm size, crop rotations, on farm use and, the ratio of average farm yields to "program yields" may also significantly affect program participation.

Brooks et al. looked at participation and expected profit, with land quality being the determinant of relative profitability. When program payments are greater than net market returns, land will be set aside and the producer participates. "Slippage" will occur as low quality land is used to meet set aside requirements first. This will cause the initial marginal supply response to be less than the marginal supply response caused by land that is diverted later.

Brooks et al. used seven years of annual crop data from 99 Iowa counties to model county level corn program participation rates. For this model, it was assumed that farm program parameters, average land quality, and variation of land quality among producers in the same county affected program participation rates. This study concluded that heterogeneous land quality possibly affects participation in the corn program in Iowa. Also, the design of commodity

programs may have significantly affected land allocation and the distribution of farm program benefits.

Hoag, Babcock, and Foster (Hoag et al.) examined field level cropping and diversion decisions and the effects of variations in land quality. When making land diversion decisions, a profit maximizing producer will divert land in such a way that minimizes costs. Direct costs are related to planting and maintaining a soil conserving crop and increased production costs caused by changes in machinery efficiency and field shape. Indirect opportunity costs arise from not planting a crop restricted by program participation. As soil quality increases, ceteris paribus, this opportunity cost increases because yield is a function of soil quality.

Hoag et al. cited the following characteristics that would cause a field to be diverted: production costs, field shape, distance between fields and from field to farm headquarters, and measures of the distribution of land quality on fields. Hoag et al. used four years of field level data from six North Carolina counties. Based on soil factors, the farm fields were classified into soil mapping units. ASCS provided farm cropping history for each field. These histories indicated acreage planted to crops, diverted, or placed into other uses. Soil productivity and soil composition for the fields allowed three moments of the distribution of soil quality at both the field and farm level to be calculated.

Based on their empirical data, Hoag et al. concluded that there is a negative relationship between average land quality on a field and the percentage of a field that is diverted, inter-field soil quality affects diversion decisions, and the percentage of a field placed in acreage conservation reserve decreases as the variance of soil quality decreases.

Walker and Penn examined acreage response of major crops and short run prediction at a time government program influence was decreasing and marketplace influence was increasing. The acreage response model consisted of seven equations for seven major crops. Factors that affected acreage included variables for own price policy effects, competing uses for production resources, and other factors hypothesized to affect crop acreage. Walker and Penn concluded that dramatic change in production, price levels, and government influence, results in difficulties for models based on time series data, and that attempts should be made to generate useful information without waiting for observations to be produced over time.

Originality of Thesis

Previous studies have analyzed the characteristics of farmers and farms, factors affecting the participation decision, and program participants and non-participants under different commodity program regimes. Many of these studies have looked at program participation as a decision

involving only two choices -- either to participate or not to participate.

As in previous studies, this research analyzes producer and farm characteristics and socioeconomic factors affecting the participation decision. Also, this research analyzes participation associated with the planting flexibility provisions of the current farm program and the probability of participation in programs offering additional planting flexibility. In addition to previous studies, this research uses selectivity models in the analysis of participation in programs granting planting flexibility.

Summary

The preceding pages introduced the concept of planting flexibility, defined the objectives of this research, reviewed the history of federal farm programs, and reviewed previous research involving participation in commodity programs. In the following chapters, data pertaining to participation in federal farm programs will be presented and analyzed for farmers in four states. The second chapter will present ASCS commodity program enrollment reports and results from a Federal Farm Program Participation Survey. In the third chapter, methods, procedures, and econometric models will be presented for estimation of the probability and level of program participation. The fourth chapter will present results from estimated models. The fifth chapter

will include a summary of the research, limitations, and suggestions for future research.

CHAPTER II

DATA

Program Enrollment and Use of Flex Acres

National Summary

In 1991, there were 33 million acres nationally that could have been flexed (excluding wheat base enrolled under the winter wheat option). The 33 million flex acres included 20 million normal flex acres and 13 million optional flex acres. Only 7.5 million of the 33 million acres were planted to a crop other than the crop for which the base was established. Net flex acres totaled almost 5.7 million acres. Relatively low shifts among crops could have been caused by the following: crop rotations not restricted by program provisions, the most profitable crop was already planted, timing of passage of new farm legislation, or inexperience with changes in the farm program (Daugherty).

For 1992, ASCS reported national preliminary enrollment rates of 77.9 percent for program crop base. Nationally, there were 212 million acres of base for the major program crops, and 165 million acres of this base were enrolled in the 1992 commodity program. The enrolled base represented 41 million acres that could have been flexed under normal

and optional flex provisions. Figure 2 gives national enrollment rates for program crop bases.

ASCS reported that all program crops, except cotton, would have a net loss in planted acreage. Soybeans accounted for 4.6 million acres of the 5.9 million acres flexed into non-base crops. Table I gives the total NFA and OFA planted to other program crops, soybeans, minor oilseeds, other crops, total flexed acreage, other NFA and OFA planted to the base crop, and net flexed acreage for program crops. Nationally, five of the six major program crops had a negative net change in plantings due to flex provisions. Only cotton had a positive net change. Wheat and corn acreage had the two largest net reductions when compared with sorghum, barley, and oats. For all program crops, more flex acres were planted to soybeans than any other single crop. 79.4 percent of corn flex acres were planted to soybeans. Sorghum, wheat, and cotton had a larger percent of flex acres planted to soybeans than planted to other program crops. Barley and oats had the largest percentage of flex acres planted to other program crops. A national summary of the percentage of NFA and OFA planted to other program crops, soybeans, minor oilseeds, and other crops is shown in Figure 3.

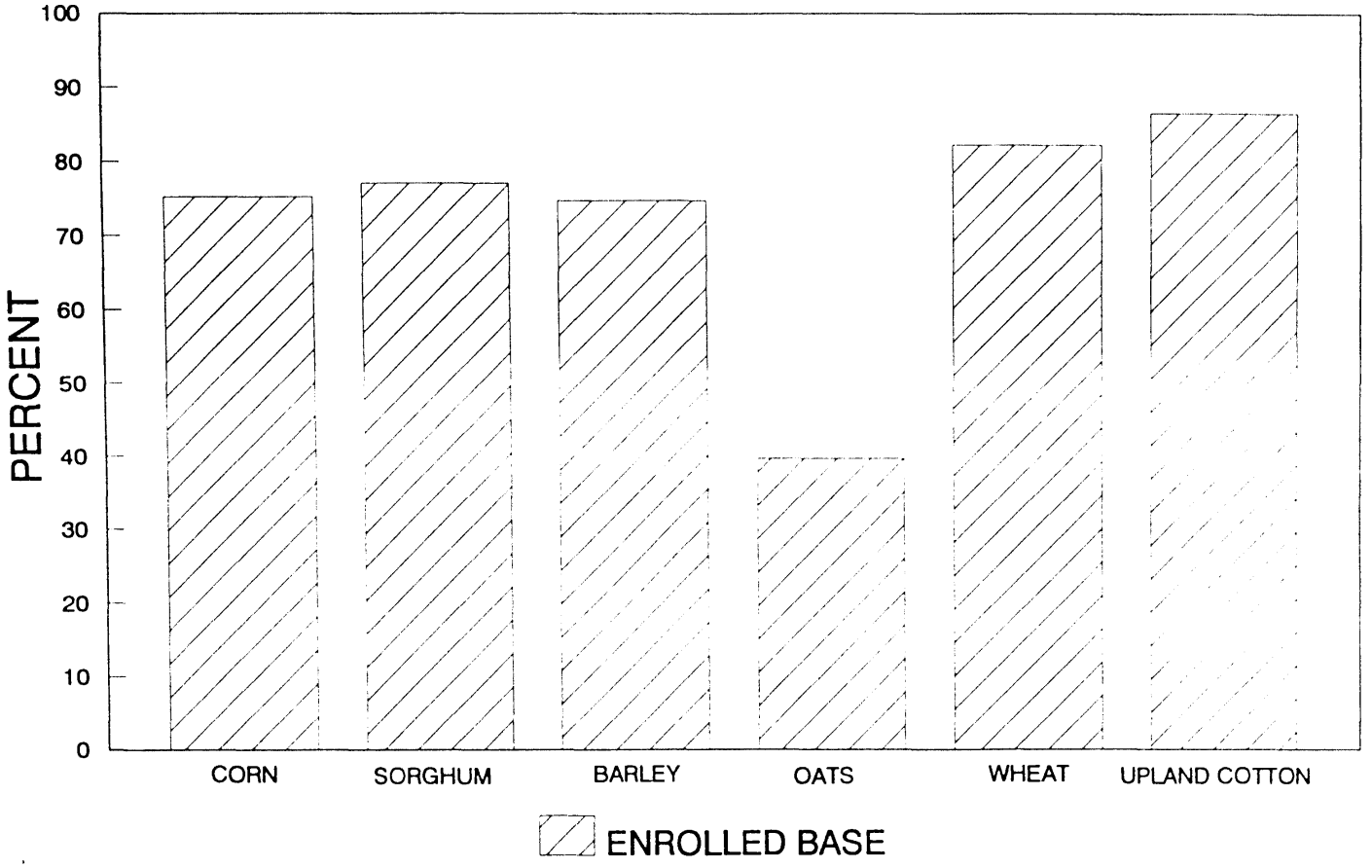


Figure 2. National Enrollment Summary
Base Enrollment 1992

TABLE I

NATIONAL SUMMARY OF FLEX ACRES: 1992
FLEX ACRES PLANTED TO THE FOLLOWING:

Crop	Other Program Crops	Soybeans	Minor Oilseeds	Other Crops	Total Flexed	Other NFA & OFA Planted To Base Crop	Net Flexed
Wheat	1,010,275	1,444,203	204,285	506,004	3,164,767	755,571	-2,409,196
Corn	354,254	2,252,272	60,726	168,756	2,836,008	625,956	-2,210,052
Sorghum	260,341	270,313	22,898	61,311	614,863	318,809	-296,054
Barley	385,170	133,175	42,444	100,737	661,526	63,296	-598,230
Oats	229,473	85,227	14,978	30,980	360,658	53,418	-307,240
Cotton	102,172	175788	14,894	26,377	319,231	452,009	132,778

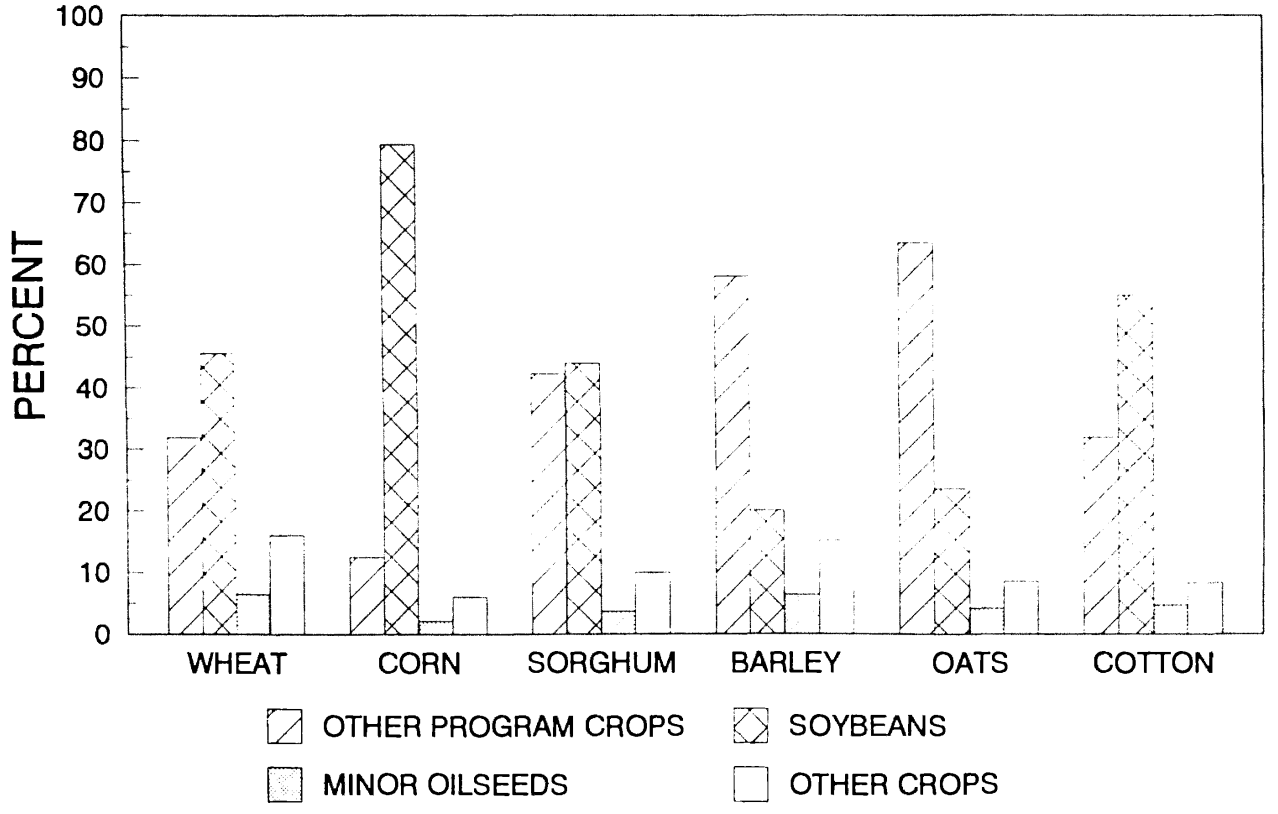


Figure 3. 1992 National Summary of Flex Acreage Crops Planted on NFA and OFA

Regional Summary

Planting flexibility and the use of crop base in four states representing four USDA farm production regions was examined. These regions and states include the Southern Plains (Oklahoma), Northern Plains (North Dakota), Cornbelt (Missouri), and Appalachia (Tennessee).

The states included in each region are: Southern Plains: Oklahoma and Texas; Northern Plains: North Dakota, Nebraska, South Dakota, and Kansas; Cornbelt: Missouri, Illinois, Ohio, Indiana, and Iowa; Appalachia: Tennessee, Kentucky, North Carolina, Virginia, and West Virginia.

Preliminary ASCS enrollment reports (1992) for wheat, corn, barley, sorghum, oats, and cotton indicate similar percentages of base enrollment among states within a region. High levels of wheat base enrollment were reported for the Northern Plains and Southern Plains. States in the Northern Plains had higher levels of base enrollment for corn, barley, sorghum, and oats. Considering the six crops, corn had a relatively high level of base enrollment in the four production regions. A summary of preliminary base enrollment in the 1992 commodity programs for the four survey states and other states within each farm production region is given in Figures 4 through 9.

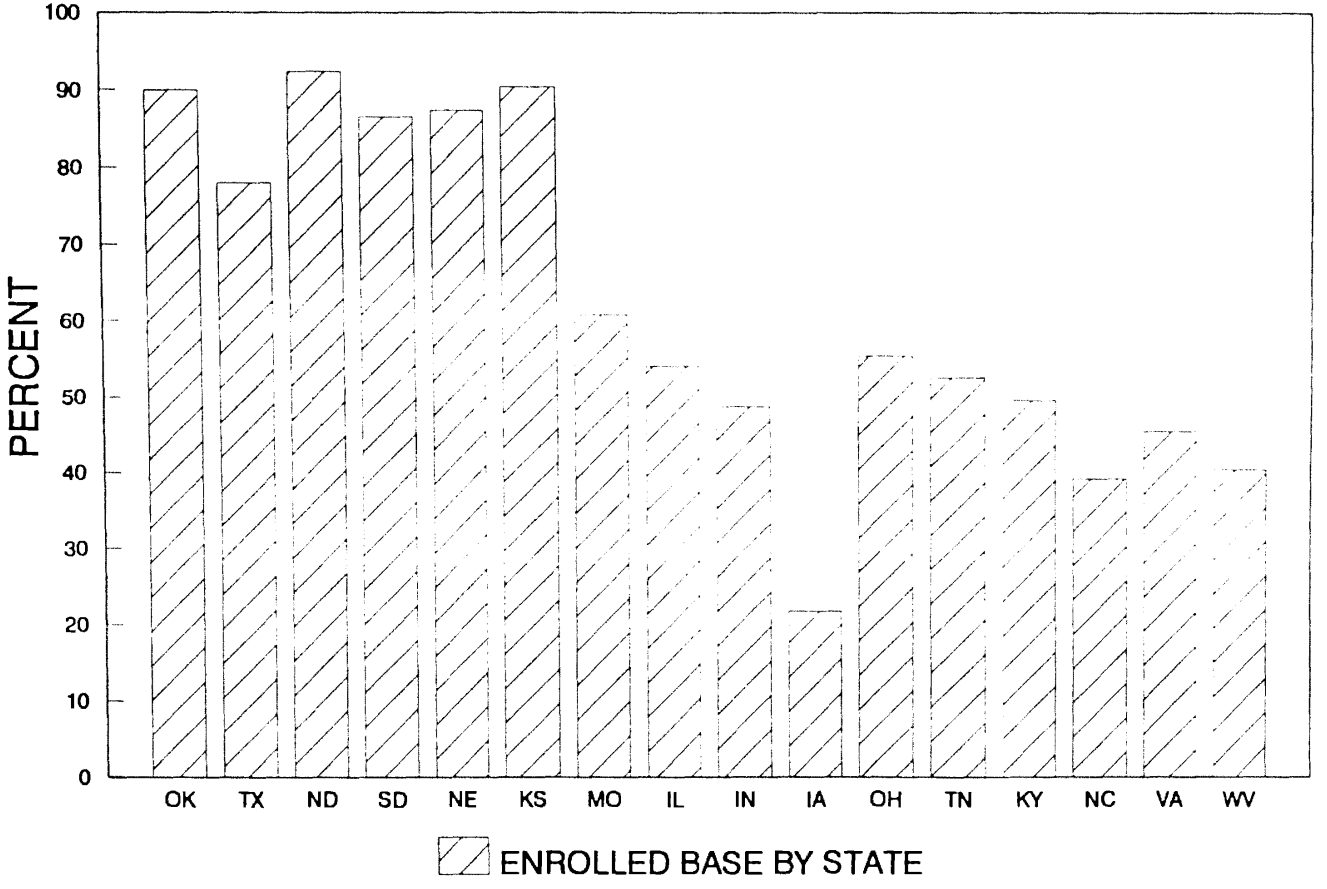


Figure 4. Wheat Base 1992 Enrollment Report

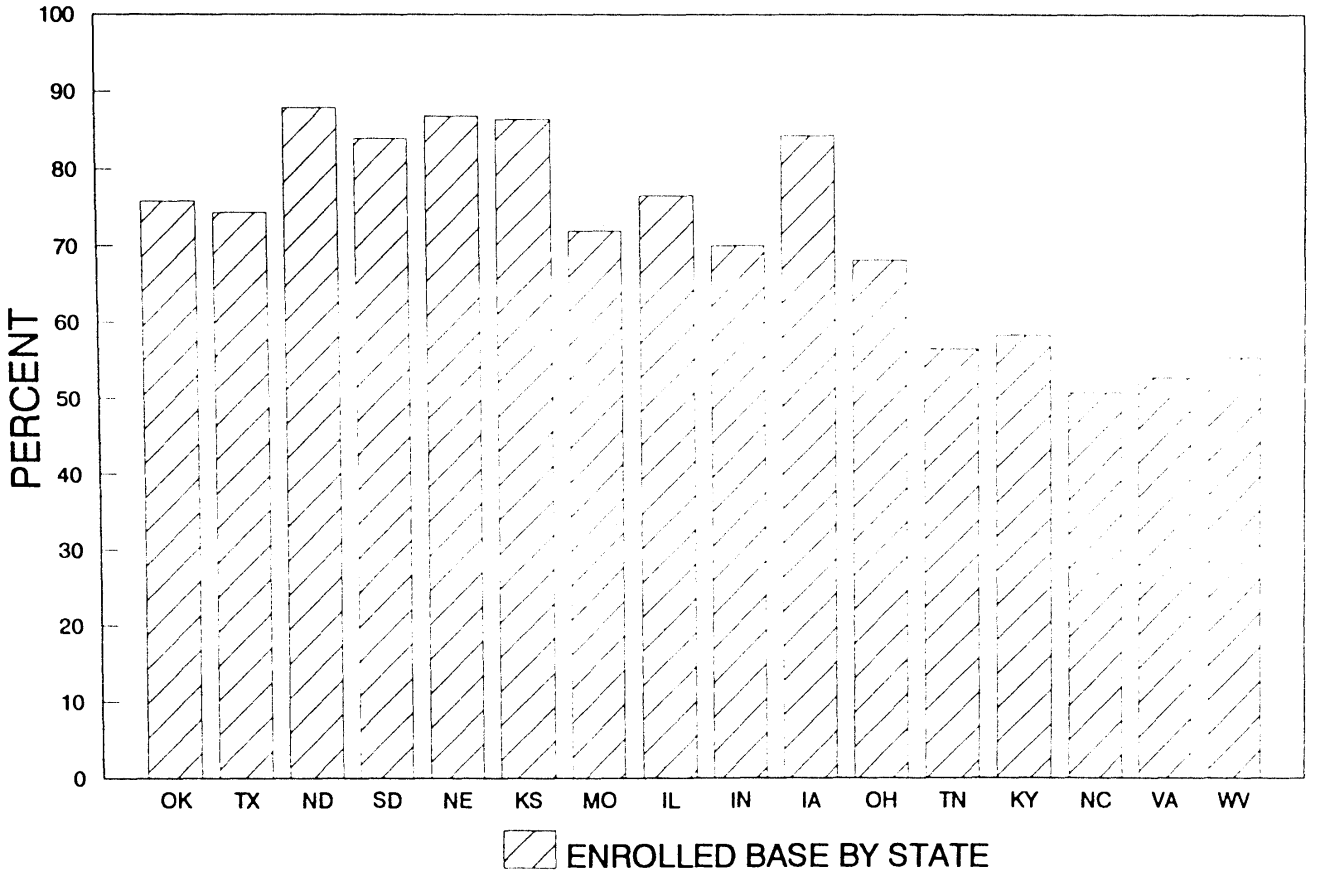


Figure 5. Corn Base 1992 Enrollment Report

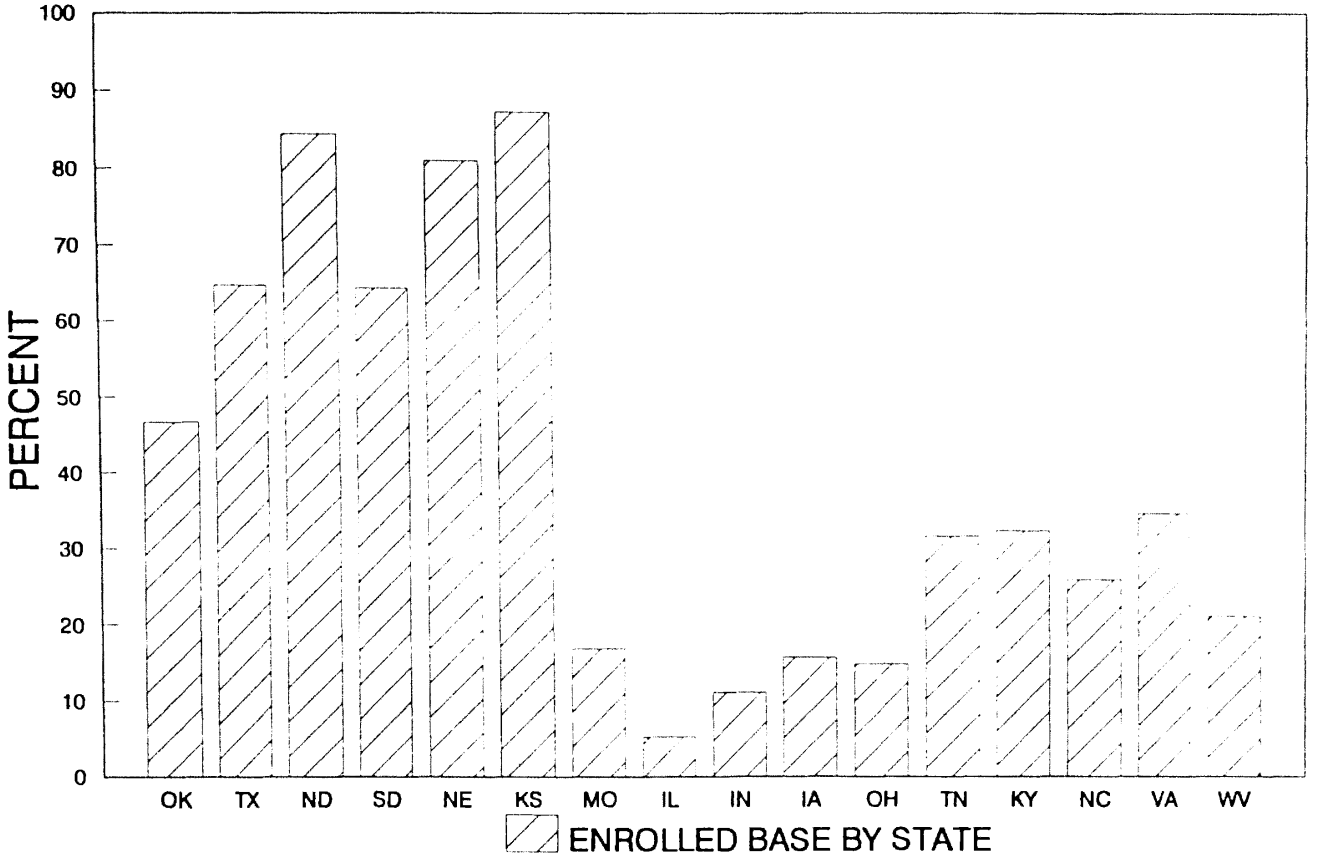


Figure 6. Barley Base 1992 Enrollment Report

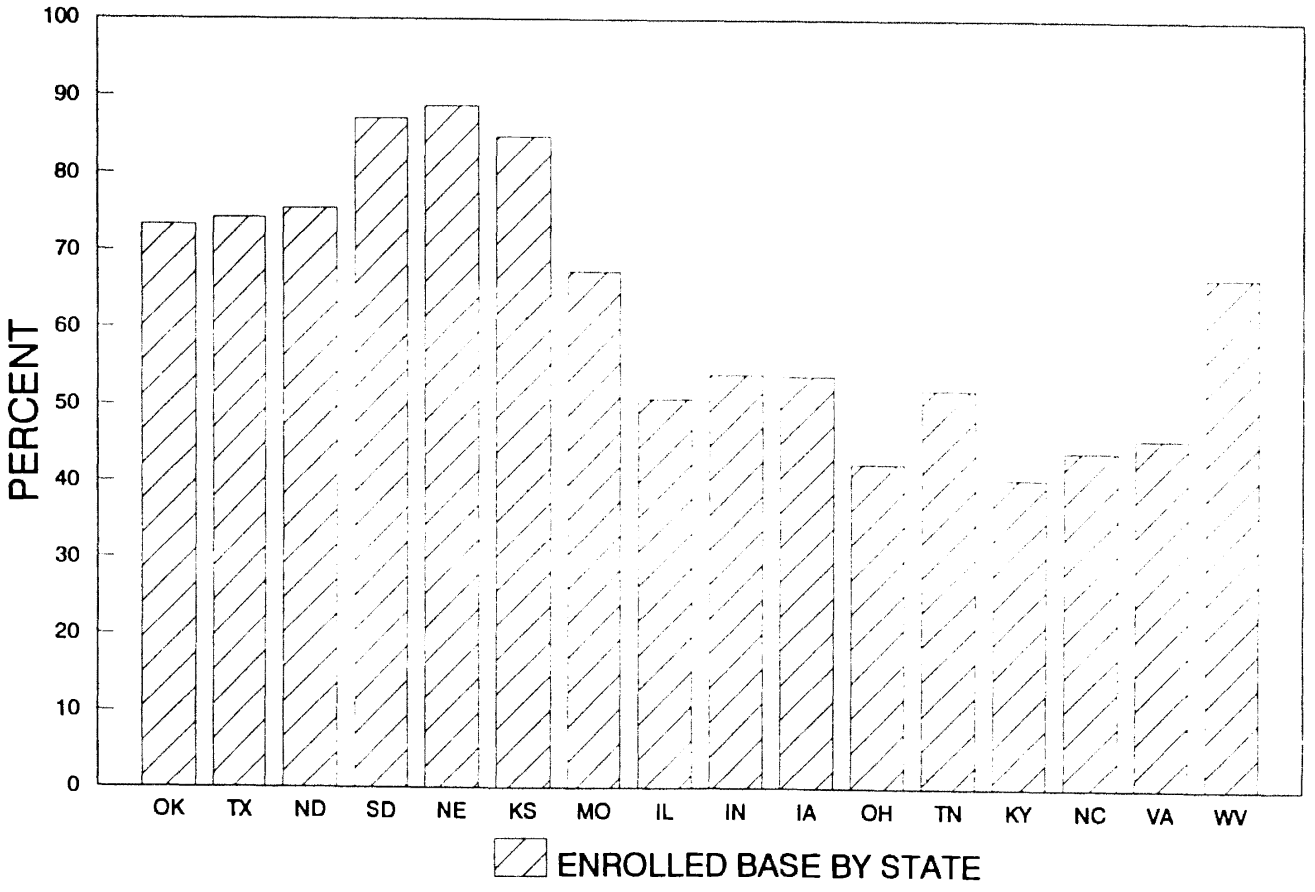


Figure 7. Sorghum Base 1992 Enrollment Base

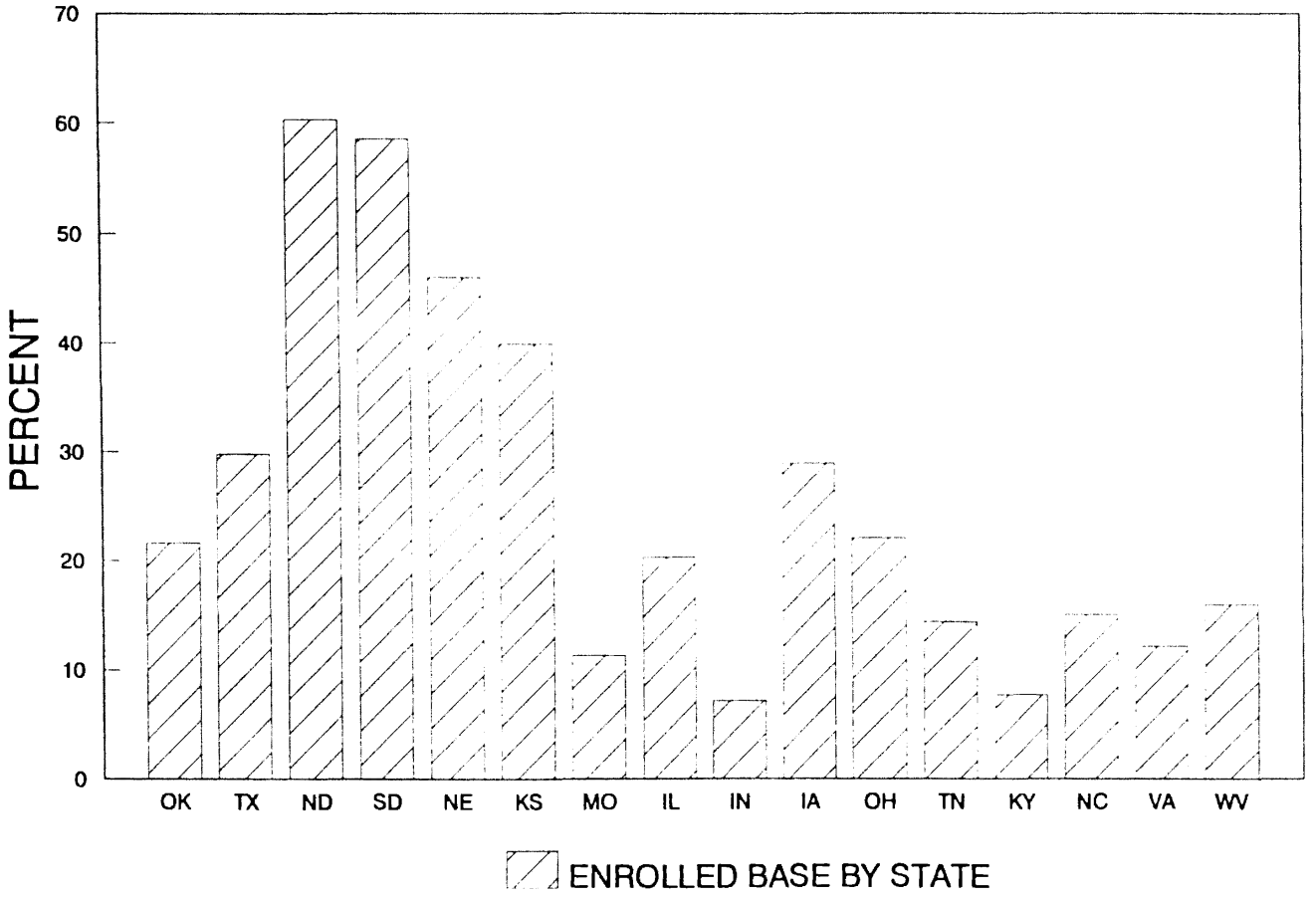


Figure 8. Oats Base 1992 Enrollment Report

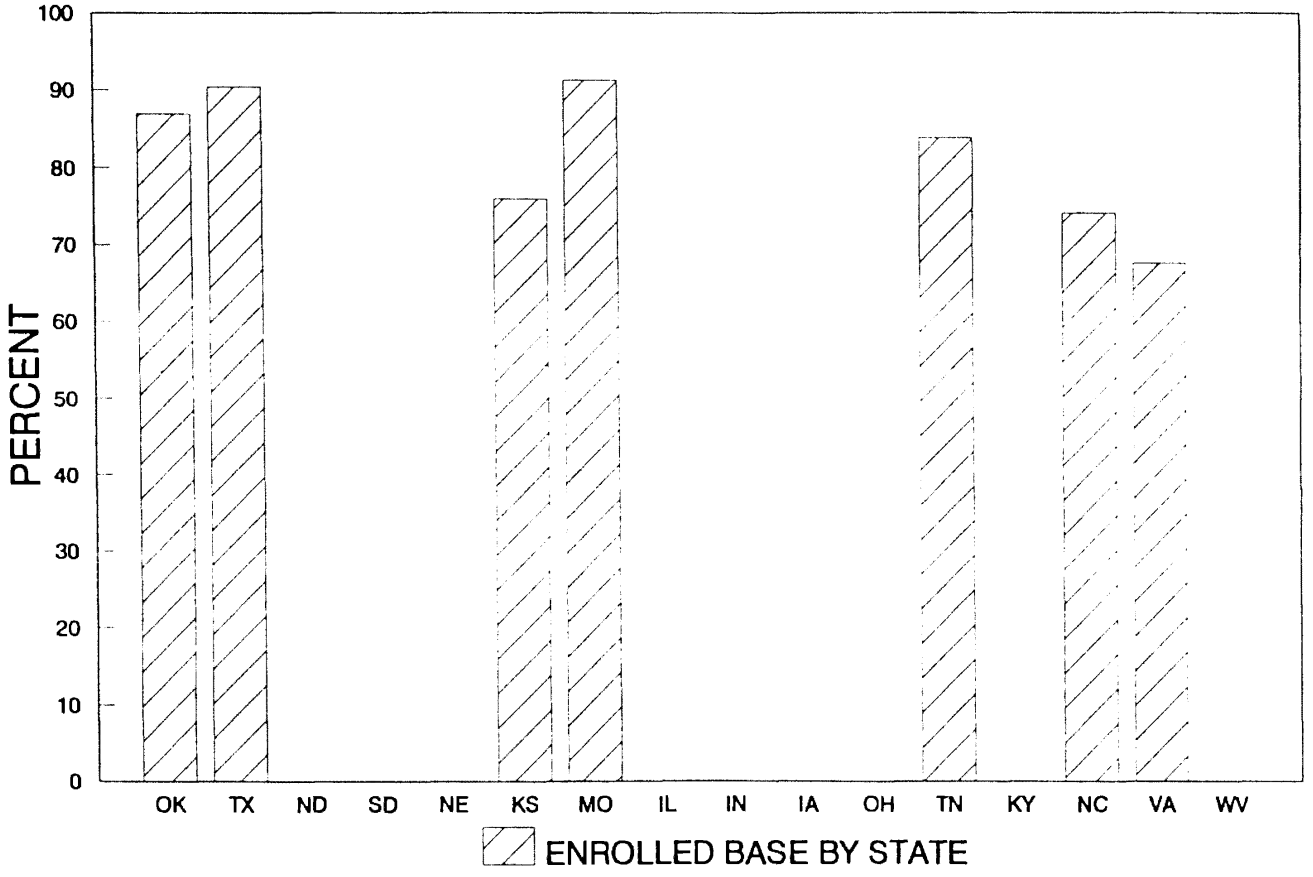


Figure 9. Cotton Base 1992 Enrollment Report

A regional summary of the allocation of total NFA and OFA is given in Table II. The table shows total flex acres planted to other program crops, soybeans, minor oilseeds, other crops, total flexed acreage, other NFA and OFA planted to the base crop, and net flexed acreage for each crop. As reported for the nation, each program commodity (except cotton) had a negative net change in plantings due to flex provisions. Figure 10 gives a summary of the allocation of total flex acres within each region.

In the Southern Plains, wheat and sorghum had the largest negative net plantings due to flex provisions. In the Northern Plains wheat, corn, barley, and oats had large negative net plantings as a result of flex provisions. Twenty-three percent of all flex acres were planted to minor oilseeds or other crops. In both the Southern Plains and Northern Plains more than 85 percent of NFA and OFA were reported to be planted to other program crops and soybeans. In the Cornbelt, more than 1.3 million acres of corn flex acres were planted to soybeans. Fifty-three percent of wheat flex acres and 74 percent of sorghum flex acres were planted to soybeans. In the Appalachia Region 60 percent of flex acres were planted to soybeans. Thirty-four percent of NFA and OFA acres were flexed from one program crop to another program crop. In both the Cornbelt Region and Appalachia Region, at least 60 percent of NFA and OFA were reported to be planted to soybeans.

TABLE II

REGIONAL SUMMARY OF FLEX ACRES: USE OF FLEX ACRES BY REGION, BY CROP: FLEX ACRES PLANTED TO THE FOLLOWING

Crop	Other Program Crops	Soybeans	Minor Oilseeds	Other Crops	Total Flexed	Other NFA & OFA Planted To Base Crop	Net Flexed
Southern Plains							
Wheat	137,788	311,632	22,006	53,205	524,631	80,412	-444,219
Corn	48,402	18,331	5,184	22,805	94,722	33,833	-60,889
Sorghum	115,197	50,460	9,066	21,033	195,756	83,899	-111,857
Barley	2,787	2,005	38	448	5,278	533	-4,745
Oats	11,015	4,830	546	1,728	18,119	2,507	-15,612
Cotton	74,435	64,334	6,514	17,964	163,247	165,075	1,828
Northern Plains							
Wheat	374,692	458,564	111,269	225,956	1,170,481	328,849	-841,632
Corn	82,601	327,829	23,088	62,763	496,281	246,307	-249,974
Sorghum	92,445	131,673	10,987	25,547	260,652	177,456	-83,196
Barley	169,320	54,457	22,919	39,521	286,217	23,626	-262,591
Oats	112,220	41,843	11,073	21,648	186,784	26,968	-159,816
Cotton	21	5	0	0	26	389	363

TABLE II (Continued)

Crop	Other Program Crops	Soybeans	Minor Oilseeds	Other Crops	Total Flexed	Other NFA & OFA Planted To Base Crop	Net Flexed
Cornbelt							
Wheat	133,174	157,442	1,207	3,214	295,037	59,144	-235,893
Corn	65,387	1,313,089	8,414	17,388	1,404,278	132,128	-1,272,150
Sorghum	9,250	28,741	325	364	38,679	16,350	-22,329
Barley	381	178	6	11	576	386	-190
Oats	27,944	10034	473	787	39,238	6,594	-32,644
Cotton	1,243	1,448	0	12	2,703	18,571	15,868
Appalachia							
Wheat	43,978	39,603	1,177	3,591	88,349	18,363	-69,986
Corn	51,408	131,468	2,984	9,985	195,845	23,624	-172,221
Sorghum	4,100	3,969	88	258	8,415	906	-7,509
Barley	1,861	2,403	29	75	4,368	2,141	-2,227
Oats	646	794	16	48	1,504	487	-1,017
Cotton	1,293	4,818	48	137	6,296	54,971	48,675

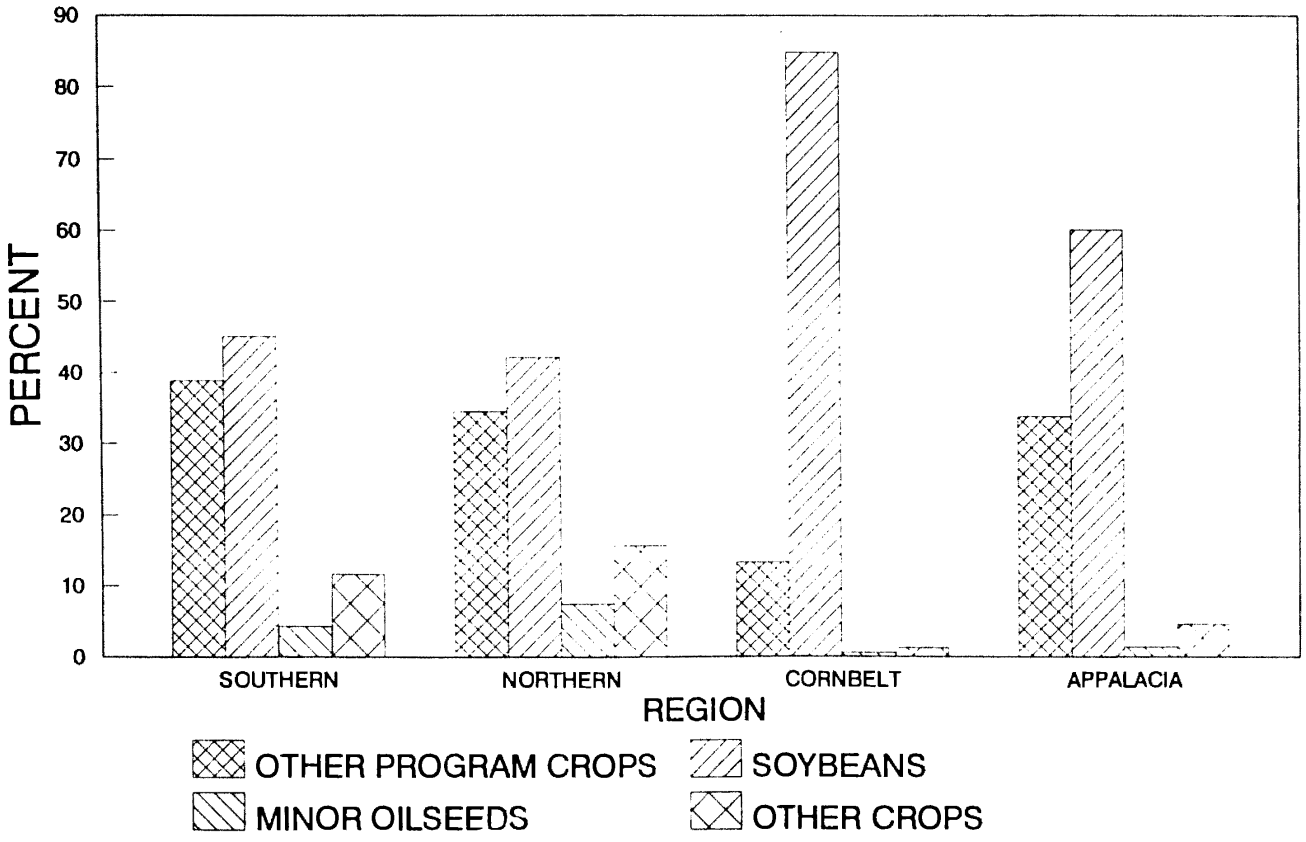


Figure 10. Regional Summary of the Flex Acreage Crops Planted on NFA and OFA

Survey State Summary

A summary of the total NFA and OFA planted to other program crops, soybeans, minor oilseeds, and other crops, and the total flexed acreage, other NFA and OFA planted to the base crop, and net flexed acreage for program crops is summarized in Table III for the survey states. Using the summary of planting intentions for 1992, the use of flex acres in the region is compared with the representative state to provide an indication of the ability of the state to represent the region in commodity program participation.

In Oklahoma, plantings of all program crops resulted in a negative net change due to flex provisions. Cotton had the second largest reduction in plantings with 58 percent of cotton flex being planted to soybeans. For the Southern Plains, cotton had a positive net change in plantings due to flex provisions.

In North Dakota, like the Northern Plains region, there was a negative net change in wheat, corn, sorghum, barley, and oats plantings due to flex provisions. Sixty-two percent of all flex acres were planted to minor oilseeds or other crops. For the Northern Plains region, 64 percent of all flex acres were planted to soybeans, minor oilseeds, or other crops.

In Missouri, 70 percent of all flex acres were planted to soybeans. For the Cornbelt, it was reported 85 percent of all flex acres would be planted to soybeans.

TABLE III

STATE SUMMARY OF FLEX ACRES: USE OF FLEX ACRES BY SURVEY STATE, BY CROP: FLEX ACRES PLANTED TO THE FOLLOWING

Crop	Other Program Crops	Soybeans	Minor Oilseeds	Other Crops	Total Flexed	Other NFA & OFA Planted To Base Crop	Net Flexed
Oklahoma							
Wheat	27,180	234,771	7,555	11,461	280,967	22,986	-257,981
Corn	1,726	5,589	129	11	7,455	4,456	-2,999
Sorghum	8,381	20,560	177	84	29,202	11,988	-17,214
Barley	862	1,101	29	1	1,993	153	-1,840
Oats	2,666	1,416	68	107	4,257	529	-3,728
Cotton	11,580	17,131	205	510	29,426	11,216	-18,210
North Dakota							
Wheat	50,678	57,066	40,882	111,585	260,211	135,085	-125,126
Corn	16,452	9,678	7,106	13,616	46,852	44,684	-2,168
Sorghum	178	80	73	89	420	90	-330
Barley	115,249	26,138	18,078	32,941	192,406	16,802	-175,604
Oats	26,964	6,298	5,013	12,770	51,045	10,162	-40,883
Cotton					0		0

TABLE III (Continued)

Crop	Other Program Crops	Soybeans	Minor Oilseeds	Other Crops	Total Flexed	Other NFA & OFA Planted To Base Crop	Net Flexed
Missouri							
Wheat	64,366	87,484	577	2,327	154,754	11,583	-143,171
Corn	10,858	96,348	518	1,055	108,779	39,740	-69,039
Sorghum	8,483	24,827	115	339	33,764	14,139	-19,625
Barley	172	132	5	11	320	130	-190
Oats	789	446	8	19	1,262	482	-780
Cotton	1,243	1,448	0	12	2,703	18,571	15,868
Tennessee							
Wheat	22,758	12,517	232	1,574	37,081	1488	-35,593
Corn	9,319	17,207	562	1,317	28,405	8,882	-19,523
Sorghum	3,062	1,798	59	103	5,022	749	-4,273
Barley	99	118	0	8	225	6	-219
Oats	49	71	1	7	128	16	-112
Cotton	815	2,319	43	5	3,182	23,900	20,718

In Tennessee, 88 percent of flex acres came from wheat and corn. It was reported that 49 percent of all flex acres would be planted to program crops and 46 percent would be planted to soybeans. For the Appalachia Region, ASCS reported 34 percent of all flex acres would be planted to program crops and 60 percent would be planted to soybeans.

Federal Farm Program Participation Survey

Introduction

During the summer and fall of 1992, farmers in four states were asked to participate in a federal farm program participation survey. The survey was designed to collect information for analysis of participation in federal farm programs and to identify the impacts of planting flexibility on the supply of traditional and non-traditional crops. Surveys were mailed to farmers in Oklahoma, North Dakota, Missouri, and Tennessee.

The survey was conducted by mail and followed, as closely as possible, the procedures for mail surveys outlined by Dillman (1978). A copy of the survey and mailing addresses were sent to faculty at the University of Tennessee, North Dakota State University, and the University of Missouri. The faculty handled the survey for their state. Surveys were mailed within the state from the respective institutions. Approximately two weeks after the original survey was mailed, a reminder was sent to those addresses for which responses had not been received.

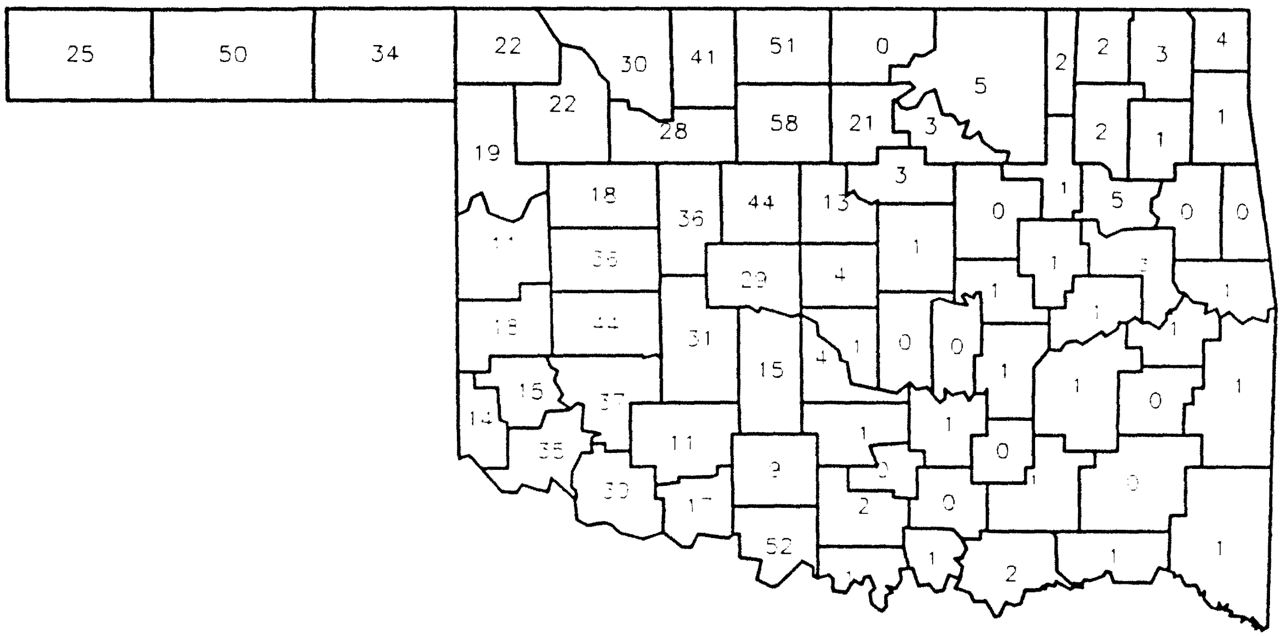
Approximately two weeks later, a new survey was sent to each address for which responses had not been received. After this third mailing, no further contact was made to non-respondents. After all surveys were returned to OSU some respondents, returning phone numbers, were called to verify responses. Respondents returning incomplete answers about flex acreage were asked for additional information. A copy of the survey mailed in Oklahoma is provided in Appendix A.

Survey Sample

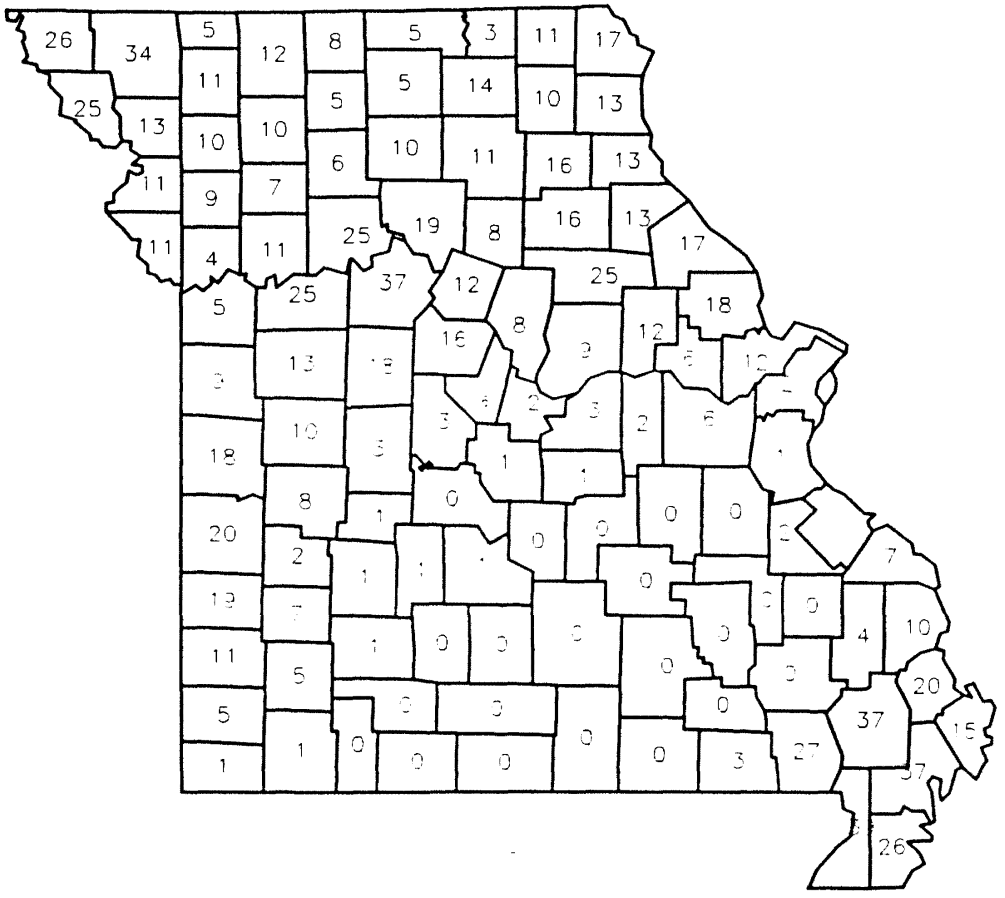
Farmers selected for the survey were drawn from ASCS files. Farmers were required to have 100 acres or more of crop base to be selected for the survey. A total of 3,361 farmers were selected from the four states, representing approximately 5 percent of the farmers in these states. Surveys were mailed to 981 producers in Oklahoma, 564 in North Dakota, 769 in Tennessee, and 1047 in Missouri. State maps 1 through 4 show the county level distribution of surveys mailed for Oklahoma, Missouri, Tennessee, and North Dakota, respectively.

Survey Response Rate

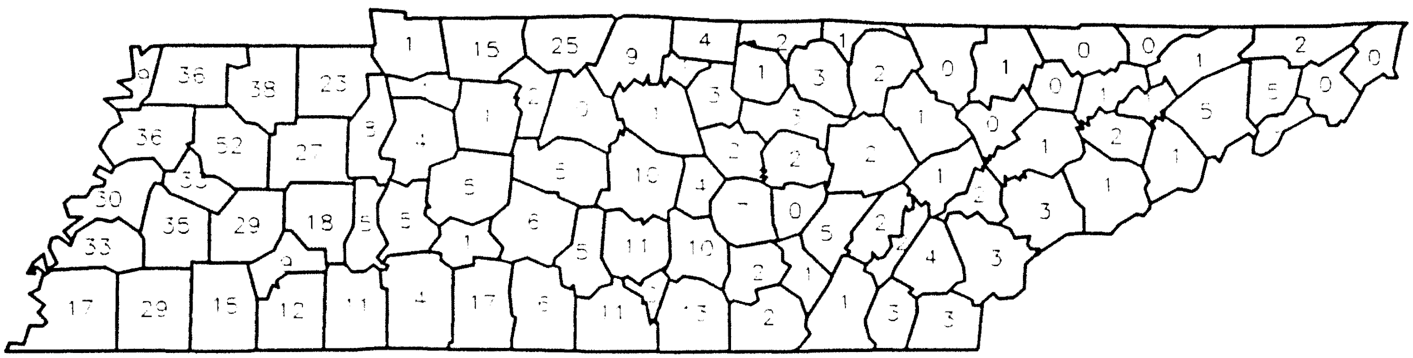
The useable response rate to the survey was 19.7 percent for Oklahoma, 22.4 percent for Missouri, 11.1 percent for Tennessee, and 13.3 percent for North Dakota. A summary of the results of the mailing and response rate to the survey is given for each state in Table IV. In



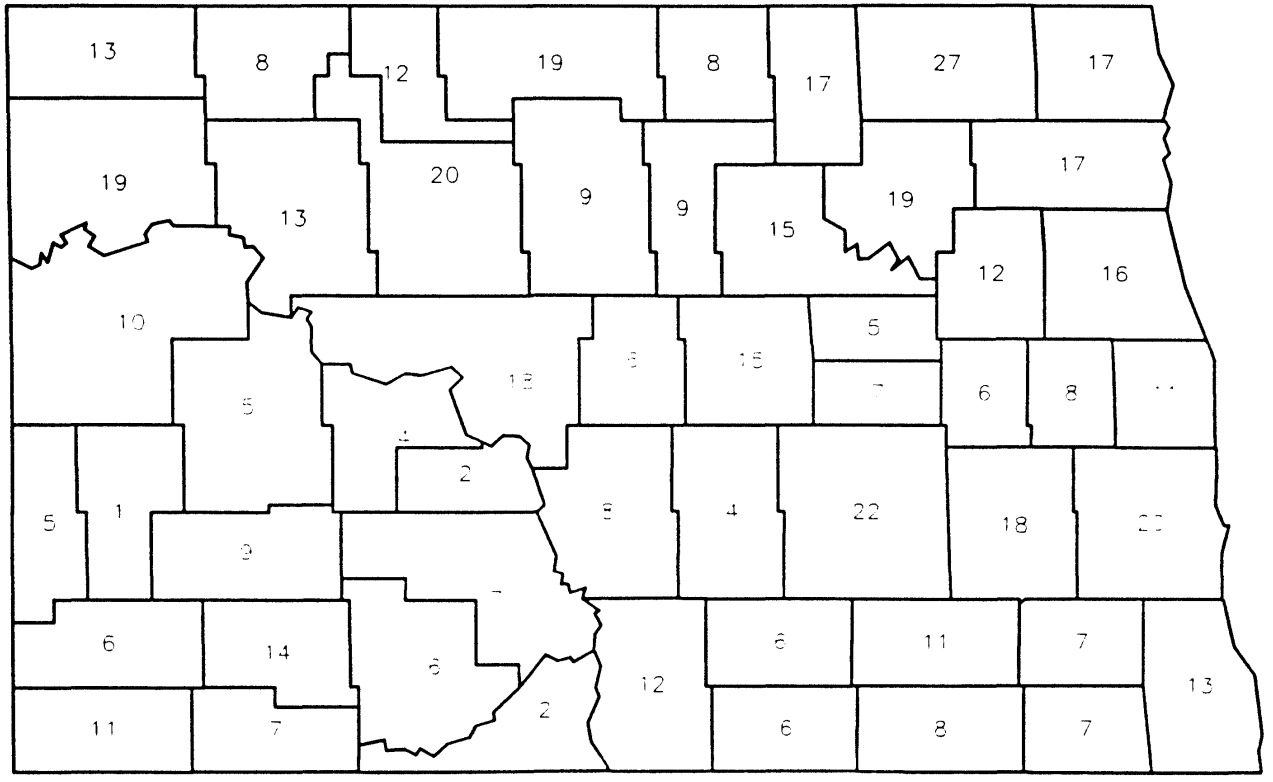
Map 1. Federal Farm Program Participation Survey Oklahoma: Surveys Mailed per County



Map 2. Federal Farm Program Participation Survey
Missouri: Surveys Mailed per County



Map 3. Federal Farm Program Participation Survey
Tennessee: Surveys Mailed per County



Map 4. Federal Farm Program Participation Survey
North Dakota: Surveys Mailed per County

TABLE IV

RESPONSE TO FEDERAL FARM PROGRAM PARTICIPATION SURVEY

	Number	Percent
Oklahoma		
Surveys Mailed	981	100.0
Bad Addresses	8	0.8
Surveys Returned	235	23.9
No Longer Farming	16	1.6
Incomplete	16	1.6
Deceased	10	1.0
Usable Surveys	193	19.7
Missouri		
Surveys Mailed	1041	100.0
Bad Addresses	34	3.3
Surveys Returned	283	27.2
No Longer Farming	21	2.0
Incomplete	23	2.2
Deceased	6	0.6
Usable Surveys	233	22.4
Tennessee		
Surveys Mailed	749	100.0
Bad Addresses	NA	NA
Surveys Returned	104	13.9
No Longer Farming	9	1.2
Incomplete	7	0.1
Deceased	5	0.7
Usable Surveys	83	11.1
North Dakota		
Surveys Mailed	564	100.0
Bad Addresses	7	1.2
Surveys Returned	86	15.2
No Longer Farming	6	1.1
Incomplete	5	0.9
Deceased	0	0.0
Usable Surveys	75	13.3

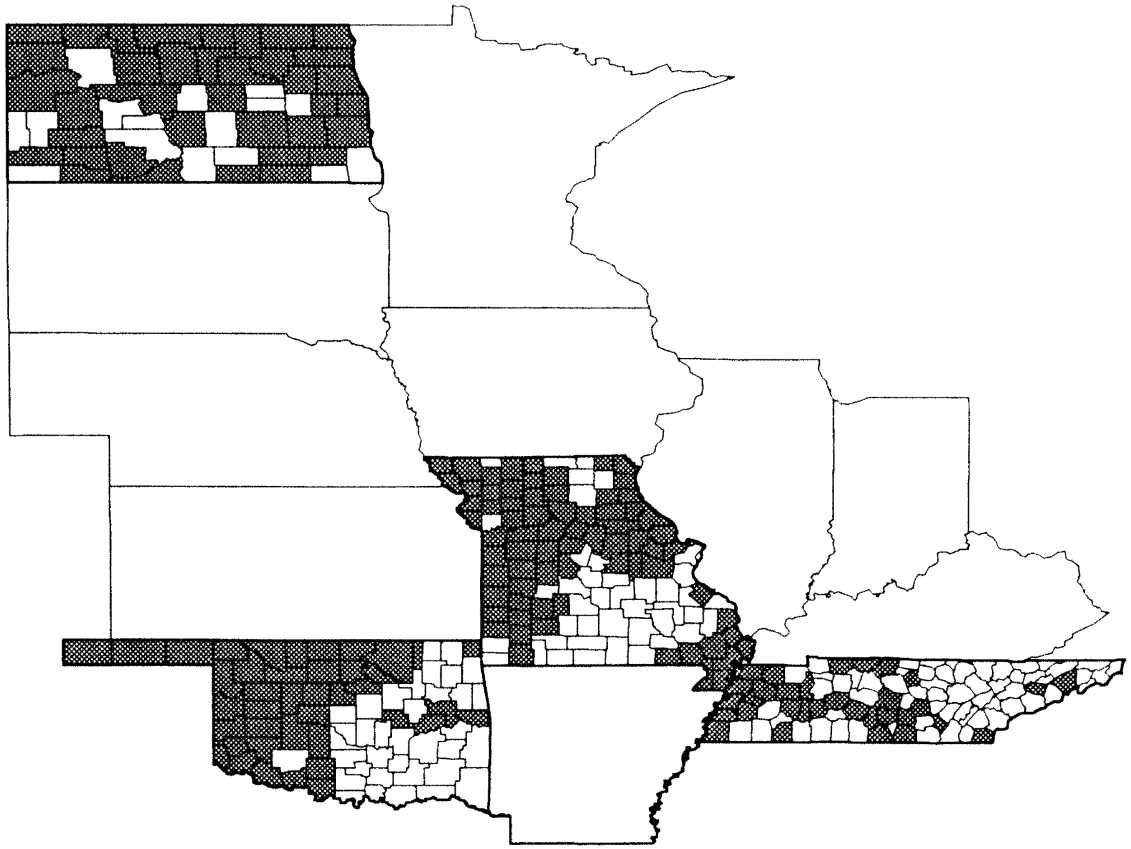
Oklahoma, responses came from the western half of the state. In Missouri, responses were received from most counties except the south central part of the state. In Tennessee, responses were received from thirty-one counties, mostly in the western two thirds of the state. Responses were received from all but sixteen counties in North Dakota. Map 5 shows counties represented by survey responses.

Summary of Survey

Previous research by Vermeer, Chambers and Foster and Johnson and Short indicated characteristics of farmers participating in commodity programs. Based on previous research results, farmers were asked for information hypothesized to affect program participation. Specific questions about farm size, crop and livestock production, and demographic and business structure characteristics were included.

Information on farm size was collected through questions about the size of operation in both acres and dollars. Specific questions collected information about total acres in the farming/ranching operation, acres owned, acres rented, acres of pasture, and acres of cropland. In terms of dollars, questions were asked about the level of gross farm income, non-farm income, and net profit or loss.

Producers were asked for information about crop and livestock production. For crops, producers were asked for



Map 5. Program Participation Survey, Counties Represented by Responses. Missouri, North Dakota, Oklahoma, and Tennessee

acres planted, acres harvested, and yield for 1991 and expected yields for crops planted during 1992. Producers were also asked for the amount of established crop bases and the level of program yields for program crops that applied to the producer's farm. Livestock producers were asked to identify the quantity for each type of livestock handled per year.

Producers were also asked for socioeconomic information. Specifically, producers were asked for age, years of farming experience, level of formal education, and a self ranking of the level of understanding of farm programs. Further, producers were asked to indicate, from a list of choices, a description of their farming/ranching operation and the business structure of the farming/ranching operation. For income and financial position producers were asked to indicate an appropriate range that corresponded to the level of off-farm income, gross farm income, level of profit or loss, and debt-to-asset ratio.

Summary of Survey Responses

Characteristics of Farm Operations

A summary of characteristics of the farm operations for survey respondents, respondents indicating participation in ARP, and respondents not participating in ARP is given in Tables V through VII. Means and standard deviations are given for total acres in farming/ranching operation, acres owned, acres rented, acres in improved pasture or native

TABLE V

CHARACTERISTICS OF FARM OPERATIONS OF SURVEY RESPONDENTS FOR OKLAHOMA, MISSOURI, TENNESSEE, AND NORTH DAKOTA

Characteristic	Response Mean and Standard Deviation*							
	Oklahoma		Missouri		Tennessee		North Dakota	
Total Acres In Farming/Ranching Operation, 1991	1796.9	(2230.9)	1123.3	(903.2)	552.5	(570.8)	2072.1	(1099.5)
Acres Owned In Farming/Ranching Operation	722.1	(1599.8)	480.4	(525.2)	250.2	(199.1)	1036.6	(883.9)
Acres Rented In Farming/Ranching Operation	1070.8	(1290.8)	619.8	(699.3)	310.5	(522.0)	1055.8	(902.1)
Acres In Improved Pasture and/or Native Rangeland	719.7	(1394.7)	189.9	(444.5)	171.8	(200.9)	408.8	(647.4)
Acres In Cropland	1014.1	(1157.7)	853.2	(789.9)	342.9	(535.4)	1571.4	(946.3)
Acres Enrolled In CRP	391.3	(464.1)	132.3	(157.5)	64.3	(81.4)	275.3	(306.1)
Acres Planted To Crops for Harvest for Grain In 1991	758.4	(751.0)	745.9	(776.8)	325.9	(532.8)	1028.0	(712.8)
Acres of Cropbase								
Wheat	772.7	(707.0)	186.6	(198.8)	107.9	(155.6)	922.2	(828.6)
Oats	23.8	(21.5)	16.9	(19.2)	4.3	(2.1)	85.1	(68.1)
Cotton	286.5	(705.2)	583.7	(473.2)	219.7	(372.8)	NA	(NA)
Corn	600.6	(884.7)	303.7	(328.9)	128.1	(191.9)	86.1	(110.5)
Barley	29.3	(30.2)	24.7	(25.4)	14.8	(17.3)	217.6	(174.4)
Sorghum	171.2	(241.7)	129.6	(120.7)	14.8	(14.1)	NA	(NA)

* Standard deviation in parentheses.

TABLE VI

CHARACTERISTICS OF FARM OPERATIONS FOR SURVEY RESPONDENTS INDICATING PARTICIPATION IN ARP FOR OKLAHOMA, MISSOURI, TENNESSEE, AND NORTH DAKOTA

Characteristic	Response Mean and Standard Deviation*							
	Oklahoma		Missouri		Tennessee		North Dakota	
Total Acres In Farming/Ranching Operation, 1991	1950.4	(2411.4)	1185.2	(886.7)	709.5	(623.9)	2207.7	(1157.4)
Acres Owned In Farming/Ranching Operation	787.7	(1774.3)	481.6	(552.3)	260.3	(176.0)	1033.4	(940.8)
Acres Rented In Farming/Ranching Operation	1156.4	(1352.6)	673.6	(627.3)	436.2	(566.7)	1166.3	(931.9)
Acres In Improved Pasture and/or Native Rangeland	777.6	(1492.9)	178.3	(419.9)	170.7	(243.8)	432.7	(703.0)
Acres In Cropland	1107.9	(1241.0)	918.5	(722.2)	477.8	(578.6)	1674.8	(983.6)
Acres Enrolled In CRP	436.3	(495.0)	130.6	(165.3)	55.85	(74.7)	270.6	(313.2)
Acres Planted To Crops For Harvest For Grain In 1991	831.6	(787.2)	792.1	(708.1)	483.3	(572.0)	1076.0	(747.4)
Acres Of Cropbase								
Wheat	832.6	(733.9)	189.3	(199.4)	140.4	(193.8)	998.9	(900.9)
Oats	20.7	(19.3)	17.9	(19.7)	NA	(NA)	87.5	(70.8)
Cotton	348.3	(802.6)	604.5	(482.2)	332.6	(439.9)	NA	(NA)
Corn	726.8	(974.7)	308.4	(291.1)	161.9	(238.2)	98.0	(118.2)
Barley	29.2	(32.0)	24.6	(27.5)	NA	(NA)	222.3	(180.7)
Sorghum	166.1	(245.1)	127.7	(123.0)	23.5	(23.3)	NA	(NA)

* Standard deviation in parentheses.

TABLE VII

CHARACTERISTICS OF FARM OPERATIONS FOR SURVEY RESPONDENTS INDICATING NON-PARTICIPATION IN ARP FOR OKLAHOMA, MISSOURI,TENNESSEE, AND NORTH DAKOTA

Characteristic	Response Mean and Standard Deviation*							
	Oklahoma		Missouri		Tennessee		North Dakota	
Total Acres In Farming/Ranching Operation, 1991	1213.3	(1186.5)	920.3	(935.1)	429.6	(498.6)	1633.9	(710.8)
Acres Owned In Farming/Ranching Operation	471.1	(498.9)	476.8	(430.3)	242.0	(217.5)	1118.1	(710.0)
Acres Rented In Farming/Ranching Operation	745.8	(969.4)	442.4	(880.6)	209.3	(464.9)	566.2	(651.7)
Acres In Improved Pasture and/or Native Rangeland	486.8	(874.0)	228.3	(519.9)	172.6	(160.8)	320.5	(387.4)
Acres In Cropland	657.3	(660.3)	639.2	(956.6)	230.0	(474.1)	1310.3	(628.3)
Acres Enrolled In CRP	166.2	(118.6)	141.1	(116.2)	75.6	(93.0)	275.3	(306.1)
Acres Planted To Crops For Harvest For Grain In 1991	476.9	(508.2)	592.7	(962.8)	196.5	(465.7)	928.2	(583.5)
Acres Of Cropbase								
Wheat	519.7	(515.1)	174.3	(198.6)	78.1	(106.0)	692.3	(399.7)
Oats	32.8	(26.0)	13.9	(18.2)	4.3	(2.0	66.0	(63.4)
Cotton	92.4	(88.7)	272.0	(NA)	31.4	(27.2)	NA	(NA)
Corn	180.0	(276.0)	283.9	(461.0)	92.9	(122.8)	29.7	(17.0)
Barley	30.0	(NA)	25.0	(NA)	14.7	(17.3)	214.9	(165.1)
Sorghum	203.2	(234.0)	139.1	(112.4)	10.4	(8.6)	NA	(NA)

* Standard deviation in parentheses.

rangeland, acres of cropland, acres enrolled in CRP, acres planted to crops for harvest in 1991, and acres of established base.

On average, producers in North Dakota reported larger farming/ranching operations than producers in other states. Producers in North Dakota owned more land, on average, as a percentage of land in the farming/ranching operation. Producers in Missouri and North Dakota reported the smallest amount of pasture or native rangeland as a percentage of the total operation. Producers in Oklahoma reported, on average, the largest amount of pasture or rangeland and acres enrolled in CRP as a percentage of the total operation.

Producers indicating participation in ARP, on average, had larger farming/ranching operations, more cropland, and more acres of crop base than non-participants. Participants planted more acres to crops for harvest than non-participants, on average. On average, participants in Oklahoma, Missouri, and Tennessee owned more acres than non-participants.

Characteristics of Producers

A summary of the self ranking for level of understanding federal farm programs and financial characteristics is given in Tables VIII through X. The number of responses and corresponding percentage are given

TABLE VIII

PRODUCER CHARACTERISTICS OF ALL SURVEY RESPONDENTS FOR OKLAHOMA, MISSOURI, TENNESSEE, AND NORTH DAKOTA

Characteristic	Number of Responses and Percent*							
	Oklahoma		Missouri		Tennessee		North Dakota	
Level of Understanding of Federal Farm Programs								
High	43	(22.2)	51	(21.9)	9	(10.8)	28	(37.3)
Medium	102	(52.3)	140	(60.1)	39	(47.0)	40	(53.3)
Low	26	(13.5)	34	(14.6)	26	(31.3)	6	(8.0)
Not at All	3	(1.6)	2	(0.9)	4	(4.8)	1	(1.3)
No Response	19	(9.8)	6	(2.6)	5	(6.0)	0	(0.0)
Level of Off-Farm Income								
Under $10,000	84	(43.5)	128	(54.9)	33	(39.8)	42	(56.0)
$10,000 to $19,999	30	(15.5)	30	(12.9)	15	(18.1)	19	(25.3)
$20,000 to $29,999	21	(10.9)	25	(10.7)	8	(9.6)	6	(8.0)
$30,000 to $49,999	13	(6.7)	18	(7.7)	10	(12.0)	1	(1.3)
$50,000 to $99,999	10	(5.2)	7	(3.0)	6	(7.2)	1	(1.3)
$100,000 or More	4	(2.1)	0	(0.0)	2	(2.4)	2	(2.7)
No Response	31	(16.1)	25	(10.7)	9	(10.8)	4	(5.3)
Level of Gross Farm Income								
Under $20,000	26	(13.5)	25	(10.7)	26	(31.3)	2	(2.7)
$20,000 to $39,999	22	(11.4)	24	(10.3)	22	(26.5)	6	(8.0)
$40,000 to $99,999	45	(23.3)	57	(24.5)	10	(12.0)	25	(33.3)
$100,000 to $249,999	48	(24.9)	58	(24.9)	12	(14.5)	34	(45.3)
$250,000 to $499,999	13	(6.7)	30	(12.9)	5	(6.0)	5	(6.7)
$500,000 to $999,999	4	(2.1)	17	(7.3)	0	(0.0)	0	(0.0)
$1,000,000 or More	5	(2.6)	2	(0.9)	0	(0.0)	0	(0.0)
No Response	30	(15.5)	20	(8.6)	8	(9.6)	3	(4.0)
Reported Net Profit or Loss								
Net Profit	118	(61.1)	163	(69.9)	34	(40.9)	70	(93.3)
Net Loss	40	(20.7)	43	(18.5)	29	(34.9)	3	(4.0)
No Response	35	(18.1)	27	(11.6)	20	(24.1)	2	(2.7)
Level of Debt-to-Asset Ratio								
No Debt	51	(26.4)	40	(17.1)	31	(37.3)	15	(20.0)
Less than 10%	29	(15.0)	34	(14.6)	13	(15.7)	19	(25.3)
11% to 40%	49	(25.4)	72	(30.1)	17	(20.5)	23	(30.7)
41% to 70%	30	(15.5)	54	(23.2)	7	(8.4)	15	(20.0)
71% to 100%	11	(5.7)	9	(3.9)	3	(3.6)	2	(2.7)
Greater than 100%	0	(0.0)	0	(0.0)	2	(2.4)	0	(0.0)
No Response	23	(11.9)	24	(10.3)	10	(12.0)	1	(1.3)

* Percent in parentheses.

TABLE IX

PRODUCER CHARACTERISTICS OF SURVEY RESPONDENTS INDICATING PARTICIPATION IN ARP FOR OKLAHOMA, MISSOURI, TENNESSEE, AND NORTH DAKOTA

Characteristic	Number of Responses and Percent*							
	Oklahoma		Missouri		Tennessee		North Dakota	
Level of Understanding of Federal Farm Programs								
High	42	(21.8)	40	(22.5)	4	(10.8)	26	(44.1)
Medium	85	(44.0)	110	(61.8)	24	(64.7)	28	(47.5)
Low	13	(6.7)	24	(13.5)	7	(18.9)	4	(6.8)
Not at All	1	(0.5)	0	(0.0)	0	(0.0)	1	(1.7)
No Response	12	(6.2)	4	(2.2)	2	(5.4)	0	(0.0)
Level of Off-Farm Income								
Under $10,000	69	(45.1)	103	(57.9)	17	(45.9)	34	(57.6)
$10,000 to $19,999	27	(17.6)	25	(14.0)	6	(16.2)	13	(22.0)
$20,000 to $29,999	15	(9.8)	18	(10.1)	3	(8.1)	6	(10.2)
$30,000 to $49,999	11	(7.2)	14	(7.9)	4	(10.8)	1	(1.7)
$50,000 to $99,999	7	(4.6)	5	(2.8)	1	(2.7)	1	(1.7)
$100,000 or More	2	(1.3)	0	(0.0)	1	(2.7)	0	(0.0)
No Response	22	(14.4)	13	(7.3)	5	(13.5)	4	(6.8)
Level of Gross Farm Income								
Under $20,000	14	(9.2)	12	(6.7)	10	(27.0)	2	(3.4)
$20,000 to $39,999	18	(11.8)	20	(11.2)	10	(27.0)	3	(5.1)
$40,000 to $99,999	35	(22.9)	45	(25.3)	4	(10.8)	17	(28.9)
$100,000 to $249,999	45	(29.4)	49	(27.5)	6	(16.2)	31	(52.5)
$250,000 to $499,999	12	(7.8)	26	(14.6)	4	(10.8)	3	(5.1)
$500,000 to $999,999	4	(2.6)	15	(8.4)	0	(0.0)	0	(0.0)
$1,000,000 or More	4	(2.6)	1	(0.6)	0	(0.0)	0	(0.0)
No Response	21	(13.7)	10	(5.6)	3	(8.1)	3	(5.1)
Reported Net Profit or Loss								
Net Profit	100	(63.4)	128	(71.9)	17	(45.9)	54	(91.5)
Net Loss	28	(18.3)	35	(19.7)	11	(29.7)	3	(5.1)
No Response	25	(16.3)	15	(8.4)	9	(24.3)	2	(3.4)
Level of Debt-to-Asset Ratio								
No Debt	34	(22.2)	25	(14.0)	12	(32.4)	9	(15.3)
Less than 10%	24	(15.7)	23	(12.9)	5	(13.5)	16	(27.1)
11% to 40%	45	(29.4)	62	(34.8)	8	(21.6)	19	(32.2)
41% to 70%	27	(17.6)	47	(26.4)	3	(8.1)	13	(22.0)
71% to 100%	8	(5.2)	6	(3.4)	2	(5.4)	1	(1.7)
Greater than 100%	0	(0.0)	0	(0.0)	2	(5.4)	0	(0.0)
No Response	15	(9.8)	15	(8.4)	5	(13.5)	1	(1.7)

* Percent in parentheses.

TABLE X

PRODUCER CHARACTERISTICS OF SURVEY RESPONDENTS INDICATING NON-PARTICIPATION IN ARP FOR OKLAHOMA, MISSOURI, TENNESSEE, AND NORTH DAKOTA

Characteristic	Number of Responses and Percent*							
	Oklahoma		Missouri		Tennessee		North Dakota	
Level of Understanding of Federal Farm Programs								
High	1	(2.5)	11	(20.0)	5	(10.9)	1	(7.7)
Medium	17	(42.5)	30	(54.5)	15	(32.6)	10	(76.9)
Low	13	(32.5)	10	(18.2)	19	(41.3)	2	(15.4)
Not at All	2	(5.0)	2	(3.6)	4	(8.7)	0	(0.0)
No Response	7	(17.5)	2	(3.6)	3	(6.5)	0	(0.0)
Level of Off-Farm Income								
Under $10,000	15	(37.5)	25	(45.5)	16	(34.8)	7	(53.8)
$10,000 to $19,999	3	(7.5)	5	(9.1)	9	(19.6)	5	(35.5)
$20,000 to $29,999	6	(15.0)	7	(12.7)	5	(10.9)	0	(0.0)
$30,000 to $49,999	2	(5.0)	4	(7.3)	6	(13.0)	0	(0.0)
$50,000 to $99,999	3	(7.5)	2	(3.6)	5	(10.9)	0	(0.0)
$100,000 or More	2	(5.0)	0	(0.0)	1	(2.2)	1	(7.7)
No Response	9	(22.5)	12	(21.8)	4	(8.7)	0	(0.0)
Level of Gross Farm Income								
Under $20,000	12	(30.0)	13	(23.6)	16	(34.8)	0	(0.0)
$20,000 to $39,999	4	(10.0)	4	(7.3)	12	(26.1)	2	(15.4)
$40,000 to $99,999	10	(25.0)	12	(21.8)	6	(13.0)	7	(53.8)
$100,000 to $249,999	3	(7.5)	9	(16.4)	6	(13.0)	3	(23.1)
$250,000 to $499,999	11	(2.5)	4	(7.3)	1	(2.2)	1	(7.7)
$500,000 to $999,999	0	(0.0)	2	(3.6)	0	(0.0)	0	(0.0)
$1,000,000 or More	1	(2.5)	1	(1.8)	0	(0.0)	0	(0.0)
No Response	9	(22.5)	10	(18.2)	5	(10.9)	0	(0.0)
Reported Net Profit or Loss								
Net Profit	18	(45.0)	35	(63.6)	17	(36.9)	13	(100.0)
Net Loss	12	(30.0)	8	(14.5)	18	(39.1)	0	(0.0)
No Response	10	(25.0)	12	(21.8)	11	(23.9)	0	(0.0)
Level of Debt-to-Asset Ratio								
No Debt	17	(42.5)	15	(27.3)	19	(41.3)	5	(35.8)
Less than 10%	5	(12.5)	11	(20.0)	8	(17.4)	2	(15.4)
11% to 40%	4	(10.0)	10	(18.2)	9	(19.6)	4	(30.8)
41% to 70%	3	(7.5)	7	(12.7)	4	(8.7)	1	(7.7)
71% to 100%	3	(7.5)	3	(5.5)	1	(2.2)	1	(7.7)
Greater than 100%	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)
No Response	8	(20.0)	9	(16.4)	5	(10.9)	0	(0.0)

* Percent in parentheses

for each level of understanding, off-farm income, gross farm income, debt-to-asset ratio, and net profit or loss.

A larger percent of producers in North Dakota reported a higher level of gross farm income than producers in other states. A larger percent of producers in North Dakota reported a net profit and lower debt-to-asset ratios than producers in the other states. The largest percent of producers in each state ranked their level of understanding of farm programs as medium. In each state, a larger percent of participants ranked their level of understanding as high or medium than non-participants.

Summary of Crop Yields

Yields for wheat, corn, barley, cotton, oats, sorghum, and soybeans are given in Table XI. Table XI provides a summary of reported survey yields, expected yields, program yields, actual state yields, and actual state program yields.

Producers reported higher expected yields than actual yields for most crops in each state. On average, producers in each state reported higher actual yields for most crops harvested in 1991 than state average yields for the same year. Producers, on average reported program yields similar to the state average program yields.

TABLE XI

COMPARISON OF SURVEY AND STATE LEVEL AVERAGE YIELDS FOR WHEAT, CORN, BARLEY, COTTON, OATS, SORGHUM, SOYBEANS

Crop	State			
	Oklahoma	Missouri	Tennessee	North Dakota
Wheat				
Survey Yield	28.0	36.4	33.1	34.2
Expected Yield	34.0	49.6	46.4	39.7
Program Yield	32.7	41.7	37.0	29.6
State Avg. Yield	28.0	32.0	24.0	31.0
State Program Yield	32.2	41.7	38.1	28.5
Corn				
Survey Yield	128.9	100.8	90.4	77.6
Expected Yield	142.7	121.7	114.6	57.5
Program Yield	145.8	94.3	84.1	46.5
State Avg. Yield	110.0	97.0	86.0	90.0
State Program Yield	98.0	93.4	78.9	64.0
Barley				
Survey Yield	23.1	40.0	40.0	52.6
Expected Yield	54.0	70.0	45.0	62.5
Program Yield	30.0	38.6	27.0	42.0
State Avg. Yield	37.0	NA	NA	49.0
State Program Yield	35.0	39.7	43.0	43.7
Cotton				
Survey Yield	363.1	653.1	574.0	NA
Expected Yield	341.3	741.0	663.1	NA
Program Yield	380.0	560.0	586.3	NA
State Avg. Yield	303.0	630.0	552.0	NA
State Program Yield	392.0	551.0	544.0	NA

TABLE XI (Continued)

Crop	State			
	Oklahoma	Missouri	Tennessee	North Dakota
Oats				
Survey Yield	32.0	73.2	NA	55.6
Expected Yield	39.2	63.5	NA	68.5
Program Yield	42.6	47.9	43.5	42.4
State Avg. Yield	38.0	51.0		50.0
State Program Yield	40.7	45.9	47.5	44.6
Sorghum				
Survey Yield	53.2	75.9	93.5	NA
Expected Yield	56.5	95.7	89.3	NA
Program Yield	44.8	74.6	55.5	NA
State Avg. Yield	45.0	72.0	65.0	NA
State Program Yield	41.8	74.8	53.5	NA
Soybeans				
Survey Yield	21	32.1	31.6	27.2
Expected Yield	35	37.0	35.1	26.7
Program Yield	NA	NA	NA	NA
State Avg. Yield	25.0	30.5	30.0	30.5
State Program Yield	NA	NA	NA	NA

Participation in Federal Farm Programs

Producers in each state were asked to identify current participation in federal farm programs and commodity programs that allow planting flexibility. The programs included both commodity programs and conservation programs. The levels of participation for each program, in each state from the survey respondents is provided in Table XII.

For commodity programs, producers were asked about participation in ARP (set-aside), optional flex, 0-50/92,

TABLE XII

PARTICIPATION IN FEDERAL FARM PROGRAMS REPORTED BY SURVEY RESPONDENTS FOR OKLAHOMA, MISSOURI, TENNESSEE, AND NORTH DAKOTA

Federal Farm Program	Number of Responses Percent*			
	Oklahoma	Missouri	Tennessee	North Dakota
Acreage Reduction Program	153 (79.3)	178 (76.4)	37 (44.6)	59 (78.7)
Optional Flex Acres	50 (25.9)	72 (30.9)	8 (9.6)	32 (42.7)
0/92 or 50/92	68 (35.2)	31 (13.3)	14 (16.9)	33 (44.0)
Nonrecourse Loans	7 (3.6)	16 (16.9)	2 (2.4)	14 (18.7)
Peanut Program	0 (0.0)	0 (0.0)	0 (0.0)	NA
Soybean Program	5 (5.6)	22 (9.4)	4 (4.8)	2 (2.7)
Crop Insurance	63 (32.6)	46 (19.7)	3 (3.6)	50 (66.7)
Farmer Owned Reserve (FOR)	193 (4.5)	1 (0.4)	0 (0.0)	9 (12.0)
Conservation Reserve Program (CRP)	34 (17.6)	49 (21.0)	18 (21.7)	21 (28.0)
Great Plains Conservation Program (GPCP)	20 (10.4)	0 (0.0)	0 (0.0)	3 (4.0)
Agricultural Conservation Program (ACP)	77 (39.9)	61 (26.2)	11 (13.3)	35 (46.7)

* Percent in parentheses.

nonrecourse loans, farmer owned reserve (FOR), crop insurance, the soybean loan program, and the peanut program.

Nonrecourse loans are price support programs administrated by the Commodity Credit Corporation. A producer of wheat, feed grains, cotton, rice, honey, sugar, peanuts, and tobacco may use the commodity as collateral to obtain a loan. The producer may repay the loan or forfeit the commodity as repayment. The FOR is a nonrecourse loan program available to wheat and feed grain producers after maturity of regular price support loans.

Federal crop insurance is a subsidy program that protects against crop production loss by providing risk management and financial stability. The peanut and soybean programs are price support programs for these commodities (USDA '91).

Producers were asked about participation in three conservation programs. These programs included the Conservation Reserve Program (CRP), the Great Plains Conservation Program (GPCP), available for producers in the Great Plains, and the Agricultural Conservation Program (ACP). The CRP is a voluntary land retirement program that pays land owners a rental payment for taking highly erodible cropland out of production for a ten year period. The GPCP and ACP are conservation programs that provide cost sharing and technical assistance (Batie).

High participation levels in the ARP were reported by survey respondents in Oklahoma, Missouri, and North Dakota. Respondents from Tennessee indicated less than 45 percent participated in the ARP. Participation in programs that offer additional planting flexibility (OFA and 0-50/92) was the highest in North Dakota. Participation in crop insurance ranged from 3.6 percent in Tennessee to 66.7 percent in North Dakota.

Participation in the CRP ranged from 17.6 percent in Oklahoma to 28.0 percent in North Dakota. Participation in the ACP was higher than CRP in every state except Tennessee.

Reasons for Participating in ARP

Producers were asked to rank a list of reasons for the level of importance for participating in ARP. Results of rankings for each reason are given in Table XIII. Four reasons in each state received similarly high rankings as being very important factors for participating in ARP. These factors included "established crop base", "more profitable", "have always participated" and "guarantee net return." In Oklahoma, Tennessee, and North Dakota, "weather conditions" also received high rankings as being an important factor for participating in ARP.

Reasons for Not Participating
in Commodity Farm Programs

Producers were asked to rank the level of importance of reasons for not participating in federal farm programs. Results of rankings for each reason are given in Table XIV. Two reasons, "more profitable" and "no base or base acreage too small" were ranked as a very important reason for not participating in each state. Other reasons receiving a large response as being a very important reason for not participating include "payment limitation too small" and "opposed to government programs". The reason, "did not understand program" was ranked by a large percent of respondents as not being very important in each state. In each state "conservation compliance rules" and "highly

Table XIII

IMPORTANCE OF REASONS FOR PARTICIPATING IN ARP: INDICATED BY SURVEY RESPONDENTS

(1 = Very Important and 5 = Not Very Important).

Oklahoma	1	2	3	4	5	No Reply
Established Crop Base	41.7	20.9	13.5	5.5	6.1	12.3
More Profitable	50.3	20.9	12.9	3.7	2.5	9.8
Weather Conditions	25.8	17.2	22.1	11.7	6.7	16.6
Required by Banker	8.0	2.5	7.4	11.0	43.6	27.6
Have Always Participated	36.2	18.4	18.4	8.0	12.3	6.7
Guarantee Net Return	31.9	23.3	19.0	3.7	6.7	15.3
Required by Landlord	6.1	11.0	12.3	7.4	37.4	25.8
Obtain Nonrecourse Loan	4.3	1.8	5.5	12.3	48.5	27.6
Marketing Loan	5.5	2.5	11.0	9.8	41.7	29.4
Other	1.2	0.6	1.2	0.6	8.0	88.3

N = 163

Missouri	1	2	3	4	5	No Reply
Established Crop Base	33.1	24.9	23.8	7.2	6.1	5.0
More Profitable	40.3	26.5	19.3	6.6	2.8	4.4
Weather Conditions	16.6	23.2	27.6	13.3	11.6	7.7
Required by Banker	3.9	3.3	9.9	9.9	58.6	14.4
Have Always Participated	21.5	18.2	28.7	11.6	14.4	5.5
Guarantee Net Return	28.2	24.9	24.9	7.7	5.0	9.4
Required by Landlord	7.7	3.9	12.2	7.7	53.6	14.9
Obtain Nonrecourse Loan	4.4	5.5	8.3	11.0	53.0	17.7
Marketing Loan	9.9	12.2	16.6	5.5	40.3	15.5
Other	1.1	0.6	2.2	0.6	11.6	84.0

N = 181

TABLE XIII (Continued)

Tennessee	1	2	3	4	5	No Reply
Established Crop Base	34.1	12.2	7.3	19.5	14.6	12.2
More Profitable	34.1	19.5	17.1	7.3	7.3	14.6
Weather Conditions	26.8	9.8	14.6	14.6	14.6	19.5
Required by Banker	9.8	4.9	7.3	2.4	53.7	22.0
Have Always Participated	24.4	14.6	19.5	14.6	14.6	12.2
Guarantee Net Return	31.7	22.0	12.2	7.3	14.6	12.2
Required by Landlord	7.3	0.0	7.3	9.8	51.2	24.4
Obtain Nonrecourse Loan	7.3	4.9	14.6	2.4	48.8	22.0
Marketing Loan	14.6	2.4	17.1	4.9	34.1	26.8
Other	2.4	0.0	0.0	0.0	7.3	90.2

N = 41

North Dakota	1	2	3	4	5	No Reply
Established Crop Base	38.6	18.6	17.1	7.1	15.7	2.9
More Profitable	45.7	25.7	21.4	4.3	1.4	1.4
Weather Conditions	28.6	25.7	25.7	2.9	10.0	7.1
Required by Banker	7.1	7.1	4.3	10.0	58.6	12.9
Have Always Participated	20.0	27.1	4.3	15.7	32.9	0.0
Guarantee Net Return	38.6	35.7	18.6	4.3	1.4	1.4
Required by Landlord	2.9	2.9	10.0	10.0	62.9	11.4
Obtain Nonrecourse Loan	10.0	18.6	11.4	11.4	38.6	10.0
Marketing Loan	10.0	15.7	11.4	11.4	40.0	11.4
Other	1.4	1.4	0.0	0.0	7.1	90.0

N = 70

TABLE XIV

IMPORTANCE OF REASONS FOR NOT PARTICIPATING IN COMMODITY FARM PROGRAMS: INDICATED BY SURVEY RESPONDENTS

(1 = Very Important and 5 = Not Very Important).

Oklahoma

	1	2	3	4	5	No Reply
More Profitable	40.7	7.4	11.1	0.0	22.2	18.5
ARP (Set-Aside) Too High	14.8	11.1	14.8	7.4	25.9	25.9
Opposed to Government Programs	7.4	11.1	18.5	11.1	22.2	29.6
No Base or Base Acreage Too Small	18.5	14.8	11.1	0.0	22.2	33.3
Payment Limitation Too Small	18.5	3.7	25.9	3.7	18.5	29.6
Landlord Objected	7.4	3.7	14.8	7.4	29.6	37.0
Conservation Compliance Rules	7.4	18.5	18.5	7.4	22.2	25.9
Highly Erodible Land Rules	14.8	7.4	11.1	3.7	37.0	25.9
Did Not Understand Program	11.1	0.0	22.2	7.4	25.9	33.3
Other	0.0	0.0	7.7	3.8	11.5	76.9

N = 27

Missouri

	1	2	3	4	5	No Reply
More Profitable	29.0	21.0	16.1	3.2	14.5	16.1
ARP (Set-Aside) Too High	4.8	9.7	21.0	12.9	29.0	22.6
Opposed to Government Programs	21.0	3.2	16.1	11.3	32.3	16.1
No Base or Base Acreage Too Small	30.6	11.3	11.3	4.8	25.8	16.1
Payment Limitation Too Small	19.4	9.7	12.9	6.5	35.5	16.1
Landlord Objected	4.8	1.6	14.5	9.7	50.0	19.4
Conservation Compliance Rules	9.7	8.1	17.7	6.5	37.1	21.0
Highly Erodible Land Rules	12.9	14.5	16.1	6.5	33.9	16.1
Did Not Understand Program	6.5	6.5	17.7	4.8	41.9	22.6
Other	8.1	0.0	1.6	0.0	11.3	79.0

N = 62

TABLE XIV (Continued)

Tennessee

	1	2	3	4	5	No Reply
More Profitable	22.2	13.9	13.9	8.3	13.9	27.8
ARP (Set-Aside) Too High	16.7	5.6	22.2	5.6	13.9	36.1
Opposed to Government Programs	30.6	2.8	13.9	5.6	19.4	27.8
No Base or Base Acreage Too Small	30.6	5.6	11.1	5.6	19.4	27.8
Payment Limitation Too Small	22.2	5.6	8.3	5.6	22.2	36.1
Landlord Objected	0.0	0.0	8.3	2.8	41.7	47.2
Conservation Compliance Rules	16.7	5.6	19.4	8.3	19.4	30.6
Highly Erodible Land Rules	11.1	5.6	16.7	8.3	16.7	41.7
Did Not Understand Program	13.9	5.6	19.4	13.9	13.9	33.3
Other	2.7	0.0	2.7	0.0	8.1	86.5

N = 36

North Dakota

	1	2	3	4	5	No Reply
More Profitable	44.1	11.8	11.8	8.8	17.6	5.9
ARP (Set-Aside) Too High	17.6	14.7	26.5	17.6	14.7	8.8
Opposed to Government Programs	17.6	11.8	23.5	20.6	14.7	11.8
No Base or Base Acreage Too Small	32.4	17.6	11.8	11.8	14.7	11.8
Payment Limitation Too Small	23.5	14.7	17.6	17.6	11.8	14.7
Landlord Objected	2.9	0.0	14.7	17.6	47.1	17.6
Conservation Compliance Rules	8.8	11.8	20.6	11.8	32.4	14.7
Highly Erodible Land Rules	11.8	11.8	14.7	17.6	32.4	11.8
Did Not Understand Program	14.7	0.0	14.7	8.8	47.1	14.7
Other	5.9	0.0	0.0	0.0	5.9	88.2

N = 34

erodible land rules" were ranked with limited levels of importance.

Importance of Sources Providing Information on Federal Farm Programs

Producers were asked to rank a list of policy information sources. Results of rankings for each source are given in Table XV. More than 60 percent of the producers in each state ranked the local ASCS office as a very important source of information on federal farm programs. Other sources ranked as being important for providing information included other farmers, university extension, and farm newspapers/magazines.

Factors Influencing Crops Planted on Flexible Acreage

Producers were asked to rank a list of reasons for the importance of factors influencing crops planted flexible acreage. A summary of responses given in Tables XVI through XIX reports the importance of factors influencing crops planted on normal flex acres for producers in each state. The ability to maintain existing base was ranked as a very important factor in all four states. In Oklahoma, stocker/feeder prices received high rankings as being a very important factor. In Missouri, Tennessee, and North Dakota between 36.7 percent and 42.2 percent of the producers ranked the ability to use a more profitable crop rotation as very important.

TABLE XV

IMPORTANCE OF ORGANIZATIONS OR AGENCIES PROVIDING INFORMATION ON FEDERAL FARM PROGRAMS INDICATED BY: SURVEY RESPONDENTS

(1 = Very Important and 5 = Not Very Important).

Oklahoma

	1	2	3	4	5	No Reply
Local ASCS Office	72.6	14.6	6.1	3.0	1.8	1.8
Local FmHA Office	7.9	3.0	7.9	11.6	46.3	23.2
Extension	23.8	17.7	18.3	9.1	14.6	16.5
Banker	18.3	9.8	15.2	11.0	26.2	19.5
Other Farmers	14.0	22.6	23.8	10.4	7.3	22.0
Farm Bureau	6.1	5.5	14.0	9.1	42.7	22.6
Farmers Union	4.9	3.7	7.9	12.2	46.3	25.0
Cattlemen Association	6.1	9.1	15.9	13.4	30.5	25.0
Wheat Growers Association	13.4	14.6	18.3	9.8	26.2	17.7
Wheat Commission	9.1	7.9	17.7	14.0	28.0	23.2
Farm Magazines/Newspapers	26.8	25.0	15.9	8.5	8.5	15.2
Other	3.7	1.8	4.9	3.7	11.7	74.2

N = 164

Missouri

	1	2	3	4	5	No Reply
Local ASCS Office	71.7	16.0	6.6	3.3	2.4	0.0
Local FmHA Office	4.7	7.1	7.5	9.0	57.1	14.6
Extension*	NA	NA	NA	NA	NA	NA
Banker	11.8	5.2	17.0	11.3	41.0	13.7
Other Farmers	15.6	17.9	24.5	11.3	17.5	13.2
Farm Bureau	6.6	6.1	9.0	11.8	51.9	14.6
Farmers Union	2.4	0.9	1.9	6.1	72.2	16.5
Cattlemen Association	2.8	6.1	7.5	6.6	59.9	17.0
Wheat Growers Association	0.9	2.4	5.7	6.1	67.9	17.0
Wheat Commission	0.9	0.9	5.2	5.7	69.8	17.5
Farm Magazines/Newspapers	21.2	29.2	22.2	6.1	11.8	9.4
Other	5.2	2.4	1.9	1.4	17.0	72.2

N = 212

TABLE XV (Continued)

Tennessee

	1	2	3	4	5	No Reply
Local ASCS Office	61.1	19.4	5.6	5.6	6.9	1.4
Local FmHA Office	9.9	9.9	4.2	11.3	40.8	23.9
Extension	32.4	25.4	9.9	4.2	12.7	15.5
Banker	9.9	4.2	9.9	16.9	32.4	26.8
Other Farmers	18.3	16.9	25.4	8.5	15.5	15.5
Farm Bureau	22.5	9.9	8.5	9.9	35.2	14.1
Farmers Union	1.4	0.0	4.2	15.5	46.5	32.4
Cattlemen Association	5.6	7.0	1.4	11.3	43.7	31.0
Wheat Growers Association	0.0	0.0	4.2	8.5	50.7	36.6
Wheat Commission	0.0	1.4	4.2	9.9	50.7	33.8
Farm Magazines/Newspapers	19.7	31.0	18.3	4.2	9.9	16.9
Other	1.4	0.0	0.0	2.8	18.3	77.5

N = 71

North Dakota

	1	2	3	4	5	No Reply
Local ASCS Office	62.9	27.1	5.7	2.9	1.4	0.0
Local FmHA Office	2.9	4.3	4.3	5.7	67.1	15.7
Extension	27.1	28.6	18.6	7.1	11.4	7.1
Banker	7.1	8.6	15.7	18.6	38.6	11.4
Other Farmers	11.4	30.0	25.7	11.4	11.4	10.0
Farm Bureau	4.3	5.7	12.9	11.4	52.9	12.9
Farmers Union	4.3	5.7	11.4	15.7	51.4	11.4
Cattlemen Association	0.0	7.1	8.6	8.6	58.6	17.1
Wheat Growers Association	7.1	14.3	21.4	15.7	27.1	14.3
Wheat Commission	8.6	8.6	25.7	14.3	28.6	14.3
Farm Magazines/Newspapers	32.9	40.0	14.3	1.4	2.9	8.6
Other	2.9	4.3	0.0	1.4	7.1	84.3

N = 70

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* Question asked about the importance of OSU extension rather than MU Extension.

TABLE XVI

IMPORTANCE OF FACTORS INFLUENCING CROPS PLANTED ON NORMAL FLEX ACRES: OKLAHOMA

(1 = Very Important and 5 = Not Very Important).

	1	2	3	4	5	No Reply
Meet Conservation Compliance Plan	21.8	21.8	15.5	3.6	17.6	20.0
Markets for the Alternative Crop	12.7	21.8	12.7	7.3	18.2	27.3
New Crop Needed for On-Farm Use	13.6	7.3	14.5	5.5	30.0	29.1
Could Maintain Existing Base	33.6	20.0	9.1	3.6	9.1	24.5
More Profitable Crop Rotation	15.5	18.2	21.8	8.2	13.6	22.7
Field Size	24.5	10.9	21.8	7.3	18.2	27.3
Field Location	10.0	14.5	24.5	6.4	14.5	30.0
Additional Machinery Required	11.8	14.5	15.5	7.3	20.0	30.9
Flex Crop Price	18.2	11.8	15.5	9.1	14.5	30.9
Base Crop Price	25.5	15.5	14.5	8.2	10.0	26.4
Weather	20.0	19.1	17.3	6.4	9.1	28.2
Stocker/Feeder Prices	32.7	16.4	14.5	3.6	9.1	23.6
Commodity Program Loan Rate	8.2	6.4	19.1	11.8	24.5	30.0
Other	2.7	0.0	4.5	1.8	9.1	81.8

N = 110

TABLE XVII

IMPORTANCE OF FACTORS INFLUENCING CROPS PLANTED ON NORMAL FLEX ACRES: MISSOURI

(1 = Very Important and 5 = Not Very Important).

	1	2	3	4	5	No Reply
Meet Conservation Compliance Plan	21.9	14.8	19.5	7.0	28.1	8.6
Markets for the Alternative Crop	17.2	17.2	15.6	14.1	24.2	11.7
New Crop Needed for On-Farm Use	4.7	6.2	14.1	15.6	43.0	16.4
Could Maintain Existing Base	37.5	24.2	20.3	1.6	5.5	10.9
More Profitable Crop Rotation	36.7	28.1	15.6	3.9	5.5	10.2
Field Size	19.5	19.5	21.1	9.4	17.2	13.3
Field Location	15.6	18.0	22.7	11.7	18.0	14.1
Additional Machinery Required	10.2	7.8	21.9	13.3	29.7	17.2
Flex Crop Price	18.8	22.7	23.4	7.8	10.9	16.4
Base Crop Price	18.0	26.6	26.6	5.5	9.4	14.1
Weather	16.4	15.6	28.1	11.7	14.1	14.1
Stocker/Feeder Prices	3.9	3.1	14.8	14.1	45.3	18.8
Commodity Program Loan Rate	4.7	7.0	18.0	14.8	32.0	23.4
Other	1.6	0.0	0.8	0.0	1.6	96.1

N = 128

TABLE XVIII

IMPORTANCE OF FACTORS INFLUENCING CROPS PLANTED ON NORMAL FLEX ACRES: TENNESSEE

(1 = Very Important and 5 = Not Very Important).

	1	2	3	4	5	No Reply
Meet Conservation Compliance Plan	32.0	16.0	12.0	8.0	20.0	12.0
Markets for the Alternative Crop	20.0	8.0	32.0	16.0	4.0	20.0
New Crop Needed for On-Farm Use	12.0	12.0	20.0	12.0	8.0	36.0
Could Maintain Existing Base	36.0	8.0	24.0	4.0	8.0	20.0
More Profitable Crop Rotation	36.0	20.0	16.0	0.0	12.0	16.0
Field Size	8.0	16.0	24.0	4.0	20.0	28.0
Field Location	20.0	8.0	24.0	12.0	12.0	24.0
Additional Machinery Required	12.0	0.0	16.0	8.0	36.0	28.0
Flex Crop Price	24.0	12.0	12.0	4.0	24.0	24.0
Base Crop Price	20.0	8.0	12.0	12.0	20.0	28.0
Weather	24.0	4.0	24.0	12.0	16.0	20.0
Stocker/Feeder Prices	24.0	8.0	12.0	8.0	28.0	20.0
Commodity Program Loan Rate	8.0	8.0	20.0	16.0	16.0	32.0
Other	4.0	0.0	0.0	4.0	0.0	92.0

N = 25

TABLE XIX

IMPORTANCE OF FACTORS INFLUENCING CROPS PLANTED ON NORMAL FLEX ACRES: NORTH DAKOTA

(1 = Very Important and 5 = Not Very Important).

	1	2	3	4	5	No Reply
Meet Conservation Compliance Plan	13.3	15.6	15.6	8.9	42.2	4.4
Markets for the Alternative Crop	33.3	15.6	8.9	2.2	31.1	8.9
New Crop Needed for On-Farm Use	11.1	8.9	6.7	4.4	55.6	13.3
Could Maintain Existing Base	42.2	15.6	15.6	0.0	15.6	11.1
More Profitable Crop Rotation	44.4	22.2	15.6	2.2	8.9	6.7
Field Size	24.4	26.7	15.6	8.9	17.8	6.7
Field Location	15.6	24.4	22.2	11.1	17.8	8.9
Machinery Requirements	13.3	11.1	26.7	15.6	24.4	8.9
Flex Crop Price	35.6	15.6	24.4	6.7	11.1	6.7
Base Crop Price	40.0	20.0	22.2	0.0	8.9	8.9
Weather	20.0	26.7	22.2	4.4	17.8	8.9
Stocker/Feeder Prices	4.4	4.4	8.9	4.4	60.0	17.8
Commodity Program Loan Rate	6.7	17.8	20.0	6.7	40.0	8.9
Other	8.9	2.2	2.2	2.2	8.9	75.6

N = 45

Crops Planted on Flexed Acreage

Farmers participating in ARP, OFA, or 0-50/92 programs were asked to report what crops were planted on the flexed acreage, rank the productivity of flexed acreage compared to other land on the farm, and rank the importance of factors influencing crops planted on flexed acreage.

A summary of the crops planted on normal flex acreage, optional flex acreage, and 0-50/92 acreage for survey

respondents is presented in Tables XX through XXII. In Oklahoma, respondents mostly indicated planting wheat on wheat flex acres. In Missouri, respondents indicated planting wheat, corn, and sorghum on their respective bases and flexing into other program crops as well as non-program crops with wheat and corn flexible acreage. Tennessee producers responding to this question indicated planting flexible acreage to the base crop. In North Dakota, respondents reported planting flexible acreage to the base crop, fallow, other program crops, and other non-program crops.

A list of crops planted for harvest is given for each state in Table XXIII. Producers in North Dakota indicated planting a wider variety of crops than producers in other states. Producers in Oklahoma reported planting the smallest variety of crops.

Conclusion

ASCS reported high preliminary enrollment for national crop base. State level enrollment indicated enrollment rates of crop base similar to other states in the same farm production region. Allocation of flexible acreage was not the same for producers in different regions. Although flex provisions resulted in negative plantings for all program crops except cotton, allocation of flexible acreage was not the same across regions.

TABLE XX

CROPS PLANTED ON NORMAL FLEX ACRES: 1991, BY SURVEY RESPONDENTS PARTICIPATING IN ARP

Base Crop	1991 NFA Planted TO:				
	Base Crop	Alfalfa, Grass, Hay Fallow	Other Program Crop	Other Non-Program Crop	No Response
Oklahoma					
Wheat	98	9	10	0	36
Corn	6	0	0	0	147
Sorghum	11	2	8	1	131
Cotton	7	0	4	1	141
Oats	4	2	1	0	146
Barley	3	0	2	0	148
Missouri					
Wheat	41	3	17	12	105
Corn	50	1	9	25	93
Sorghum	11	0	6	6	155
Cotton	3	0	0	0	175
Oats	9	0	3	1	165
Barley	1	0	0	0	177
Tennessee					
Wheat	8	1	2	0	26
Corn	11	2	0	0	24
Sorghum	0	0	0	0	37
Cotton	4	0	1	0	32
Oats	0	0	0	0	37
Barley	0	0	0	0	37
North Dakota					
Wheat	30	1	5	5	18
Corn	6	0	1	0	52
Sorghum	NA	NA	NA	NA	NA
Cotton	NA	NA	NA	NA	NA
Oats	9	0	0	1	49
Barley	21	1	4	2	31

TABLE XXI

CROPS PLANTED ON OPTIONAL FLEX ACRES: 1991, BY SURVEY RESPONDENTS PARTICIPATING IN Optional Flex

Base Crop	1991 OFA Planted to:				
	Base Crop	Alfalfa, Grass, Hay Fallow	Other Program Crop	Other Non-Program Crop	No Response
Oklahoma					
Wheat	25	1	2	0	22
Corn	1	0	0	0	49
Sorghum	2	1	1	0	46
Cotton	1	0	2	0	47
Oats	0	0	0	0	50
Barley	0	0	0	0	50
Missouri					
Wheat	10	1	5	5	51
Corn	13	0	3	7	49
Sorghum	0	0	2	2	68
Cotton	1	0	0	0	69
Oats	1	0	3	0	66
Barley	0	0	0	0	0
Tennessee					
Wheat	2	0	2	0	4
Corn	1	0	1	1	5
Sorghum	0	0	0	0	0
Cotton	0	0	0	0	0
Oats	0	0	0	0	0
Barley	0	0	0	0	0
North Dakota					
Wheat	7	1	0	0	24
Corn	0	0	0	1	31
Sorghum	NA	NA	NA	NA	NA
Cotton	NA	NA	NA	NA	NA
Oats	1	0	1	0	30
Barley	5	1	1	1	24

TABLE XXII

CROPS PLANTED ON 0-50/92 ACRES: 1991, BY SURVEY RESPONDENTS PARTICIPATING IN 0-50/92

Base Crop	1991 0-50/92 Acres Planted to:				
	Base Crop	Alfalfa, Grass, Hay Fallow	Other Program Crop	Other Non-Program Crop	No Response
Oklahoma					
Wheat	21	4	1	0	42
Corn	NA	NA	NA	NA	NA
Sorghum	1	1	2	1	63
Cotton	2	0	0	1	65
Oats	1	0	0	0	67
Barley	NA	NA	NA	NA	68
Missouri					
Wheat	2	0	1	0	28
Corn	3	1	0	2	25
Sorghum	1	0	0	1	29
Cotton	1	0	0	0	30
Oats	NA	NA	NA	NA	NA
Barley	NA	NA	NA	NA	NA
Tennessee					
Wheat	1	1	0	0	12
Corn	1	2	0	0	11
Sorghum	NA	NA	NA	NA	NA
Cotton	NA	NA	NA	NA	NA
Oats	NA	NA	NA	NA	NA
Barley	NA	NA	NA	NA	NA
North Dakota					
Wheat	0	5	0	1	27
Corn	0	4	1	3	25
Sorghum	NA	NA	NA	NA	NA
Cotton	NA	NA	NA	NA	NA
Oats	0	2	0	1	30
Barley	1	2	0	1	29

TABLE XXIII

CROPS PLANTED FOR HARVEST IN 1991 BY PRODUCERS

State			
Oklahoma	Missouri	Tennessee	North Dakota
Barley	Barley	Barley	Barley
Corn	Corn	Corn	Corn
Cotton	Cotton	Cotton	NA
Oats	Oats	NA	Oats
Rye	Rye	Rye	Rye
Sorghum	Sorghum	Sorghum	NA
Soybeans	Soybeans	Soybeans	Soybeans
Sunflowers	NA	NA	Sunflower
Hay	Hay	Hay	Hay
Alfalfa	Alfalfa	Alfalfa	Alfalfa
Wheat	Wheat	Wheat	Wheat
Sudan	Canola	Canola	Beans
	Peas	Tobacco	Pinto Beans
	Rice	Rice	Beets
	Potatoes		Durum Wheat
	Lespedeza		Peas
			Flax
			Millet
			Mustard

Farm level survey data can provide useful information about producers for analysis of program participation. Results from the survey show participants have larger farming/ranching operations and have more cropland as a percent of total acres than non-participants. Participants indicated a higher level of understanding of farm programs. Respondents in all states ranked their ASCS office as being an important source for providing information on federal farm programs.

CHAPTER III

METHODS

Introduction

In the social sciences, regression analysis has become a standard statistical tool. When more than two variables are examined, regression analysis may provide considerable explanatory power. A multiple regression model has the power of explaining the dependent variable with independent, explanatory variables. Based on the Gauss-Markov Theorem, regression analysis is able to provide desirable statistical properties (Aldrich and Nelson). Possible procedures for analysis of participation in federal commodity programs include linear regression models, contingency tables, and qualitative choice models.

Procedures

Special econometric procedures are needed when the dependent variable is discrete or limited. When the assumptions of Gauss-Markov theorem hold, ordinary least squares estimators (OLS) are best linear unbiased estimators and consistent. When observations on the dependent variable are discrete or limited, the assumptions of the Gauss-Markov Theorem are violated. Econometrics literature (Pindyck and

Rubinfeld, Maddala, Judge et al.) supports the use of qualitative choice models for estimation when the dependent variable is discrete or limited.

Linear Probability Model

The linear probability model can be used to represent a regression model where observations on the dependent variable Y are binary. The model is:

$$Y_k = \sum_{i=1}^{N} \beta_i X_{ik} + e_k \qquad (1)$$

Where

- Y_k takes on values of 0 or 1 for the k^{th} observation,
- X_{ik} represents the k^{th} observation on the i^{th} explanatory variable,
- β_i is the parameter for the i^{th} explanatory variable, and
- e_k is independently distributed random variable with zero mean (Pindyck and Rubinfeld).

One assumption of the Gauss-Markov theorem is that OLS estimators have an error term with a constant variance. Violation of this assumption results in heteroskedasticity. Pindyck and Rubinfeld demonstrate that the error term in the linear probability model does not have a constant variance and is heteroskedastic. When heteroskedasticity is present, estimators are unbiased and consistent, but there is a loss in efficiency. Hypothesis tests are also invalid because the estimate of the variance of the error term is biased.

The use of OLS when the dependent variable is limited to a discrete number, results in biased and inconsistent parameter estimates.

Probit Model

The probit model is an alternative binary choice model. The probit model is based on the cumulative normal probability function and provides similar results to the logit model, which is based on the cumulative logistic probability function. Unless the sample size is large, there will be little difference in the results from probit and logit models (Maddala). The probit model can be used to translate values of X to predictions that lie in the (0,1) interval. For example, let Y be the dependent variable for program participation. Y can have two values, zero for nonparticipation and one for participation. Assuming the k^{th} individual choice for Y_k is based on individual characteristics represented by X_k, a (1xN) vector of explanatory variables, the probit model is:

$$P_k^* = \Phi\left(\sum_{i=1}^{N} \beta_i X_{ik}\right) \qquad (2)$$

Where

P_k^* is the probability that the observation on Y for the k^{th} individual will equal one,

Φ represents the cumulative distribution function of the standard normal,

X_{ik} represents the k^{th} observation on the i^{th} explanatory variable, and

β_i is the parameter for the i^{th} explanatory variable.

As with OLS, there are assumptions for the probit model. The assumption of a linear relationship between the independent and dependent variables does not exist, the Y's can take on values of zero and one, the Y's should be statistically independent of each other, and there can be no exact linear relationship among the explanatory variables. Maximum likelihood estimation (MLE) methods can be used to estimate the parameters of the probit model. MLE estimates have asymptotic properties of unbiasedness, efficiency, and normality. T-statistics are asymptotically valid for testing the significance of parameter estimates.

Bivariate Probit Model

A more complex case of the probit model can be used for estimation when two dependent variables are observed for the same individual. For example, the k^{th} individual may be able to participate in two programs. It is possible to estimate two probit models for each individual, one for participation in the first program and one for participation in the second program. This type of estimation ignores correlation between the disturbance terms. If the disturbance terms are correlated, more efficient estimates can be obtained using a bivariate probit model (Greene).

In the analysis of participation in programs that allow planting flexibility, the final outcome is a result of two decisions. The first decision is whether or not to participate in ARP, the second is whether or not to participate in the flex program. This decision process is determined sequentially because participation in ARP is required before participation in flex programs can occur. This leads to partial observability or selectivity. A bivariate probit model with selectivity can be estimated using the LIMDEP econometrics computer program. The model developed for analysis of participation in flex programs is:

$$P_k^* = P[Y_{k1}=1]\ P[Y_{k2}=1]$$
$$P_k^* = \Phi\left(\sum_{i=1}^{N} \beta_{i1} X_{ik1}\right)\ \Phi\left(\sum_{i=1}^{N} \beta_{i2} X_{ik2}\right) \qquad (3)$$

Where

P_k^* is the probability that the observation on Y for the k^{th} individual in the second program will equal one.

Φ represents the cumulative distribution function of the standard normal,

X_{ik1} represents the k^{th} observation on the i^{th} explanatory variable for program 1,

X_{ik2} represents the k^{th} observation on the i^{th} explanatory variable for program 2,

β_{i1} is the coefficient of the i^{th} explanatory variable for program 1, and

β_{i2} is the coefficient of the i^{th} explanatory variable for program 2.

In this type of sequential decision process, the error terms are assumed uncorrelated. The LIMDEP econometrics computer program uses the Davidon/Fletcher/Powell (DFP) algorithm for MLE estimation (Greene).

Tobit Model

A tobit choice model can be used for estimation when the dependent variable is continuous, but observed over a limited range. Values of Y are observed over a range that includes the lower and upper values of zero and one. This type of the dependent variable is doubly censored. When the dependent variable has an upper and lower limit, a two limit tobit model is appropriate. OLS estimates are biased and inconsistent.

For example, there is planting flexibility on up to fifteen percent of base acres for farmers participating in ARP. Farmers can plant from 0 to 15 percent of established crop base to a nonbase crop. This leads to a two limit tobit model. Let Y be the base acreage of crop i flexed into acreage of crop j. Let Y be measured as a percentage of base for crop i. Observations on the dependent variable can be represented as $0 \leq Y \leq 1$. Assuming that the i^{th} individual choice for Y^*_k is based on individual characteristics represented by X_k, which is a (1xn) vector

of explanatory variables, the two limit tobit model can be written as:

$$Y_k^* = \sum_{i=1}^{N} \beta_i X_{ik} + e_k^* \qquad (4)$$

Where $Y_k = 0$ if $Y^*_k \leq 0$

$Y_k = Y^*_k$ if $0 \leq Y^*_k \leq 1$

$Y_k = 1$ if $Y^*_k \geq 1$

Y^*_k is a latent variable that represents the level of base acres flexed for the k^{th} individual measured as a percent,

X_{ik} represents the k^{th} observation on the i^{th} explanatory variable,

β_i is the parameter estimates for the i^{th} explanatory variable, and

$e_k^* \sim N(0, \sigma^2)$.

The actual estimated equation is:

$$Y_k = \sum_{i=1}^{N} \beta_i X_{ik} + e_k \qquad (5)$$

Where

Y_k is the observed value from Y^*_k.

Observations on the amount of base acres flexed are only observed for farmers that participate in ARP and have an established crop acreage base. This results in a two step decision process and leads to a two limit tobit model with selectivity.

As with the probit model, MLE procedures can be used to estimate the parameters of the tobit model. The LIMDEP econometrics program uses Newton's algorithm to obtain the MLE estimates. With this method, the variance matrix for the coefficients is estimated with the second derivatives of the log-likelihood (Greene).

Empirical Estimation

The theoretical models discussed in this chapter are used to test hypotheses about responses from the federal farm program participation survey. The theoretical models are specified for analysis of participation in federal farm programs. The specified models include socioeconomic variables hypothesized to affect participation.

Results of the estimated models will be used to determine explanatory variables that are significant at the 5 and 10 percent level. Model statistics computed by LIMDEP for the log-likelihood, Chi-square, and significance level will be reported with the results.

When observations on explanatory variables are missing, the missing value will be replaced with the response mean for the respective state. In some individual state models, NA appears when an explanatory variable was deleted to prevent collinearity among the variables.

Probit Analysis

ARP

Provisions of FACTA '90 require farmers to voluntarily enroll land in the annual set aside program to be eligible for program benefits. Farmers make the decision to participate or not participate in the annual set aside program. Analysis of this binary decision can be accomplished with a probit model. The empirical probit model developed to estimate the probability that a farmer will participate in the annual set aside program (ARP) is:

$$\begin{aligned} P_{ARP} = \alpha &+ \beta_1 AGE + \beta_2 FARMSIZE + \beta_3 PARTNER \\ &+ \beta_4 CORP + \beta_5 OTHER + \beta_6 EDUC \\ &+ \beta_7 LEVEL + \beta_8 DA + \beta_9 LIVESTOCK \\ &+ \beta_{10} BASE + \beta_{11} OFI + \beta_{12} SIZESQ \end{aligned} \tag{6}$$

where:

P_{ARP} is one if the farmer participates in ARP.

AGE is measured in years.

FARMSIZE is total acres in the farming/ranching operation.

PARTNER is 1 if the operation is a partnership.

CORP is 1 if the operation is a corporation.

OTHER is 1 if the operation is another business form.

LEVEL is a value for the a self description of the level of understanding farm programs.

EDUC is amount of formal education in years.

DA is a value for the debt asset ratio.

LIVESTOCK is one if the self description of the operation includes beef, dairy, or other livestock.

BASE is the amount of base acres as a ratio of total cropland.

OFI is off farm income.

SIZESQ is FARMSIZE squared.

Pooled Model Estimation. For analysis of participation in ARP when observations are pooled from more than one state, equation 6 can be respecified to include slope shifters for additional states. One state, Oklahoma, is not included to prevent collinearity among the slope intercept shifters. The respecified pooled probit model for participation in ARP is given in equation 7.

$$\begin{aligned} P_{ARP} = {} & \alpha + \beta_1 AGE + \beta_2 FARMSIZE + \beta_3 PARTNER \\ & + \beta_4 CORP + \beta_5 OTHER + \beta_6 EDUC \\ & + \beta_7 LEVEL + \beta_8 DA + \beta_9 LIVESTOCK \\ & + \beta_{10} BASE + \beta_{11} OFI + \beta_{12} SIZESQ \\ & + \beta_{13} MO + \beta_{14} TN + \beta_{15} ND \end{aligned} \tag{7}$$

where:

MO is one if the producer is from Missouri, else MO is zero.

TN is one if the producer is from Tennessee, else TN is zero.

ND is one if the producer is from North Dakota, else ND is zero.

Nonrecourse Loan

Nonrecourse loans are used by the Commodity Credit Corporation to give price support for program commodities. Producers of wheat, feed grains, rice, cotton, and peanuts that comply with program rules are eligible for these loans. Under this program, farmers pledge grain as collateral to obtain a CCC loan. The farmer can either repay the loan or forfeit the collateral. The empirical probit model developed to estimate the probability of participation in the nonrecourse loan program is given in equation 8.

$$P_{NRL} = \alpha + \beta_1 AGE + \beta_2 FARMSIZE + \beta_3 PARTNER + \beta_4 CORP + \beta_5 OTHER + \beta_6 EDUC + \beta_7 LEVEL + \beta_8 DA + \beta_9 LIVESTOCK + \beta_{10} GRAINS + \beta_{11} OFI \quad (8)$$

where:

P_{NRL} is one if the farmer participates in the nonrecourse loan program.

AGE is measured in years.

FARMSIZE is total acres in the farming/ranching operation.

PARTNER is 1 if the operation is a partnership.

CORP is 1 if the operation is a corporation.

OTHER is 1 if the operation is another business form.

LEVEL is a value for the self description of the level of understanding farm programs.

EDUC is amount of formal education in years.

DA is a value for the debt asset ratio.

LIVESTOCK is one if the self description of the operation includes beef, dairy, or other livestock.

GRAINS is the acres of feed grains as a ratio of cropland.

OFI is off farm income.

Pooled Model Estimation. For analysis of participation in the nonrecourse loan program when observations are pooled from more than one state, equation 9 can be respecified to include slope shifters for additional states. The respecified pooled probit model for participation in the nonrecourse loan program is given in equation 9.

$$\begin{aligned} P_{NRL} = \alpha &+ \beta_1 AGE + \beta_2 FARMSIZE + \beta_3 PARTNER \\ &+ \beta_4 CORP + \beta_5 OTHER + \beta_6 EDUC \\ &+ \beta_7 LEVEL + \beta_8 DA + \beta_9 LIVESTOCK \\ &+ \beta_{10} GRAINS + \beta_{11} OFI \\ &+ \beta_{12} MO + \beta_{13} TN + \beta_{14} ND \end{aligned} \tag{9}$$

where:

MO is one if the producer is from Missouri, else MO is zero.

TN is one if the producer is from Tennessee, else TN is zero.

ND is one if the producer is from North Dakota, else ND is zero.

Conservation Reserve Program

Conservation provisions of FSA '85 mandate that farmers producing agricultural commodities on highly erodible land

must implement a conservation plan by 1995. FACTA '90 amends the conservation requirements of FSA '85. The conservation reserve program (CRP), started in 1985, is designed to reduce erosion on farmland. Participants agree to convert erodible land to conserving uses for ten years and receive rental payments and partial reimbursement for land conversion costs. The empirical probit model developed to estimate the probability of participation in CRP is:

$$\begin{aligned} P_{CRP} = \alpha &+ \beta_1 AGE + \beta_2 FARMSIZE + \beta_3 PARTNER \\ &+ \beta_4 CORP + \beta_5 OTHER + \beta_6 EDUC \\ &+ \beta_7 LEVEL + \beta_8 DA + \beta_9 LIVESTOCK \\ &+ \beta_{10} OWNLAND + \beta_{11} PASTURE \end{aligned} \tag{10}$$

where:

P_{CRP} is one if the farmer participates in CRP.

AGE is measured in years.

FARMSIZE is total acres in the farming/ranching operation.

PARTNER is 1 if the operation is a partnership.

CORP is 1 if the operation is a corporation.

OTHER is 1 if the operation is another business form.

LEVEL is a value for the self description of the level of understanding farm programs.

EDUC is amount of formal education in years.

DA is a value for the debt asset ratio.

LIVESTOCK is one if the self description of the operation includes beef, dairy, or other livestock.

OWNLAND is the amount of acres owned as a ratio of total acres for the operation.

PASTURE is the amount of pasture or native rangeland as a ratio of total acres for the operation.

Pooled Model Estimation. For analysis of participation in the CRP when observations are pooled from more than one state, equation 11 can be respecified to include slope shifters for additional states. The respecified pooled probit model for participation in the CRP is given in equation 11.

$$\begin{aligned} P_{CRP} = {} & \alpha + \beta_1 AGE + \beta_2 FARMSIZE + \beta_3 PARTNER \\ & + \beta_4 CORP + \beta_5 OTHER + \beta_6 EDUC \\ & + \beta_7 LEVEL + \beta_8 DA + \beta_9 LIVESTOCK \\ & + \beta_{10} OWNLAND + \beta_{11} PASTURE \\ & \beta_{12} MO + \beta_{13} TN + \beta_{14} ND \end{aligned} \qquad (11)$$

where:

MO is one if the producer is from Missouri, else MO is zero.

TN is one if the producer is from Tennessee, else TN is zero.

ND is one if the producer is from North Dakota, else ND is zero.

Bivariate Probit Analysis

Participation in Optional Flex

Once a farmer has decided to participate in the annual set aside program, eligibility is possible in other flex

programs. Analysis of this joint decision process can be accomplished with a bivariate probit with selectivity. For bivariate probit estimation, two probit models need to be estimated. The first probit model estimates participation in ARP and is the same model specified in equation 6. The second probit model is needed to estimate the probability of participation in OFA and is specified in equation 12.

$$P_{OFA} = \alpha + \beta_1 AGE + \beta_2 FARMSIZE + \beta_3 PARTNER + \beta_4 CORP + \beta_5 OTHER + \beta_6 EDUC + \beta_7 LEVEL + \beta_8 DA + \beta_9 BASE + \beta_{10} ALTCROP + \beta_{11} CROPMIX \quad (12)$$

where:

P_{OFA} is one if the farmer participates in OFA.

AGE is measured in years.

FARMSIZE is total acres in the farming/ranching operation.

PARTNER is 1 if the operation is a partnership.

CORP is 1 if the operation is a corporation.

OTHER is 1 if the operation is another business form.

LEVEL is a value for the self description of the level of understanding farm programs.

EDUC is amount of formal education in years.

DA is a value for the debt asset ratio.

BASE is the amount of base acres as a ratio of total cropland.

ALTCROP is one if a permitted alternative crop is planted on the farm.

CROPMIX is 1 if changes were made in the crop from 1988 to 91.

The bivariate probit model with selectivity combines explanatory variables from the two probit models. In addition, the bivariate model includes Rho. Rho is used to determine if the addition of selectivity to the model is appropriate.

Participation in 0-50/92

Participation in ARP is required before participation in 0-50/92 is possible. Analysis of participation in 0-50/92 can be accomplished with a bivariate probit model with selectivity. Estimation of the first probit model will be the same as in equation 6. The second probit model will be the same as specified in equation 12 for the estimation of participation in the optional flex program. Only the dependent variable will be changed to $P_{0/92}$. Where, $P_{0/92}$ is one if the farmer participates in the 0-50/92 program.

Pooled Model Estimation

Participation in optional flex and 0-50/92 will also be estimated using a pooled model. Equation 12, respecified to include slope intercept shifters for three states, will also be combined with equation 7 to form the pooled bivariate probit model with selectivity.

Tobit Analysis

The amount of crop base acres that can be planted to another crop while remaining eligible for program benefits is limited according to normal flex, optional flex, or 0-50/92 provisions. NFA provisions allow up to 15 percent of crop base, not eligible for deficiency payments, to be planted to a non-base crop. Analysis of the level of participation in NFA can be accomplished with a two limit tobit model with selectivity. For estimation, two models need to be estimated. First a probit model needs to be estimated for participation. This model will be the same as specified in equation 7. However, the dependent variable will be redefined so that observations on P_{nfai} will equal one if and only if the individual participates in the ARP and has an established crop base, otherwise P_{nfai} equals zero. Second, a two limit tobit model needs to be estimated for the amount of flex acres planted to a non-base crop.

Only a pooled tobit model with selectivity will be estimated. The pooled model will be estimated after observations in the data set are stacked. The model developed for analysis of the amount of acres flexed from crop i is given in equation 13. The model includes slope intercept shifters for program crops within each state. To prevent collinearity, a slope intercept shifter for Oklahoma wheat is excluded.

$$
\begin{aligned}
P_{NFAi} = {} & \alpha + \beta_1 AGE + \beta_2 FARMSIZE + \beta_3 PARTNER \\
& + \beta_4 CORP + \beta_5 OTHER + \beta_6 EDUC + \beta_7 LEVEL \\
& + \beta_8 DA + \beta_9 BASE_i + \beta_{10} PRGYLD_i \\
& + \beta_{11} OKWHEAT + \beta_{12} OKCORN + \beta_{13} OKSORG \\
& + \beta_{14} OKOATS + \beta_{15} OKCOTN + \beta_{16} MOWHEAT \\
& + \beta_{17} MOCORN + \beta_{18} MOSORG + \beta_{19} MOBARL \\
& + \beta_{20} MOOATS + \beta_{21} MOCOTN + \beta_{22} TNWHEAT \\
& + \beta_{23} TNCORN + \beta_{24} TNSORG + \beta_{25} TNBARL \\
& + \beta_{26} TNOATS + \beta_{27} TNCOTN + \beta_{28} NDWHEAT \\
& + \beta_{29} NDCORN + \beta_{30} NDBARL + \beta_{31} NDOATS
\end{aligned}
\qquad (13)
$$

where:

P_{nfai} is the percent of normal flex acres flexed from base $crop_i$ to a nonbase crop. The range for P_{nfa} is from zero to one.

AGE is measured in years.

FARMSIZE is total acres in the farming/ranching operation.

PARTNER is 1 if the operation is a partnership.

CORP is 1 if the operation is a corporation.

OTHER is 1 if the operation is another business form.

LEVEL is a value for the self description of the level of understanding farm programs.

EDUC is amount of formal education in years.

DA is a value for the debt asset ratio.

LIVESTOCK is one if the description of the farming operation includes beef, dairy, or other livestock.

$BASE_i$ acres of base for crop i as a ratio of total cropland.

PRGYLD is the program yield for crop i for the farm.

OKWHEAT is 1 if the base crop is wheat in Oklahoma

OKCORN is 1 if the base crop is corn in Oklahoma

OKSORG is 1 if the base crop is sorghum in Oklahoma

OKOATS is 1 if the base crop is oats in Oklahoma

OKCOTN is 1 if the base crop is cotton in Oklahoma

MOWHEAT is 1 if the base crop is wheat in Missouri

MOCORN is 1 if the base crop is corn in Missouri

MOSORG is 1 if the base crop is sorghum in Missouri

MOBARL is 1 if the base crop is barley in Missouri

MOOATS is 1 if the base crop is oats in Missouri

MOCOTN is 1 if the base crop is cotton in Missouri

TNWHEAT is 1 if the base crop is wheat in Tennessee

TNCORN is 1 if the base crop is corn in Tennessee

TNSORG is 1 if the base crop is sorghum in Tennessee

TNBARL is 1 if the base crop is barley in Tennessee

TNOATS is 1 if the base crop is oats in Tennessee

TNCOTN is 1 if the base crop is cotton in Tennessee

NDWHEAT is 1 if the base crop is wheat in North Dakota

NDCORN is 1 if the base crop is corn in North Dakota

NDBARL is 1 if the base crop is barley in North Dakota

NDOATS is 1 if the base crop is oats in North Dakota

The two limit tobit model with selectivity combines explanatory variables from the probit model and two limit tobit model. In addition, the model includes Rho and Sigma.

Likelihood Ratio Test

When maximum likelihood estimation methods are used the likelihood ratio test is an appropriate procedure for

testing whether parameter restrictions are supported by the data. The test statistic computed for the likelihood ratio test is distributed asymptotically as a chi-square (χ^2). Degrees of freedom are equal to the number of restrictions being tested. The likelihood ratio test statistic is:

$$-2\,[L(\beta_R) - L(\beta_{UR})] \sim \chi^2_m \qquad (14)$$

Where $L(\beta_R)$ represents the maximum value of the log likelihood function when the restrictions do apply, $L(\beta_{UR})$ represents the maximum value of the log likelihood function when the restrictions do not apply, and m is the number of restrictions. The likelihood ratio test is performed by comparing a computed test statistic from equation 14 to a critical value, for a chosen level of significance, from the χ^2 distribution. If the computed test statistic is greater than the χ^2 critical value the null hypothesis is rejected and the conclusion reached is that the restrictions do not apply (Pindyck and Rubinfeld, Kennedy).

Test of Pooling

Five Probit and bivariate probit models are estimated for selected dependent variables. First, state level survey data is used to estimate four state models. Second, state level survey data is aggregated for pooled model estimation. In the pooled models, the slope coefficients are equal. The likelihood ratio test can be used to test hypotheses about the slope coefficients. $L(\beta_{UR})$ is the sum of the log likelihood functions for the four individual state models.

$L(\beta_R)$ is the log likelihood function for the pooled model. The null hypothesis is that the slope coefficients are equal. The alternative hypothesis is that the slope coefficients are not equal. When the null hypothesis is rejected pooling is not supported by the data.

Test of Regional Dummy Variables

Pooled probit and bivariate models are estimated with regional dummy variables included in the models. The likelihood ratio test can be used to test hypotheses about the value of the dummy variable coefficients. $L(\beta_{UR})$ is the log likelihood function for the for pooled model including dummy variables for the states. $L(\beta_R)$ is the log likelihood function for the pooled model without dummy variables for the states. The null hypothesis is that the coefficients for the dummy variables are equal to each other and equal zero. The alternative hypothesis is that the coefficients are not equal to each other or do not equal zero. If the null hypothesis is rejected, the data supports the inclusion of dummy variables in the models.

Survey Response Bias

A method is needed for validating data received from survey respondents. An analysis of means can be used to compare survey response means to population means. When the population mean, survey mean, survey standard deviation, and

number of survey responses are known a t statistic can be computed (Pindyck and Rubinfeld). The t statistic is:

$$t = \frac{\mu_s - \mu_p}{\frac{\delta_s}{n^{-1/2}}} \qquad (15)$$

where:

μ_s is the mean from the survey sample.

μ_p is the mean from the population.

σ_s is the standard deviation from the survey sample.

n is the number of survey responses.

The computed t statistic can be compared to a critical value from the t distribution to test hypotheses. The null hypothesis is that the means are equal. The alternative hypothesis is that the means are not equal. Selected variables will be tested. These variables will be age, farmsize, program yield, actual yield for crops harvested in 1991, and acres of base per enrolled farm.

CHAPTER IV

RESULTS

Probit Model Results

Participation in ARP

Results of the pooled probit model analyzing participation in the ARP are provided in Table XXIV. Results indicate age, farm size, level of understanding of farm programs, debt to asset ratio, livestock operations, and off-farm income significantly effect the probability of participation. Producers in Tennessee are less likely to participate.

The negative relationship between age and participation indicates older farmers are less likely to participate. Older farmers may be more independent or be in a favorable financial position and have less dependence on government programs and payments. Older farmers may also spend less time farming and find program participation to be relatively cumbersome.

A higher level of off-farm income indicates a lower probability of participation. Farmers with higher off-farm incomes may not rely solely upon farm income for survival. These farmers may have the ability or desire to farm free of

TABLE XXIV

PROBIT RESULTS: PARTICIPATION IN ACREAGE REDUCTION PROGRAM

	Pooled Model		Oklahoma		Missouri		Tennessee		North Dakota	
Explanatory Variable	Coeffi-cient	(T-Stat)	Coeffi-cient	(T-Stat)	Coeffi-cient	(T-Stat)	Coeffi-cient	(T-Stat)	Coeffi-cient	(T-Stat)
Constant	2.4078	(3.761)**	1.2079	-(0.937)	1.5073	(-1.621)	2.3154	(-1.591)	4.6659	(1.672)*
Age	-0.0108	(-2.060)**	0.0084	-(0.789)	-0.0173	(-2.160)**	-0.0001	(0.007)	-0.0326	(-1.682)*
Farmsize	0.0002	(2.318)**	0.00004	-(0.216)	0.0006	(2.339)**	0.0023	(2.417)**	-0.0007	(-0.534)
Partnership	-0.2298	(-1.502)	-0.6889	(-2.145)**	-0.2952	(1.271)	0.1653	(-0.389)	-0.0179	(-0.036)
Corporation	-0.0862	(-0.291)	-0.0025	(0.004)	0.0710	(-0.189)	NA	NA	-4.585	(-0.095)
Other	-0.2672	(-0.984)	-0.4423	(0.999)	0.0968	(-0.197)	-0.0030	(0.004)	-5.579	(-0.116)
Education	-0.0349	(-1.328)	0.0593	-(1.033)	-0.0229	(0.567)	-0.1827	(-2.825)**	-0.0911	(-0.83)
Level	-0.3958	(-4.117)**	-0.8125	(-3.859)**	-0.0803	(0.517)	-0.5732	(-2.312)**	-0.2477	(-0.774)
Debt/Asset	0.1057	(1.871)*	0.1828	(1.686)*	0.0820	(-0.875)	0.1678	(-1.116)	(0.0021	(0.012)
Livestock	-0.2875	(-2.086)**	-0.4760	(-1.731)**	-0.1627	(0.765)	-0.4739	(1.389)	(0.3876	(0.578)
Base	0.0542	(1.257)	0.0339	-(0.777)	0.0351	(-0.643)	0.1321	(-1.028)	(0.1379	(0.523)
OFI	-0.0994	(-1.993)**	-0.1415	(1.534)	-0.0643	(0.724)	0.0226	(-0.18)	-0.1897	(-1.255)
Farmsize Square	-0.10E-07	-(1.281)	0.58E-08	-(0.225)	-0.10E-06	(2.186)**	-0.83E-06	(2.12)	0.28E-06	(0.781)
North Dakota	-0.2949	-(1.406)	NA	NA	NA	NA	NA	NA	NA	NA
Missouri	-0.1116	-(0.724)	NA	NA	NA	NA	NA	NA	NA	NA
Tennessee	-0.5843	(-3.014)**	NA	NA	NA	NA	NA	NA	NA	NA
Log-Likelihood	-288.3405		-78.05472		-116.0289		-43.00093		-28.53852	
Chi-Square	103.2085		40.8646		22.60444		28.08275		20.67392	
Significance Level	0.0000001		0.0000516		0.0312781		0.0031442		0.0553642	

* significant at the 10 percent level.

** significant at the 5 percent level

government programs and choose to do so. Farmers with higher off-farm income may have a higher opportunity cost for time required to enroll in the program at the ASCS office.

Farms that rely upon livestock production are less likely to participate because income from crops may be small compared to income from livestock and participation may be relatively unimportant. These farms may also use crops (feed grains or wheat pasture) to support the livestock operation.

The coefficient for level of understanding is negative. Responses to this question were coded where 1 = "high" and 4 = "not at all". The negative sign for this variable means as a farmers' understanding of farm programs goes up, they are more likely to participate. Farmers with a higher level of understanding of federal farm programs may be in a better position to adopt a program complementing their farming/ranching operation. Producers with a low level of understanding may think participation is restrictive to their farming/ranching operation, or they may feel participation is frustrating.

The positive relationship between the debt to asset level and participation indicates that farmers in poor financial position are more likely to participate. These farmers may depend upon government payments to reduce price risk or support income.

The positive effect of farm size indicates that producers with larger farms are more likely to participate than producers with smaller farms. Large farms may have economies of size making participation favorable. Producers with smaller farms may find program compliance burdensome or government payments small or insignificant. Farmers with large farms may reach payment limitations discouraging participation. This is indicated by farm size squared, which has a negative affect on participation. Farm size squared is significant at the twenty percent level.

The pooled model indicated producers in Tennessee are less likely to participate than producers in Oklahoma. Producers in Tennessee may have farming practices or farming operations in which participation is less desirable compared to the other states.

The likelihood ratio test for pooling results in a computed χ^2 statistic of 45.6. At the five percent level the χ^2_{33} equals 47.4. Based on the survey data, the null hypothesis that the slope coefficients are equal cannot be rejected at the five percent level.

The likelihood ratio test for regional dummy variables results in a computed χ^2 statistic of 10.8. At the five percent level the χ^2_3 equals 7.8. Based on the survey data, the null hypothesis that the state dummy variable coefficients equal zero is rejected at the five percent level.

Participation in Nonrecourse Loan Program

Results of the pooled probit model analyzing participation in the nonrecourse loan program are provided in Table XXV. Results indicate that only the level of understanding of farm programs and debt to asset ratio significantly affect participation. Producers in North Dakota are more likely to participate.

The positive relationship between level of understanding of farm programs and participation indicates producers with a higher level of understanding of farm programs are more likely to participate. These producers may know and understand how the non-recourse loan program works and understand how they can gain from a price increase without risk of loss.

The positive relationship between debt-to-asset ratio and participation indicates farmers in poor financial positions are more likely to participate. These farmers may participate because of the price support and ability to gain from a price increase offered by the loan program.

The pooled model indicated producers in North Dakota are more likely to participate than producers in Oklahoma. This could be caused by two reasons, first, farmers in North Dakota may have more on-farm approved storage facilities. Second, farmers may want to keep control of the commodity and market it throughout the year.

TABLE XXV

PROBIT RESULTS: PARTICIPATION NONRECOURSE LOAN PROGRAM

	Pooled Model		Oklahoma		Missouri		Tennessee		North Dakota	
Explanatory Variable	Coeffi-cient	(T-Stat)	Coeffi-cient	(T-Stat)	Coeffi-cient	(T-Stat)	Coeffi-cient	(T-Stat)	Coeffi-cient	(T-Stat)
Constant	-3.2041	(-3.046)**	-2.0793	(-0.751)	-3.0196	(-1.776)*	-17.5000	(-0.005)	-3.0201	(-1.428)
Age	0.0088	(1.029)	0.0039	(0.188)	0.0116	(0.839)	-0.1227	(-0.001)	0.0173	(0.999)
Farmsize	-0.71E-06	(-0.01)	-0.000055	(-0.407)	0.0001	(0.333)	-0.0012	(-0.001)	0.0001	(0.718)
Partnership	-0.0187	(-0.078)	0.3469	(0.537)	-0.2411	(-0.590)	4.4156	(0.003)	-0.2070	(-0.398)
Corporation	0.2676	(0.759)	0.7651	(0.987)	0.0342	(0.071)	NA	NA	-3.0063	(-0.062)
Other	-0.1419	(-0.275)	-2.3721	(-0.073)	0.2822	(0.412)	-0.3118	(0.0)	-3.3255	(-0.069)
Education	0.0692	(1.520)	0.1488	(1.173)	0.0287	(0.408)	1.2672	(0.003)	0.0516	(0.498)
Level	-0.4622	(-2.847)**	-0.3443	(-0.920)	-0.5208	(-1.973)**	-3.0918	(-0.001)	-0.2466	(-0.740)
Debt/Asset	0.3307	(3.724)**	0.0392	(1.551)	0.5276	(2.888)**	0.6288	(0.002)	0.3435	(1.845)*
Livestock	-0.1305	(-0.539)	-0.4133	(-0.656)	-0.1132	(-0.314)	-7.9028	(-0.003)	0.2063	(0.365)
Grains	0.0123	(0.398)	-2.2858	(-2.179)	0.0134	(0.266)	4.5308	(0.002)	0.1059	(0.956)
OFI	-0.0924	(-1.048)	-0.2541	(-1.066)	-0.1313	(-0.819)	0.2278	(-0.0)	-0.2074	(-0.916)
North Dakota	0.9409	(3.572)**	NA	NA	NA	NA	NA	NA	NA	NA
Missouri	0.3056	(1.248)	NA	NA	NA	NA	NA	NA	NA	NA
Tennessee	0.0708	(0.17)	NA	NA	NA	NA	NA	NA	NA	NA
Log-Likelihood	-117.8029		-22.67941		-48.56459		-0.00003		-31.65279	
Chi-Square	50.82425		14.81909		19.45644		18.85413		8.89743	
Significance Level	0.0000044		0.1190923		0.0533764		0.042155		0.6313596	

* significant at the 10 percent level.
** significant at the 5 percent level

The likelihood ratio test for pooling results in a computed χ^2 statistic of 29.6. At the five percent level the χ^2_{30} equals 43.8. Based on the survey data, the null hypothesis that the slope coefficients are equal cannot to be rejected at the five percent level.

The likelihood ratio test for regional dummy variables results in a computed χ^2 statistic of 14.2. At the five percent level the χ^2_3 equals 7.8. Based on the survey data, the null hypothesis that the state dummy variable coefficients equal zero is rejected at the five percent level.

Participation in CRP

Results of the probit model analyzing participation in the Conservation Reserve Program are provided in Table XXVI. Results indicate farm size and forms of business structure other than sole proprietorship, corporation, or partnership significantly affect participation. Producers in Tennessee are more likely to participate.

The negative relationship between other forms of business structure and participation indicates these farming operations are less likely to participate. These farming operations may not want to engage in long term contracts or find it difficult to comply with approved conservation practices.

The positive relationship between farmsize and participation indicates larger farms are more likely to

TABLE XXVI

PROBIT RESULTS: PARTICIPATION IN CONSERVATION RESERVE PROGRAM

Explanatory Variable	Pooled Model Coeffi-cient	(T-Stat)	Oklahoma Coeffi-cient	(T-Stat)	Missouri Coeffi-cient	(T-Stat)	Tennessee	North Dakota
Constant	-1.0250	(-1.552)	-2.9574	(-2.046)**	-1.1678	(-1.124)		
1.3556	(0.868)	-0.2881	(-0.155)					
Age	0.0018	(0.323)	0.0018	(0.158)	0.0094	(1.052)		
-0.0166	(1.016)	-0.0012	(-0.074)					
Farmsize	0.0002	(4.364)**	0.0003	(3.666)**	0.0003	(2.227)		
0.0001	(0.310)	0.0002	(1.095)					
Partnership	-0.2518	(-1.538)	-0.4129	(-1.106)	-0.3983	(-1.524)		
-0.3151	(0.749)	-0.0514	(-0.125)					
Corporation	0.2525	(0.987)	1.8312	(2.778)**	-0.1900	(-0.550)		NA
NA	-3.2823	(-0.068)						
Other	-0.8987	(-2.072)**	-1.9344	(-1.506)	-0.4884	(-0.850)		
-3.5648	(0.102)	-3.5750	(-0.074)					
Education	-0.0316	(-1.163)	0.0907	(1.476)	-0.0525	(-1.213)		
-0.1135	(-1.875)*	-0.0147	(-0.157)					
Level	0.0079	(0.08)	-0.0033	(-0.015)	0.1261	(0.790)		
-0.0254	(-0.106)	-0.4502	(-0.17)					
Debt/Asset	-0.0011	(-0.449)	-0.0577	(-0.516)	0.0581	(0.592)		
0.0664	(0.465)	-0.1698	(-0.925)					
Livestock	0.0681	(0.449)	0.3386	(1.081)	-0.1445	(-0.606)		
0.3864	(1.042)	-0.1969	(-0.362)					
Ownland	0.1958	(1.245)	0.4781	(1.164)	0.0474	(0.218)		
0.5152	(0.984)	0.2550	(0.409)					
Pasture	-0.2776	(-0.995)	-0.4333	(-0.784)	-0.1047	(-0.214)		
-0.7876	(-1.271)	-0.0006	(-0.001)					
North Dakota	0.2770	(1.360)	NA	NA	NA	NA	NA	
NA	NA	NA						
Missouri	0.2304	(1.405)	NA	NA	NA	NA	NA	
NA	NA	NA						
Tennessee	0.4242	(2.018)**	NA	NA	NA	NA	NA	
NA	NA	NA						
Log-Likelihood	-277.4926		-68.04694		-113.8357			
-39.18166	-42.32829							
Chi-Square	43.61596		43.60048		12.01782			
8.44049	4.286422							
Significance Level	0.0000683		0.0000085		0.3623054			
0.5858929	0.960773							

* significant at the 10 percent level.
** significant at the 5 percent level

participate. Producers with large farms may want to farm less land while owning or leasing the same amount of acreage. Or, producers with large farms may not have adequate machinery to farm all of their cropland. These producers could participate in CRP by taking cropland out of production and still receive an annual payment from the land.

The pooled model indicated producers in Tennessee are more likely to participate than producers in Oklahoma. Results of the pooled probit model for participation in ARP indicated producers in Tennessee were less likely to participate in ARP. Participation in ARP is not required for participation in CRP. Producers in Tennessee are indicating a higher probability of taking cropland out of production by placing it into the CRP and not ARP. It may be Tennessee producers responding to the survey had poor soil for growing crops or highly erodible soil and are more likely to participate in CRP.

The likelihood ratio test for pooling results in a computed χ^2 statistic of 28.4. At the five percent level the χ^2_{30} equals 43.8. Based on the survey data, the null hypothesis that the slope coefficients are equal cannot to be rejected at the five percent level.

The likelihood ratio test for regional dummy variables results in a computed χ^2 statistic of 43.6. At the five percent level the χ^2_3 equals 7.8. Based on the survey data, the null hypothesis that the state dummy variable

coefficients equal zero is rejected at the five percent level.

Bivariate Probit Model Results

Participation in 0-50/92

The results of the bivariate probit model with selectivity are provided in Table XXVII. Rho is significant which suggests the addition of selectivity to the model is appropriate. Results indicate age, farmsize, other form of business structure, level of understanding of farm programs, debt-to-asset ratio, and livestock operations significantly effect participation in the 0-50/92 program. Producers in Missouri and Tennessee are less likely to participate.

The negative relationship between age and participation indicates older farmers participating in ARP are less likely to participate in 0-50/92. Older farmers may be "set in their ways" with an established cropmix or farming practices and unwilling to adopt changes necessary for participation.

Farms with a business structure other than sole proprietorship, corporation, or partnership are less likely to participate. These farming operations may not want to participate because of the complexity of additional programs or may face obstacles preventing enrollment or meeting conserving use requirements.

TABLE XXVII

BIVARIATE PROBIT RESULTS: PARTICIPATION IN 0-50/92

	Pooled Model		Oklahoma		Missouri		Tennessee		North Dakota	
Explanatory Variable	Coeffi-cient	(T-Stat)	Coeffi-cient	(T-Stat)	Coeffi-cient	(T-Stat)	Coeffi-cient	(T-Stat)	Coeffi-cient	(T-Stat)
++ Constant	-0.4783	(-0.684)	-3.3960	(-2.536)**	-0.2183	(-0.190)	NA	NA	3.2119	(1.094)
++ Age	-0.0098	(-1.726)*	0.0110	(1.015)	-0.0052	(-0.509)	NA	NA	-0.0728	(-3.106)**
++ Farmsize	0.0097	(1.859)*	0.0064	(1.062)	0.0140	(0.769)	NA	NA	0.0515	(1.993)*
++ Partnership	-0.1202	(-0.668)	-0.2592	(-0.761)	-0.0172	(-0.050)	NA	NA	-0.4200	(-0.643
++ Corporation	0.0905	(0.317)	0.1130	(0.181)	-0.0782	(-0.193)	NA	NA	NA	NA
++ Other	-0.7692	(-2.164)**	-1.0348	(-1.955)	0.1163	(0.164)	NA	NA	NA	NA
++ Education	0.0234	(0.817)	0.1108	(1.996**)	0.0150	(0.265)	NA	NA	-0.0467	(-0.304
++ Level	-0.0039	(-0.038)	0.0144	(0.073)	-0.3445	(-1.468)	NA	NA	0.5719	(1.504
++ Debt/Asset	0.0107	(0.179)	0.2577	(2.393)**	-0.1459	(-1.089)	NA	NA	-0.2360	(-1.114
++ Base	0.0007	(0.287)	-0.2577	(-2.393)**	-0.0270	(-0.175)	NA	NA	0.0167	(1.111
++ Altcrop	-0.2332	(-1.634)	-0.0628	(-0.367)	-0.0500	(-0.131)	NA	NA	-0.7424	(-1.269
++ Cropmix	0.0359	(0.238)	-0.1022	(-0.36)	0.2404	(0.774)	NA	NA	-0.3154	(-0.711
++ North Dakota	0.4449	(1.191)	NA	NA	NA	NA	NA	NA	NA	NA
++ Missouri	-0.4183	(-2.306)**	NA	NA	NA	NA	NA	NA	NA	NA
++ Tennessee	-0.3854	(-1.543)	NA	NA	NA	NA	NA	NA	NA	NA
+ Constant	2.3825	(-3.568)	1.2722	(0.746)	1.5639	(1.568)	NA	NA	5.0587	(1.473
+ Age	-0.0101	(-1.825)*	0.0068	(0.499)	-0.0177	(-2.239)**	NA	NA	-0.0323	(-1.271
+ Farmsize	0.0204	(1.699)*	0.0021	(0.086)	0.0587	(2.248)**	NA	NA	-0.0701	(-0.418
+ Partnership	-0.2168	(-1.434)	-0.6176	(-1.901)*	-0.2532	(-1.062)	NA	NA	0.1470	(0.275
+ Corporation	-0.0703	(-0.212)	0.0564	(0.069)	0.0548	(0.132)	NA	NA	NA	NA
+ Other	-0.2450	(-0.950)	-0.4057	(-0.894)	0.0954	(0.191)	NA	NA	NA	NA
+ Education	-0.0356	(-1.328)	0.5918	(0.863)	-0.0245	(-0.599)	NA	NA	-0.1172	(-0.964
+ Level	-0.4230	(-4.253)**	-0.8497	(-2.886)**	-0.0851	(-0.553)	NA	NA	-0.3492	(-0.902
+ Debt/Asset	0.1163	(2.019)**	0.2263	(1.989)**	0.0925	(0.976)	NA	NA	0.0025	(0.013
+ Livestock	-0.3814	(-2.878)**	-0.6162	(-2.144)**	-0.2381	(-1.111)	NA	NA	0.0732	(0.116
+ Base	0.0026	(0.344)	0.0324	(0.214)	0.0381	(0.327)	NA	NA	0.0189	(0.19
+ OFI	-0.0572	(-1.321)	-0.1278	(-1.537)	-0.0302	(-0.340)	NA	NA	-0.1149	(-0.836
+ Farmsize	-1.0261	(-0.534)	0.6101	(0.149)	-10.2590	(-2.039)**	NA	NA	21.7660	(0.479

TABLE XXVII (Continued)

Explanatory Variable	Pooled Model		Oklahoma		Missouri		Tennessee		North Dakota	
	Coeffi-cient	(T-Stat)	Coeffi-cient	(T-Stat)	Coeffi-cient	(T-Stat)	Coeffi-cient	(T-Stat)	Coeffi-cient	(T-Stat)
+ North Dakota	-0.2559	(-1.213)	NA	NA	NA	NA	NA	NA	NA	NA
+ Missouri	-0.0819	(-0.527)	NA	NA	NA	NA	NA	NA	NA	NA
+ Tennessee	-0.5708	(-2.876)**	NA	NA	NA	NA	NA	NA	NA	NA
Rho	0.9993	(3.885)**	0.99635	-0.1695	0.99604	(3.704)**	NA	NA	0.99828	(3.096)**
Log-Likelihood	-520.4206		-168.6505		-189.7718		NA		-59.95048	

* Significant at the 10 percent level.
** Significant at the 5 percent level
++ Variables refer to participation in 0-50/92.
+ Variables refer to participation in ARP.

Producers with a higher level of understanding of farm programs are more likely to participate. Participation in optional programs requires more knowledge. Producers understanding the program may be in a better position to adopt program compliance farming practices complementing their current farming/ranching operation.

Livestock operations are less likely to participate. These operations may place more importance on livestock, and less machinery or time may be available for crop production and 0-50/92 acreage management.

Larger farms are more likely to participate. Larger farms may have more base resulting in more 0-50/92 acres and economies of size. Producers on larger farms may have management skills or access to machinery allowing adoption of 0-50/92 participation.

The level of debt-to-asset ratio has a positive affect on participation. Producers with higher levels of debt may find participation profitable because they can grow program or non-program crops and receive either deficiency payments or marketing loans. These producers may be aggressive marketers and have the ability to sell crops produced on 0-50/92 acreage for market price in addition to receiving deficiency payments for the program crop.

The pooled model indicated producers in Missouri and Tennessee are less likely to participate in the 0-50/92 program than farmers in Oklahoma. It may be that soybeans

are an important part of crop rotations in these states. Because soybeans are not an eligible crop for 0-50/92 acreage farmers may be less likely to participate. Alternatively, farmers in these states may not be able to adopt farming practices incorporating crops eligible to be grown on 0-50/92 acres.

The likelihood ratio test for regional dummy variables results in a computed χ^2 statistic of 37.6. At the five percent level the χ^2_6 equals 12.6. Based on the survey data, the null hypothesis that the state dummy variable coefficients equal zero is rejected at the five percent level.

Participation in Optional Flex

The results of the bivariate probit model with selectivity are provided in Table XXVIII. Rho is significant which suggests the addition of selectivity to the model is important. Analysis of participation in optional flex indicates education, debt-to-asset ratio, cropmix, age, farmsize, partnerships, level of understanding of farm programs, off-farm income significantly effect participation in optional flex for farmers participating in ARP. The negative relationship between age and participation indicates older farmers are less likely to participate. Younger farmers may be willing to adopt new technology or farming practices to produce crops for which

TABLE XXVIII

BIVARIATE PROBIT RESULTS: PARTICIPATION IN OPTIONAL FLEX ACRES

Explanatory Variable	Pooled Model		Oklahoma		Missouri		Tennessee		North Dakota	
	Coeffi-cient	(T-Stat)	Coeffi-cient	(T-Stat)	Coeffi-cient	(T-Stat)	Coeffi-cient	(T-Stat)	Coeffi-cient	(T-Stat)
++ Constant	-1.6387	(-2.510)**	-5.5413	(-3.483)**	-0.0638	(-0.060)	NA	NA	1.6393	(0.597
++ Age	-0.0086	(-1.613)	0.0161	(1.178)	-0.0188	(-1.278)	NA	NA	0.0085	(0.317
++ Farmsize	0.0071	(1.537)	0.0092	(1.445)	-0.0066	(-0.33)	NA	NA	-0.0248	(-0.974
++ Partnership	0.0479	(0.311)	-0.0032	(-0.009)	-0.0023	(-0.008)	NA	NA	1.5118	(2.384)**
++ Corporation	-0.1560	(-0.550)	0.2098	(0.305)	-0.2845	(-0.730)	NA	NA	NA	NA
++ Other	-0.3553	(-1.140)	-0.7778	(-1.440)	-0.0637	(-0.125)	NA	NA	NA	NA
++ Education	0.0575	(2.109)**	0.2173	(3.361)**	0.0265	(0.613)	NA	NA	-0.2396	(-1.703
++ Level	-0.1315	(-1.217)	-0.0504	(0.224)	-0.0032	(-0.016)	NA	NA	-0.1265	(-0.26
++ Debt/Asset	0.2206	(3.653)**	0.2557	(2.187)**	0.2199	(1.424)	NA	NA	0.5427	(2.329)**
++ Base	-0.0004	(-0.131)	-0.0004	(-0.067)	-0.0181	(-0.335)	NA	NA	-0.0036	0.279
++ Altcrop	0.1834	(1.229)	0.2084	(0.831)	-0.0928	(-0.244)	NA	NA	0.3791	(0.765
++ Cropmix	0.4465	(3.489)**	0.6040	(1.926)*	0.3727	(1.553)	NA	NA	0.0744	(0.154
++ North Dakota	0.2533	(1.264)	NA	NA	NA	NA	NA	NA	NA	NA
++ Missouri	0.0015	(0.009)	NA	NA	NA	NA	NA	NA	NA	NA
++ Tennessee	-0.4875	(-1.947)*	NA	NA	NA	NA	NA	NA	NA	NA
+ Constant	2.3388	(3.439)**	1.206	(0.735)	1.4276	(1.35	NA	NA	5.069	(1.411
+ Age	-0.0112	(-2.022)**	0.0079	(0.580)	-0.0156	(-1.835)*	NA	NA	-0.0301	(-1.200
+ Farmsize	0.0218	(1.773)*	0.0039	(0.132)	0.0663	(2.562)**	NA	NA	-0.0637	(-0.345
+ Partnership	-0.2728	(-1.776)*	-0.6780	(-1.921)*	-0.2527	(-1.039)	NA	NA	0.1354	(0.249
+ Corporation	-0.1125	(-0.357)	0.0015	(0.002)	0.0831	(0.201)	NA	NA	NA	NA
+ Other	-0.3436	(-1.318)	-0.4627	(-0.970)	0.1361	(0.271)	NA	NA	NA	NA
+ Education	-0.0327	(-1.188)	0.0729	(1.009)	-0.0188	(-0.441)	NA	NA	-0.1233	(-1.011
+ Level	-0.3899	(-3.910)**	-0.7950	(-2.923)**	-0.070997	(-0.465)	NA	NA	-0.3916	(-0.981
+ Debt/Asset	0.1136	(2.036)**	0.1696	(1.438)	0.0708	(0.736)	NA	NA	0.0347	(0.181
+ Livestock	-0.1873	(1.452)	-0.4605	(-1.695)	-0.2444	(-1.087)	NA	NA	0.1356	(0.201
+ Base	0.0061	(1.016)	0.0033	(0.220)	0.0358	(0.354)	NA	NA	0.0121	(0.124
+ OFI	-0.1036	(-2.326)**	-0.2126	(-1.977)**	-0.0741	(-0.771)	NA	NA	-0.1661	(-1.192
+ Farmsize	-1.0258	(-0.522)	0.5816	(0.116)	-11.164	(-2.597)**	NA	NA	21.79	(0.432
+ North Dakota	-0.2414	(1.123)	NA	NA	NA	NA	NA	NA	NA	NA
+ Missouri	-0.0691	(0.447)	NA	NA	NA	NA	NA	NA	NA	NA

TABLE XXVIII (Continued)

Explanatory Variable	Pooled Model Coeffi-cient	Pooled Model (T-Stat)	Oklahoma Coeffi-cient	Oklahoma (T-Stat)	Missouri Coeffi-cient	Missouri (T-Stat)	Tennessee Coeffi-cient	Tennessee (T-Stat)	North Dakota Coeffi-cient	North Dakota (T-Stat)
+ Tennessee	-0.5856	(-2.955)**	NA	NA	NA	NA	NA	NA	NA	NANA
Rho	0.9874	(1.689)*	0.996	(1.999)**	-0.56058	(-0.847)	NA	NA	0.1844	(0.088)
Log-Likelihood	-536.8295		-155.8136		-217.9522		NA		-63.08302	

* Significant at the 10 percent level.
** Significant at the 5 percent level.
++ Variables refer to participation in OFA.
+ Variables refer to participation in ARP.

base is not established or, they may want to allocate more than 15 percent of established base to a non-base crop.

Partnerships indicated a lower probability of participation. It may be more difficult for farmers in these operations to coordinate compliance practices required for participation.

Producers with a higher level of understanding of farm programs indicated a higher probability of participation. Participation in optional programs requires more knowledge. Producers understanding the program know they can plant up to an additional 10 percent of base to a non-base crop without losing established base.

A positive relationship exists between years of education and participation. These farmers might be better managers and able to use normal flex acres for crop rotations or the production of non-base crops or, these farmers may have marketing skills making the production of non-base crops a profitable alternative to growing the base crop and receiving deficiency payments.

Farmers with higher debt-to-asset ratios indicated a higher probability of participation. These farmers may be more aggressive marketers and, like farmers with more education, find a more profitable alternative to growing the base crop and receiving a deficiency payment.

Farmers changing the crop mix planted on their farm indicated a higher probability of participation. These

farmers have the ability to make changes in their crop mix and are able to do so without losing established base.

Producers with larger farms indicated a higher probability of participation. These farms may have access to management skills or need the additional flexible acreage, to obtain economies of size, making participation desirable.

The pooled model indicated farmers in Tennessee are less likely to participate in OFA than farmers in Oklahoma. After the decision has been made to participate in ARP and eligibility is established for program payments, a more profitable alternative to producing the base crop may not exist.

The likelihood ratio test for regional dummy variables results in a computed χ^2 statistic of 9.6. At the five percent level the χ^2_6 equals 12.6. Based on the survey data, the null hypothesis that the state dummy variable coefficients equal zero cannot be rejected at the five percent level.

Level of Participation in Normal Flex Acres

Tobit analysis for the level of participation in normal flex acres resulted in a discovery not previously hypothesized. Most observations occurred at the limit of one or zero. Little information was gained allowing the dependent variable to lie in the range from zero to one. As

a result of observations on the dependent variable being observed at the limits, Probit analysis rather than Tobit analysis was used for estimation. The model, specified in equation 14, was estimated by substituting bivariate probit with selectivity procedures in place of two limit tobit with selectivity procedures. Observations of P_{NFAi} not at the zero-one limit were rounded to 0 and 1. Observations less than or equal to 0.5 were rounded to zero and observations greater than 0.5 were rounded to one. Observations on Missouri barley and Tennessee sorghum, barley, and oats were not observed. To prevent collinearity, MOBARL and MOOATS were combined as MOBAROAT and, TNSORG, TNBARL, and TNOATS were dropped from the model.

Results of the bivariate probit model with selectivity are provided in Table XXIX. Results indicate farming/ranching operations that are partnerships, corporations, and other business forms, the debt-to-asset ratio, livestock operations, base as a percent of total cropland, off-farm income, farmsize, level of education, and age significantly affect normal flex acres. Differences existed for individual crops within states and for producers in Tennessee and North Dakota.

TABLE XXIX

BIVARIATE PROBIT RESULTS: LEVEL OF PARTICIPATION IN NORMAL FLEX ACRES

Explanatory Variable	Coeffi-cient	(T-stat)
+ +Constant	-1.2941	(-1.2320)
+ +Age	-0.1260	(-1.4140)
+ +Farmsize	-0.3884	(-0.9490)
+ +Partnership	0.4313	(1.7770)*
+ +Corporation	0.3006	(0.7460)
+ +Other	-0.6569	(-0.8830)
+ +Education	0.0799	(2.1120)**
+ +Level	0.0542	(0.2420)
+ +Debt/Asset	0.0504	(0.5330)
+ +Base	-0.0985	(-0.8370)
+ +Prgyld	-0.2937	(-1.2290)
+ +OKcorn	-3.6873	(0.0000)
+ +OKsorg	0.9970	(2.2820)**
+ +OKcotn	0.8118	(1.6160)
+ +OKBarl	0.6983	(0.9510)
+ +OKoats	1.0405	(1.2840)
+ +MOwheat	1.0172	(3.6070)**
+ +MOcorn	0.7005	(2.5930)**
+ +MOsorg	1.0143	(2.6140)**
+ +MObaroat	0.3758	(0.6630)
+ +MOcotn	-3.4657	(0.0000)
+ +TNwheat	1.3116	(2.5320)**
+ +TNcorn	1.2136	(2.1880)**
+ +TNcotn	0.9715	(1.4270)
+ +NDwheat	0.3023	(0.6940)
+ +NDcorn	-0.1128	(-0.1890)
+ +NDbarl	0.0905	(0.1770)
+ +NDoats	-0.5409	(-0.6010)
+Constant	0.4712	(1.0080)
+Age	-0.0959	(-2.5530)**
+Farmsize	0.2473	(3.3510)**
+Partner	-0.3844	(-3.7130)**
+Corporation	-0.4065	(-1.8250)*
+Other	-0.4709	(-2.3650)**
+Education	0.0090	(0.5050)
+Level	-0.3900	(-5.4160)**
+Debt/Asset	0.0997	(2.4910)**
+Livestock	-0.2161	(-2.2260)**
+Baseper	0.1138	(2.5800)**
+OFI	-0.0895	(-2.7750)**
+Size-SQ	-0.0099	(-1.1020)
+Tennessee	-0.5549	(-3.8480)**
+North Dakota	0.3191	(2.1690)**
+Missouri	0.0397	(0.3740)
RHO(1,2)	-0.2549	(-0.4200)

* Significant at the 10 percent level.
** Significant at the 5 percent level
+ + Variables refer to participation in NFA.
+ Variables refer to participation in ARP.

The negative relationship between age and participation indicates older producers are less likely to participate.

Livestock operations are less likely to participate. These operations may place more importance on livestock, and less machinery or time may be available for crop production.

The level of off-farm income is negatively related to participation. Producers with higher levels of off-farm income may have less reliance on farm income and government payments, or have less time and management to devote to the farming/ranching operation and program participation.

The negative relationship between corporations and participation indicates these farming/ranching operations are less likely to participate. These operations may face program compliance limitations.

The negative sign for partnerships indicates partnerships are less likely to participate in ARP. It may be partnerships have difficulty with program compliance. The positive sign for partnerships indicates once participation is established, these farming/ranching operations are more likely to flex. These operations may have better management skills or more time to devote to meeting program compliance.

Producers with higher levels of education and higher levels of understanding of farm programs are more likely to participate. Producers understanding the program may be in a better position to participate if they know how too. Once participation is established, farmers with more education

may be able to adopt new farming practices or have the ability to manage a new crop complementing participation in flex acres.

Producers with higher levels of debt relative to assets are more likely to participate. This variable is significant in the probit model for participation. These farmers may depend upon government programs and payments for financial reasons.

Farm size is positively related to participation. Larger farms may have more base and more flexible acreage, resulting in economies of size making participation favorable.

Producers in Tennessee are less likely to participate and producers in North Dakota are more likely to participate than producers in Oklahoma.

Slope intercept shifters for program crops within states indicate sorghum and oats base in Oklahoma is more likely to be flexed than Oklahoma wheat base. In Missouri, wheat, corn, and sorghum base is more likely to be flexed than Oklahoma wheat base. In Tennessee, wheat and corn base is more likely to be flexed than Oklahoma wheat base.

Comparison of Means

A summary of the state mean, survey mean, standard deviation, number of observations, and computed t-statistic for selected variables is given in Tables XXX through XXXIII for Oklahoma, Missouri, Tennessee, and North Dakota,

respectively. NA appears when observations on the variable were not available.

The null hypothesis for age is that average age of survey respondents equals the average age of farmers in the state. This null hypothesis is rejected for Missouri and Tennessee. The average age reported by respondents from Missouri was greater than the state average. The average age reported by respondents from Tennessee was less than the state average.

The null hypothesis for farm size is that average farm size reported by survey respondents equals the average farm size for state. This null hypothesis is rejected for each state. The average farm size for survey respondents in each state was larger than the state average. Two possible explanations for this exist. First, the sample of farmers surveyed included farms with at least one hundred acres of crop base and these farms are larger than the average farms. Secondly, producers with larger farms may have stronger feelings concerning the importance of returning a survey. Producers with smaller farms are less likely to participate in ARP and might feel their input is not important.

TABLE XXX

COMPARISON OF MEANS: OKLAHOMA

State	State Mean	Survey Mean	Standard Deviation	N	Computed t-Statistic
Oklahoma					
Age	53.6	52.5	12.9	175	(1.1280)
Farmsize	449.0	1796.9	2230.9	192	(-8.3720)**
Program Yield					
Wheat	32.0	32.7	8.1	163	(-1.1033)
Corn	98.0	96.4	57.7	10	(0.0877)
Sorghum	41.8	44.8	21.2	30	(-0.7751)
Barley	35.0	30.0	7.1	2	(0.9959)
Oats	40.7	42.6	10.8	13	(-0.6343)
Cotton	392.0	380.0	151.8	23	(0.3791)
1991 Yield					
Wheat	28.0	28.0	10.1	158	(0.0000)
Corn	110.0	128.9	44.3	9	(-1.2799)
Sorghum	45.0	53.2	26.1	21	(-1.4397)
Barley	37.0	23.1	18.0	4	(1.5444)
Oats	38.0	32.0	9.8	3	(1.0604)
Cotton	303.0	363.1	161.5	16	(-1.4885)
Soybeans	25.0	21.0	21.2	2	(0.2668)
Base (Acres/Enrolled Farm)					
Wheat	173.0	832.6	733.9	148	(-10.9339)**
Corn	94.0	726.8	974.7	10	(-2.0530)*
Sorghum	73.0	166.1	245.1	44	(-2.5196)**
Barley	23.0	29.2	32.0	9	(-0.5813)
Oats	16.0	20.7	19.3	23	(-1.1679)
Cotton	91.0	348.3	802.6	22	(-1.5037)

** Significant at the 5 percent level of Alpha.
* Significant at the 10 percent level of Alpha.

TABLE XXXI

COMPARISON OF MEANS: MISSOURI

State	State Mean	Survey Mean	Standard Deviation	N	Computed t-Statistic
Missouri					
Age	52.9	49.8	13.6	226	(3.4267)**
Farmsize	275.3	1123.3	903.2	231	(-14.2698)**
Program Yield					
Wheat	41.7	41.7	6.6	155	(0.0000)
Corn	93.4	94.3	14.8	159	(-0.7668)
Sorghum	74.8	74.6	12.2	76	(0.1429
Barley	39.7	38.6	4.4	7	(0.6614)
Oats	45.9	47.9	12.1	22	(-0.7753)
Cotton	551.0	560.0	84.9	14	(-0.3966)
1991 Yield					
Wheat	32.0	36.4	11.3	133	(-4.4906)**
Corn	97.0	100.8	32.8	162	(-1.4746)
Sorghum	72.0	75.9	25.1	61	(-1.2135)
Barley	NA	NA	NA	NA	NA
Oats	51.0	73.2	22.7	8	(-2.7661)**
Cotton	630.0	653.1	186.8	15	(-0.4789)
Soybeans	30.5	32.1	9.2	180	(-2.3333)**
Base (Acres/Enrolled Farm)					
Wheat	63.0	189.2	199.4	151	(-7.7772)**
Corn	75.9	308.4	191.1	144	(-14.5997)**
Sorghum	73.3	127.7	123.0	73	(-3.7788)**
Barley	18.4	24.6	27.5	7	(-0.5965)
Oats	11.8	17.9	19.7	26	(-1.5789)
Cotton	73.4	604.5	482.5	15	(-4.2631)**

** Significant at the 5 percent level of Alpha.
* Significant at the 10 percent level of Alpha

TABLE XXXII

COMPARISON OF MEANS: TENNESSEE

State	State Mean	Survey Mean	Standard Deviation	N	Computed t-Statistic
Tennessee					
Age	53.8	57.6	13.7	79	(-2.4653)**
Farmsize	147.0	580.8	571.1	78	(-6.7085)**
Program Yield					
Wheat	38.0	37.0	7.2	33	(0.7979)
Corn	78.0	84.1	14.5	41	(-2.6937)**
Sorghum	53.5	55.0	29.1	5	(-0.1153)
Barley	NA	NA	NA	NA	NA
Oats	47.5	43.5	13.7	4	(0.5839)
Cotton	544.0	586.3	87.9	11	(-1.5961)
1991 Yield					
Wheat	24.0	33.1	15.5	24	(-2.8762)**
Corn	86.0	90.4	25.0	39	(-1.0991)
Sorghum	116.0	93.5	23.3	2	(1.3657)
Barley	NA	NA	NA	NA	NA
Oats	NA	NA	NA	NA	NA
Cotton	552.0	574.0	124.3	12	(-0.6131)
Soybeans	30.0	31.6	7.2	39	(-1.3878)
Base (Acres/Enrolled Farm)					
Wheat	45.8	140.4	193.8	21	(-2.2369)**
Corn	41.0	162.0	238.1	27	(-2.6406)**
Sorghum	10.3	23.5	23.3	2	(-0.8012)
Barley	NA	NA	NA	NA	NA
Oats	NA	NA	NA	NA	NA
Cotton	62.9	332.6	439.8	10	(-1.9392)*

** Significant at the 5 percent level of Alpha.
* Significant at the 10 percent level of Alpha

TABLE XXXIII

COMPARISON OF MEANS: NORTH DAKOTA

State	State Mean	Survey Mean	Standard Deviation	N	Computed t-Statistic
North Dakota					
Age	48.3	49.2	12.4	75	(-0.6286)
Farmsize	1143.0	2072.5	1099.5	75	(-7.3212)**
Program Yield					
Wheat	28.0	29.6	6.0	70	(-2.2311)**
Corn	64.0	46.5	19.5	23	(4.3040)**
Sorghum	NA	NA	NA	NA	NA
Barley	43.7	42.0	9.7	65	(1.4130)
Oats	44.6	42.4	6.3	28	(1.8478)*
Cotton	NA	NA	NA	NA	NA
1991 Yield					
Wheat	31.0	34.2	8.5	71	(-3.1722)**
Corn	90.0	77.6	21.4	7	(1.5331)
Sorghum	NA	NA	NA	NA	NA
Barley	49.0	52.6	14.2	57	(-1.9140)*
Oats	50.0	55.8	17.5	16	(-1.3257)
Cotton	NA	NA	NA	NA	NA
Soybeans	30.5	27.2	6.8	6	(1.1887)
Base (Acres/Enrolled Farm)					
Wheat	254.2	998.9	900.9	59	(-6.3494)**
Corn	83.5	98.0	118.2	24	(-0.6010)
Sorghum	NA	NA	NA	NA	NA
Barley	94.8	222.3	180.8	53	(-5.1339)**
Oats	42.2	87.5	70.8	26	(-3.2625)**
Cotton	NA	NA	NA	NA	NA

** Significant at the 5 percent level.
* Significant at the 10 percent level.

Null hypotheses for acres of crop base per enrolled farm is that the average crop acreage base equals the state average. This null hypothesis is rejected for at least half of the program crops in each state. Again the sample of farmers surveyed had more than the state average acreage of crop base or larger farmers may feel strongly about returning a survey.

The null hypothesis for program yields is that the average program yield reported by survey respondents is equal to the state average. This null hypothesis is rejected for corn in Tennessee and wheat, corn, and oats in North Dakota. The average yield reported by survey respondents for most crops in all states was greater than the state average yield. The null hypothesis for actual yields in 1991 is rejected for wheat, oats, and soybeans in Missouri; wheat in Tennessee; and wheat and barley in North Dakota.

Conclusions

First, the use of probit analysis has identified characteristics having a significant affect on participation. Based on data from survey responses, probit analysis has identified some characteristics significantly affecting participation. These characteristics include age, farm size, form of business structure, understanding of farm programs, financial position, type of farming operation, and the ability to plant non-program crop.

Second, results from probit analysis has determined producers in some states have a different probability of participation. Producers in Tennessee are less likely to participate in ARP, 0-50/92, and optional flex, and more likely to participate in CRP than producers in Oklahoma. Producers in North Dakota are less likely to participate in ARP and more likely to participate in the nonrecourse loan program and 0-50/92 program. Producers in Missouri are less likely to participate in 0-50/92 than producers in Oklahoma.

Third, probit analysis has determined the probability of flexing out of the base crop is not the same for all crops in all states. In Oklahoma, oats and sorghum base is more likely to be flexed than Oklahoma wheat base. In Missouri, wheat, corn, and sorghum base are more likely to be flexed than wheat base in Oklahoma. In Tennessee, wheat and corn base are more likely to be flexed than Oklahoma wheat base.

CHAPTER V

SUMMARY

The objectives of this thesis were to identify socioeconomic characteristics influencing participation in federal farm programs, identify crops planted on flexible acreage and reasons for these planting decisions, and determine if differences affecting participation exist among producers in different regions.

The first objective was to present characteristics of agricultural producers, with established crop acreage base. The second objective was to identify participation in federal farm programs and socioeconomic characteristics influencing participation in federal farm programs. Results indicate commodity program participants operate larger farms and have more cropland and that socioeconomic characteristics (eg. off-farm income, understanding of farm programs, farm size, age, debt-to-asset ratio, and form of business structure) affect participation and differences exist among producers in different regions.

The third objective was to identify participation in commodity farm programs that allow planting flexibility, crops planted on flexible acreage and determine if differences, affecting participation, exist among producers in different regions. The results also indicate that, with

respect to planting flexibility, (eg. NFA, OFA, and 0-50/92) differences exist among producers in different regions. For crop bases within states, differences existed affecting the probability of being flexed into a non-base crop.

Limitations of Study and Suggestions for Future Research

In the process of this study, several limitations were encountered. The limitations are: (1) The understanding of federal farm programs and interpretation of questions by survey recipients cannot be known during the survey design. The survey was written for a wide variety of producers in four states. Therefore some terms did not apply to all survey recipients; (2) Analysis of survey data is dependent upon returned responses. Acceptance of the survey instrument and the decision to respond can be encouraged but not controlled. (3) Responses are returned by producers feeling they will benefit or be able to provide useful information. Responses to the survey are subject to the respondent's interpretation of the question. Producers with small farms or non-participants in federal farm programs may feel they can provide little or no useful information. Because of this, useable information is not reported.

Any method able to reduce response bias for future farm level analysis could be justified. One such method would be to obtain farm level information from the Agricultural Stabilization Conservation Service.

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APPENDIX

OKLAHOMA STATE UNIVERSITY FEDERAL FARM PROGRAM PARTICIPATION SURVEY

OKLAHOMA STATE UNIVERSITY
FEDERAL FARM PROGRAM PARTICIPATION SURVEY

At OSU, we are conducting a study of Oklahoma farmers and ranchers concerning participation in federal farm programs and planting flexibility. This survey was written for a variety of producers across the state. Therefore, some crops and/or terms will not apply to all survey participants. Please answer only the questions that apply to your farming operation.

DIRECTIONS: Please fill in the blanks, circle answers that apply or rank the level of importance for the following questions or statements.

1. How many total acres were in your Oklahoma farming/ranching operation in 1991 (INCLUDE LAND YOU OWNED OR RENTED FROM OTHERS; EXCLUDE LAND YOU RENTED TO OTHERS)? ____

2. In your farming/ranching operation, how many acres do you own? ____

3. In your farming/ranching operation, how many acres do you rent? ____

4. How many total farming/ranching acres are in improved pasture and/or native rangeland? ____

5. How many total farming/ranching acres are in cropland (INCLUDE CULTIVATED FORAGE LAND, SET-ASIDE and CRP LAND)? ____

6. How many acres do you have enrolled in CRP (IF YOU HAVE NONE PUT "0")? ____

7. How many total acres were planted to crops for harvest for grain in 1991? ____

8. How many fields is your cropland divided into for ASCS Purposes? ____

9. How many acres of crop base does your farm have for the following crops?

wheat	____	corn	____
oats	____	barley	____
cotton	____	sorghum	____

10. What are the program yields for the crops you plant on your farm? (IF THIS DOES NOT APPLY SKIP THIS QUESTION).

wheat	____	corn	____
oats	____	barley	____
cotton	____	sorghum	____

11. Indicate the changes you have made and the changes you would like to make (IT IS POSSIBLE TO CHECK MORE THAN ONE BOX IN EACH ROW).

	made changes 1988 - 91		changes planned 1992-95	
	yes	no	yes	no
rent more acres	☐	☐	☐	☐
rent fewer acres	☐	☐	☐	☐
crop mix	☐	☐	☐	☐
increase crop base	☐	☐	☐	☐
enter land in 0/50 or 0/92 program	☐	☐	☐	☐
enter land in CRP	☐	☐	☐	☐
tillage practice	☐	☐	☐	☐
conservation practice	☐	☐	☐	☐
type of nutrient used	☐	☐	☐	☐
amount of nutrient used	☐	☐	☐	☐
machinery	☐	☐	☐	☐
chemicals used	☐	☐	☐	☐

12. What were the total acres planted for harvest, acres actually harvested, and the average yield for the following crops that you planted in 1990-91 for harvest in 1991?

	planted	harvested	yield/ acre
barley	☐ acres	☐ acres	☐
corn	☐ acres	☐ acres	☐
cotton	☐ acres	☐ acres	☐
oats	☐ acres	☐ acres	☐
rye	☐ acres	☐ acres	☐
sorghum	☐ acres	☐ acres	☐
soybeans	☐ acres	☐ acres	☐
sunflower	☐ acres	☐ acres	☐
hay	☐ acres	☐ acres	☐
alfalfa	☐ acres	☐ acres	☐
wheat	☐ acres	☐ acres	☐
other_____	☐ acres	☐ acres	☐
other_____	☐ acres	☐ acres	☐

13. For the 1992 crop year, what are your expected average yields for the crops you will plant?

wheat ☐ bu/ac	rye ☐ bu/ac
soybeans ☐ bu/ac	sorghum ☐ bu/ac
barley ☐ bu/ac	sunflower ☐ bu/ac
oats ☐ bu/ac	cotton ☐ lbs/ac
corn ☐ bu/ac	other _____ ☐ bu/ac

14. If you are a livestock producer circle the letter that represents your livestock operation and enter the number of animals per year that you handle.

a. stocker/feeder _____

b. beef cows/heifer calves _____

c. dairy cows/heifers _____

d. hogs _____

e. sheep (goats) _____

15. Do you currently participate in federal farm programs?

yes ☐ no ☐

IF NO GO TO NUMBER 30.

16. From the following list of reasons indicate the level of importance for participating in the annual Acreage Reduction Program (ARP) or set-aside program.

	VERY IMPORTANT				NOT VERY IMPORTANT
established crop base	1	2	3	4	5
more profitable	1	2	3	4	5
weather conditions	1	2	3	4	5
required by banker	1	2	3	4	5
have always participated	1	2	3	4	5
to guarantee net return	1	2	3	4	5
required by landlord	1	2	3	4	5
to obtain nonrecourse loan	1	2	3	4	5
marketing loan	1	2	3	4	5
other_____	1	2	3	4	5

17. Which federal farm programs do you currently participate in (CHECK ALL THAT APPLY)?

☐ ARP (set aside)

☐ 0/92 or 50/92

☐ peanut program

☐ soybean program

☐ crop insurance

☐ optional flex acres

☐ nonrecourse loans

☐ Conservation Reserve Program (CRP)

☐ Farmer Owned Reserve (FOR)

☐ Great Plains Conservation Program (GPCP)

☐ Agricultural Conservation Program (ACP)

18. Now we would like to ask some questions about how you use your **normal flex acres (NFA)**. For each crop that has historical base on your farm indicate the different crop that you have planted (1991) and the crop that you plan to plant (1992) under the **normal flex option**. For the different crop planted indicate the yield and acres planted to this crop. If you planted or plan to plant the base crop on the **normal flex acres** please indicate this.

Crop with base	Crop planted on **normal flex acres** (NFA) 1991			Crop that you plan to plant on **normal flex acres (NFA)** 1992		
	crop	acres	yield	crop	base	expected yield
wheat	_____	_____	_____	_____	_____	_____
corn	_____	_____	_____	_____	_____	_____
sorghum	_____	_____	_____	_____	_____	_____
cotton	_____	_____	_____	_____	_____	_____
oats	_____	_____	_____	_____	_____	_____
barley	_____	_____	_____	_____	_____	_____

19. On how many fields are your normal flex acres designated? ___

20. How would you rank the yields of the **normal flex acres** on your farm compared to the non-flex acres on your farm?

    a. above average
    b. average
    c. below average

21. From the following list, rank the importance of factors that influence which crops you plant on your **normal flex acreage** (CIRCLE THE NUMBER THAT BEST DESCRIBES THE LEVEL OF IMPORTANCE).

	very- important				not very important
to meet conservation compliance plan	1	2	3	4	5
markets for the alternative crop	1	2	3	4	5
new crop needed for on-farm use	1	2	3	4	5
could maintain existing base	1	2	3	4	5
more profitable crop rotation	1	2	3	4	5
field size	1	2	3	4	5
field location	1	2	3	4	5
additional machinery required	1	2	3	4	5
flex crop price	1	2	3	4	5
base crop price	1	2	3	4	5
weather	1	2	3	4	5
stocker/feeder prices	1	2	3	4	5
commodity program loan rate	1	2	3	4	5
other _____	1	2	3	4	5

IF YOU HAD NO OPTIONAL FLEX ACRES GO TO QUESTION 26.

22. Now we would like to ask some questions about how you use your **optional flex acres (OFA)**. For each crop that has historical base on your farm indicate the different crop that you have planted (1991) and the crop that you plan to plant (1992) on **optional flex acres**. For the different crop planted indicate the yield and acres planted to this crop. If you planted or plan to plant the base crop on the **optional flex acres** please indicate this.

Crop with base	Crop planted on optional flex acres (OFA) 1991			Crop that you plan to plant on optional flex acres (OFA)1992		
	crop	acres	yield	crop	base	expected yield
wheat	_____	_____	_____	_____	_____	_____
corn	_____	_____	_____	_____	_____	_____
sorghum	_____	_____	_____	_____	_____	_____
cotton	_____	_____	_____	_____	_____	_____
oats	_____	_____	_____	_____	_____	_____
barley	_____	_____	_____	_____	_____	_____

23. On how many fields are your **optional flex acres** designated? ___

24. How would you rank the yields of the **optional flex acres** on your farm compared to the non-flex acres on your farm?
    a. above average
    b. average
    c. below average

25. From the following list rank the importance of factors that influence which crops you plant on your **optional flex acres** (CIRCLE THE NUMBER THAT BEST DESCRIBES THE LEVEL OF IMPORTANCE).

	very- important				-not very important
to meet conservation compliance plan	1	2	3	4	5
markets for the alternative crop	1	2	3	4	5
new crop needed for on-farm use	1	2	3	4	5
could maintain existing base	1	2	3	4	5
more profitable crop rotation	1	2	3	4	5
field size	1	2	3	4	5
field location	1	2	3	4	5
additional machinery required	1	2	3	4	5
flex crop price	1	2	3	4	5
base crop price	1	2	3	4	5
weather	1	2	3	4	5
expected deficiency payment	1	2	3	4	5
stocker/feeder	1	2	3	4	5
ARP (set aside) level	1	2	3	4	5
commodity program loan rate	1	2	3	4	5
other _____	1	2	3	4	5

IF YOU HAVE NO 0-50-/92 ACRES GO TO QUESTION 31.

26. Now we would like to ask some questions about how you use your **0-50/92 acres**. For each crop that has historical base on your farm indicate the different crop that you have planted (1991) and the crop that you plan to plant (1992) under the 0-50/92 option. For the different crop planted indicate the yield and acres planted to this crop. If you planted or plan to plant the base crop on the **0-50/92 acres** please indicate this.

Crop with base	Crop planted on **0-50/92 acres 1991**			Crop that you plan to plant on **0-50/92 acres in 1992**		
	crop	acres	yield	crop	base	expected yield
wheat	_____	_____	_____	_____	_____	_____
corn	_____	_____	_____	_____	_____	_____
sorghum	_____	_____	_____	_____	_____	_____
cotton	_____	_____	_____	_____	_____	_____
oats	_____	_____	_____	_____	_____	_____
barley	_____	_____	_____	_____	_____	_____

27. On how many fields are your **0-50/92 acres** designated? _____

28. How would you rank the production of the **0-50/92 acres** on your farm compared to the non-0-50/92 acres on your farm?
    a. above average
    b. average
    c. below average

29. From the following list rank the importance of factors that influence which crops you plant on your **0-50/92** acreage (CIRCLE THE NUMBER THAT BEST DESCRIBES THE LEVEL OF IMPORTANCE).

	very-important				**-not very important**
to meet conservation compliance plan	1	2	3	4	5
markets for alternative crop	1	2	3	4	5
new crop needed for on-farm use	1	2	3	4	5
could maintain existing base	1	2	3	4	5
more profitable crop rotation	1	2	3	4	5
field size	1	2	3	4	5
field location	1	2	3	4	5
additional machinery required	1	2	3	4	5
0-50/92 crop price	1	2	3	4	5
base crop price	1	2	3	4	5
weather	1	2	3	4	5
expected deficiency payment	1	2	3	4	5
maintaining crop base	1	2	3	4	5
stocker/feeder	1	2	3	4	5
ARP (set aside) level	1	2	3	4	5
commodity program loan rate	1	2	3	4	5
other _____	1	2	3	4	5

IF YOU ANSWERED QUESTIONS 16 THROUGH 29 GO TO 31.

30. From the following list rank the importance of factors that influence reasons for <u>not</u> participating in commodity farm programs (CIRCLE THE NUMBER THAT BEST DESCRIBES THE LEVEL OF IMPORTANCE).

	very-important				-not very important
more profitable	1	2	3	4	5
ARP (set aside) too high	1	2	3	4	5
opposed to government programs	1	2	3	4	5
no base or base acreage too small	1	2	3	4	5
payment limitation too small	1	2	3	4	5
landlord objected	1	2	3	4	5
conservation compliance rules	1	2	3	4	5
Highly Erodible Land rules	1	2	3	4	5
did not understand program	1	2	3	4	5
other _____	1	2	3	4	5

31. For each of the following organizations or agencies, indicate the importance of each in providing information on federal farm programs **(1= very reliable, 4=not very reliable. Circle 5 if you do not use this source.).**

	very-important			not very important	none
local ASCS office	1	2	3	4	5
local FmHA office	1	2	3	4	5
OSU Extension	1	2	3	4	5
Banker	1	2	3	4	5
Other Farmers	1	2	3	4	5
Farm Bureau	1	2	3	4	5
Farmers Union	1	2	3	4	5
Cattlemens Association	1	2	3	4	5
Wheat Growers Association	1	2	3	4	5
Wheat Commission	1	2	3	4	5
Farm Magazines/Newspapers	1	2	3	4	5
other _____	1	2	3	4	5

DEMOGRAPHIC AND BUSINESS CHARACTERISTICS

Now we would like to have some information about yourself

32. What is your age? _____

33. How many years of experience do you have farming? ____

34. Circle the number that best represents your level of formal education in years.

--------high school------college---------
6 7 8 9 10 11 12 13 14 15 16 17 18

35. In which county is the majority of your crop land located.

_____

36. Circle the letter that best describes your farming/ranching operation.

a. cash grain
b. cow/calf
c. cash grain/cattle
d. other livestock
e. dairy
f. other _____

37. Circle the letter that best describes the business structure of your farming/ranching operation.

a. sole owner
b. partnership
c. corporation
d. other _____

38. How would you describe your level of understanding of the federal farm programs.

    a. high
    b. medium
    c. low
    d. not at all

39. Circle the appropriate range that corresponds to your off-farm income for 1991 (**This information can be found on line number 7 of federal tax form 1040).**

    a. less than $10,000
    b. $10,000--$19,999
    c. $20,000--$29,999
    d. $30,000--$49,999
    e. $50,000--$99,999
    f. $100,000 or more

40. Circle the appropriate range that corresponds to your gross farm income for 1991 (line number **11 from the middle of form 1040F).**

    a. less than $20,000
    b. $20,000--$39,999
    c. $40,000--$99,999
    d. $100,000--$249,999
    e. $250,000- -499,999
    f. $500,000- -999,999
    g. $1,000,000 or more

41. Indicate whether your farm made a net profit or loss for 1991 (**line 37 from the bottom of form 1040F) and circle the appropriate range that corresponds to this profit or loss.**

a. a net profit	b. a net loss
$1--$9,999	$1--$9,999
$10,000--$19,999	$10,000--$19,999
$20,000--$29,999	$20,000--$29,999
$30,000--$39,999	$30,000--$39,999
$40,000--$49,999	$40,000--$49,999
$50,000--$59,999	$50,000--$59,999
$60,000--$69,999	$60,000--$69,999
over $70,000	over $70,000

42. Circle the range that best describes your debt-to-asset ratio.

    a. No Debt
    b. less than 10%
    c. 11 to 40%
    d. 41 to 70%
    e. 71 to 100%
    f. greater than 100%

43. If we have any questions to clarify your answers, may we call you?

    phone number _____

    best time of day to call _____

Thank you for the time you have taken to complete these questions. Please return this survey in the enclosed business reply envelope. If you would like a summary of the results, please write to.

Mike Dicks
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VITA

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