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AN ANALYSIS OF BASELINE CHARACTERISTICS
AND ECONOMIC IMPACTS OF THE CONSERVATION
RESERVE PROGRAM IN NORTH DAKOTA

Timothy L. Mortensen
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Department of Agricultural Economics
North Dakota State University
Fargo, North Dakota 58105

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Retirement of cropland is an agricultural policy tool for both conservation objectives and supply control. The Soil Bank program of the 1960s was the first large-scale, government-subsidized land retirement program. Enrollment in Soil Bank in North Dakota peaked at about 2.7 million acres in 1960, nearly 10 percent of total enrolled acres in the United States (USDA various years). During the period 1957 to 1970, North Dakota landowners received over \$210 million in payments from Soil Bank with average annual payments of about \$10 per acre. U.S. enrollment in Soil Bank also peaked in 1960 at nearly 29 million acres with an average contract rate of nearly \$12 per acre.

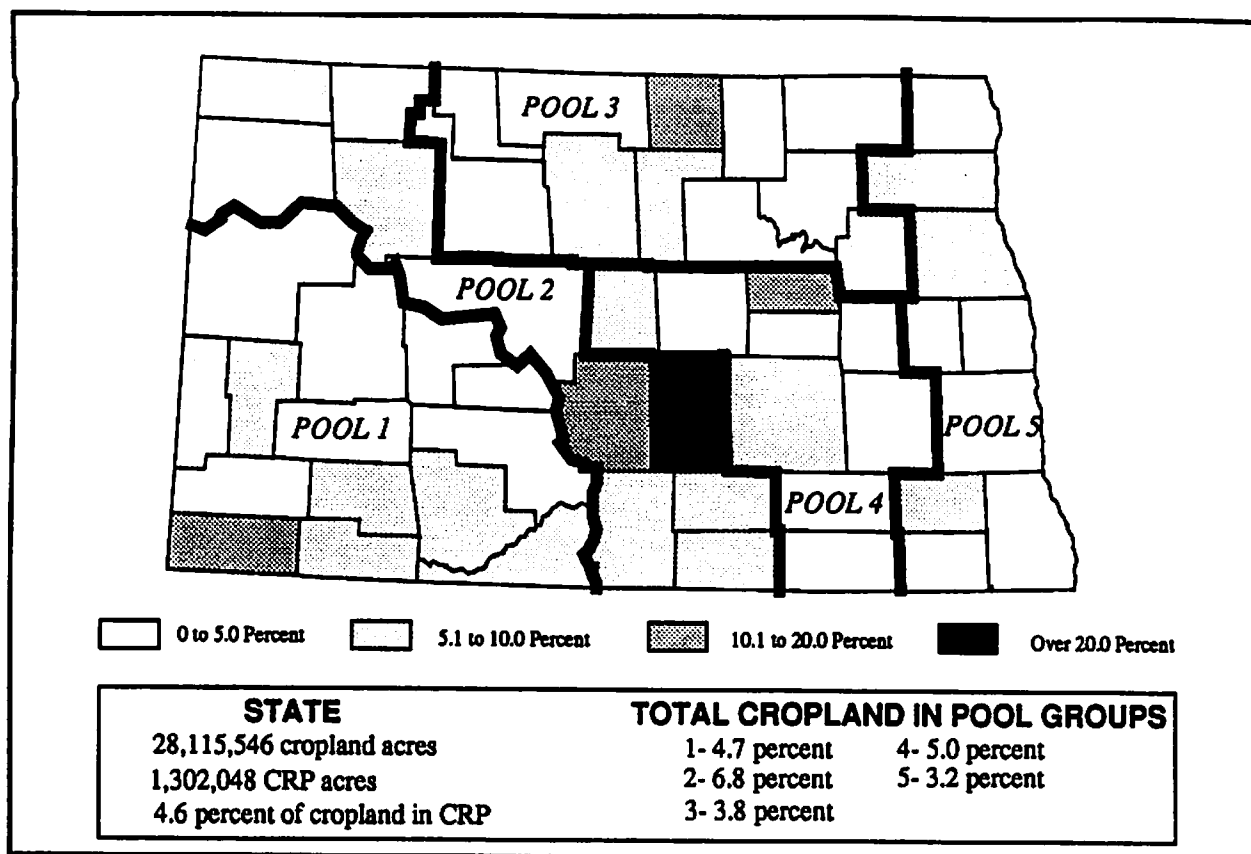
Most recently, soil conservation objectives are being sought through the Conservation Reserve Program (PL. 99-198). After the first five sign-ups, North Dakota ranked seventh among the states in acres enrolled, with 1.3 million contracted acres or about 4.8 percent of the state's total cropland after the first five sign-ups (U.S. Bureau of Census and Dicks et al.). Kidder County, with nearly 25 percent of its total cropland in CRP, had the largest percentage enrollment (Figure 1).

The purpose of this paper is to describe and report the results of a study conducted to establish a set of baseline characteristics of CRP participants in North Dakota and estimate the impacts of the program through the first five sign-ups.

Study Procedures

CRP has the potential of having long-term impacts on North Dakota landowners and surrounding communities. Some potential effects are (1) economic impacts to retail agribusinesses, (2) environmental and water quality changes, (3) demographic impacts, (4) effects on commodity production levels, and (5) land use changes. A review of literature dealing with the effects of the Soil Bank program suggests that enrollment in the CRP could be associated with increased off-farm work by farm operators and could speed farm consolidation and rural-to-urban migration (Kaldor; McArthur; Christensen and Micka; Paulson et al.; Barr et al.; Schmid; and Butler and Lanham). Taylor et al. studied the effects of the Soil Bank Program in Ransom County, North Dakota, but little is known about statewide farmer or community impacts of the program. Thus, it was difficult for policymakers to fashion the present program given the paucity of information on previous programs. Specific characteristics examined in this study include

*Mortensen is research assistant, Leitch is associate professor, Leistritz is professor, Ekstrom is research associate, and Coon is research specialist, Department of Agricultural Economics, North Dakota State University, Fargo.



SOURCE: USDA Soil Conservation Service, 1988.

Figure 1. Percentage of Total Cropland Enrolled in CRP Through the Fifth Signup by Category

1. Landowner characteristics;
2. CRP land characteristics;
3. Farm operator financial data;
4. Opinion questions; and
5. Economic impacts.

A mail survey of participating CRP landowners was conducted in the spring of 1988. A six-page questionnaire was pretested on a sample of 20 CRP participants attending the Northwest Farm Managers meeting in Fargo, North Dakota, during February 1988. The population of over 7,000 landowner names and addresses was stratified by pool group (Figure 1) and randomized using a computerized routine. A sample of nearly 3,000 names (approximately 40 percent of the population) representing 53 North Dakota counties was mailed questionnaires (Table 1). Follow-up mailings to nonrespondents resulted in 1,289 usable surveys for a response rate of 44 percent. We feel comfortable that the response is representative of the population and are confident in extrapolating sample characteristics to the population.

TABLE 1. SUMMARY OF SURVEY QUESTIONNAIRES SENT AND RECEIVED BY POOL GROUP

Item	Unit	Pool					Total
		1	2	3	4	5	
Questionnaires sent	No.	457	805	638	479	549	2,928
Questionnaires returned	No.	199	349	274	215	252	1,289
Percentage of total sent	%	15.6	27.5	21.8	16.4	18.8	100.0
Percentage returned	%	43.5	43.4	42.9	44.9	45.9	44.0

Results

Demographic Characteristics

Nearly 62 percent of CRP respondents were over age 55. The average age of CRP landowners was 57.2 years with no significant age difference between farmers (73 percent were farmers, which includes individuals who farmed either part-time or full-time in 1987) and nonfarmers. This compares to an average age of 47.2 years for respondents to a 1988 longitudinal survey of selected farmers in the state (Leistritz et al.).

Ninety percent of the survey respondents lived in North Dakota. About 4 percent lived in the neighboring states of Montana, South Dakota, or Minnesota, and the balance lived in 22 other states.

Land/Landowner Characteristics

The average acreage owned by all respondents was about 916 acres (Table 2). Current farmers operated 1,530 total acres on average with about 906 cropland acres. CRP participants who farmed in 1987 owned 65.1 percent more land (1,024.2 acres) in North Dakota than nonfarmers (620.5 acres) and had 28.6 percent more land enrolled in CRP.

Nearly 62 percent of the farms operated by CRP landowners who farmed in 1987 were classified as cash crop farms (over 50 percent of their gross income was from sales of crops). Only 15 percent were predominantly livestock farms, and slightly over 23 percent were mixed (i.e., neither crops nor livestock accounted for more than 50 percent of their gross income).

TABLE 2. LAND OWNERSHIP CHARACTERISTICS OF CRP SURVEY RESPONDENTS

Item	Farmers ^a	Nonfarmers ^b	All Respondents
	-----average acres-----		
Land owned*	1,024.2	620.5	916.0
Land in CRP*	213.4	165.9	200.7
Land operated	1,530.0	**	**
Total cropland	906.0	**	**

*Statistically significant difference between farmers and nonfarmers using the Tukey test at alpha = .05.

**Not applicable.

^aFarmed either part-time or full-time during 1987.

^bDid not farm in 1987.

CRP Land Characteristics

Initial Tillage

Some land entered into CRP through sign-up five had been initially cultivated over 90 years ago. Although over 39 percent of the respondents were unsure when their CRP land was originally tilled, 33 percent indicated it was first tilled before 1921 (Figure 2). Only slightly over 5 percent stated the land was first tilled after 1960, which would include marginal land broken during the "boom" period that occurred in the early 1970s.

Costs and Returns

The average cost of establishing cover on CRP acres in North Dakota was \$37.20 per acre (Table 3). Average annual maintenance costs were estimated to be \$6.92 per acre. The average annual contract payment from the federal government averaged \$36.98 per acre in North Dakota for land entered during the first five sign-up periods. Farmers received slightly more (\$2.06 per acre) on average than did nonfarmers, possibly because farmers were more aware of bid levels being accepted in their respective counties.

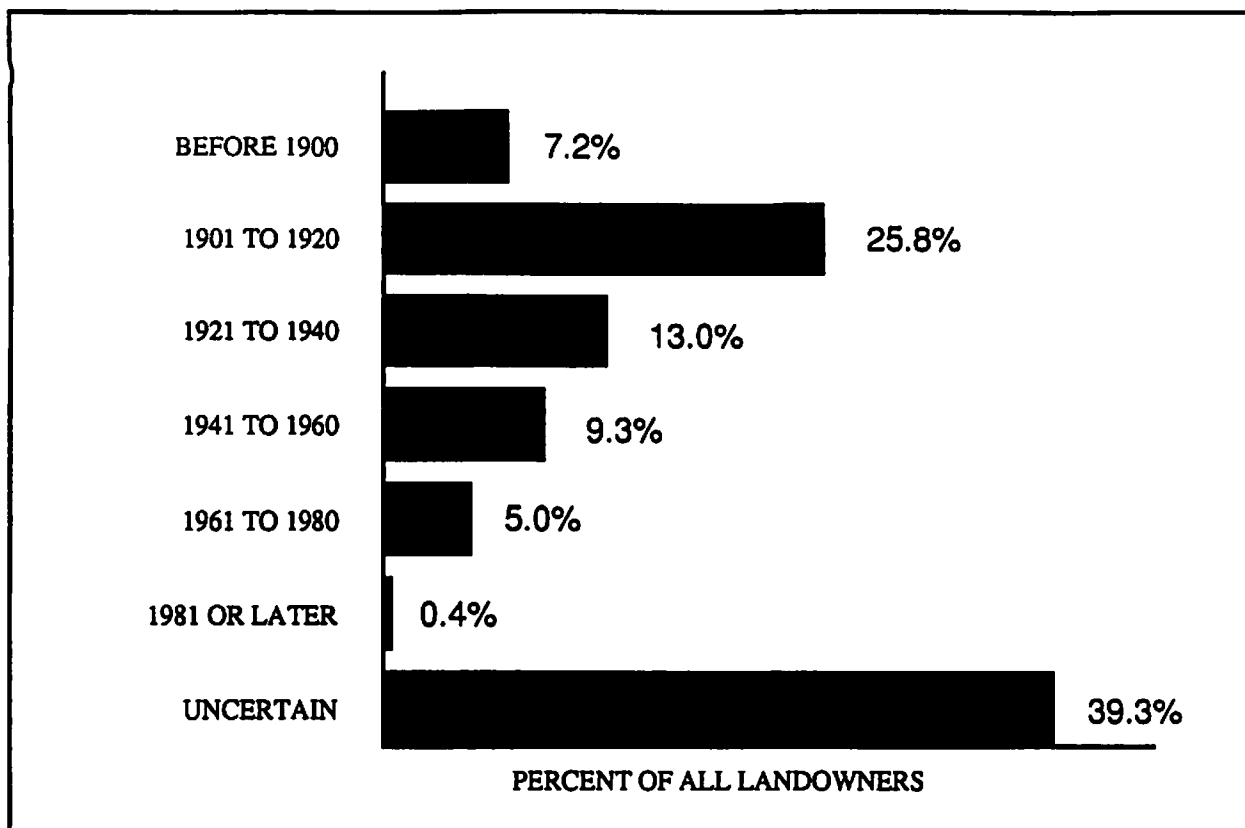


Figure 2. Original Tillage of CRP Land by Category

Comparison to Local Cash Rent

Over one-third (37.1 percent) of the annual payments were about the same as local cash rent (Figure 3). Only about 5 percent of the respondents said that the annual payment was less than the local cash rental rate. Over one-half (57.8 percent) indicated that CRP payments were higher than local cash rent; in some cases payments were up to \$20.00 per acre more than local cash rent. Annual CRP payments for all landowners averaged about 6.7 percent more than local cash rents.

Productivity

CRP land productivity was also explored, because CRP land is presumably poorer land or marginal land with lower yields and higher relative input costs. Respondents were asked to compare yields on their CRP land to other cropland in their locale that was not enrolled in CRP. CRP land yielded 9.5 percent less, on average, than non-CRP land (Table 3). CRP respondents indicated that input costs were slightly higher (0.5 percent) when farming CRP land compared to non-CRP land.

TABLE 3. SELECTED COMPARISONS OF CRP SURVEY RESPONDENTS

Variable	Unit	Farmers	Non Farmers	All Respondents
Cover establishment costs	\$/ac	37.34	36.75	37.20
Annual maintenance costs	\$/ac	7.09	6.33	6.92
Annual contract payment	\$/ac	37.50 ^a	35.44 ^a	36.98
CRP yield compared to non-CRP yield ^b	%	-10.0	-5.2	-9.5
CRP input costs compared to non-CRP costs ^b	%	+0.3	+1.5	+0.5
Planted trees for cover	%	7.8	12.1	9.0
More trees if cost-sharing increased	%	22.7	29.9	24.5
Considered water impoundments as cover	%	6.8	7.6	7.0

^aDenotes statistical difference between groups using the Tukey test at alpha = .05.

^bRefers to yields and costs before land was enrolled in CRP.

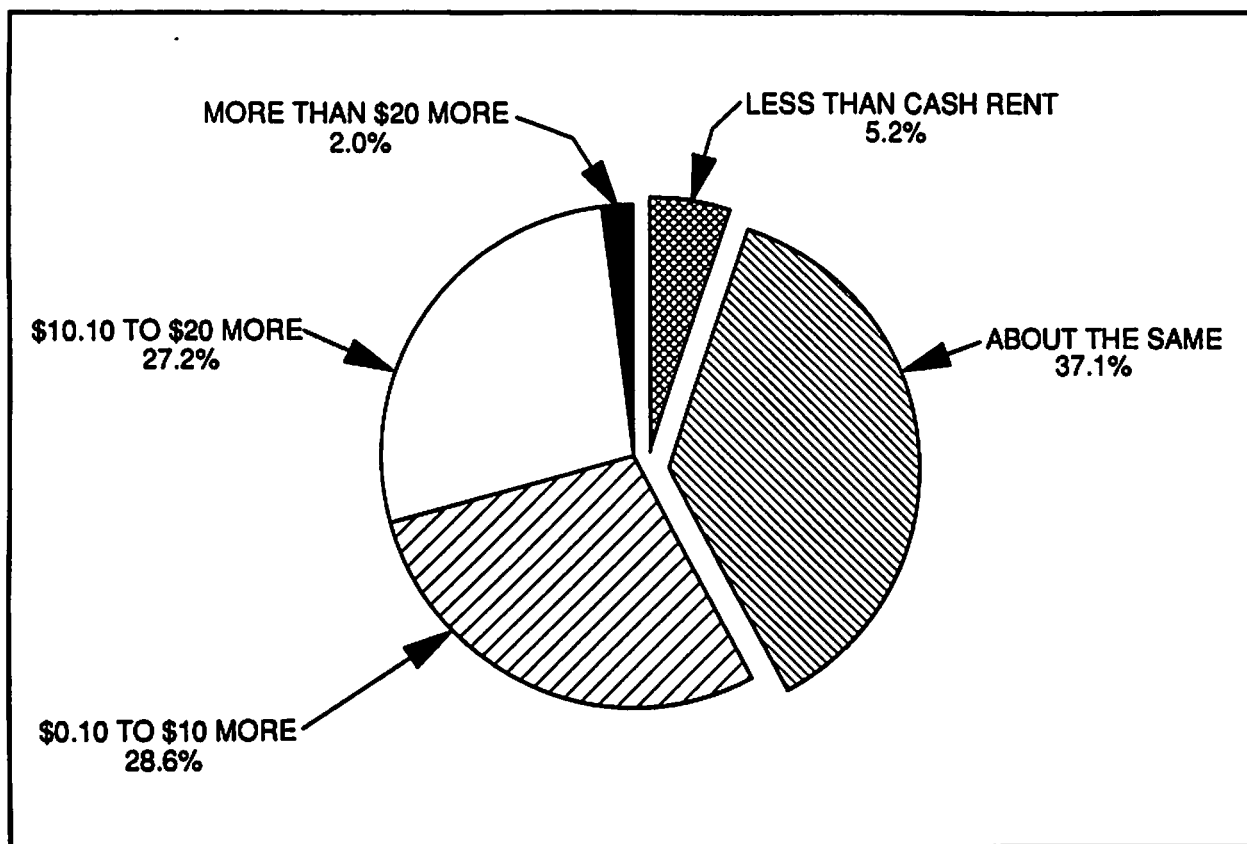


Figure 3. Comparison of Annual Contract Payments to Cash Rent by Category

Cover Options

Generally, grass or grass-legume mixtures were planted for permanent cover on CRP land. However, nearly 8 percent of the farmer respondents and 12.1 percent of the nonfarmers planted trees as at least a partial cover crop (Table 3). Trees were not usually planted on whole tracts of land but only on a portion (5.3 percent of the tract on average) of the CRP acreage (for those participants who planted trees). Nearly 30 percent of the nonfarmers and 22.7 percent of the farmers said they would have considered planting more trees if the cost-share percentage had been higher. Only about 7 percent of the survey respondents had considered water impoundments, such as restored wetlands, as a means of CRP cover.

Tillage Methods

Respondents were asked what seeding method was used when establishing cover on CRP land and what method they intend to use after the contract expires. Four choices were (1) no-till, where the landowner uses equipment that does not destroy crop residue on the soil surface; (2) minimum tillage, using a chisel plow or similar equipment designed to leave some residue for protection from soil erosion; (3) conventional tillage, using a moldboard plow for the primary tillage operation and leaving the soil virtually bare; and (4) other, including combinations of the previous three choices. Over 38 percent employed conventional methods for establishing cover, about 47 percent used either no-till or minimum tillage, and about 14 percent used other combinations (Figure 4).

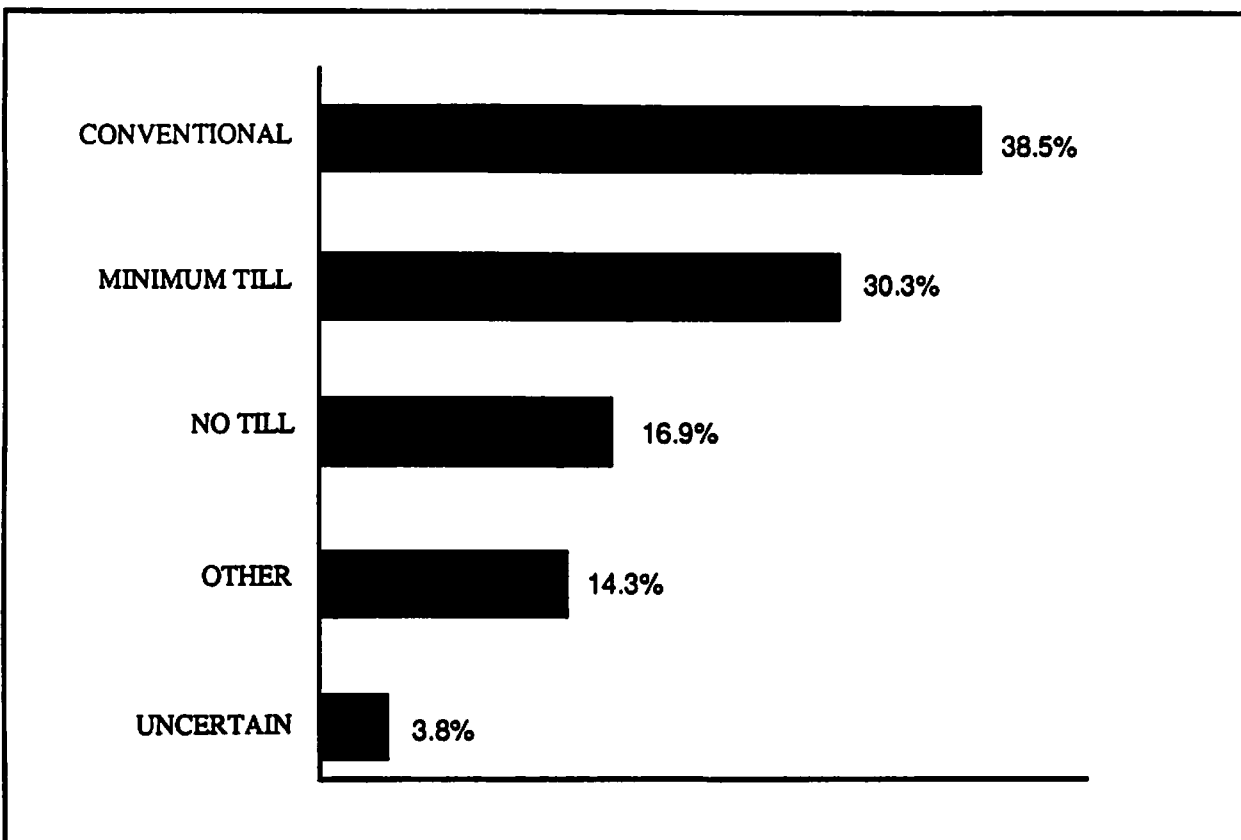


Figure 4. Tillage Method for Establishing Cover Crop on CRP Land

Even though up to 10 years will pass before ultimate adoption of a tillage method for farming CRP land, respondents were asked their intentions regarding such tillage. Over 42 percent of all respondents indicated they will use minimum tillage, 31.4 percent will use conventional tillage, and 8.7 percent said they will practice no-till (Figure 5). Only about 10 percent indicated they were undecided what tillage method they would use.

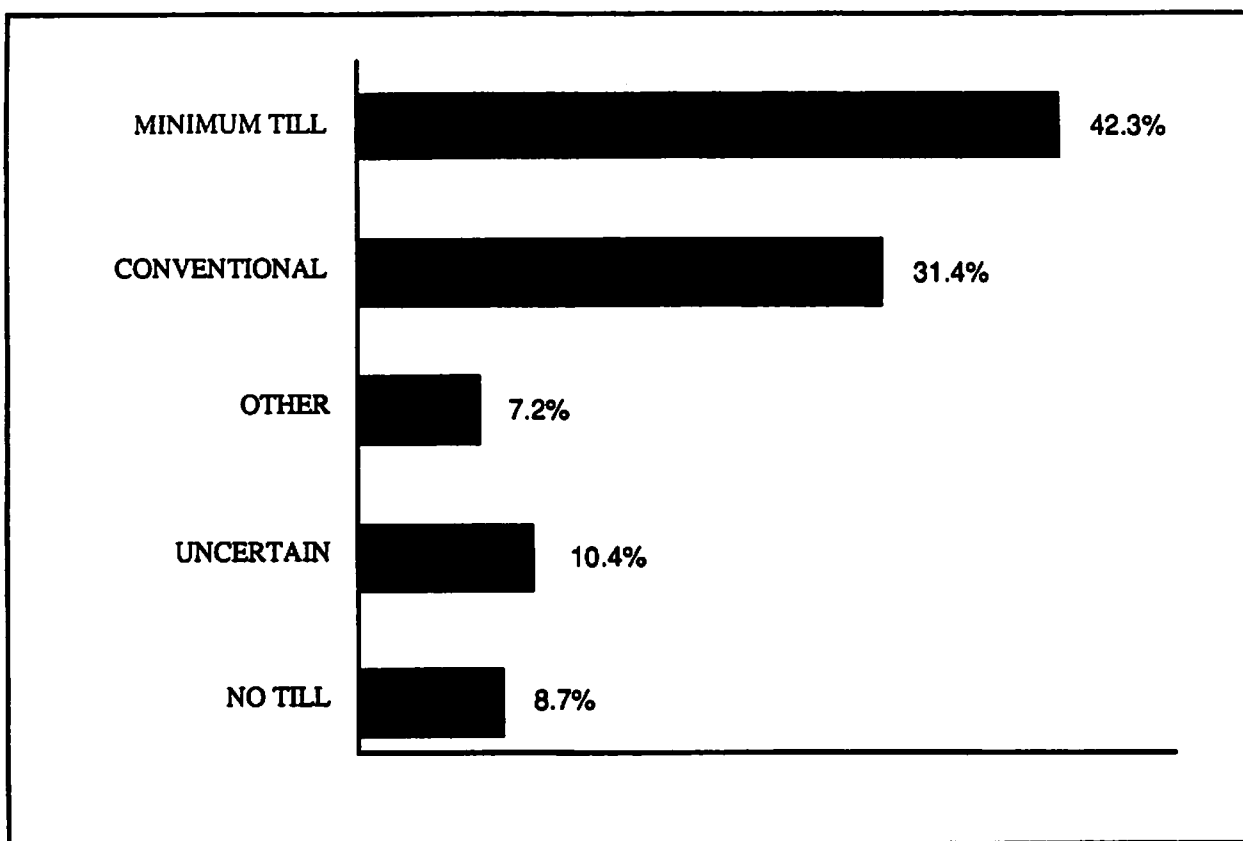
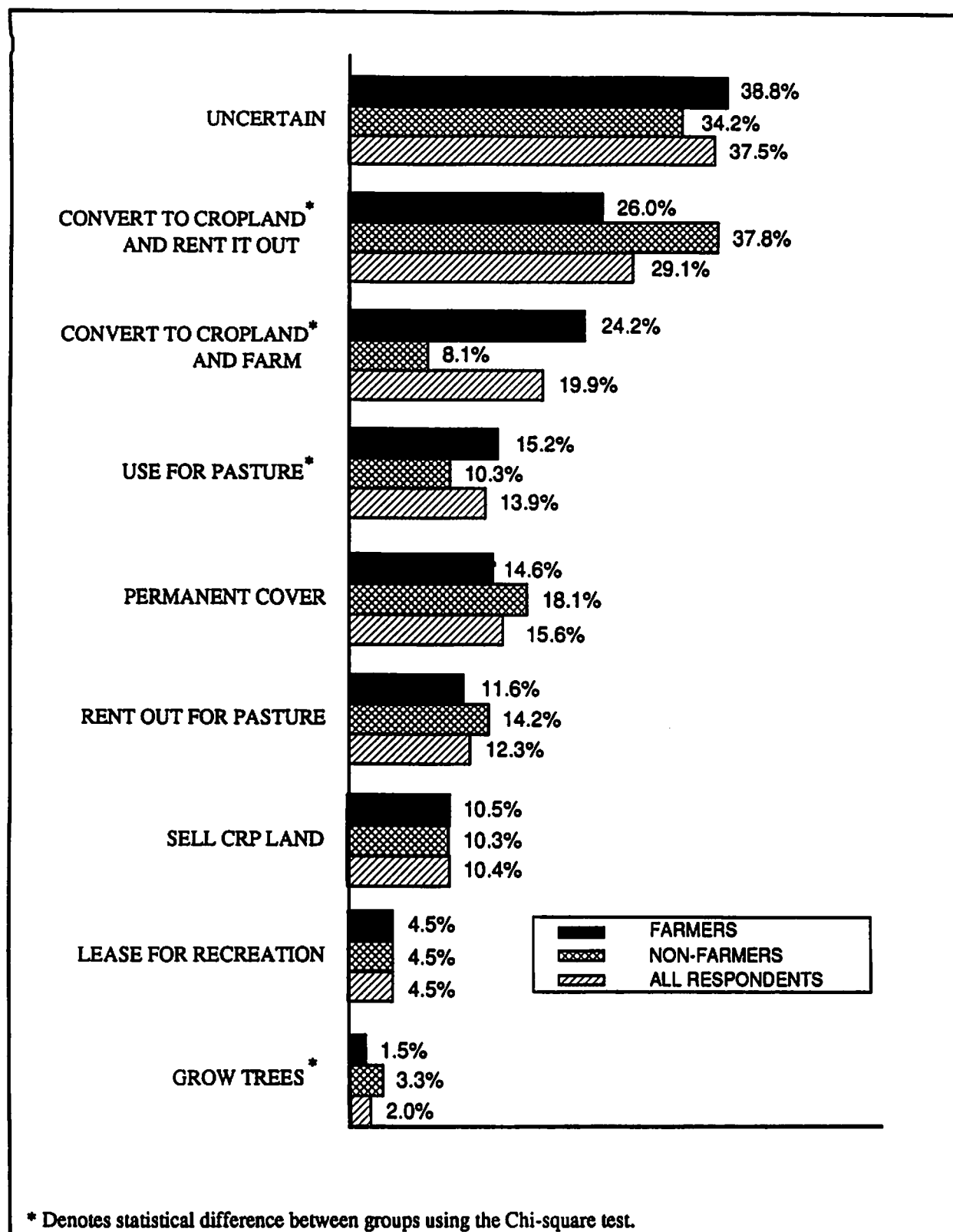


Figure 5. Intended Tillage Method After Contract Expires

Intended Use

Some of the land in the CRP may ultimately fall under the "sodbuster" provision of the 1985 Farm Bill. While about 37 percent indicated that they were undecided what they will do with CRP acres after the program expires, nearly one-half (49 percent) intend to convert the land to cropland, and 15.5 percent intend to leave it in permanent cover (Figure 6). In addition, over 12 percent intend to rent it out for pasture and nearly 14 percent will use it for pasture themselves. Slightly over 10 percent indicated they will sell their CRP land, 4.5 percent intend to lease it for recreational purposes, and only 2 percent intend to grow trees on it.



NOTE: TOTALS DO NOT EQUAL 100% BECAUSE RESPONDENTS WERE ABLE TO INDICATE MORE THAN ONE ANSWER.

Figure 6. Intended Land Use After CRP Contract Expires

Use of Annual Payments

The majority of survey participants (54.5 percent) will use annual CRP payments for living expenses (Figure 7). Other uses are (1) paying CRP land debt, 27.8 percent; (2) paying other debt, 24.5 percent; and (3) savings or investment, 21.6 percent. About 14 percent will use all or part of the annual payments to retire in North Dakota, and only about 3.5 percent will use payments to retire out-of-state. Likewise, about 10 percent and 3.5 percent will use their payments for leisure activities in-state and out-of-state, respectively.

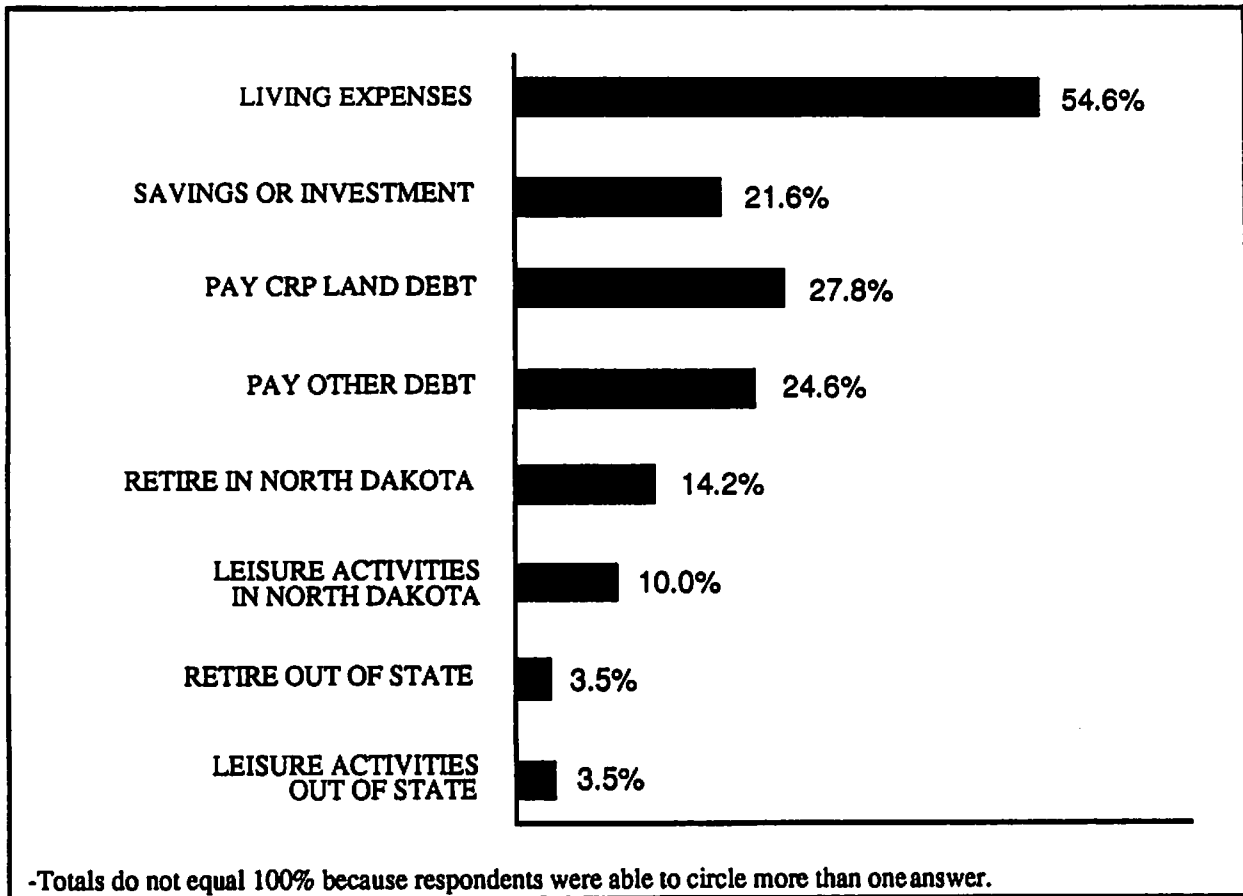


Figure 7. Use of CRP Annual Income

Assets and Debts

Nearly 21 percent of the farmer respondents indicated that CRP was a factor that enabled them to continue their farming operation. This is manifested by the financial information supplied by respondents who were farmers in 1987. Nearly 41 percent of all landowners and 36.9 percent of the farmers had no debt. This compares to about 16 percent of farmers having no debt based on the 1988 farmer survey in North Dakota, which was representative of all farmers who were less than age 65 and considered farming to be their primary occupation (Leistritz et al.)

Farm Income

Farmers participating in the CRP tend to have smaller farming operations than those responding to the 1988 farmer survey; nearly 70 percent had a gross farm income of less than \$100,000 (Figure 8), compared to 62 percent for the farmer survey. The average gross farm income was \$92,440. Participants in the 1988 North Dakota farm survey had an average gross farm income of \$114,899.

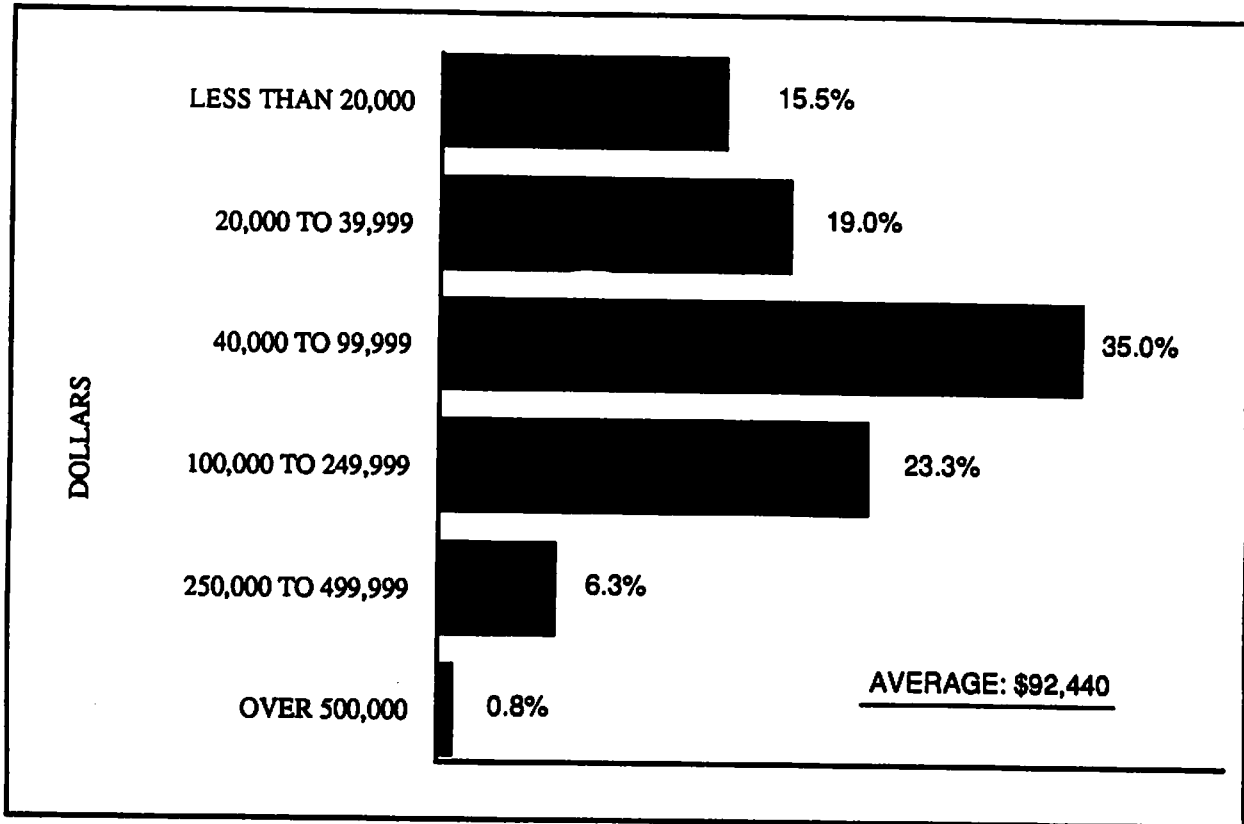


Figure 8. Gross Farm Income of CRP Participants Who Farmed in 1987

CRP payments are a major source of income for many farmers. The value of CRP contract payments to farmers is about \$50 million based on average figures through the fifth sign-up. About 14 percent of the farmers had a negative net farm income (Figure 9). In addition, 26.4 percent stated the CRP payment exceeded their net farm income. If the two categories are added, over 40 percent of the farmers had CRP incomes that were greater than their pre-CRP-payment net farm income, indicating that CRP payments are an important source of income and enabled at least some to continue their farm operation. In fact, 21 percent of the farmer respondents indicated that CRP payments were a major factor enabling them to continue.

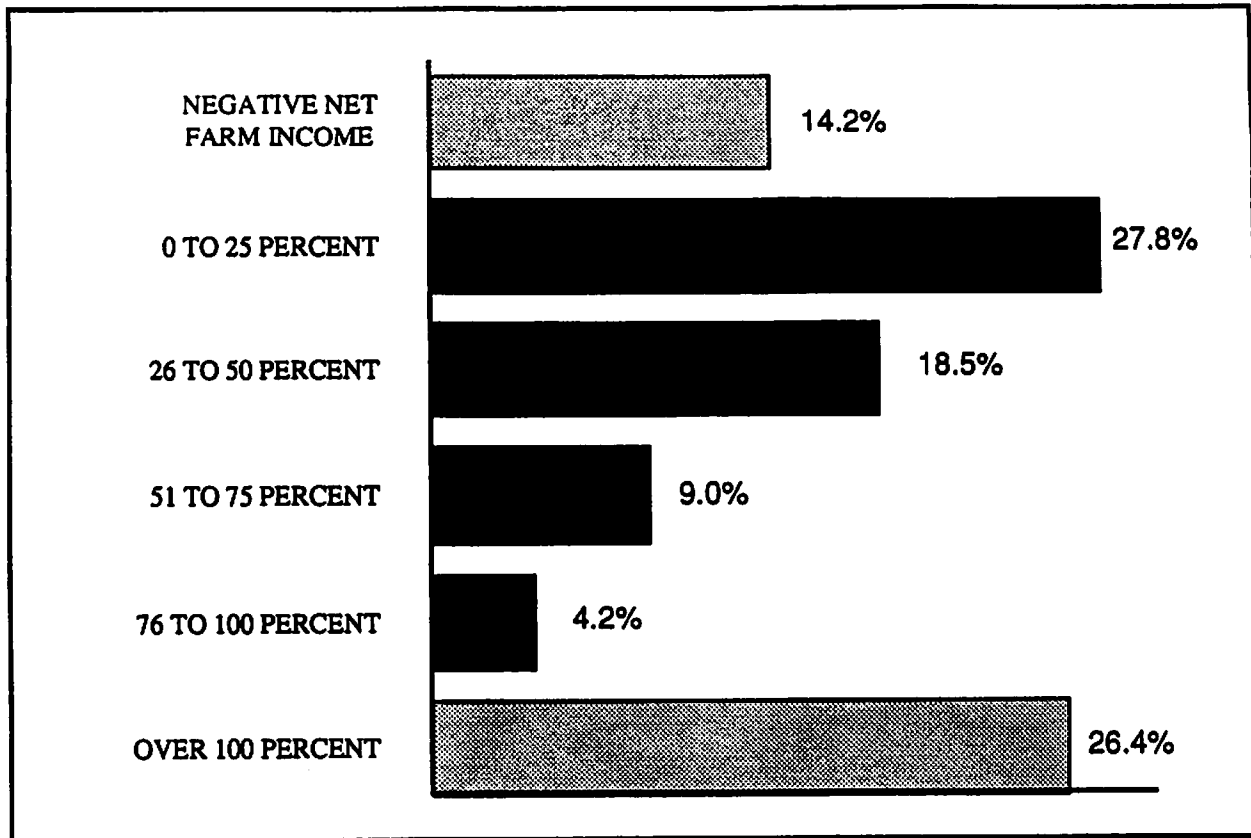


Figure 9. Annual CRP Payment as a Percent of Net Farm Income

Opinion Questions

Over 92 percent agreed that CRP provides wildlife habitat (Figure 10). In addition, nearly 90 percent felt that CRP offers protection for fragile land. About 80 percent agreed that eligibility for CRP entry should be based on soil characteristics rather than management and tillage practices. Over 77 percent of the landowners agreed that CRP benefits them financially. A majority (71.1 percent) also agreed that CRP reduces the sales of local agribusiness suppliers. Nearly 39 percent agreed and over 33 percent disagreed with the statement that land eligibility requirements should be eased. Nearly an equal percentage agreed and disagreed (37.4 percent and 38.4 percent, respectively) with the statement that counties should have the option of going beyond the 25 percent of total county cropland limit for enrolling CRP acreage. About 37 percent agreed with the statement that CRP rewards poor farming practices, and about 42 percent disagreed. Reaction was also mixed to the question of raising the 45 million acre national CRP limit with about 39 percent indicating a neutral response. Nearly 41 percent disagreed and only about 27 percent agreed with the notion that CRP is costing the federal government too much money.

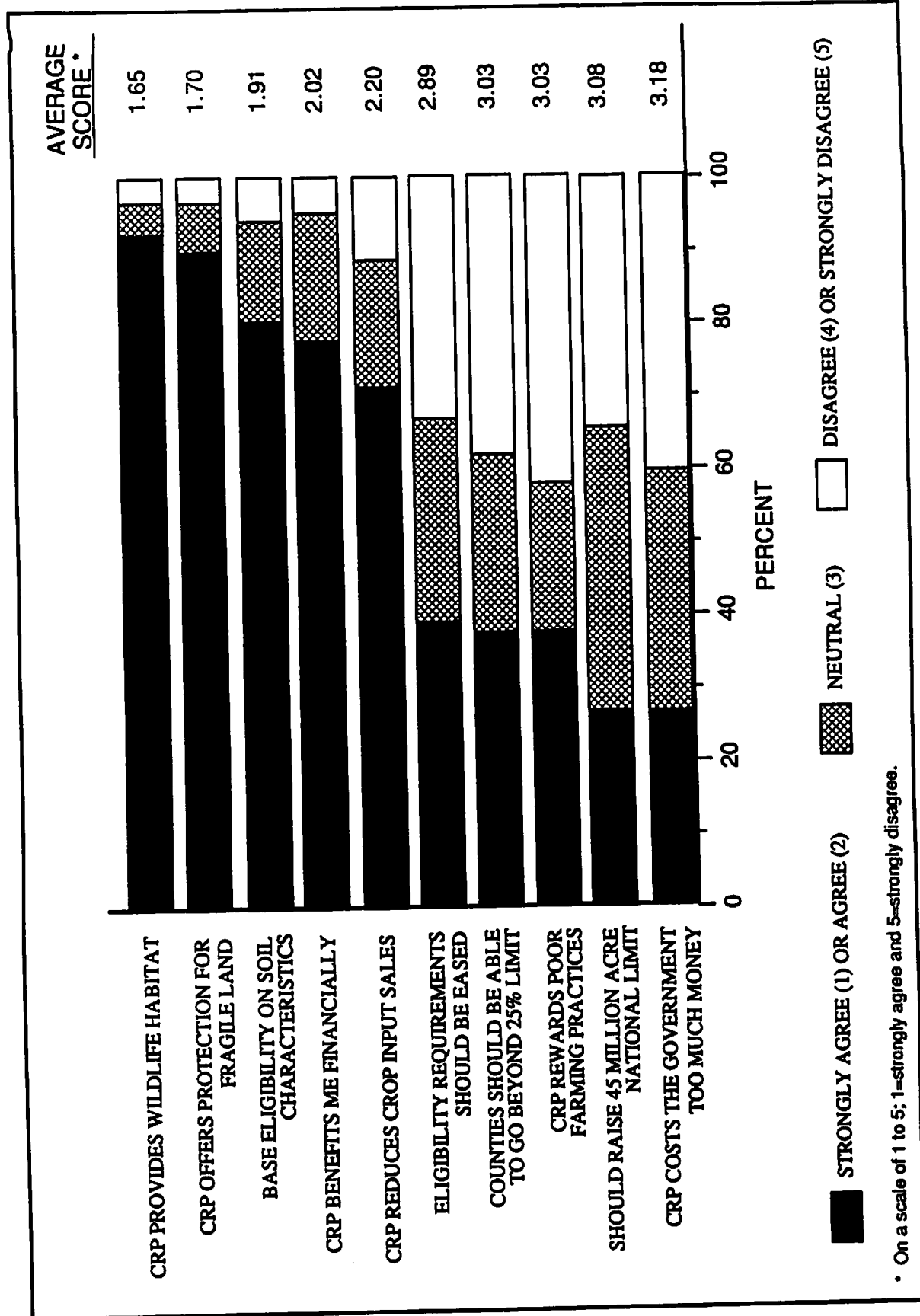


Figure 10. CRP Opinions of All Respondents

Economic Impacts

In addition to providing the necessary information to establish a baseline the survey data, when combined with other information, can be used to estimate the economic effects of CRP (Mortensen et al.). The North Dakota Input-Output model consists of 17 sectors among which agricultural production and energy are the principal basic (export-oriented) activities (Coon et al.). The model was reaggregated into the five CRP pool groups. Sales for final demand were compiled for eight years (1980 to 1987) and adjusted to 1987 base dollars by economic sector.

Direct Effects of CRP

Payments to North Dakota farmers based on average figures through the fifth sign-up totaled nearly \$50 million. However, when reduced input expenditures and crop returns are included the state total direct effect is -\$56 million with nearly 62 percent impacting the retail trade sector (Table 4). Pool groups two, four, and five have the highest net direct impact of about \$12 million each. The household sector is positively impacted in pool groups one, two, and three primarily due to the CRP rental payments exceeding farm income and government program payments. However, the net effect is negative.

TABLE 4. DISTRIBUTION OF CRP ACRES, CRP-RELATED CHANGE IN DIRECT EXPENDITURES, TOTAL CRP IMPACT, CRP IMPACT AS A PERCENT OF BASELINE, AND CRP-RELATED EMPLOYMENT CHANGE

Pool Group	CRP Acres	CRP Payment	CRP-Related Net Change in Direct Expenditures and Household Income	Total CRP Impact	CRP Impact as a Percentage Of Pool Baseline	CRP-Related Employment Change
	(%)	-----million \$-----			(%)	(number)
1	18.8	7.89	-8.34	-21.2	-0.33	-371
2	29.3	13.95	-12.23	-30.0	-0.68	-552
3	20.0	9.53	-10.18	-25.5	-0.52	-453
4	18.5	9.03	-12.57	-31.6	-0.91	-523
5	13.4	7.75	-12.59	-32.2	-0.39	-517
Total	100.0	48.14	-55.90	-140.5	-0.54	-2,416

Direct and Indirect Effects

The impact of \$56 million in direct effects resulting from the CRP translates into about \$141 million in reduced business activity for the state or an overall multiplier of 2.56 (Table 4). This total is spread among 13 sectors of the state's economy with the retail sector absorbing the greatest impact--about 40 percent of the state total. Households were adversely affected by about \$34 million or 23.9 percent of the total.

The largest net change occurred in pool group five where business activity was reduced by over \$32 million. While accounting for only 13.4 percent of the total CRP acres in the state (through the fifth sign-up), it had nearly 23 percent of the reduced business activity (Table 5). Pool four represents 22.5 percent (\$31.6 million) of the CRP associated business activity and had about 18.5 percent of the acres. Pool groups one, two, and three account for 18.2, 21.4, and 15.1 percent of the total CRP impact, respectively.

TABLE 5. BASELINE BUSINESS ACTIVITY, BUSINESS ACTIVITY ASSOCIATED WITH CRP PROGRAM, PERCENT OF BUSINESS ACTIVITY LOST, AND SECONDARY EMPLOYMENT LOSS, BY POOL GROUP, 1987

Pool Group	Baseline Business Activity	CRP Associated Business Activity	CRP Percent Of Baseline	Secondary Job Loss
	----million dollars----		percent	no.
1	6,518	21	0.32	371
2	4,399	30	0.68	552
3	4,914	26	0.53	453
4	3,500	32	0.91	523
5	8,367	32	0.38	517
State	26,247	141	0.54	2,434

Although the net total impact of the CRP is negative for most sectors, the household sector was positively impacted for some pool groups. The gain was primarily due to the CRP contract payments being greater than the reduction in returns from farming and commodity program payments. This was generally the case in western and northern North Dakota (pool groups one, two, and three).

The overall impact on the state's economy is \$141 million (based on 1987 data). Translated into percentage terms, business activity declined statewide by about one-half percent (Table 4). Pool group four had the potential for the highest impact on a percentage basis where about nine-tenths percent of its baseline was reduced as a result of the CRP. Pool group one was impacted the least at about one-third percent.

Secondary Job Losses

Perhaps a more poignant result shown by the analysis is the potential for secondary job loss due to the CRP. On a statewide basis over 2400 secondary jobs may be lost over a period of years as the full effects of the program are felt (Table 4). While job reductions are not shown for individual industries, the retail sector certainly would be among the hardest hit since it accounts for the largest dollar volume of CRP impact. Pool two, where 552 jobs may potentially be lost, was impacted the most among the pool groups.

Per-Acre Effects

An analysis of the per-acre effects of the CRP reveals that generally moving west to east increases the effect of one acre of CRP on the state's economy. The total direct effect of enrollment in CRP is about \$34 per acre in pool group one (Figure 11). While the direct effect is slightly less for pool group two, the effects gradually become larger negative values moving to pool groups three, four, and five where the direct effect of one acre is nearly \$72. This is primarily due to the more intensive nature of farming in the eastern part of the state.

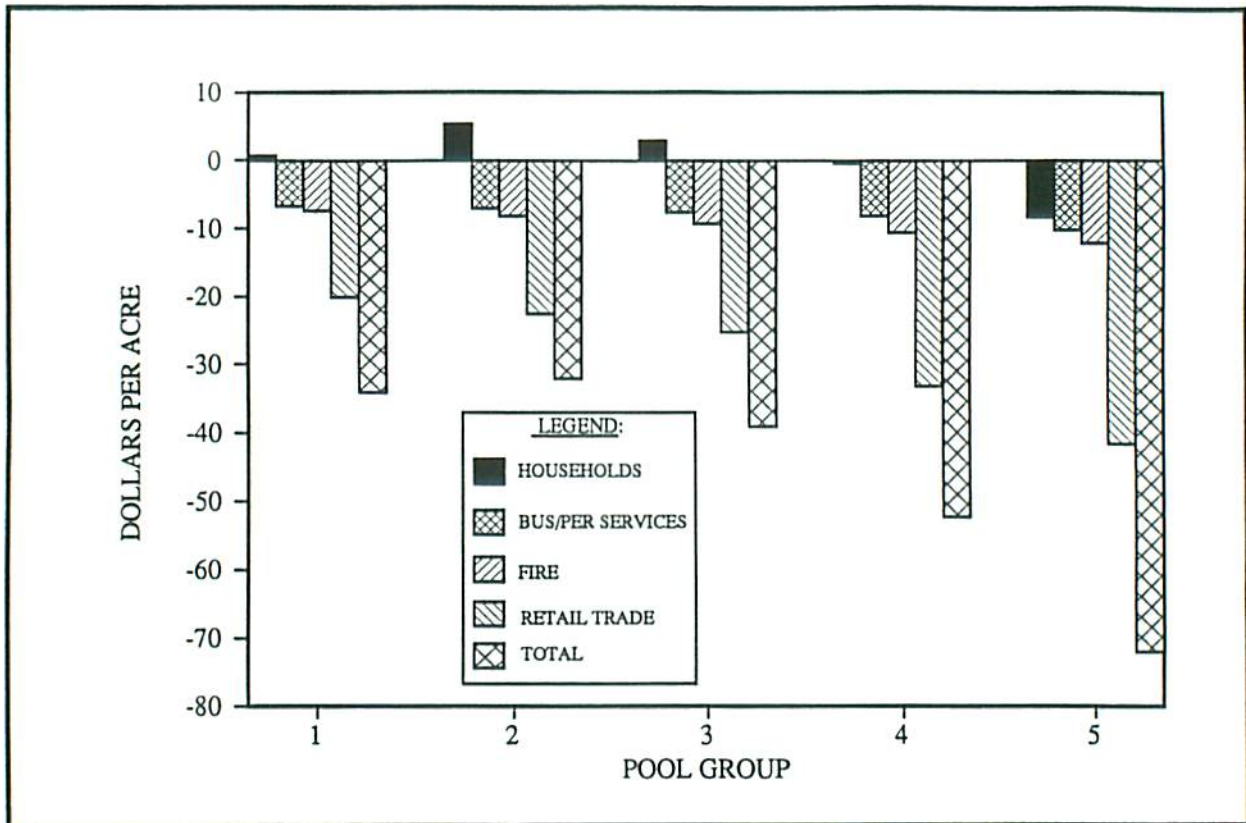


Figure 11. Net Per Acre Direct Effect of CRP by Economic Sector

Summary and Conclusions

This study was undertaken in order to establish baseline characteristics of CRP participants in North Dakota. In addition, information gained from the survey was also used to further analyze the economic impacts of CRP on pool groups in the state. A number of observations and conclusions can be drawn from this baseline analysis:

- Some landowners planted trees as cover on CRP tracts, and about 24.5 percent indicated that they would have considered planting more if the government cost share rate was higher.

- Many respondents (38.8 percent) indicated they did not know what their land use intentions were after the contract expired. However, up to 16 percent indicated they would not use it for cropland but would keep it permanently covered, pasture it themselves, rent it out for pasture, or lease it for recreation purposes.
- About 21 percent of the farmer participants said that the CRP enabled them to continue their farming operation.
- The \$50 million in CRP payments was a major source of income for farmer landowners; over 40 percent had CRP incomes that exceeded their net cash income from their farming operation.
- The injection of CRP payments into rural North Dakota was insufficient to offset reduced business activity and employment. Net direct expenditures declined by about \$56 million, and combined direct and indirect negative impacts totaled \$141 million.
- Employment will also decline by about 2400 jobs if alternative activities do not replace changes in agricultural purchases over the long run.
- Progress is being made toward the conservation objectives of the program, such as (1) reduced soil erosion, (2) increased wildlife habitat and cover, and (3) increased water quality.

Three policy recommendations evolve from the North Dakota study of CRP participants. First, companion programs with state or local governments or private organizations should be encouraged. These might include cost-sharing for establishing tree plantings, restoring wetlands, or otherwise enhancing wildlife habitat; supplemental payments for recreationist access; or purchase of CRP payments to provide landowners with a lump sum payment. Second, measures could be taken to mitigate the potential for negatively impacting rural communities. Possible programs might include tax credits or reduced interest loans for impacted businesses, displaced worker retraining, or business/worker relocation assistance. Finally, soil erosion objectives would be more efficiently accomplished if enrollment in future CRP-like programs were based on soil and topographical characteristics rather than past tillage practices.

Since CRP is a 10-year program, we have an opportunity to collect selected program information on an ongoing basis. Time series characteristics will be accomplished through a panel study of new and continuing CRP entrants. Information gathered during this program will aid policymakers in future program and policy analysis.

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