

CORE CONSERVATION PRACTICES :

ADOPTION BARRIERS PERCEIVED

BY SMALL AND LIMITED RESOURCE FARMERS

Bulletin 646 May 2001
Alabama Agricultural Experiment Station Auburn University
Luther Waters, Director Auburn, Alabama

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ACKNOWLEDGEMENT: We thank the USDA-Alabama Agricultural Statistics Service for its assistance in instrument design, sampling, and data collection.

First Printing 2M, May 2001

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CORE CONSERVATION PRACTICES : ADOPTION BARRIERS PERCEIVED BY SMALL AND LIMITED RESOURCE FARMERS

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INTRODUCTION

FOUR SETS OF FARMING PRACTICES—conservation tillage, crop nutrient management, weed and pest management, and conservation buffers—are the central focus of technical assistance efforts by conservation agencies. Although small and limited resource farms comprise more than three-quarters of the operations in Alabama, Georgia, and Mississippi, this segment of the farm population has disproportionately low levels of adoption of these farming practices (also called the Core 4 practices), which are established measures for conserving soil and protecting groundwater.

The purpose of this report is to provide baseline information for technical assistance for achieving national conservation objectives—specifically the adoption of the Core 4 Practices—on small and limited resource farms in the Deep South. Statewide samples from Alabama, Georgia, and Mississippi are used to present detailed profiles of the conservation practices and understandings of these practices among small and limited resources farmers.

OBJECTIVES

1. Profile core conservation practices utilized by small and limited resource farmers in Alabama, Mississippi, and Georgia.
2. Compare the practices and perceptions of black and white farmers in Alabama, Georgia, and Mississippi.
3. Identify perceived barriers and disadvantages to the implementation of core conservation practices.
4. Describe patterns of information source utilization and preferences among small and limited resource farmers.

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DEFINITION OF LIMITED RESOURCE FARMERS

Research suggests that no all-purpose definition of a small farm can be readily established, but that a number of common characteristics can be identified (Tweeten, 1983). Working definitions have centered on the size of the operation, gross farm sales, and the number of hours contributed to labor and management of the farm operation. Small and limited resource farmers have been shown to be more risk-averse and possess fewer slack resources to invest in conservation measures (Dishongh, 1991; Zabawa, 1989; 1991). Most small farmers depend on farming to obtain a significant part of family income, but not necessarily a majority of it. In addition, the limited resource farmer and family members usually provide most of the labor and management for the farm operation.

A part-time owner-operator obtains a percentage of total family income through off-farm employment, providing a substantial part of the household's overall budget (Molnar and Adrian, 1980). For the purpose of this report, an income figure of \$40,000 is used to distinguish limited resource farmers from commercial farmers, although other studies with other purposes may use different standards or combinations of criteria.¹

As a target audience for USDA-NRCS programs limited resource farmers have many of the following characteristics (NRCS, 1991b):

- Gross farm sales average \$40,000 or less in each of the last three years.
- Total household net income, farm and non-farm, is 75 percent or less of the non-metropolitan median income level for the state or county.
- Access to capital, labor, or equipment is not readily available.
- Farm or ranch size is significantly smaller than average size.
- Social, cultural, customs or language barriers may include the following: minimal awareness of USDA programs, limited management skills, levels of formal education below the county average, and less inclination to take business risks and adopt new technology.

SMALL AND LIMITED RESOURCE FARMER PROGRAM PARTICIPATION

Previous research on agricultural program participation suggests a number of basic patterns that might be expected to apply to the conservation practices used by small and limited resource farmers in the Deep South. Decisions regarding implementing new technology on small farms might actually cause some small farmers to change their operation or stop farming as Gladwin and Zabawa found in their studies of small and part-time farmers in Florida (1985; 1986). Mclean-Meynesse (1994) found that Louisiana small farmers do not participate in the Conservation Reserve Program if revenues from cropland are an important source of income, or if they are tenants. She found that actual participation depends on whether payments per acre are comparable to the opportunity costs of removing

¹ The USDA National Commission on Small Farms chose to use gross income to categorize farms and defined small farms as "those with less than \$250,000 gross receipts annually, on which day-to-day labor and management are provided by the farmer and/or the farm family that owns the production or owns, or leases, the productive assets." This definition includes 94% of all farms in the United States.

cropland from production. Awareness of the program was positively related to education, income, race, and average return per acre. Willingness to participate was inversely related to age, but positively influenced by the size of the payment per acre. Others have shown similar patterns of difference in the use of information sources (Korsching and Hoban, 1990; Hoban et al., 1986).

Limited resource farmers and socially disadvantaged minority farm operators tend not to purchase crop insurance or to participate in insurance-type programs (Dismukes et al., 1997). They tend, more than the typical U.S. farmer, to raise livestock rather than crops. As there are no government-sponsored insurance-type programs for livestock, this seems to reduce the need for contact with public agencies among these producers. In addition, many of those who raise crops tend to concentrate on specialty crops such as fruits and vegetables rather than row crops that are the focus of most government programs. In many cases, farm income makes a minor contribution to a household's overall income. A lack of insurance for the farm enterprise may be less important for these operators than for others more reliant on farm income.

Mishra et al. (1999) investigated the factors affecting profitability of limited resource and other small farms. Profitability on limited resource farms—as measured by net farm income and operators' labor and management income—depended on the operator's age, soil productivity, debt-to-asset ratio, and ratios of variable and fixed costs of production to value of agricultural production. A major source of variation in the performance measures of small and limited resource farms is the ratio of variable costs to value of agricultural production. Unexpected variable costs can have a disastrous effect on the profitability of a particular farm enterprise as well as the viability of the entire operation.

One piece of conventional wisdom is that farmers must either get bigger or get out of farming, but this assertion fails to recognize the diversity of niches for farming in nature and society. The future is dim for small-scale production of basic agricultural commodities such as corn, hogs, soybeans, cattle, etc. Nonetheless, Ikerd (1999) makes the case that there is a future in producing food and fiber products by methods that both can be sustained by nature and will be sustained by society.

Sustainable systems must conform to marketing and ecological niches inherent in nature—including human nature. Those niches are small and diverse, not large and uniform. Many families that operate small units depend on farming for a significant part of their economic, social, and spiritual way of life, if not their whole livelihood. For example, Feldman's (1999) analysis of maple sugar operators describes their activity as a sideline and a lifeline, illustrating how small farms can conform to the economic and ecological niches of markets and of nature.

BLACK AND MINORITY - OPERATED FARMS

The number of black-owned farms is declining at a more rapid rate than other farms, which has called into question the treatment of minority farmers in receiving federal assistance (Yeboah and Wright, 1985). GAO (1997) reviews efforts to

treat minority farmers in the same way as non-minority farmers in delivering program services. Many minority and limited resource farmers blame government policies and practices for the severe decline in farm ownership by minorities, especially black farmers, in the last 70 years.

Much of the black-owned land had been held for generations, in some cases acquired by these farm families after slavery was abolished in the 1860s. According to the Census of Agriculture, the number of farms owned by blacks fell from 925,000 in 1920, 14 percent of all farms, to only 18,000 in 1992, one percent of all farms. Although the number of farms owned by other minorities has increased in recent years, particularly among Hispanics, the total acres of land farmed by these groups has actually declined. Only women have seen an increase in both number of farms and acres farmed. During this time, the number of non-minority farmers also has dramatically declined, although at a slower rate.

Minority farm advocates blame farm program regulations that—intentionally or not—shut out minority and limited-resource farmers from the benefits of the programs that have helped larger non-minority producers survive the changes in agriculture in the last 50 years (Brown and Larson, 1979). And they identify institutional insensitivity to the differing needs of minority and limited-resource customers and public agency tendencies to neglect their responsibility to reach out and serve all that need assistance. Some farm advocates liken minority farmers to an “endangered species” (USDA, 1997a; 1997b).

GAO (1997) identified 101 U.S. counties with the largest concentration of minority farmers, several of which are in Alabama. One-quarter had no minority employees in their farm service agency (FSA) offices. In those offices that did employ minorities, most were program assistants, although one-quarter of the offices had minority county executive directors. Perhaps the lack of diversity that minority and limited-resource customers deem to be most critical is the lack of minority and female representation on the county committees, which can affect access to FSA programs. In 1994, 94 percent of all U.S. county committees had no female or minority representation.

Bagi (1984) examined the likelihood of a farmer being visited by an extension agent in West Tennessee, given the personal characteristics of the operator and economic aspects of 80 farm-firm households. The results show that extension agents visit some small farm operators, but even among this group of small farms, extension agents tend to visit operators of relatively large farms. Within the small farm group, extension agents are more likely to visit white farmers than black farmers, and tend to visit better-educated small farm operators. In other words, extension agents are less likely to visit those small farm operators who need more help due to their perceived lower level of organizational and management ability. Most of the small farm operators in the Bagi study were not being served by regular extension services.

Onianwa et al. (1999) identified factors that affect conservation practice choices among Conservation Reserve Program (CRP) participant farmers in Alabama. Analyzing 204 useable surveys from farmers with CRP contracts, they found

that education, ratio of cropland in CRP, farm size, gender, prior crop practice, and geographic location of contract each had a significant influence on the choice of conservation practice. No significant differences by race were reported, however. This study also determined that limited resource farmers do not implement conservation practices as frequently as full-time farmers.

The disparity in participation and treatment of non-minority and minority farmers may be partially accounted for by the smaller average size of minority and female-operated farms, their lower average crop yields, and their greater likelihood not to plant program crops. In addition, minority farmers tend to have less sophisticated technology, insufficient collateral, poor cash flow, and poor credit ratings (GAO, 1997). However, representatives of minority and female farm groups point out that previous discrimination in USDA programs has helped to produce these very conditions now used to explain disparate treatment.

Many perceive that public agencies do not place a priority on serving the needs of small and limited resource farmers and do not support any official effort to address this problem (USDA, 1997b). The several public agencies that serve farmers have developed their own separate programs that may or may not be successful in responding to the numerous differences found among minority and limited resource customers. Some minority and limited resource farmers feel they do not receive the technical assistance they require nor the basic information about programs for which they might be eligible. Many who need help to complete application forms also need help to understand and meet eligibility requirements for programs. They need information about how their applications will be processed. If their application is denied, they need information on how they might succeed in future applications. When they do receive loans or other program benefits, they need assistance to use those benefits most effectively to improve their operations (Schor, 1992; 1996).

This report provides basic information profiling the conservation practices and technical assistance preferences of black and white small farm operators, a body of information not available from any other source.

METHODS

SAMPLE AND DATA COLLECTION

The sampling design for the study was structured so as to yield approximately equal numbers of black and white farmers in Alabama, Georgia, and Mississippi.² A simple, random sample of white farm operators included those operations with

² Each USDA-National Agricultural Statistics Service state office maintains a constantly updated list of all known agricultural producers. Names and information from the 1997 Census of Agriculture were used to supplement the farm operator list. Every effort is made to maintain and keep the list as up-to-date as possible. However, any list frame of farm operators will always be incomplete because of constant changes in population due to retirements, farm sales, farm consolidations, entry of new farm operators, changes in operating arrangements, etc. Consequently, there is an undetermined amount of incompleteness in the list frames for the states involved in this study, but it is minimal.

less than \$40,000 gross value of sales and row crop control data for cotton, corn, soybeans, or peanuts. All list names of black and other minority farm operators were selected for the survey. The sample sizes and number of completed mail surveys that were returned by black and white respondents in each state are shown in Table 1.

TABLE 1. POPULATION COUNTS, SAMPLE SIZES, AND SURVEY RESPONSES BY STATE, 2000

State	—White farm operators—			—Black farm operators—		
	Population	Sample	Responded	Population	Sample	Responded
Alabama	2,332	507	138	1,062	1,062	157
Georgia	2,763	552	115	688	688	119
Mississippi	1,496	487	127	1,053	1,053	178
Total	6,591	1,546	380	2,803	2,803	454

Survey data were collected by mail using a self-administered survey instrument adapted in part from previous research conducted in a sample of farm operators in the Midwest (CTIC, 2001). A second request questionnaire was used to increase the mail response. To further boost response counts, a limited amount of non-response follow-up was done for both race groups in Georgia and the white sample in Mississippi. Trained telephone interviewers from the NASS Alabama State Statistical Office conducted the follow-up.

Responses are tabulated by race and state to facilitate comparisons of the data for educators and technical assistance providers, farmers, and other professionals with interest in the pattern of results in a particular state. Four respondents did not provide race identification so all tables were constructed on a base of 830 cases. Chi-square statistics are presented where appropriate to draw attention to important differences by race or state. Chi-square statistics are not appropriate for multiple response items where respondents could indicate more than one category in response to a question.

There are several statistical caveats to the use of significance tests on these data due to the nature of the sampling, low response rates that signal some concerns about representativeness, and other shortcomings that suggest caution in interpretation of the observed differences. Nonetheless, significance tests do draw attention to patterns of differences that are less likely to have occurred by chance and may be worth interpreting in a qualified way given the aforementioned limitations.

MEASURING ADOPTION

Conservation Tillage (CT) adoption was measured by four variables reflecting precursor conditions associated with the actual use of specific CT practices. Respondents were asked to rate their level of *familiarity* with CT and the perceived *practicality* of CT. They were asked to note possible *reasons* for using CT on their farms. The measure counts how many they cited. They also were asked to check a

series of CT practices that they had implemented in their farms and the measure counts the number of *practices* they reported.

Crop Nutrient Management (CNM) adoption was measured by four variables reflecting precursor conditions associated with the actual use of specific CNM practices. Respondents were asked to rate their level of *familiarity* with CNM and the perceived *practicality* of CNM on their farms. They were asked to note possible *reasons* for using CNM. The measure counts how many they cited. They also were asked the *frequency* at which they obtained soil tests for the nutrient properties of their farmland or pastures, the central feature of any program of CNM.

Integrated Pest Management (IPM) adoption was measured by four variables reflecting precursor conditions associated with the actual use of specific IPM practices. Respondents were asked to rate their level of *familiarity* with IPM and the perceived *practicality* of IPM on their farms. They were asked to note possible *reasons* for using IPM and the measure counts how many they cited. They also were asked to check a series of IPM practices that they had implemented in their farms; this measure counts the number of *practices* they reported.

Conservation Buffer (CB) adoption was measured by four variables reflecting precursor conditions associated with the actual use of specific CB practices. Respondents were asked to rate their level of *familiarity* with CB and the perceived *practicality* of CB on their farms. They were asked to note possible *reasons* for using CB and the measure counts how many they cited. They also were asked to check a series of CB practices that they had implemented in their farms; this measure counts the number of *practices* they reported.

Statistical weighting was employed in regression analysis to restore representativeness to the combined data set due to the differential rate at which black farm operators were sampled. The weights restore statistical representation in the sample mirroring the statistical representation in the population of farm operators in the three states.

RESULTS

Table 2 shows the respondents' characteristics by state and race. Most of the small-scale operators who responded to the study were male and—due to sample selection procedures—were nearly equally divided between black and white in each state. About one percent of the overall sample was Native American. These respondents are tabulated with the white respondents primarily because there were insufficient cases for specific analysis of this category of farmers and one focus of the study was to examine the problems challenging black farmers.

Education varied significantly by race and state. Thirty seven percent of the Alabama black respondents had a college education or higher, suggesting that many part-time, hobby, or heir-property landowners may be included in the sample. In Georgia, 28 percent of the black respondents had advanced education, compared to 20 percent of the white farmers. This was a parallel pattern across the three states. The black respondents had higher levels of education than the white respondents.

TABLE 2. RESPONDENT CHARACTERISTICS BY RACE AND STATE,
SMALL AND LIMITED RESOURCE FARMERS, 2000

	—Alabama—			—Georgia—		—Mississippi—		—Chi-square—	
	All %	White %	Black %	White %	Black %	White %	Black %	State	Race
What is your gender?									
Male	94	97	94	93	92	96	91		
Female	6	3	6	7	8	4	9		
								2.2	3.2
Race									
African American	54	0	100	0	100	0	100		
White	46	99	0	98	0	98	0		
Native American	1	1	0	3	0	2	0		
								N/A	N/A
What is the highest level of formal education you (the operator) completed?									
Less than high school	18	13	20	18	27	13	17		
High school diploma or GED	29	37	19	42	29	30	22		
Some college	24	25	25	19	16	34	24		
Completed 4-year college degree	15	16	16	10	10	16	16		
Graduate school	14	8	21	10	18	7	21		
								19.4*	36.7**
How old were you on your last birthday?									
Under 35	3	6	1	3	4	4	0		
35-44	13	17	7	10	12	16	15		
45-54	22	17	26	14	22	21	27		
55-64	35	27	32	29	26	22	15		
65-69	27	13	14	16	9	12	19		
70 and over	24	20	20	28	27	25	24		
								21.4*	16.8*
How many days did you work at least 4 hours off this operation last year (1999)?									
Did not work off the farm	25	25	24	27	24	31	22		
1-49 days	19	19	13	12	18	14	19		
50-200 days	22	22	26	18	27	17	30		
200+ days	34	34	37	44	32	39	28		
								1.7	10.3*
Did your spouse work at least 4 hours per day off this operation last year (1999)?									
No spouse	13	12	13	13	14	10	15		
Spouse did not work off the farm	37	28	40	37	36	39	40		
1-49 days	13	18	15	12	6	9	14		
50-200 days	9	9	8	8	12	9	9		
200+ days	29	33	24	31	33	34	22		
								6.9	4.5
Number	830	137	154	118	116	129	176		

*p < .05 **p < .01

Age varied significantly by race and state, though these patterns were not consistent across categories. About 44 percent of Georgia white farmers were age 65 or over, as were about 43 percent of Mississippi black farmers.

About a fourth of all operators did not work off the farm in the previous year. The test statistic suggests that differences by race, but not by state, are worth attending to. More Mississippi white farmers did not work off the farm (31 percent), but Mississippi black farmers were least likely to not work off the farm (22 percent). About 44 percent of Georgia white farmers worked full-time off the farm, the highest rate in the sample.

About 34 percent of the sample had spouses who worked 200 or more days off the farm, but differences were not significant by race or state. About half either had no spouse or had a spouse who did not work off the farm.

INCOME SOURCES

Table 3 shows the sources of farm income in the sample of small and limited resource farmers. There were large differences by race and state. Row crops such as cotton, soybeans, and other items were grown by approximately a third of the farmers. In each state, more white farmers reported growing row crops and they were consistently more likely to report this enterprise as a source of 75 percent or more of their farm income. Only 15 percent of Alabama and 20 percent of the Mississippi black farmers reported growing row crops.

Around 70 percent of the sample had income from livestock with large differences by race and state. More white farmers did not have any livestock. Black farmers were more likely to report that more than 75 percent of their farm income came from livestock.

Only three percent of the sample had poultry, primarily white farmers. The test statistics for race and state were not significant. Central to the growing industrialized sector, poultry represents the single most important agricultural product in Alabama and Georgia. It accounts for more than half of all farm income in these states, employing many people and generating the majority of farm exports. Small and limited resource farmers are not participating in the most technologically dynamic and economically active components of agriculture.

Sixteen percent of small and limited resource farmers reported sales income from fruit, vegetable, horticulture, or specialty crops. There were no significant differences by race or state.

Roughly 74 percent of the sample received no income from government payments, though state differences were significant. About 16 percent of Georgia farmers received half or more of their income from government payments, the highest in the sample.

About four percent indicated that 75 percent or more their income was from the farm. Overall differences by race and state were not significant.

Farm income category differed significantly by race. More white farmers in each state reported farm incomes in the top three categories. More black farmers in each state were in the lower income categories.

Although the sample was selected to target operators of farms with less than \$40,000 in sales, about 3 percent of the sample had a higher level of annual sales. This is due primarily to annual variability in farm income between the reporting year and the year of the sample selection criterion. Data from these operators was not excluded because farm income is variable from year to year and these operations qualified as small and limited resource farms in previous reporting periods.

TABLE 3. FARM INCOME SOURCES AND CHARACTERISTICS BY RACE AND STATE, SMALL AND LIMITED RESOURCE FARMERS, 2000

	—Alabama—		—Georgia—		—Mississippi—		—Chi-square—	
	All %	White %	Black %	White %	Black %	White %	Black %	State Race
What percent of the sales reported on your operation came from the following commodity groups?								
Row crops such as corn, cotton, soybeans, etc.								
None	67	61	85	50	63	53	80	
1 to 49 percent	9	9	4	13	11	14	6	
50 to 74 percent	8	12	6	14	7	5	5	
75 to 100 percent	17	19	6	24	19	28	10	
								24.5** 45.3**
Livestock such as cattle, hogs, sheep etc.								
None	30	32	18	48	32	40	20	
1 to 49 percent	7	13	4	7	14	5	3	
50 to 74 percent	7	5	6	8	9	7	6	
75 to 100 percent	56	50	72	36	46	48	70	
								33.2** 34.9**
Poultry, including contract broilers, eggs, etc.								
None	97	96	99	100	97	98	95	
1 to 49 percent	1	1	1	0	0	2	2	
50 to 74 percent	1	0	0	0	1	0	2	
75 to 100 percent	1	3	0	0	2	0	1	
								11.2 4.7
Fruit, vegetables, horticulture, or speciality crops								
None	84	83	83	81	85	86	86	
1 to 49 percent	8	7	6	12	7	8	10	
50 to 74 percent	2	3	4	2	3	2	1	
75 to 100 percent	5	7	6	6	5	5	2	
								9.5 1.6
Government agricultural payments								
None	74	73	79	58	72	77	78	
1 to 49 percent	16	18	17	24	13	12	15	
50 to 74 percent	3	3	3	8	2	4	1	
75 to 100 percent	7	6	2	9	13	7	6	
								19.1* 8.8*

continued

TABLE 3, CONTINUED. FARM INCOME SOURCES AND CHARACTERISTICS
BY RACE AND STATE, SMALL AND LIMITED RESOURCE FARMERS, 2000

	—Alabama—			—Georgia—		—Mississippi—		—Chi-square—	
	All %	White %	Black %	White %	Black %	White %	Black %	State	Race
About what percent of your total 1999 household income was from farming?									
Less than 25%	73	72	78	69	75	70	73		
25%	17	19	17	15	15	18	18		
50%	6	5	3	10	7	6	6		
75% or more	4	4	3	6	3	6	3	7.9	4.4
Including ag payments, what was the total gross value of sales from this operation?									
Less than \$1,000	25	23	33	14	31	17	30		
\$1,000-\$2,499	25	16	26	24	22	15	27		
\$2,500-\$4,999	14	17	15	10	8	18	15		
\$5,000-\$9,999	22	19	17	27	25	30	19		
\$10,000-\$39,999	14	21	10	21	10	19	8		
\$40,000 and over	3	4	1	4	5	3	1	19.1	44.0**
Number	830	137	154	118	116	129	176		

*p < .05 **p < .01

CONSERVATION TILLAGE

Table 4 shows the conservation tillage (CT) experiences reported by study respondents. Only 17 percent of the sample was very familiar with CT, but many differences by race were significant. Black farmers were consistently less familiar with CT than white farmers. Alabama black farmers had the highest proportion indicating they were not familiar with CT, 44 percent. Conversely, 26 percent of the Alabama white farmers said they were very familiar with CT, the highest proportion across the three states.

About a third of the respondents felt that CT would be practical on their farms. Differences were significant by race showing that 20 percent of Alabama and 29 percent of Mississippi black operators saw CT as practical on their farms, the lowest levels in the sample.

Only about 15 percent of the respondents had crop acreage planted used CT practices. More whites consistently had more land under CT than blacks.

Less than 10 percent used any single CT technique. No-till was the overall most used tillage practice. Respondents were given a number of reasons for using CT and asked to mark all that applied to them. The table ranks them in terms of the overall frequency that each was chosen. About 20 percent felt that the main reason for using CT was reducing soil erosion, but this was highly variable across the states. Around 10 percent noted conserving soil moisture, and 9 percent marked increasing organic matter and saving time as reasons for using CT. There were few consistent differences by state or race, though more Mississippians felt that CT increased yields per acre.

The main perceived problems with CT were more weeds, higher herbicide costs, and high equipment costs, each cited by about 10 percent of the sample. More white farmers cited disadvantages. In each state, slightly more black farmers noted that how-to information was not available.

TABLE 4. CONSERVATION TILLAGE EXPERIENCES AND PERCEPTIONS BY RACE AND STATE, SMALL AND LIMITED RESOURCE FARMERS, 2000

	—Alabama—			—Georgia—		—Mississippi—		—Chi-square—	
	All %	White %	Black %	White %	Black %	White %	Black %	State	Race
How familiar with conservation tillage (CT) are you?									
Not at all familiar	30	24	44	20	31	19	37		
Somewhat familiar	53	50	45	60	55	63	50		
Very familiar	17	26	11	20	14	18	13	7.2	31.0**
Is CT practical on your farm?									
It would be good	32	40	20	32	30	40	29		
Not very practical	21	23	20	30	18	25	15		
No opinion	47	37	60	38	52	35	56	3.1	32.6**
What percentage of your total crop acreage was planted last year (1999) using any CT practices?									
No crop acreage	85	79	93	85	83	78	89		
Less than 50 percent	5	6	4	3	7	7	5		
50 percent	3	4	1	2	4	3	2		
More than 50 percent	7	11	2	10	6	12	4	1.3	18.1**
What conservation tillage practices did you use?									
No till	5	8	1	8	5	9	3		
Reduced till	5	8	2	3	3	9	3		
Mulch till	3	3	3	1	5	4	3		
Strip till	1	2	1	2	1	2	2		
Ridge till	1	1	0	3	3	0	1	N/A	N/A
What are the main reasons you would use CT on your farming operation?									
Reduces soil erosion	20	29	12	18	18	30	19		
Conserves soil moisture	10	14	5	10	10	14	9		
Increases organic matter	9	9	6	11	11	13	4		
Saves time	7	9	3	6	8	13	6		
Lowers production costs	6	9	5	6	5	8	5		
Increases yields per acre	6	4	3	3	8	9	8		
Reduces soil compaction	5	3	3	6	5	7	4		
Other	0	0	0	0	1	0	0	N/A	N/A

continued

TABLE 4, CONTINUED. CONSERVATION TILLAGE EXPERIENCES AND PERCEPTIONS
BY RACE AND STATE, SMALL AND LIMITED RESOURCE FARMERS, 2000

	—Alabama—			—Georgia—		—Mississippi—		—Chi-square—	
	All %	White %	Black %	White %	Black %	White %	Black %	State	Race
What are the main problems you might have with CT on your operation?									
More weeds	11	14	5	13	13	15	8		
Higher herbicide costs	11	18	3	13	5	21	6		
Equipment costs too much	10	12	6	11	6	15	13		
“How to” Information not available	3	3	5	3	4	2	3		
Crop yields are lower	2	3	1	1	3	5	2		
Disease problems	1	1	1	1	3	3	1		
More insects	1	0	2	2	1	2	1		
Tried CT and it didn't work	1	0	1	1	1	0	2		
Other	1	1	0	1	2	0	1		
								N/A	N/A
Number	830	137	154	118	116	129	176		

*p < .05 **p < .01

CONSERVATION TILLAGE ADOPTION

Table 5 shows regression analyses of conservation tillage adoption variables on selected characteristics of small and limited resource farmers. These data show the variables that best predict a number of dimensions associated with the implementation of CT by limited resource farm operators.

Education predicted three of the adoption variables. Respondents with more years of schooling thought that CT was more practical on their farms, they gave more reasons for using CT on their operations, and they had actually adopted more of the CT practices on their land.

Total gross value of sales predicted familiarity with CT and the number of reasons given. It was not significantly related to the perceived practicality nor the actual number of practices adopted.

Farm sales as percent of total income was associated with familiarity, perceived practicality, the number of reasons for using CT, and the actual number of practices adopted. Dependence on farming for livelihood was linked to conditions associated with the use of CT practices as well as how many were actually adopted.

Black farm operators were significantly less familiar with CT. The equations explained 10 percent or less in the variation in each of the adoption variables.

TABLE 5. REGRESSION ANALYSIS OF CONSERVATION TILLAGE ADOPTION VARIABLES ON SELECTED FARM AND INDIVIDUAL CHARACTERISTICS, SMALL AND LIMITED RESOURCE FARMERS, 2000

	Conservation tillage			
	Familiarity	Practicality	Reasons	Practices
Formal education	0.051	0.096*	0.114**	0.098*
Age	0.038	-0.081	-0.037	-0.054
Total gross value of sales	0.093*	0.029	0.120*	0.066
Your outside work	0.103*	0.011	0.061	0.026
Spouse outside work	0.011	-0.013	-0.041	-0.004
Land	0.075	-0.037	0.020	-0.064
Row crops farmed	0.163*	-0.029	-0.080	0.039
Livestock raised	0.088	-0.138*	-0.143*	-0.034
Poultry raised	0.053	-0.122**	-0.056	-0.068
Fruits and vegetables raised	0.114*	-0.036	-0.058	0.015
Government assistance payments received	0.069	-0.117*	-0.113*	-0.012
Farm operator's gender	0.019	0.005	-0.024	0.026
Race	-0.087*	0.020	-0.068	-0.071
Farming receipts as percent of total income	0.132**	0.183**	0.160**	0.106*
R ²	0.100	0.059	0.077	0.044
Adjusted R ²	0.078	0.036	0.055	0.021
F-value	4.570**	2.598**	3.446**	1.924*

*p<.05 ** p<.01

CROP NUTRIENT MANAGEMENT

More than half of the farmers in this study were familiar with crop nutrient management, (CNM), Table 6. Around 11 percent were very familiar, but differences were not significant by state or race. Alabama black farmers had the highest proportion that was not familiar, 43 percent.

A quarter (24 percent) of the sample believed that CNM practices would be practical on their operation. Mississippi black farmers gave it the highest rating, 42 percent.

There were important differences by state and race in the frequency of soil testing. By a large margin in each state, more black than white farmers reported never soil testing. More Georgia farmers reported testing every year. Less than 10 percent of the sample soil tested every year, and about 44 percent of the sample tested every three years or less often.

Farmers use CNM for a variety of reasons. Overall, 21 percent of the respondents thought CNM would increase crop yield per acre. Reduction in fertilizer costs motivated other farmers to implement CNM practices, a reason consistently cited by more whites than blacks. About 12 percent felt that CNM improved crop quality.

TABLE 6. CROP NUTRIENT MANAGEMENT EXPERIENCES AND PERCEPTIONS
BY RACE AND STATE, SMALL AND LIMITED RESOURCE FARMERS, 2000

	—Alabama—			—Georgia—		—Mississippi—		—Chi-square—	
	All %	White %	Black %	White %	Black %	White %	Black %	State	Race
How familiar with crop nutrient management (CNM) are you?									
Not at all familiar	35	26	43	36	40	36	32		
Somewhat familiar	54	63	49	51	48	54	56		
Very familiar	11	11	8	13	12	10	11	3.0	2.6
Is CNM practical on your farm									
No opinion	55	46	59	48	53	53	45		
It would be useful	24	37	31	36	36	33	42		
Not very practical	20	17	10	16	11	15	13	1.9	0.3
About how often do you have your soils tested?									
Never	34	27	42	15	40	30	46		
3 years or more	44	48	47	43	30	48	45		
2 years	14	18	8	25	17	14	7		
Every year	8	7	3	18	13	8	2	4.8**	39.8**
What are the main reasons you would use CNM in your operation?									
Increases crop yields									
per acre	21	20	18	20	26	17	26		
Reduces fertilizer cost	17	22	11	25	15	19	13		
Improves crop quality	12	10	11	7	14	14	14		
Better soil and water									
conservation	9	12	9	9	7	9	8		
Reduces soil erosion	7	6	6	6	5	9	10		
Slows water runoff	3	3	2	3	2	4	2		
Other	0	0	1	0	1	0	0	N/A	N/A
What are the main problems you might have with CNM on your operation?									
Equipment costs									
too much	12	15	10	10	11	11	16		
Information on									
"how to do it" is not									
readily available	10	9	10	7	9	12	13		
It is not cost effective	10	8	9	15	10	8	10		
Takes too much									
of my time	5	5	5	6	6	6	6		
Can't find enough labor	3	1	3	1	5	2	4		
Crop yields per acre									
are lower	2	2	1	0	1	2	6		
I've tried CNM and									
they didn't work	1	0	1	0	2	0	1		
Other	1	0	1	0	1	1	1	N/A	N/A
Number	830	137	154	118	116	129	176		

*p < .05 **p < .01

Around 12 percent of the farmers said that expensive equipment was the greatest problem they had with CNM on their operation. More black farmers felt they did not have readily available information on how to use CNM. The perception that CNM was not cost effective kept many of the respondents from using CNM on their farm. Fifteen percent of white Georgia farmers gave this particular reason.

CROP NUTRIENT MANAGEMENT ADOPTION

Table 7 shows regression analyses of crop nutrient management adoption variables on selected farm and individual characteristics of small and limited resource farmers. These data show the variables that best predict a number of dimensions associated with the implementation of CNM by limited resource farm operators.

Education predicted two of the four adoption precursor variables, but not familiarity with soil testing. Respondents with more years of schooling thought that CNM was more practical on their farms, and they gave more reasons for using CNM.

Whether or not the respondent farmed row crops predicted perceived practicality, the number of reasons given for CNM use, and the frequency of soil testing. The variable was not linked to differences in familiarity with CNM. Similarly, those who raised livestock gave more reasons for using CNM and were more convinced of its practicality. Farmers growing fruit and vegetables were more familiar with CNM, tended to view it as practical, and gave more reasons for its use.

TABLE 7. REGRESSION ANALYSIS OF CROP NUTRIENT MANAGEMENT ADOPTION VARIABLES ON SELECTED FARM AND INDIVIDUAL CHARACTERISTICS, SMALL AND LIMITED RESOURCE FARMERS, 2000

	Crop nutrient management			
	Familiarity	Practicality	Reasons	Testing
Formal education	0.084	0.200**	0.172**	0.028
Age	0.011	-0.076	-0.041	-0.033
Total gross value of sales	0.035	0.088	0.113*	0.228**
Your outside work	0.001	-0.003	0.021	0.034
Spouse outside work	-0.011	0.064	0.062	0.081
Land	0.085	-0.077	-0.013	0.040
Row crops farmed	0.089	0.296**	0.180*	0.251*
Livestock raised	0.121	0.308**	0.236*	0.131
Poultry raised	0.051	-0.045	-0.045	0.020
Fruits and vegetables raised	0.179*	0.178**	0.172*	0.039
Government assistance payments received	0.040	0.096	0.089	0.031
Farm operator's gender	0.013	0.082*	0.064	0.027
Race	-0.011	0.061	-0.001	-0.099*
Farming receipts as percent of total income	0.091	0.114*	0.079	0.063
R ²	0.051	0.109	0.087	0.168
Adjusted R ²	0.028	0.087	0.064	0.148
F-value	2.221**	5.055**	3.915**	8.363**

*p<.05 ** p<.01

Black farmers had lower frequencies of soil testing than white farmers. There were no other differences by race on the other adoption variables.

Farm sales, as percent of total income, were associated with the perceived practicality of soil testing. Those more dependent on farming for their livelihood knew more about CNM and tested their soil more frequently.

ROTATION AND FERTILIZATION PRACTICES

Fertilizer and crop rotation practices of small and limited resource farmers are portrayed in Table 8. Changes in fertilizer use were significantly different by race. Approximately 62 percent of all farmers indicated that their commercial fertilizer use had remained about the same over the past five years, although only 47

TABLE 8. FERTILIZER AND CROP ROTATION PRACTICES BY RACE AND STATE, SMALL AND LIMITED RESOURCE FARMERS, 2000

	—Alabama—			—Georgia—		—Mississippi—		—Chi-square—	
	All %	White %	Black %	White %	Black %	White %	Black %	State	Race
Over past five years, has the average amount of commercial fertilizer used per acre on this operation:									
Remained about the same	62	75	51	75	53	63	47		
Increased	19	12	24	11	22	19	21		
No fertilizer used in past five years	12	5	22	5	17	10	22		
Decreased	8	8	3	9	8	8	10	10.1	55.1**
When is commercial fertilizer applied?									
No fertilizer used in past five years	12	5	22	5	17	10	22		
At planting time	39	48	31	36	40	50	31		
Before crops are planted	39	42	30	52	35	42	37		
After crops have come up (side-dressing)	41	42	31	59	40	46	33		
Through irrigation system as crops are being watered	1	0	1	1	2	1	1	N/A	N/A
Do you use different amounts of fertilizer in different fields?									
No fertilizer used in past five years	12	5	22	5	17	10	22		
Same amount is used	61	68	54	65	55	59	50		
Different amounts are used	21	23	17	27	18	29	19		
Don't know	6	4	7	3	10	2	9	6.8	49.5**

continued

TABLE 8, CONTINUED . FERTILIZER AND CROP ROTATION PRACTICES BY RACE AND STATE,
SMALL AND LIMITED RESOURCE FARMERS, 2000

	—Alabama—			—Georgia—		—Mississippi—		—Chi-square—	
	All %	White %	Black %	White %	Black %	White %	Black %	State	Race
Is litter or manure ever applied to the crop/pasture land that you operate?									
No	78	70	87	73	81	74	82		
Yes	20	29	12	27	15	25	16		
Don't know	2	1	1	1	4	1	2	1.9	23.7**
How often is chicken litter or animal manure applied on your fields?									
Do not use litter or manure	80	68	83	72	80	74	81		
Every 3 years	8	9	5	10	5	9	8		
Every 2 years	5	9	4	6	2	7	3		
Every year	7	10	3	10	8	9	5	3.8	23.0**
Is more or less commercial fertilizer used after chicken litter or animal manure is applied?									
Do not use commercial fertilizer	80	68	83	72	80	74	81		
None is used	3	5	1	4	3	3	2		
Less	12	19	6	16	9	14	9		
Same	5	4	4	6	3	7	5		
More	0	1	1	0	0	1	0	3.7	23.3**
Do you grow the same crops in the same fields year after year or do you rotate between fields?									
Do not rotate crops -- Always use the same fields	41	36	54	25	28	34	35		
Rotate crops	37	39	17	40	45	33	30		
Some of each	22	20	10	28	14	28	18	26.3**	17.9**
How often are crops rotated between fields?									
Do not rotate crops	41	36	54	25	28	34	36		
Varies depending	24	24	8	35	18	32	15		
Every year	13	15	6	12	24	9	9		
2 years	13	12	10	9	14	9	13		
3 years or more	9	8	3	13	3	11	11	37.5**	56.6**
Do you include legumes in rotation?									
Do not rotate crops	41	36	54	25	28	34	36		
Yes	28	35	10	45	30	36	22		
No	16	19	11	13	15	16	19		
I do not plant legume crops	8	5	6	10	14	8	7	32.7**	40.8**
Number	830	137	154	118	116	129	176		

*p < .05 **p < .01

percent of the black farmers in Mississippi said so. About 19 percent said that their fertilizer use had increased, though only about an eighth of the white farmers in Alabama and Georgia said so. Black farmers were much more likely to say that they had not used fertilizer in the past five years. Previously, the data showed the black farmers were much less likely to be involved in row crop enterprises where fertilizer is a central tool.

Almost 41 percent of the sample used side-dressing for the application of commercial fertilizer, followed closely by application at planting time and before crops are planted. White farmers tended to use more of each approach to crop fertilization.

Whites were significantly more likely to adjust the amount of fertilizer they used in different fields. The basic knowledge for such adjustments comes from soil testing.

More white than black farmers in each state applied litter or manure to their fields, a statistically significant pattern. About 27 percent of the white farmers applied litter or manure compared to about 14 percent of the black farmers. Similarly, more white farmers than blacks used chicken litter or manure and they applied it more often. White farmers were more likely to indicate that they used less commercial fertilizer after applying litter, a statistically significant pattern.

Crop rotation varied significantly by state and race. Forty-five percent of the Georgia black farmers reported rotating their crops, compared to 40 percent of the Georgia white farmers but the pattern was reversed in the other states. Only 17 percent of the black Alabama producers indicated they used crop rotation.

Frequency of rotation also varied significantly by state and race. Most respondents indicated that their crop rotation cycle varied from year to year.

Inclusion of legumes in rotations differed statistically by race and state. Whites were more likely to include legumes in their rotations in each state, but only 10 percent of black Alabama operators did so.

INTEGRATED PEST MANAGEMENT

Familiarity with integrated pest management (IPM) varied significantly by race and state, as shown in Table 9. About half of the sample was not familiar with IPM. Less than eight percent of the overall sample indicated that they were very familiar with IPM as a means for controlling weeds, insects, and other threats to crop yield. Black farmers were less familiar with IPM than white farmers. Black Alabama farmers were most unfamiliar with IPM compared to other categories of producers.

About a third of the farmers believed that IPM would be practical on their operation, but more whites in each state said that it was not very practical. About three-quarters of the black operators had no opinion.

Only a small number of respondents reported implementing any pesticide practices. Georgia white farmers reported using more pesticide management practices than any other category of producer.

TABLE 9. INTEGRATED PEST MANAGEMENT PERCEPTIONS BY RACE AND STATE,
SMALL AND LIMITED RESOURCE FARMERS, 2000

	—Alabama—			—Georgia—		—Mississippi—		—Chi-square—	
	All %	White %	Black %	White %	Black %	White %	Black %	State	Race
How familiar with integrated pest management (IPM) are you?									
Not at all familiar	49	46	64	33	51	40	53		
Somewhat familiar	45	45	33	54	44	54	42		
Very familiar	7	9	3	13	5	6	5	12.2*	23.0**
Is IPM practical on your farm?									
No opinion	31	62	75	48	70	55	74		
Not very practical	37	22	12	28	12	31	11		
It would be good	32	16	13	24	18	14	15	9.7*	1.1
What are the main reasons you would use IPM on your farming operation?									
Reduces use of pesticides	8	10	5	11	11	10	6		
Increases crop yields per acre	8	7	9	15	6	5	8		
Better control of insects and other pests	7	7	6	9	10	5	8		
Lowers production costs	3	2	2	6	3	4	3		
Improves water quality	2	1	3	2	3	2	1		
Maintains soil fertility	1	0	0	2	1	1	1	N/A	N/A
What pesticide practices have you implemented on your farm?									
Apply pesticides as needed	10	12	5	18	13	6	9		
Use lowest possible application rate	6	5	3	11	8	6	4		
Calibrate application equipment	5	6	1	14	5	4	3		
Use different pesticides to reduce pest resistance	5	3	4	10	5	5	2		
Use pesticides less harmful to beneficial insects	5	4	3	10	7	2	4		
Keep records on pesticides used, rates, and applications	4	7	1	9	5	3	3		
Train workers to properly handle and apply pesticides	2	4	1	3	3	0	1	N/A	N/A

continued

TABLE 9, CONTINUED. INTEGRATED PEST MANAGEMENT PERCEPTIONS
BY RACE AND STATE, SMALL AND LIMITED RESOURCE FARMERS, 2000

	—Alabama—			—Georgia—		—Mississippi—		—Chi-square—	
	All %	White %	Black %	White %	Black %	White %	Black %	State	Race
What are the main problems you might have with IPM on your operation?									
Chemicals are too expensive	6	4	5	5	8	5	7		
Crop scouting is too expensive	4	2	1	7	5	5	3		
Information on "how to do it" not available	2	2	1	3	1	4	2		
Equipment needed for IPM costs too much	2	3	1	1	4	0	3		
Reliable crop scouts not available	2	3	3	3	1	0	1		
IPM takes too much time	1	1	0	3	3	1	0		
Tried IPM and it didn't work for me	0	0	0	0	0	0	1		
								N/A	N/A
Number	830	137	154	118	116	129	176		

*p < .05 **p < .01

About eight percent of the sample said that the main reason for using IPM was that it reduced the use of pesticides, and a similar proportion thought it increased crop yields per acre. Seven percent felt that it provided better control of insects and other pests. The latter reason was particularly important for black farmers in Georgia.

The main problems associated with IPM pertained to the expense of the chemicals and the costs of crop scouting. Overall, less than six percent reported any single problem.

INTEGRATED PEST MANAGEMENT ADOPTION

Table 10 shows regression analysis of IPM adoption variables on selected farm and individual characteristics. The data suggest that farmers with more education were more familiar with IPM and had actually adopted more IPM measures than farmers with less education.

Age was not related to the IPM adoption variables. Farmers with more farm sales were more familiar with IPM and gave more reasons for using IPM. Farmers who worked more days off the farm adopted more IPM practices, but the number of days the spouse worked off the farm was negatively related to the number of IPM practices adopted. Those who raised row crops saw IPM as more practical, indicated more reasons for using IPM, and had actually implemented more IPM practices on their farms.

Farm sales as a percent of total income predicted the four IPM adoption variables. Farmers who were more dependent on farm income were more aware of IPM, gave more reasons for using it, and had actually implemented more IPM practices on their farms. The background and farm characteristics explained about 12 percent of the variation in the awareness and adoption variables, but less of the practicality and reasons variables.

CONSERVATION BUFFERS

Familiarity with conservation buffers (CB) varied markedly between black and white farmers, Table 11. Between 10 and 14 percent of the black farmers indicated that they were very familiar with the concept while between 17 and 31 percent of the white farmers indicated familiarity.

More whites than blacks reported using grass filter strips on their farms. Thirty percent of white Alabama farmers used grass filter strips compared to seven percent of black Georgia farmers, who used filter strips the least. More white farmers than black farmers used all the various kinds of conservation buffers.

The perceived practicality of CB varied significantly by race. Whites consistently viewed CB as more useful than black farmers. Alabama white farmers had the highest rating at 46 percent but only 25 percent of the black farmers in Georgia thought CB to be useful on their farm.

TABLE 10. REGRESSION ANALYSIS OF INTEGRATED PEST MANAGEMENT ADOPTION VARIABLES ON SELECTED FARM AND INDIVIDUAL CHARACTERISTICS, SMALL AND LIMITED RESOURCE FARMERS, 2000

	—————Integrated pest management—————			
	Familiarity	Practicality	Reasons	Practices
Formal education	0.108**	0.037	0.078	0.101*
Age	0.079	0.005	0.057	0.015
Total gross value of sales	0.113*	0.014	0.098*	0.082
Your outside work	0.066	0.072	0.091	0.137*
Spouse outside work	0.055	-0.062	-0.049	-0.099*
Land	0.098*	-0.012	0.001	0.066
Row crops farmed	0.085	0.207*	0.206*	0.196*
Livestock raised	-0.123*	-0.008	-0.073	-0.065
Poultry raised	0.008	-0.033	-0.048	0.002
Fruits and vegetables raised	0.028	-0.015	0.033	0.035
Government assistance payments received	-0.070	-0.004	-0.024	-0.055
Farm operator's gender	-0.040	0.069	0.049	0.029
Race	-0.097*	0.141**	0.039	0.010
Farming receipts as percent of total income	0.125**	0.095*	0.151**	0.190**
R ²	0.145	0.072	0.119	0.145
Adjusted R ²	0.124	0.049	0.098	0.125
F-value	7.003**	3.187**	5.583**	7.027**

*p<.05 ** p<.01

More than 41 percent of the Alabama white respondents identified reducing soil erosion as the main reason to use CB, but only 18 percent of the Georgia black farmers did so. Similar patterns of difference were found for protecting soil and water from runoff and the creation of habitat for birds and animals as reasons for using CB.

The main perceived problem with CB was that they take too much land out of production. There were no consistent differences by race, but white farmers were

TABLE 11. C ONSERVATION BUFFER PERCEPTIONS BY RACE AND STATE,
SMALL AND LIMITED RESOURCE FARMERS, 2000

	—Alabama—			—Georgia—		—Mississippi—		—Chi-square—	
	All %	White %	Black %	White %	Black %	White %	Black %	State	Race
How familiar with conservation buffers (CB) are you?									
Not at all familiar	32	22	40	27	35	22	41		
Somewhat familiar	51	47	46	51	55	61	47		
Very familiar	17	31	14	22	10	17	11	8.1	31.7**
Which CB are currently used on your operation?									
Grass filter strips	14	30	8	14	7	23	10		
Grass or shrubs planted on land that erodes	8	12	8	10	9	7	0		
Grass waterways	8	22	5	9	3	9	3		
Trees or shrubs planted for windbreaks	8	11	8	8	10	6	0		
Contour buffer strips	4	6	3	3	2	6	5		
Other	0	1	0	1	0	0	0		
None	4	4	4	9	3	2	2	N/A	N/A
Are CB practical on your farm?									
No opinion	44	32	56	31	51	37	55		
They would be useful	33	46	26	36	25	39	26		
Not very practical	23	22	18	34	24	24	19	4.5	22.1**
What are the main reasons you would use CB on your farm?									
Reduce soil erosion	26	41	19	25	18	34	21		
Protects soil and water from runoff	21	30	14	20	17	26	18		
Supports more birds, animals, etc.	8	12	5	14	7	10	6		
Reduces pollution	5	4	4	7	5	8	3		
Promotes more hunting and fishing	4	4	4	5	5	6	2		
Makes the area look nicer	3	4	4	3	5	4	2		
Other	0	0	0	1	0	0	0	N/A	N/A

continued

TABLE 11, CONTINUED. CONSERVATION BUFFER PERCEPTIONS BY RACE AND STATE,
SMALL AND LIMITED RESOURCE FARMERS, 2000

	—Alabama—			—Georgia—		—Mississippi—		—Chi-square—	
	All %	White %	Black %	White %	Black %	White %	Black %	State	Race
What are the main problems with CB on your farm?									
Takes too much land out of production	8	12	6	6	10	14	5		
Costly to build and maintain buffers	8	12	5	10	6	11	9		
Difficult to farm around buffers	7	10	3	11	6	11	6		
“How to” information not available	4	4	5	3	2	5	5		
Other	1	2	1	1	1	1	1		
Tried buffers and they didn't work	0	0	0	0	0	0	0		
								N/A	N/A
Number	830	137	154	118	116	129	176		

*p < .05 **p < .01

more likely to cite most of the problems. The option to indicate that they had tried buffers and they did not work was provided in the questionnaire, but was not selected by any respondent.

CONSERVATION BUFFER ADOPTION

Table 12 shows regression analysis of conservation buffer adoption variables on selected farm and individual characteristic. Education was a significant predictor of the operators' familiarity with conservation buffers, the number of reasons for using CB, and the number of practices that had been adopted. Older farmers were less convinced of the practicality of using CB.

Farmers with more days of outside work had higher scores on each of the CB adoption variables. Farmers with more acres of land gave more reasons for using CB.

Those who raised fruits and vegetables were more likely to be familiar with CB and to give more reasons for using CB. Similarly, those who received more government payments were more familiar with CB.

Black farmers consistently had lower scores on three of the adoption measures. Black operators were less familiar with CB, gave fewer reasons for using them, and had actually implemented fewer CB measures on their farms. Neither gender nor dependence on farm income was related to any of the CB adoption measures.

The four equations explained a significant proportion of the variation in each CB adoption variable. The adjusted R² value ranged between 7.3 for practicality to 11.8 for the number of reasons given for using CB.

CONSERVATION PROGRAM PARTICIPATION

Approximately 30 percent of the sample reported having conservation plans for their farms, Table 13. The differences by race and state were not statistically significant.

Of those with conservation plans, about 26 percent indicated that the plan was fully implemented, and another 27 percent indicated it was three-quarters completed. Differences by race were statistically significant. Whites consistently reported higher levels of conservation plan completion in each of the three states. A fourth of the black farmers said their plans were less than 25 percent completed.

The Conservation Reserve Program was the most often cited government program in which respondents participated. Ten percent of Alabama black farmers participated in the Forestry Incentive Program compared to five percent of the Alabama white farmers. The rates of participation in the different programs varied widely across states and race categories, but were most nearly equal in Georgia.

TABLE 12. REGRESSION ANALYSIS OF CONSERVATION BUFFER ADOPTION VARIABLES ON SELECTED FARM AND INDIVIDUAL CHARACTERISTICS, SMALL AND LIMITED RESOURCE FARMERS, 2000

	Conservation buffers			
	Familiarity	Practicality	Reasons	Practices
Formal education	0.109**	0.066	0.088*	0.140**
Age	-0.034	-0.113*	-0.065	-0.069
Total gross value of sales	0.09*	-0.034	-0.007	-0.005
Your outside work	0.075	0.146*	0.170**	0.131**
Spouse outside work	0.063	-0.029	0.026	0.038
Land	0.079	0.098	0.158**	0.081
Row crops farmed	0.147*	-0.093	0.102	0.000
Livestock raised	0.172*	-0.080	0.169*	0.036
Poultry raised	0.004	0.074	0.079	0.092*
Fruits and vegetables raised	0.226**	-0.068	0.168*	0.069
Government assistance payments received	0.133*	0.004	0.090	0.060
Farm operator's gender	0.035	-0.025	0.011	0.016
Race	-0.114*	-0.040	-0.100*	-0.158**
Farming receipts as percent of total income	0.043	-0.012	-0.045	-0.026
R ²	0.117	0.073	0.118	0.112
Adjusted R ²	0.096	0.041	0.096	0.091
F-value	5.495**	2.293**	5.506**	5.215**

*p<.05 ** p<.01

The participation rate in the Environmental Quality Incentive Program was highest among Alabama black farmers, at 11 percent. Georgia black farmers had the highest participation rate in the Farmland Protection Program at nine percent. Ten percent or less participated in the Wildlife Habitat Incentive Program, but six percent of Georgia black farmers were in the Wetland Reserve Program, a rate twice that for the other states. A tenth of the respondents indicated participation in the wildlife and wetland programs.

Less than a fifth of the respondents cited a lack of understanding of program requirements as a reason for not participating in the various conservation programs that were mentioned to them. Mississippi white farmers were least likely to indicate lack of understanding, at 11 percent, but 23 percent of the Mississippi black farmers cited a lack of understanding as a reason for not participating.

Half the sample had no contact with Natural Resources Conservation Service (NRCS) in the past year, but differences by race and state were not statistically significant. Mississippi farmers reported the most frequent contacts. Around 40 percent indicated contacts through visits to county offices, a fifth by letter. Georgia had the highest rates of no contact.

Forty percent of Mississippi white farmers had visited an NRCS office compared to 20 percent of Georgia black farmers who had done so. There were no other consistent patterns of difference by race or state. Mississippi black farmers were most likely to have received a letter from NRCS (23 percent). White farmers were more likely to report phone contacts in Alabama and Georgia (around 20 percent), but farmers were slightly more likely to report phone contact with NRCS in Mississippi.

Respondents were asked to indicate their satisfaction with the information or services received from NRCS. Overall, 80 percent were very or somewhat satisfied with this conservation agency. Whites were more satisfied than blacks in Alabama and Mississippi. Seventeen percent of Alabama black farmers were dissatisfied compared to seven percent or less in all the other state or race categories.

DETERMINANTS OF NRCS CONTACT

Table 14 regresses conservation plan and NRCS contact variables on small and limited resource farm characteristics. Those with more education, more land, and higher levels of government payments were more likely to have a conservation plan, to have a greater proportion of it implemented, to have more previous contacts with NRCS, and to express higher levels of satisfaction with the services they received from the agency.

Farmers with higher gross sales had implemented more of their conservation plans, had more contacts with NRCS, and were more satisfied with the agency. Men and those with income from row crops were more likely to have a conservation plan and to have more of it implemented.

Those more dependent on farming for income were more likely to have a conservation plan and to indicate that they had more of it implemented. They also had more contacts with NRCS, but were not more satisfied with the agency's services.

TABLE 13. CONSERVATION PROGRAM PARTICIPATION BY RACE AND STATE,
SMALL AND LIMITED RESOURCE FARMERS, 2000

	—Alabama—			—Georgia—		—Mississippi—		—Chi-square—	
	All %	White %	Black %	White %	Black %	White %	Black %	State	Race
Do you have a conservation plan for your farm?									
No	57	53	67	54	53	54	59		
Yes	30	34	24	29	33	33	28		
Don't Know	13	14	9	16	14	13	13	2.5	3.5
About how much of the conservation plan has been implemented?									
Less than 25%	16	4	30	6	29	7	20		
25%	10	9	16	9	8	12	8		
50%	21	17	11	24	32	17	27		
75%	27	30	27	35	18	29	24		
100%	26	39	16	26	13	36	20	5.9	25.0**
Are you currently participating in any conservation programs?									
Conservation Reserve Program (CRP)	23	22	13	29	32	19	20		
Forestry Incentive Program (FIP)	11	5	10	9	9	12	11		
Environmental Quality Incentive Program (EQIP)	8	5	11	4	7	5	0		
Farmland Protection Program (FPP)	6	3	6	5	9	5	6		
Wildlife Habitat Incentive Program (WHIP)	10	4	2	3	4	4	3		
Wetland Reserve Program (WRP)	3	1	3	3	6	2	3		
								N/A	N/A
Why are you not participating in EQIP?									
Don't understand program requirements	16	17	14	13	17	11	23		
Other reasons	7	7	6	8	10	8	8		
Cannot afford this particular program	7	6	5	8	5	6	10		
EQIP excludes poorer farmers	4	0	6	3	4	3	6		
Application takes too much time and paperwork	3	1	3	2	2	6	3		
I don't like this particular program	2	2	1	2	3	2	1		
EQIP is not flexible	2	1	1	3	3	1	1		
My county is not eligible	0	1	0	0	1	0	1		
								N/A	N/A

continued

TABLE 13, CONTINUED. CONSERVATION PROGRAM PARTICIPATION BY RACE AND STATE,
SMALL AND LIMITED RESOURCE FARMERS, 2000

	—Alabama—			—Georgia—		—Mississippi—		—Chi-square—	
	All %	White %	Black %	White %	Black %	White %	Black %	State	Race
How often did you have contact with the NRCS during the past twelve months?									
No contact	49	48	51	51	58	43	45		
1-2 times	24	28	22	25	21	25	23		
3-4 times	15	13	15	14	12	17	14		
5+ times	11	8	10	8	9	15	15	10.5	2.2
How was contact made with NRCS?									
No contact reported	49	48	51	51	58	43	45		
Visit to an NRCS office	28	28	24	29	20	40	30		
By letter	16	14	12	9	17	20	23		
Received the NRCS Newsletter	16	20	19	12	7	21	16		
Telephone	16	19	14	20	12	15	15		
Someone from NRCS visited my farm	7	7	9	8	6	5	9		
Heard an NRCS employee speak at a meeting	4	3	5	2	5	2	8	N/A	N/A
How satisfied were you with the information or services received from NRCS?									
Very satisfied	39	49	33	32	48	38	37		
Somewhat satisfied	40	40	36	45	29	41	45		
Neither satisfied or dissatisfied	14	9	15	16	19	15	12		
Somewhat dissatisfied	4	3	10	5	2	1	4		
Very dissatisfied	3	0	7	2	2	4	1	4.9	2.7
Number	830	137	154	118	116	129	176		

*p < .05 **p < .01

The farm and individual characteristics explained around 12 percent of the conservation plan variables but less than nine percent of the NRCS contact and satisfaction variables. Having a conservation plan is a linked qualification for many farm programs associated with crop production. Thus, those more dependent on crops and income from farming were more attentive to having a conservation plan.

INFORMATION SOURCES

Respondents were asked to rate a series of information sources on a five-point scale as to the importance of each source for making conservation decisions. Table 15 ranks the sources in terms of the mean importance of each item where a high score means more important. F-tests of analysis of variance indicate whether means differ significantly by race or by state.

TABLE 14. REGRESSION ANALYSIS OF CONSERVATION PLAN AND NRCS CONTACT VARIABLES ON SMALL AND LIMITED RESOURCE FARMERS, 2000

	————Conservation plan and NRCS contact————			
	Conservation plan	Percent implemented	NRCS contact	NRCS satisfaction
Formal education	0.210*	0.179*	0.158**	0.172*
Age	-0.019	-0.020	-0.005	0.017
Total gross value of sales	0.029	0.098*	0.105*	0.156*
Your days of outside work	0.041	-0.009	0.073	0.055
Spouse days of outside work	0.045	0.062	0.033	0.002
Land operated	0.102*	0.103*	0.077*	0.088*
Row crops farmed	0.149*	0.186*	-0.033	0.080
Livestock raised	0.153*	0.146*	0.042	0.085
Poultry raised	0.009	-0.005	-0.007	-0.022
Fruits and vegetables raised	0.151*	0.099	0.086	0.107
Government payments received	0.234**	0.233*	0.164*	0.159*
Male	0.071*	0.085*	0.041	0.025
Black	0.038	-0.023	0.026	0.003
Farm sales as percent of total income	0.169*	0.135*	0.101*	0.062
R ²	0.140	0.151	0.109	0.112
Adjusted R ²	0.117	0.129	0.086	0.088
F-value	6.106*	6.719**	4.636**	4.757**

*p<.05 ** p<.01

The mean importance of the cooperative Extension agent as an information source varied significantly by race but not by state. Limited resource farmers consistently ranked the cooperative extension agent as the most important information source across states and race categories, except white Alabama farmers. This segment ranked extension as the second most important source. In each state, black farmers gave higher importance ratings to extension than white farmers.

Farm magazines or newsletters were the next most important source. Again black farmers tend to give higher ratings to this source than white farmers, but the differences were not significant.

The third most important information source was “another farmer or family member.” This source was particularly important for white farmers in Alabama—rating even higher than extension for that group, but there were no significant differences by state or race.

NRCS was fourth ranked as an information source in the overall sample. Black farmers, particularly in Alabama and Mississippi, tended to give higher ratings to NRCS as a conservation information source but these differences were not statistically significant.

Farm demonstrations and field days were ranked next. Media information was particularly important for black farmers in Mississippi and Alabama. The rated importance of these two information sources differed significantly across race categories.

TABLE 15. MEAN IMPORTANCE OF INFORMATION SOURCES BY RACE AND STATE,
SMALL AND LIMITED RESOURCE FARMERS, 2000

	—Alabama—			—Georgia—		—Mississippi—		--F-ratio--	
	All mean	White mean	Black mean	White mean	Black mean	White mean	Black mean	State	Race
How important is each source of information for making decisions about conservation practices?									
Cooperative extension agent	3.6	3.5	3.7	3.5	3.6	3.4	3.6	1.0	3.1*
Farm magazine or newsletter	3.4	3.5	3.7	3.1	3.3	3.2	3.6	1.3	2.6
Another farmer or family member	3.3	3.6	3.3	3.1	3.1	3.3	3.3	0.5	0.5
Natural Resources Conservation Service (NRCS)	3.3	3.3	3.4	3.0	3.1	3.2	3.4	0.5	1.5
Farm demonstrations and field days	2.8	2.8	3.1	2.6	2.8	2.4	3.0	2.1	3.5*
Newspaper, radio, or television	2.7	2.3	3.0	2.2	3.1	2.4	3.1	1.6	11.7**
Pesticide company reps or dealer	2.4	2.3	2.4	2.2	2.4	2.4	2.5	0.6	0.9
A banker, community leader or farm leader	2.3	2.3	2.5	2.0	2.2	2.0	2.7	0.7	3.8*
Private consultant	2.3	2.2	2.3	1.9	2.2	2.2	2.6	1.0	1.6
Internet (World Wide Web)	2.0	1.9	2.1	1.5	2.2	1.8	2.2	0.8	2.9**
Number	830	137	154	118	116	129	176		

*p < .05 **p < .01

Newspapers, radio, and television were significantly more important as information sources for black farmers, but particularly so in Georgia and Mississippi. Differences between black and white farmers were wider on this item than on any other. Black farmers relied more heavily on the media for their conservation information.

Pesticide company representatives, local leaders, and private consultants were respectively the next most important information sources as rated by the farmers. Black farmers consistently rated leaders as more important information sources than did white farmers, a pattern of differences that was statistically significant.

Low importance was given to the Internet as a source of information, though blacks consistently rated it as more important than whites, a statistically signifi-

cant difference. Other research shows that less than 10 percent of farmers have home access to the Internet, but the rate is much higher among farms with \$500,000 or more in annual sales.

INFORMATION MODE

Table 16 profiles preferences for receiving government information about conservation. The farmers were presented a list of possible information sources and asked to mark the ones they preferred. Respondents could check multiple items. The table rank orders the items in terms of overall percentage of those who selected it.

About 64 percent of the sample indicated that printed materials such as bulletins, newsletters, and other publications was their preferred means of receiving information. There were no statistically significant differences by race or state.

TABLE 16. CONSERVATION INFORMATION PREFERENCES BY RACE AND STATE, SMALL AND LIMITED RESOURCE FARMERS, 2000

	—Alabama—			—Georgia—		—Mississippi—		—Chi-square—	
	All %	White %	Black %	White %	Black %	White %	Black %	State	Race
How would you like to receive government information?									
Printed materials such as bulletins, newsletters, etc.	64	62	68	61	60	74	63	3.1	0.4
Direct contact with Farm Service Agency (FSA) offices	41	36	41	41	38	43	44	1.8	0.3
Group meetings or seminars	18	9	24	14	18	12	27	2.4	19.5**
At workshops where I receive "hands on" training	16	12	19	10	19	12	24	2.6	14.4**
The news media (radio, TV, newspaper)	14	7	16	13	26	12	15	11.2*	6.5
By free telephone hotline (1-800 number)	13	12	14	8	18	11	14	0.0	3.9
Websites on the Internet	10	10	9	7	11	13	9	0.4	0.1
University specialists	7	4	9	6	11	2	7	2.3	7.6*
Electronic media (videotapes, CD-ROMs)	7	6	11	3	8	5	7	2.5	6.1*
Teleconference or satellite broadcast at a central location	2	3	2	0	3	2	1	0.5	0.6
Number	830	137	154	118	116	129	176		

*p < .05 **p < .01

Farm Service Agency offices were the next most frequently cited, by 41 percent of the sample. There were no significant differences by race or state.

Black farmers preferred group meetings or seminars more than whites, a statistically significant difference. Similarly, blacks preferred workshops more than whites did.

The news media was preferred as an information source by black Georgia farmers. News media preference differed significantly by state. There were no differences in preference for toll-free hotlines or websites.

Black farmers did prefer university specialists as information sources more than white farmers. They also preferred electronic media for home use such as videotapes more than white farmers. Both differences were statistically significant. Whites preferred news media more than blacks, a statistically significant difference.

LAND AND WATER RESOURCES

Getting conservation on the ground is a difficult task for public agencies serving a diverse population of resource owners with many different orientations and capabilities of following recommended land treatment strategies. Table 17 suggests that the many small farm operators in the region control a substantial amount of land resources. Acres own differed statistically by race and state, but particularly by race.

More white farmers reported owning larger acreages in each state. Most of the respondents in our sample had between 50 and 179 acres, although 41 percent of Alabama black-owned farms were between 10 and 49 acres in size. More Georgia white farmers had larger holdings and more Mississippi black farmers owned farms less than 50 acres in size. Nine percent owned no land. Slightly more blacks than whites in each state owned no land.

A third of the sample rented land from other farmers, but the pattern of differences was not statistically significant. More Mississippi and Alabama black farmers rented land from others, but more Alabama farmers of both races rented land from others than did farmers in other states.

Roughly 10 percent of the small and limited resource farmers rented land to others, although Georgia farmers of both races were slightly more likely to rent out land. This pattern was statistically significant by race.

The net acres operated were computed by summing the acres owned plus the acres rented from others, minus the acres rented to others. The modal category for land operated was 50 to 179 acres except for Georgia black operators who most frequently cited 10 to 49 acres as the category of net acres operated. Differences by race and state were each significant, but the largest contrasts were between races.

The last item in the table shows the water bodies found on the respondents' farm, rank ordered in the frequency that the item was selected in the overall sample. Creeks or streams were the most frequently reported on-farm water resource. Nearly half the farmers had a creek or stream on their property, but about 30 percent had no water body or watercourse on their land at all. Forty-one percent of the Georgia black farmers said they had no water bodies on their land, but only 17 percent Mississippi white

TABLE 17. LAND AND WATER RESOURCES BY RACE AND STATE,
SMALL AND LIMITED RESOURCE FARMERS, 2000

	—Alabama—			—Georgia—		—Mississippi—		—Chi-square—	
	All %	White %	Black %	White %	Black %	White %	Black %	State	Race
How many acres do you own?									
None	9	6	11	6	8	9	12		
1-9 acres	7	7	8	4	6	2	12		
10-49 acres	27	26	41	13	33	16	28		
50-179 acres	40	39	34	46	39	48	38		
180-499 acres	15	17	5	26	11	23	9		
500 acres or more	3	5	1	5	3	2	1	26.6*	61.1**
How many acres do you rent from others, included land used rent free?									
None	60	57	56	68	67	62	56		
1-9 acres	4	4	3	5	3	3	3		
10-49 acres	17	17	23	10	20	16	15		
50-179 acres	16	19	14	11	8	15	23		
180-499 acres	3	2	4	5	2	3	3		
500 acres or more	1	1	0	1	1	2	0	15.3	6.1
How many acres do you rent to others?									
None	90	91	97	83	89	91	95		
1-9 acres	1	2	0	1	2	0	1		
10-49 acres	3	2	1	4	3	2	4		
50-179 acres	6	5	1	12	5	8	1		
180-499 acres	0	0	0	0	1	0	0	17.2	17.7*
What are the net acres you operate?									
1-9 acres	4	1	4	3	2	2	7		
10-49 acres	26	22	39	13	42	16	23		
50-179 acres	48	50	47	51	38	47	55		
180-499 acres	19	20	9	27	15	32	14		
500 acres or more	3	6	1	6	3	3	1	19.6*	57.2**
Waterbodies on farm									
None	31	30	30	29	41	17	30		
Creek/stream	44	45	47	42	35	61	35		
Drainage ditch	23	21	24	13	12	28	35		
Wetlands	10	7	14	19	9	10	6		
Swamp	9	7	9	12	10	10	5		
Lake	8	9	7	17	6	9	5		
Waterway	3	2	4	8	1	1	3		
River	3	6	1	3	1	3	2	N/A	N/A
Number	830	137	154	118	116	129	176		

*p < .05 **p < .01

farmers said they had none. More than a third of the Mississippi black farmers reported drainage ditches on their farms, the highest proportion across the states.

CONCLUSIONS

The first objective of this study was to profile the core conservation practices utilized by small and limited resource farmers in Alabama, Mississippi, and Georgia. Research shows that conservation tillage is familiar to three-fourths of the farmers in each state, although not at all familiar to a large proportion of black farmers. A fifth of all the farmers viewed conservation tillage as not practical on their farms. A fifth cited weeds and herbicide costs as main CT problems. These data suggest that many farmers have been reached by the efforts of NRCS, extension, and other public agencies, but they also suggest that many have not been supplied with the CT solutions that fit their farm situations. A lack of how-to information was more often cited by black farmers as a barrier to performing conservation techniques on their operations.

Nutrient management awareness and implementation is probably best indicated by the regular practice of soil testing on a farm. Soil testing is a fundamental step in economically sound and environmentally responsible farming. A third of the sample never engaged in soil testing. Given that seven of eight small and limited resource farmers used commercial fertilizer, and that about one in five used broiler litter on the land, the information from a soil test is a basic part of making nutrient management decisions. Reaching the unaware and the uncommitted with the basic precepts of land management will require an extended effort of outreach and technical support.

Integrated pest management is not a widely understood concept among small and limited resource farmers in Alabama, Georgia, and Mississippi. About half the sample was not familiar with the term and only a third thought it would be good for their farm operation. Alabama black farmers were most unfamiliar with this technique. Conservation buffers represented the most traditional and well-known category of soil and water protection interventions. Nonetheless, a third of the farmers were not familiar with the term and only a third thought these measures would be useful on their farm. Alabama producers were most familiar with this class of interventions and most convinced of their usefulness.

Another objective of the study was to compare the conservation practices and perceptions of black and white small and limited resource farmers in Alabama, Georgia, and Mississippi. Black and white limited resource farmers who participated in the study differed in a number of basic ways. More black farmers had less than a high school education and more white farmers tended to grow row crops and engage in other more intensive farm enterprises. Many of our survey respondents of both races had college educations and advanced degrees, pointing to the rapidly growing segment of part-time, hobby, and lifestyle farm residents that may have felt and unmet needs for guidance on land treatment strategies. The challenge to public agencies is to provide timely and appropriate responses to the felt needs

for technical assistance. In addition, the agencies must find a way to stimulate a demand for conservation assistance by increasing awareness of the practical tools that are available for protecting soil resources and water quality.

The data also pointed to the diversity within the small and limited resource farm segment of the farm population. Some small and limited resource farmers were poor; some were pensioned; some were prosperous by other means. Any initiatives to expand adherence to core conservation principles and increase participation in conservation programs must begin by recognizing this diversity.

A third objective was to identify perceived barriers and disadvantages to the implementation of core conservation practices. Each set of core conservation practices has obstacles to implementation by the full gamut of small and limited resource farms. Some obstacles reflect defects and limits in the outreach mechanisms of the public agencies. Some reflect limits in the applicability and fit of the recommended practices on each individual small and limited resource farm. Other obstacles to implementation bear on the interests and capabilities of the individual farm operator. Lifecycle stage, personality, financial capability, and technical capacity all shape an individual farm operator's ability to consider and use the interventions recommended by NRCS and other public agencies.

Nonetheless, the data revealed a large segment of operators who had no contact with NRCS or other public agencies. It was not that core conservation practices have been tried and found wanting on these farms; rather, they have been found wanting to be tried. It was a statistical reality that the overall number of farms tended to decline in the past decades, but now the number of small and limited resource farms are increasing due to better counting methods and the growing number of part-time, lifestyle, and hobby farms.

Marketing core conservation to small and limited resource farmers will require mass mailings and other methods to reach farmers not regularly participating in NRCS and other public agency land and water programs (Lovejoy, 1999). There are myriad of reasons why individual producers have not participated in programs. Mass approaches may lead some to seek NRCS technical assistance, but others will require one-on-one personal interaction to realize the possibilities of core conservation principles on their land.

The fourth objective of the study was to describe patterns of information source utilization and preferences among small and limited resource farmers. The data suggested that farmers remain wedded to printed materials as a fundamental source of reference information for their conservation decisions. Although information technology is rapidly changing, most small and limited resource farmers will require simple and direct technical materials to implement core conservation measures. The demand for the materials is clearly present, but farmers may not be aware of the actual supply of information that is available or how to access it. Targeted mailings to small and limited resource producers might provide publication lists highlighting the information that is available upon request (Napier et al., 2000).

It is also clear that NRCS must rely on the goodwill and respect that farmers have for other farm agencies, particularly the Cooperative Extension Service, that are already well-regarded and familiar to farmers. Although no public agency is without its limits, NRCS' conservation partners often have access to and relationships with small and limited resource farmers that would be difficult or inefficient to duplicate.

NRCS has ongoing efforts to develop working relationships with community-based organizations and educational institutions that could help communicate programs to small and limited resource farmers. Other public agencies and non-governmental organizations might help overcome cultural and language differences that sometimes interfere with minority participation in farm programs. These partners can help address the special needs of small-scale and limited-resource enterprises in implementing the technological improvements, alternative enterprises, and conservation measures that protect the land and enhance water quality. When NRCS is perceived as addressing the primary needs of small and limited resource farm communities, producer interest in conservation measures is likely to increase.

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