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# A Social Exchange Explanation of Participation in the U.S. Farm Program

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# A SOCIAL EXCHANGE EXPLANATION OF PARTICIPATION IN THE U.S. FARM PROGRAM[1]

**By John K. Thomas and Jack Thigpen**

## ABSTRACT

Passage of the 1990 Food, Agriculture, Conservation, and Trade Act resulted from the political influence of many environmental interest groups and, consequently, included many conservation provisions. As agricultural policy has increasingly reflected the environmental concerns of the public, farmers who participate in the Farm Program have adjusted their production practices to conserve land and water resources, minimize use of agrichemicals, and control animal wastes. Social exchange theory was used to examine personal and farm characteristics that could affect agroenvironmental attitudes, Farm Program participation, and conservation practices of Texas farmers (n = 1,063 farmers) in 1991. One in four farmers did not participate in a federal commodity/conservation program. Less than 8 percent of the variation in regulatory and environmental attitudes was explained by personal and farm characteristics, compared to 30 percent of the variation in Farm Program participation and 14 percent in use of conservation practices. Agroenvironmental attitudes and most background characteristics were poor predictors of farm-related behaviors. Level of gross farm income was the best predictor of farmers' attitudes and behaviors. Implications of these findings are discussed.

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## INTRODUCTION

Recent U.S. farm legislation signaled a major shift from past policies designed to protect and stabilize domestic commodity prices towards an agroenvironmental policy which integrates commodity price supports with conservation efforts (Fedkiw, 1989). Passage of the Food Security Act in 1985 and the Food, Agriculture, Conservation, and Trade Act in 1990 coupled eligibility for Farm Program participation and benefits with conservation compliance (Reichelderfer, 1990). The 1985 Farm Act made receipt of most federal Farm Program benefits, such as commodity price supports, agricultural credit, and crop insurance, contingent upon farmers' applications of appropriate production and conservation management practices (Soil and Water Conservation Society, 1990). The 1990 Farm Act extended many of the provisions of the 1985 Act, added new conservation programs, and strengthened procedures for ensuring farmers' compliance with program guidelines. The shift represented by these two policies occurred in a sociopolitical climate of economic crisis in the farm sector (Berlan, 1991) and intensified concern among special interest groups regarding the impacts of agricultural practices on the environment and human safety (Brown, 1988). This sociopolitical climate and its causes challenged farmers' beliefs about government's involvement in agriculture (Lobao & Thomas, 1992; Molnar & Wu, 1989) and prompted farmers who participate in the Farm Program to alter production practices, develop conservation plans, and mitigate production impacts on the environment (Ayer & Abdalla, 1990; Segerson, 1990).

This study assessed how personal and farm characteristics affect farmers' attitudes towards agroenvironmental policies, their Farm Program participation, and their conservation-related production practices. Because use of conservation practices has become intricately connected with the receipt of Farm Program benefits, farmers might have adapted to policy-imposed conditions without necessarily believing in environmental stewardship, the need to be regulated, or the Farm Program's cross-compliance requirements. Therefore, the extent to which Farm Program participation and the use of conservation practices were affected by beliefs about the environment and current agricultural policies was also examined.

## Federal Farm Program Payments

U.S. commodity program payments greatly changed during the 1980s. Cotton, feed grain, rice, wheat, and wool programs continued to account for most of the payments to farmers. Program payments for these and other commodities totaled $3.5 billion in 1982. Payments more than doubled by mid-decade and they doubled again to $16.7 billion in 1987 (Economic Research Service, 1991; Thomas, 1992). By 1990, however, the total outlay had declined to $9.3 billion, still a three-fold increase over payments during the early 1980s (Economic Research Service, 1993).

Conservation program payments also increased during the past decade. In 1982, the United States Department of Agriculture paid nearly $180 million to participants in programs such as the Agricultural Conservation Program, the Emergency Conservation Program, the Great Plains Program, and the Appalachian Land Stabilization and Conservation Program (Economic Research Service, 1991). Since passage of the 1985 Farm Act, however, conservation program payments have increased to almost $2 billion. The proportion of these funds to total Farm Program payments also substantially increased during the 1980s. In 1990, conservation program payments were 20.4 percent of total Farm Program payments, compared to 5.1 percent of the 1982 program payments (Economic Research Service, 1993).

The importance of program payments to particular segments of the farm sector and regions of the nation varies (Nowak et al., 1990; Osborn, 1993; Pfeffer & Gilbert, 1989). Evidence indicates that two of every three farms did not receive federal Farm Program support in the late 1980s (Reinsel, 1991). Many of these farms produced nonprogram crops such as fruits, nuts, and berries (92 percent) and vegetables (67 percent). Other farmers did not want the government involved in their farm operations and chose not to participate in the Farm Program. Most of these farmers had gross farm sales of less than $25,000 (80 percent of this income group were nonparticipants) or sales of more than $1 million (56 percent of this income group were nonparticipants). In contrast, 40 percent of the farmers with sales between $25,000 and $500,000 were nonparticipants in the Farm Program (Reinsel, 1991).

Texas farmers have significantly benefitted from the Farm Program. In 1982, they were paid $643.6 million, or 18.4 percent of the total national outlay for Farm Programs. Their program payments increased

to $975 million in 1990, or 10 percent of the national outlay that year (Economic Research Service, 1991). The Texas share of conservation-related payments was $19.6 million, or 11 percent of all U.S. conservation payments in 1982, and $180 million, or 9.5 percent of all conservation payments in 1990 (Economic Research Service, 1993).

Although the national proportions of commodity and conservation payments to Texas farmers declined during the 1980s, the ratios of total Farm Program and conservation program payments to total crop income have increased in the state. In 1982, the total Farm Program payment ($643.6 million) to farmers was 15.2 percent of their total crop income ($4.2 billion), and conservation-related payments ($19.6 million) were .5 percent. By 1990, total Farm Program payments and conservation program payments increased to 24 percent and 4.4 percent of total crop income ($4 billion), indicating greater dependence on Farm Program income by participating farmers.

## Theory

In its simplest form, social exchange theory proposes that social actors possess different levels of information, power, and motivation that influence their decision making and interaction (Emerson, 1972). A situation of dependency arises when one actor values the exchange outcome more than the other actor. Farmers and the federal government (vis-a-vis the Farm Program) are social actors engaged in goal attainment behavior (Napier & Napier, 1991). Farmers strive to reduce costs and maximize profits by appraising their economic situations, assessing farm production practices, markets and policies, and making rational production decisions (Cook 1986; Napier & Napier, 1991). The federal government attempts on behalf of the public to regulate commodity production, quality, and prices and to mitigate agricultural impacts on the soil, water, wildlife, and human safety with minimal cost to society (Napier & Napier, 1991). By building cross-compliance provisions into the past two Farm Programs, the federal government created a situation in which it and farmers could mutually benefit.

While other studies have addressed the governmental side of U.S. agricultural policy in the social exchange process (Paarlberg, 1984; Wimberley, 1993), this study was focused on the farmer side, on how farmers' attitudes and willingness to participate in the Farm Program

depend on several motivating factors. Compliance with the provisions of the Farm Program ensures that eligible farmers will receive benefits such as commodity price supports, crop insurance, and farm credit. Access to such benefits was important to surviving the farm financial crisis during the 1980s and continues to be a stabilizing factor for farm incomes (Pfeffer & Gilbert, 1989). Farmers who depend on receiving Farm Program benefits to support their operations are likely to have positive agroenvironmental attitudes that support Farm Program participation and use of conservation practices (Elster, 1979).

Farmers who form negative attitudes toward farm policies and conservation are unlikely to participate in the Farm Program and practice conservation. These farmers could be uninformed about Farm Program benefits or might perceive a loss of decision-making control because of federal government involvement in farming (Lobao & Thomas, 1992). Some farmers might believe that compliance with farm policies could increase production costs, particularly on highly erodible lands, or reduce farm income by removing wetlands and protecting habitats of endangered/threatened species from production (Hoag & Holloway, 1991). Others might oppose the policies because they do not believe they are polluting the environment. In short, farmers who believe they have little to gain from Farm Program participation and/or conservation practices are not likely to do either activity.

## Hypotheses

The following hypotheses were formulated to determine the extent to which farmers' personal and farm characteristics influenced the formation of agroenvironmental attitudes and affected in turn their need and willingness to participate in the Farm Program and to adopt conservation practices.

***Hypotheses 1 and 2:*** *Farming experience negatively affects and level of education positively affects farmers' (a) agroenvironmental attitudes, (b) participation in Farm Programs, and (c) use of conservation practices.* Decision making in social exchanges is influenced by an actor's past experiences (Lobao & Thomas, 1992), values (Emerson, 1986), and level of knowledge (Coleman, 1986). Years of farming experience was used to indicate the scope of past experiences, while level of education indicated farmers' values and knowledge. Farmers who have

attained more years of farming experience and less education than other farmers are not likely to develop long-term farming plans, perceive environmental problems where they farm (Gould et al., 1989), and conserve resources for the future (Featherstone & Goodwin, 1993; Napier & Camboni, 1988). Therefore, these farmers are likely to foster negative attitudes toward agroenvironmental regulations and to consider the regulations to be a burden and threat to their autonomy. Perceiving minimal benefits, they would not participate in the Farm Program or adopt conservation practices. However, younger, more educated farmers are more likely to be knowledgeable about the cross-compliance regulations, to perceive positively the benefits of agroenvironmental regulations and conservation practices for protecting the environment, and to depend on Farm Program benefits as they develop their farming enterprises (Clearfield, 1983; Hoag & Holloway, 1991; Nowak et al., 1990). These farmers would participate in the Farm Program and adopt conservation practices.

***Hypothesis 3:*** *The number of highly erodible acres positively affects farmers' (a) agroenvironmental attitudes, (b) Farm Program participation, and (c) conservation practices.* Farmers who own a large amount of highly erodible land have a vested interest in controlling the impacts of farming practices on their land. Soil erosion reduces the quality of their land, increases the need for fertilizers, and pollutes nearby water resources. Although owners of a large amount of highly erodible land would oppose agroenvironmental regulations that would increase their production costs (Napier & Napier, 1991), they could obtain cost-sharing benefits by Farm Program participation (i.e., the Conservation Reserve Program) and raise profits by using conservation practices such as dryland farming (Gould et al., 1989; Hoag & Holloway, 1991; Nowak, et al., 1990). Farmers who must contend with land erosion are more motivated than other farmers to support agroenvironmental regulations, participate in the Farm Program, and adopt conservation practices.

***Hypothesis 4:*** *Farm location positively affects farmers' (a) agroenvironmental attitudes, (b) Farm Program participation, and (c) use of conservation practices.* Environmental conditions can constrain an actor's choices and decision making in a social exchange (Elster, 1979; Friemand, 1986). Rice production is highly concentrated along the Texas Gulf Coast (Agricultural Stabilization and Conservation Service,

1991). Compared to farmers elsewhere in Texas, Gulf Coast farmers depend heavily on irrigation and pesticides. Both practices can potentially affect numerous wetland areas in the Gulf Coast region (Segerson, 1990). Rice farmers would have negative attitudes toward agroenvironmental regulations designed to protect wetlands and to limit pesticide use. Their attitudes would be based on perceived regulatory threats to their control of decision making and ability to produce higher farm yields and incomes (Featherstone & Goodwin, 1993). Despite their attitudes, most rice farmers economically depend on participation in the rice commodity program to stabilize farm incomes and, consequently, use conservation practices.

***Hypothesis 5:*** *Gross farm income positively affects farmers' (a) agroenvironmental attitudes, (b) participation in the Farm Program, and (c) use of conservation practices.* Social exchanges are also affected by the amount of resources possessed by each social actor. Actors with more resources are able to take more and greater risks and have more ability to affect the course of an exchange (Thibaut & Kelly, 1986). Farm income has been used to represent the scale of an operation and resource availability (Nowak, 1987). Large-income farmers have more decision-making flexibility, greater access to alternative sources of capital, more ability to deal with adoption-related risks, and more tax incentives for investing in conservation compliance practices than other farmers (Gould et al., 1989). Consequently, affluent farmers are better able to afford conservation practices mandated in cross-compliance provisions of the Farm Program. Unlike less affluent farmers, large-income farmers should have positve agroenvironmental attitudes resulting in participation in Farm Programs and use of conservation practices.

***Hypothesis 6:*** *The percentage of gross farm income provided by government farm payments positively affects farmers' (a) agroenvironmental attitudes, (b) participation in the Farm Program, and (c) use of conservation practices.* The percentage of gross farm income provided by government payments indicates a farmer's level of economic dependence on the Farm Program (Coleman, 1986). Farmers who more heavily depend on receiving Farm Program benefits have more vested interests in the exchange relationship with government. Consequently, these farmers would have more positive agroenvironmental attitudes, greater participation in the Farm Program, and greater use of conservation

practices than farmers who receive no and small percentages of their farm income from the federal government.

***Hypothesis 7:*** *Agroenvironmental attitudes positively affect (a) Farm Program participation and (b) use of conservation practices.* Identifying an individual's attitudes and underlying beliefs should enable a reasonable prediction of that individual's action in a social exchange (Friedman, 1987; see also Ajzen & Fishbein, 1980). Farmers who believe that the environment should be protected and/or that regulations are needed to ensure this protection would be motivated to participate in the Farm Program and to adopt conservation practices. Farmers who oppose government intervention in agriculture and/or disbelieve production agriculture seriously affects the environment would not participate in the Farm Program and would not practice conservation.

## METHODOLOGY

### Sample Selection

A disproportionate stratified random sample[2] of 2,037 Texas farmers was selected by type of crop grown (i.e., cotton, rice, and wheat) and level of gross farm income in 1991 (i.e., less than $40,000, $40,000 to $250,000, and more than $250,000). The sample was disproportionately chosen because farms with gross incomes of more than $250,000 are few but account for the majority of production (Albrecht & Ladewig, 1982). Farmers selected for one crop sample were excluded from the selection of other farmer samples in the study. This nonreplacement procedure eliminated the possibility of a farmer's participating more than once in the study.

The sample was stratified by cotton and wheat production because these crops are two of the most important crops grown in Texas. These crops accounted for the most farms (16,557 and 19,386, respectively) and the most harvested acres (4.3 million and 3.6 million acres, respectively) in Texas (U.S. Bureau of the Census, 1989). Texas ranks first nationally in cotton acres harvested and fifth in wheat acres harvested. Rice was

[2]In the disproportionate stratified sampling design, equal numbers of farmers were randomly selected according to two stratification criteria, the type of crop they grew and the level of farm income attained in 1991.

included because almost all rice farmers are geographically located in counties along the Gulf Coast and because of the high level of irrigation necessary for rice production. In 1987, 1,212 farms grew rice on 299,388 acres, ranking Texas fourth nationally in number of harvested rice acres (U.S. Bureau of the Census, 1989).

A letter explaining the purpose of the study was mailed to each sample member during early 1992. The telephone survey was conducted two weeks later with the assistance of the Texas Agricultural Statistical Service. Overall, 1,149 farmers (56 percent) participated in the survey, 246 (12 percent) refused to participate, and 642 (32 percent) no longer farmed and/or could not be contacted. Respondents were almost equally distributed across the crop groups: cotton (35 percent), wheat (30 percent), and rice (35 percent).[3] The findings reported here were based on 1,063 respondents; 86 respondents were excluded because they farmed in other regions of the state. The data were weighted to restore proportional representation of commodity-income groups of farmers that were over/under-represented because of the disproportionate sampling and to permit study findings to be generalized to all crop producers in the study regions.

## Weighted Variable Measurement

Personal farmer characteristics were indicated by two variables. Level of education was determined by the question, "How much formal education do you have?" Fifty-three percent of the farmers had attained a high school/trade school or lower education, compared to 26 percent

[3]After determining that sampling errors varied from $\pm$ .048 to $\pm$ .087 with 95 percent confidence for each crop and gross farm income group statewide, we compared respondents in the unweighted sample with nonrespondents (farmers who refused to participate in the survey or who could not be contacted) using type of crop grown, while controlling for level of gross farm income. A chi-square test determined the statistical significance of each comparison. For farmers with gross farm incomes of less than $40,000, the crop distribution of respondents and nonrespondents did not statistically differ (chi-square value = 1.093, df = 2, alpha = .05). Crop differences between the two groups were significantly different for farmers with gross farm incomes ranging from $40,000 to $250,000 (chi-square value = 25.591, df = 2, alpha = .05) and with incomes of more than $250,000 (chi-square value = 13.418, df = 2, alpha = .05). Differences resulted from a higher proportion of rice than other farmers responding to the survey. Chi-square tests were also conducted to determine income differences between respondents and nonrespondents, while controlling for type of crop produced. None of the differences in levels of gross farm income between respondents and nonrespondents in the crop groups were statistically significant.

who had attained some college education and 21 percent who had attained a college degree or more education. Years of farming experience was measured by the question, "How many years have you operated a farm or ranch?" Farmers had an average of 31 years of experience, with a standard deviation of 15 years of experience.

The number of highly erodible acres of land was determined by the question, "How many acres in your operation are classified by the Soil Conservation Service as highly erodible land?" The mean number of acres was 125. Sixty-one percent reported having no highly erodible land, compared to 14 percent who had fewer than 75 acres, 11 percent who had between 75 and 249 acres, and 14 percent who had more than 250 acres.

Farm location was indicated by a dummy variable, which referred to farms operated in the Gulf Coast region (1) versus in the Panhandle/Central Texas region (0). Classification was based on the presence of more wetlands and less highly erodible land in the Gulf Coast region than elsewhere. Ten percent of the weighted sample was classified as Gulf Coast farmers, compared to 90 percent for the Panhandle/Central Texas region.

Respondents were asked to consider all sources of income in their 1991 farm operation. Gross farm income was indicated using a scale which varied from less than $40,000 (1) to $1 million or more (7). Almost 48 percent of the weighted sample reported farm incomes of less than $40,000, compared to 45 percent who had incomes ranging from $40,000 to $250,000 and 7 percent who had sales of more than $250,000.

To indicate their level of economic dependence on the Farm Program, farmers were also asked to report the percentage of their gross farm income from government farm payments. The mean percentage of dependence was 17 percent. Thirty-nine percent of the farmers received no government farm payments. Forty-four percent received less than one-fourth of their farm income from the government, 12 percent received between one-fourth to one-half, and 5 percent depended on the government for more than one-half of their farm income.

Farmers' agroenvironmental attitudes were measured using 19 questions with a five-point response scale (i.e., strongly agree-1, agree-2, undecided-3, disagree-4, strongly disagree-5). A preliminary principle component analysis of questions was conducted to determine the dimensionality and internal validity of farmers' attitudinal responses. It

unexpectedly produced two factors after varimax rotation. Each factor had an eigenvalue larger than 2. To construct independent factor scales, we selected only the seven questions/items that had produced loadings greater than .380 on the first rotated factor, which was labeled as a general regulatory attitude, and conducted a second principle component analysis. This analysis resulted in an eigenvalue of 2.891 and 41 percent of the total variation being explained by the factor. The same procedure was used for the seven items that loaded well on the second rotated factor, which referred to more specific environmental attitudes. The principle component analysis produced an eigenvalue of 2.445 and explained 35 percent of the variation among these items. Five questions were omitted because of low loadings or failure to produce scalable factors. Scale reliability was measured by the theta coefficient. The regulatory scales produced a coefficient of 79 percent, compared to 69 percent by the environmental scale (Carmines & Zeller, 1979). The bivariate correlation coefficient of .561 for the two factor scales was statistically significant. High scale scores indicated attitudes were positive towards farm regulations and the environment.

Federal Farm Program participation was measured by two questions: "Did you participate in any of the following (i.e. cotton, grains, rice, wheat, other) USDA commodity programs?" and "Did you participate in any of the following federal Farm Programs in 1991?" Respondents indicated whether they had participated in such programs as the Conservation Reserve Program, Wetlands Conservation Program, Water Quality Incentives Program (or Rural Clean Water Program), Highly Erodible Lands Easements Program, Integrated Farm Management Program, Swampbuster, and Sodbuster.[4] To adjust for area differences in the availability and applicability of these and commodity programs, participants (74 percent) in the Farm Program received a score of one and nonparticipants (26 percent, compared to 20 percent nationally) were given a score of zero.

Three questions were used to measure farmers' use of conservation practices: "Did you use any of the following methods (i.e. bench terraces, furrow diking, contour furrows, tailwater pits, other methods) to conserve

[4]The Swampbuster and Sodbuster provisions of the 1985 Farm Act are not "programs" per se. They set forth conditions that farmers with highly erodible land must satisfy if they are to receive commodity price support benefits.

irrigation water in 1991?" A second question determined if farmers had used practices and technologies such as scouting insect pests, pest-resistant crop varieties, conservation cropping, animal manure fertilizing, early planting to control pests, conservation tillage, and soil testing in 1991. The third question asked if farmers had used habitat management techniques such as planting food plots, improving wetlands, disking fallow land, and controlling brush on their farms. All of the practices could be used in any given region, although some would not be considered "best management practices" in a particular region. Each "yes" response in these series of questions had a value of one. Added scores produced a scale varying from 0 to 5 or more. Thirty-two percent of the respondents used none of the practices. The overall mean number of practices used was 1.9, with a standard deviation of 1.8 practices.

**Four regression models tested the research hypotheses.** The dependent variables were scale measures of agroenvironmental attitudes in the first two models, Farm Program participation in the third model, and use of conservation practices in the fourth model. Multicollinearity was assessed by examination of the correlation matrix (unreported) and by calculation of variable tolerances for each independent variable. Bivariate correlation coefficients did not exceed .420 and tolerance values varied between .690 and .900, indicating no problem with multicollinearity.

## FINDINGS

Although two scales were produced by the principal component procedure, similar regulatory beliefs were important to the measurement of both scales. This result and the moderate correlation between the scales suggest that the scales may not be measures as distinct as our labels imply. Nevertheless, the statistical identification of separate factor scales led to their inclusion in the linear regression models used to test our hypotheses.

### Agroenvironmental Attitudes

Descriptive and factor analytic results for farmers' agroenvironmental attitudes are reported in Table 1. Regulatory results (items 1 to 7) indicated that the majority of farmers opposed mandatory

environmental regulations in the Farm Program. Fifty-five percent agreed that they did not know farmers who favored the regulations (item 1). Furthermore, a majority of the farmers considered the provisions to be written by people who do not understand farming (item 4), to be more for appearance than impact (item 5), and to be best left out of the Farm Program (item 6). Large percentages of farmers, however, did support environmental provisions in the Farm Program. Almost 40 percent agreed with coupling benefits with environmental provisions (item 2), the provisions' potential effectiveness in improving the environment in their area (item 3), and the need to include the provisions in the Farm Program (item 6). Slightly larger percentages of farmers believed otherwise for items 2, 3, and 6. Overall, 68 percent of the farmers believed that they would be eventually forced out of business by the government (item 7).

Responses to the more specific environmental questions (items 8 to 14) also indicated a bias against regulations, a bias stemming from beliefs that agriculture does not produce serious environmental impacts and that farmers are concerned about environmental stewardship. A majority of the respondents disagreed with statements that environmental programs should be mandatory for all farmers (item 9), that water pollution is a serious threat to fish and wildlife (item 11), and that farming practices should be controlled by the government if they have an environmental impact (item 13). Sixty-eight percent clearly agreed that wetlands should be protected for wildlife (item 12), compared to 23 percent who disagreed. Farmers were more evenly divided, however, regarding their beliefs that regulations are needed to ensure that agriculture does not destroy the environment (item 8), that farmers should not receive program benefits unless they use water quality management practices (item 10), and that endangered species and their habitats should be protected on agricultural land (item 14).

## Regression Analysis

The regression equations that tested the research hypotheses are reported in Table 2. The attitudinal models explained 2 percent of the total variation in regulatory attitudes and 7 percent of the variation in environmental attitudes. Level of education (H2a) and gross farm income (H5a) produced the only statistically significant effects on regulatory attitudes. Contrary to expectations, farmers who had earned the most

**Table 1. Principle component analyses of agroenvironmental attitudes of Texas farmers (n=1,063)**

| Attitudinal Items | Percentages[a] SA/A | UND | D/SD | Factor Loading | Factor Score |
|---|---|---|---|---|---|
| **Regulatory Attitudes (eigenvalue=2.891)[b]** | | | | | |
| 1. Farmers I know are in favor of government regulation of land use to maintain environmental quality.[c] | 35.1 | 10.3 | 54.6 | 0.689 | 0.238 |
| 2. Federal farm program benefits should be tied to compliance with environmental provisions.[c] | 42.5 | 10.8 | 46.7 | 0.741 | 0.256 |
| 3. Environmental provisions of the Farm Program will be effective in improving the environment in my area.[c] | 38.8 | 16.4 | 44.8 | 0.731 | 0.253 |
| 4. Environmental provisions of the Farm Program are written by and for urban residents who do not understand farming. | 75.0 | 12.4 | 12.6 | 0.475 | 0.164 |
| 5. Environmental provisions are more for appearance than for impact. | 51.4 | 16.9 | 31.7 | 0.657 | 0.227 |
| 6. The government should leave environmental provisions completely out of the Farm Program. | 50.8 | 9.0 | 40.2 | 0.647 | 0.223 |
| 7. Eventually, farmers will be forced out of business by the government. | 68.2 | 6.4 | 25.4 | 0.508 | 0.176 |

**Table 1.** ***continued***

| Attitudinal Items | Percentages[a] SA/A | UND | D/SD | Factor Loading | Factor Score |
|---|---|---|---|---|---|
| **Environmental Attitudes (eigenvalue=2.445)[b]** | | | | | |
| 8. Regulations are needed to ensure that agriculture does not destroy the environment.[c] | 48.3 | 7.0 | 44.7 | 0.682 | 0.279 |
| 9. Environmental programs should be mandatory for all farmers regardless of Farm Program participation.[c] | 31.5 | 8.0 | 60.5 | 0.587 | 0.240 |
| 10. Farmers should not receive government program benefits unless they use water quality management practices.[c] | 47.4 | 14.5 | 38.1 | 0.540 | 0.221 |
| 11. Agricultural water pollution is a serious threat to fish and wildlife.[c] | 33.6 | 6.4 | 60.1 | 0.543 | 0.222 |
| 12. Farmers should be concerned about protecting wetlands for wildlife.[c] | 68.7 | 8.5 | 22.8 | 0.540 | 0.221 |
| 13. Farming practices should be controlled by the federal government if they have an environmental impact.[c] | 32.5 | 9.3 | 58.1 | 0.660 | 0.262 |
| 14. Endangered species and their habitats should be protected on agricultural land.[c] | 48.0 | 8.5 | 43.4 | 0.589 | 0.241 |

a. The five-point scale values varied from strongly agree (SA = 1), to undecided (UND = 3), to strongly disagree (SD = 5).
b. One factor dimension was produced for each series of items. Theta reliability coefficients were 76 percent for the regulatory scale and 69 percent for the environmental scale. The correlation between the two scales was .561 and statistically significant.
c. Response scale was reversed prior to factor analysis to produce common direction for items in the factor scale.

education and gross farm income had the most anti-regulatory attitudes. Similar findings, including the statistically significant effect of years of farming experience (H1a) occurred for environmental attitudes. Farmers who had the most farming experience, education, and gross farm income had the most negative environmental attitudes. Acres of highly erodible land (H3a), farm location (H5a), and percentage of gross farm income from government payments (H6a) produced negligible effects on attitudes.

**Table 2. Standardized regression results of agroenvironmental attitudes, Farm Program participation and use of conservation practices on personal and farm characteristics of a 1992 sample of Texas farmers.**

| Independent Variables | Regatt | Envatt | Program | Practice |
|---|---|---|---|---|
| Farmer characteristics | | | | |
| Education | -.072* | -.215** | -.097** | .070* |
| Farming experience | -.066 | -.115** | -.103** | -.011 |
| Farm characteristics | | | | |
| Erodible land | .001 | -.059 | .048 | .121** |
| Regional location | .024 | .036 | -.024 | .016 |
| Gross farm income | -.152** | -.130** | .327** | .313** |
| Government payments | .008 | .021 | .438** | -.038 |
| Attitudes | | | | |
| Regulatory (Regatt) | | | -.004 | .015 |
| Environmental (Envatt) | | | -.044 | .027 |
| Adjusted R-square | .024 | .067 | .305 | .136 |
| F-ratio | 4.657 | 11.648 | 47.872 | 18.558 |
| Probability>F | .000 | .000 | .000 | .000 |

* Unstandardized coefficient is at least twice its standard error.
** Unstandardized coefficient is at least three times its standard error.

The model for Farm Program participation explained 30 percent of the variation among farmers. Results showed that farmers who depended the most on government payments (H6b), followed by those who earned

the most gross farm income (H5b), had the least farming experience (H1b), and attained the least education (H2b), were the most likely to have participated in the Farm Program. The effects of acres of highly erodible land (H3b), farm location (H4b), and regulatory and environmental attitudes (H7a) were negligible.

The final model explained 14 percent of the variation in farmers' adoption of conservation practices. Gross farm income (H5c), acres of highly erodible land (H3c), and education (H2c) produced the only statistically significant, positive effects on the use of conservation practices. In addition to farmers' experience (H1c) and attitudes (H7b), farm location (H4c) and dependency on government payments (H6c) had no significant effects on use of conservation practices.

## DISCUSSION

Increased public concern about the impacts of U.S. agriculture on the environment and human safety manifested itself in the 1985 and 1990 Farm Acts. Consequently, many farmers contended with natural resource conservation issues required by cross compliance policies to receive Farm Program benefits. In this study, social exchange theory was used to propose and test seven hypotheses regarding the effects of personal and farm characteristics of a weighted sample of Texas farmers on their agroenvironmental attitudes, Farm Program participation, and use of conservation practices. The governmental side of the social exchange process was not examined. Overall, only a few research hypotheses, particularly those for Farm Program participation, were confirmed. Low levels of explained variation and the poor performance of attitudinal variables were problems in this study and other similar studies (e.g., Lockeretz, 1990; Napier & Camboni, 1988, 1993).

Nevertheless, several findings and their implications were notable. Agroenvironmental beliefs were distinguished by regulatory and environmental attitudes. Although farmers' regulatory attitudes had more internal consistency than did their environmental attitudes, beliefs underlying both attitudes indicated that a majority of farmers opposed inclusion of environmental provisions in the Farm Program because they questioned the effectiveness and mandatory nature of these regulations and doubted that agriculture produced serious impacts on the environment. Still, large percentages of farmers (30 percent to 48

percent) expressed pro-regulatory beliefs and supported the protection of wildlife and wildlife habitats.

Further, the negative effects of education and gross farm income on regulatory and environmental attitudes were unexpected. Farmers with more education and large gross farm incomes had more negative attitudes than other farmers. These farmers could have been knowledgeable about the environmental provisions and their possible negative impacts, such as lower profitability, caused by Farm Program participation. Also, farmers with high education and income attainment have been shown to be less supportive of progressive political agendas that threaten the agricultural status quo (Buttel et al., 1982; Lobao & Thomas, 1992). Regardless of their attitudes, these farmers were more likely than farmers who had less education and lower farm incomes to have practiced conservation and, in the case of large-income farmers, to have participated in the federal Farm Program. This incongruity between attitudes and Farm Program participation indicated that farmers might have suppressed their attitudes when faced with the economic realities of operating profitable farms and the possibility of stabilizing farm income by Farm Program participation.

## CONCLUSION

A higher proportion of farmers in Texas than elsewhere in the nation participate in the Farm Program. Participants account for the majority of farmland acres and farm productivity, especially in program crops, nationally and in Texas (Reinsel, 1991). Many of these farmers expect 1995 farm legislation to include more environmental provisions than the current Farm Program and believe this legislation will negatively impact farm profitability. A slight shift from crop to livestock production in several states in the deep south has already occurred since passage of the 1985 Farm Program (Thomas, 1992). If policy makers are to devise strategies that encourage farmers to begin or renew participation in subsequent government Farm Programs, more research will be needed on the social exchange process between government and farmers. The issues of farmers' needs and preferences for incentives and methods of compensation in the Farm Program, their understanding of the complexity of provisions in the Farm Program and federal requirements for participation, and problems encountered in complying with program regulations were not addressed in this study. How these factors affect

farmers' willingness to participate in the exchange process with government has yet to be determined (Cook, 1986; Lobao & Thomas, 1992; Napier & Napier, 1991).

Any improvement in the conceptualization of the exchange process must also address the identification of antecedent influences on attitudinal formation and subsequent attitudinal effects on farm-related behaviors. Traditional demographic and farm structural measures (except for education and farm income) explained very little variation in regulatory and environmental attitudes, adding to the poor results of past agricultural conservation studies. Also, results reported here and in other studies have indicated that the relationships between agroenvironmental attitudes and Farm Program participation and conservation behaviors were negligible (Camboni & Napier, 1993; Featherstone & Goodwin, 1993; Napier & Napier, 1991; Swanson & Thigpen, 1984) or unrelated (Ervin & Ervin, 1982; Nowak & Korsching, 1983). Although some degree of measurement error is endemic in all survey research, this lack of attitudinal-behavioral correspondence and explanation in this area of rural sociological research needs more attention if the social exchange process between farmers and government is to be more fully understood.

Finally, researchers and policy makers need to consider the characteristics of different farming systems and regions and how they are affected by farm policies (Nowak et al., 1990). Wimberley (1993) has pointed out that a one-size-fits-all approach to agricultural policy can be ineffective. The same can be said for modeling farmer-government exchange processes. He observed that the census-defined Midwest has more farms and rural farm residents than any other region, but the South claims more rural people than elsewhere. He further noted that farm policy has historically supported more midwestern commodities (i.e., corn, soybeans, and wheat) than southern commodities, that few southern farms are large enough to receive substantial payments for program-supported crops, and that Farm Program program controls restrict the number of farm acres planted in traditional southern crops (i.e., cotton and peanuts). Such structural differences in agriculture would suggest dissimilar research results for this and other studies. For example, gross farm income was consistently the most important variable in models examined for agroenvironmental attitudes, Farm Program participation, and conservation behaviors. This finding consistently matched results of other southern farm studies (Kairumba & Wheelock,

1990; Lynn & Rola, 1988; McIntosh et al., 1990; Pfeffer & Gilbert, 1989) but differed from results reported in midwestern farm studies (Lobao & Thomas, 1992; Napier & Camboni, 1988; Nowak, 1987; Pampel & van Es, 1977).

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