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Attitudes Toward the Environment: How Do the Attitudes of Conventional, No-Till, and Organic Farmers Compare?[1]

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Introduction

One of the key dynamics in today's increased interest in alternative farming is concern for the environment (Beus and Dunlap, 1990). Many advocates of alternative farming argue that conventional farming harms the environment and may even destroy the future of agriculture. The implicit, and often explicit, notion associated with this view is that conventional farmers are less concerned about the environment than are alternative farmers. The present study will test this notion by comparing the attitudes toward the environment of conventional farmers with two types of alternative farmers, organic and no-till.

By definition, conventional farmers are those farmers who practice high-input farming, including the use of such commercial chemicals as herbicides, pesticides, fungicides, and synthetic fertilizers. Additionally, they typically practice routine tillage to supplement their chemical efforts to control weeds. In contrast, alternative farmers are those farmers who generally avoid

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the use either of commercial chemicals or of conventional tillage techniques. Specifically, organic farmers minimize the use of commercial chemicals, while no-till farmers minimize tillage. Presumably, the goal in switching to these alternative practices is to reduce pollution and soil erosion, so it is reasonable to expect that farmers who engage in these practices have more pro-environment attitudes than those who do not.

However, there are some internal inconsistencies in the farming practices of alternative farmers that obfuscate efforts to pursue pro-environmental farming and complicate our efforts to predict farmers' attitudes. For example, as organic farmers reduce their use of herbicides, fungicides, and pesticides, these farmers need an alternative means of controlling weeds, fungi, and insects. The use of routine tillage practices, similar to those used by conventional farmers, is such an alternative (Buttel et al., 1990).

In contrast, many no-till farmers would argue that routine tillage is environmentally damaging and should be avoided, but no-till farmers need an alternative means of controlling the weeds, fungi, and insects that grow among the crop residue left by no-till or minimum till farming. The use of herbicides, fungicides, and insecticides, such as those used by conventional farmers, is such an alternative. Thus, while both groups of alternative farmers engage in practices which distinguish them from conventional farmers, the break with conventional farming is not complete for either group (organic farmers still practice routine tillage, and no-till farmers still use commercial chemicals), and the two groups of alternative farmers, themselves, emphasize potentially contradictory approaches to pro-environmental or sustainable farming.

These overlapping and contradictory practices among the three farm-types complicate our efforts to predict farmers' environmental attitudes, and the research on farmers' attitudes does little to address this complexity. The following three short-comings exist in the literature on environmental attitudes: a) no-till farmers have been ignored; b) both the extent and nature of the differences between conventional and organic farmers needs further clarification; and c) researchers have failed to take advantage of available multiple-item, standardized measures of environmental attitudes. The present paper addresses each of these short-comings.

First, little or no research exists on the environmental attitudes of no- till farmers. No-till farmers simply may be conventional farmers who are the first to adopt new, minimum tillage equipment, or they truly may be alternative farmers. The present paper explicitly includes no-till farmers from a no-till farm organization and measures their attitudes toward environmental issues.

Second, a better understanding is needed of the extent and nature of the differences between the two groups of farmers, conventional and organic, that have received all the attention of past research. Research suggests that the attitudes and practices of these two types of farmers, while distinct, may not be as distinct as their public images suggest. For example, Buttel and Gillespie (1988) found that organic farmers in New York were more concerned than conventional farmers about the impact of pesticides and nitrate fertilizers on the environment, and that organic farmers were significantly more likely than conventional farmers to view "soil erosion as one of the major threats to the future of American agriculture" (1988: 14). However, the same researchers found no difference between organic and conventional farmers in their preference for tillage practices. These researchers also found substantial support among conventional farmers for many nominally organic farm practices (see also Buttel et al., 1990).

Similarly, Haistead, Padgitt, and Batie (1990:130) surveyed the priorities of farmers in Virginia and Iowa and found '...a high level of concern regarding agricultural chemicals and water quality," and only modest differences in concern between "high" nitrogen appliers (often associated with conventional farming practices) and 'low nitrogen appliers. Furthermore, Lockeretz and Wernick (1980) compared organic farmers from the Corn Belt to the stereotypical traits of conventional and organic farmers, and found that the actual traits of organic farmers often came closer to the stereotypical conventional farmer than to the stereotypical organic farmer.

A survey of these same farmers a decade later reinforced the original findings (Lockeretz and Madden, 1987). Only one-fourth to one-third of the organic farmers in either survey identified 'less environmental damage" as one of the significant advantages of organic farming. In addition, respondents to the second survey were more tolerant towards materials of disputed acceptability" (p. 61), such as superphosphate, herbicides and urea, than they had been a decade earlier. Collectively, these sdies (Buttel and Gillespie, 19 Buttel et al., 1990; Halstead, Padgitt, and Bade, 1990; Lockeretz and
Madden, 1987; Lockeretz and Wernick, 1980) suggest that the attitudes of conventional and organic farmers, while distinct, may not be as different as commonly assumed, and that these attitudes must be periodically re-assessed to see if a difference remains. The present paper provides an update on the extent to which the attitudes of these groups differ.

Additional research alerts us to the importance of examining, not just the extent, but the nature of any such difference. Buttel et al. (1981) studied farmers' attitudes toward agricultural pollution and soil erosion and found that these two, attitudinal dimensions were virtually independent of each other and were affected differently by an array of independent variables. Our earlier discussion of farm practices suggests that this distinction is critical to comparing farm types (especially with the inclusion of no-till farmers): Conventional and organic farmers differ in their use of commercial chemicals, but not necessarily in their tillage practices; while conventional and no-till farmers differ in their tillage practices, but not necessarily in their use of commercial chemicals. This pattern of practices suggests that conventional and organic farmers also may differ in their concern about agricultural pollution, but not soil erosion; while conventional and no-till farmers also may differ in their concern about soil erosion, but not agricultural pollution. Focusing on either dimension of environmental attitudes alone or on some global measure of environmental attitudes would miss these subtle distinctions.

The present paper includes both the erosion and pollution dimensions of environmental attitudes and a third dimension, attitude toward environmental regulation. The inclusion of this third dimension is largely exploratory. Little research has been done on comparing the attitudes of these farm types toward regulation, and such a comparison should aid in understanding the implications of farmers' attitudes for the politics of farm policy. Thus, the inclusion of multiple dimensions of comparison and the inclusion of multiple farm types help us to address the first two shortcomings of the research, the need to further understand both the extent and nature of the attitudinal differences between conventional and organic farmers, and the lack of data on no-till farmers.

Our third and final concern is to contribute to the literature by employing multi-item, standardized indexes of farm-related, environmental attitudes. Properly developed, multi-item indexes should be more reliable than the single-item indexes often used in prior research. In addition, the use of standardized measures promotes comparability among studies and over time. Unfortunately, a standardized measure of environmental attitudes did not appear in our review of agricultural research, but a review of the more general literature on environmental attitudes revealed a recent instrument developed by Gill et al. (1986) that is easily adaptable to a farm survey. Gill et al., in turn, had constructed their index from items used by Maloney, Ward, and Braucht (1975), Kinnear and Taylor (1973), and Antil and Bennett (1979).

Consistent with our needs, the instrument includes separate indexes to measure concern about "pollution/natural resources" and about "regulation/spending." Both indexes proved highly reliable in a two-state survey of the general public (Gill et al. report Cronbach's alphas .86 for each index). We modified the pollution and regulation indexes for an agricultural audience and took a few items from the pollution index to create a new, soil erosion index. These indexes were pretested, found to be satisfactory, and employed as the basis for our comparison of farm types.

Methods

Sample

A survey of 568 North Dakota farm and ranch operators was conducted in March and April of 1990. Eighty were deleted from the original sample of 648 either because they were not farmers or because they had no current phone or mailing address and, in effect, had "disappeared' from the population. These 80 are not included in the sample n's reported below.

We relied on three sources for our sampling frame. The first source was 424 farmers who participated in a panel study initiated by Leistritz et al. in 1985 (see Leistritz et al., 1989). These farmers were selected at random and screened 'to ensure that all respondents were less than 65 years old, were operating a farm, considered farming to be their primary occupation, and sold at least $2,500 of farm products in 1984" (p. 1). These farmers were contacted again in 1986, in 1988, and then in 1990 for our study.

The second and third sources of names were taken from membership lists of two farm organizations associated with sustainable agriculture, the Manitoba/North Dakota Zero Tillage Farmer's Association (M/NDZTFA), and the Northern Plains Sustainable Agricultural Society (NPSAS). Because the panel study included relatively few alternative farmers, members of these two farm groups were added to our data set. The former group supplied a list of phone numbers for 73 no-till farmers in North Dakota and the latter supplied phone numbers for 71 farmers.

This sampling approach is roughly analogous to the logic of disproportionate sampling: in effect, one sampling ratio was applied to conventional farmers (i.e., the random sample of North Dakota farmers, the vast majority of whom are conventional farmers) and another sampling ratio-- a good faith attempt at total enumeration--was applied to two, small "strata' of alternative farmers, no-till and organic. Buttel et al. (1990) used this same approach to compare a random sample of New York farmers with members of an organic farm organization (see also Buttel and Gillespie, 1988). The overriding advantage of this approach is that it provides a more stable base for comparing alternative farmers with conventional farmers. Otherwise, a random sample would need to be very large (and expensive) to include a sizable number of such farmers. One disadvantage of this approach is that those alternative farmers who do not belong to alternative farm organizations are not represented. In addition, this approach combines a random sample with two nonrandom samples and complicates the interpretation of statistical significance tests. Nevertheless, we will follow the example of Buttel et al. (1990) and report significance tests as general guides for interpreting the results.

Procedures

Farmers received an introductory letter before being surveyed by phone. Those who were reached by phone also were sent a mall questionnaire. Repeat efforts were made to contact nonrespondents to either survey (for more detail, see Youngs, Goreham, and Watt, 1992). The response rate for the phone survey was 81 percent. Of these respondents, 73 percent answered the mail survey. Thus, 59 percent answered both the phone and mail surveys.

Measuring the Independent Variable

The independent variable in this study is farm type with the following values: organic, no-till, and conventional. Two general criteria were used to classify farmers, group membership and actual farm practices. With respect to group membership, a farmer had to belong to the Northern Plains

Sustainable Agricultural Society to be classified as an organic farmer or belong to the Manitoba/North Dakota Zero Tillage Farmer's Association to be classified as a no-till farmer. Group membership is less useful as a criterion for identifying conventional farmers, but we followed the same general principle of classification implicit in group membership, that is, self-identification. Farmers were asked the following two questions: a) "Would you say your current farming practices can best be described as Conventional, No-till, or Organic? and b) Five years from now, what will best describe your farming practices: Conventional, No-till, or Organic? For a farmer to be classified as conventional, he or she had to mark "Conventional' in response to both questions.

Self-reported farming practices also were used as a basis for classification. All respondents were asked a series of questions on the phone survey to assess their farming practices. The format of these questions was as follows: 'On what percent of your cropland, both owned and rented, did you use [________] practices in 1989?' The term "conventional," no-till"or"organic was inserted in place of the bracketed blank to create three distinct questions. Members of the different farm groups (conventional, no-till, and organic) had to indicate that they used their respective farming practices on 50 percent or more of their cropland before they actually could be classified as a conventional, no-till, or organic farmer.

Additional questions were asked about specific chemical and tillage practices to provide a profile of the type of farmer falling into each of the above categories and to validate the accuracy of our classification scheme. To assess chemical practices, respondents were queried about their use of insecticides, herbicides, fungicides, commercial fertilizer, animal wastes and manures, and green manures (e.g., legumes). The following, now familiar, format was used for each of these behaviors: "On what percent of your cropland, if any, did you use [_______] in 1989? _____ %"The bracketed blank was replaced with a specific referent, such as, insecticide, each time the question was asked. To assess tillage practices, farmers were asked, "In 1989 did you use any of the following erosion control techniques: strip cropping, cover crops, contouring, grass strips, or field windbreaks? Respondents could check "No" or "Yes."

Matching Farmers Across Farm Types

Before the analysis began, farmers were matched on the following characteristics: farm size, percent of sales from livestock, general soils classification of the farm, and region of the state. Those who could not be reasonably matched were dropped from the analysis. This matching was done to separate farm type from potentially confounding factors--an approach rarely used in prior research on farm type and environmental attitudes.

Perfect matches were impossible. Instead, our goal was to achieve reasonably close comparisons. This was done in two stages. First, no-till and conventional farmers were matched, and then organic and conventional farmers were matched. There were too few no-till and organic farmers to match these groups, as well. Finally, a matched pair was dropped from a given analysis if one or both members failed to respond to any of the individual items within the environmental attitude index.

Measuring Environmental concern

The dependent variables were three measures of environmental attitudes, concern about agricultural pollution, concern about soil erosion, and support for environmental regulations. These measures were modifications of those developed by Gill et al. (1986). The original instrument included two dimensions, pollution/natural resources and regulation/spending. Each dimension consisted of a series of statements. Following each statement, respondents could indicate the extent of their agreement or disagreement on a 7-point Likert scale with end points labeled "strongly agree" and "strongly disagree." In the final coding, all items were scored so larger numbers represent more pro-environment attitudes.

The present study used the statements of Gill et al. (1986) to measure concern about pollution and support for environmental regulations. However, several items were altered to fit the specific issues facing farmers. For the most part, these changes were minor, but two items were dropped because they did not appear to be pertinent to most farmers ("I'm usually not bothered by so-called 'noise pollution." and "I get depressed on smoggy days).

Our versions of Gill et al.'s (1986) statements were pretested on two classes of students at North Dakota State University, and minor changes were made. One rather awkward item was dropped ("I feel fairly indifferent to the statement--'The world will be dead in 40 years if we don't remake the environment.'"). All modifications and the final statements used in the present study are shown in Figure 1. These indexes were then used for all farm types in the main survey. The final Cronbach alphas from the main survey were .86 and .70 for the pollution/natural and regulation/spending indexes, respectively.

We were unable to find a scale similar to the above scales to assess concern about soil erosion, so we constructed our own measure. This measure included three statements followed by 7-point Likert scales (Figure 1). The first two items were written to parallel items from the pollution scale of Gill, et al. (1986) with the focus changed to soil erosion. Cronbach's alpha in the main survey for this index was a solid, but somewhat disappointing, .63.

These three indexes, pollution, erosion, and regulation, have a combined Cronbach's alpha of .76. The is a fairly high Cronbach's alpha, and it suggests that these indexes are tapping into the same universe of concern, that is, attitudes about the environment. This high alpha correctly leads us to expect the following substantial intercorrelations of these indexes: pollution and erosion, r .57; pollution and regulation, r = .64; and erosion and regulation, r .36. However, while these correlations are substantial, the most variance shared by any two of the indexes is 41 percent for pollution and regulation. The shared variance for the pollution and regulation indexes is probably due to the focus of Gill et al.'s (1986) regulation index on items associated with the regulation of pollution. Nevertheless, the indexes do appear to be assessing distinct dimensions of environmental concern and to be worthy of inclusion as separate dependent variables in the analysis to follow.

Figure 1. Environmental Concern Measures[2]

POLLUTION AND NATURAL RESOURCE ITEMS

I feel people worry too much about pesticides on food products.
It frightens me to think that much of the food I eat is contaminated with pesticides.
I become [incensed] (angry) when I think about the harm being done to plant and animal life by pollution.
When I think of the ways [industries] (we) are polluting (in agriculture), I get frustrated and angry.
The whole pollution issue has never upset me too much since I feel it's somewhat overrated.
I rarely [ever] worry about the effects of [smog] (chemical spray and drift) on me or my family.
It is futile for the individual [consumer] (farmer) to try to do anything about pollution.
I think [that a person] (farmers) should urge their [friends not to use] (neighbors to avoid using) products that pollute.
Every person should [stop increasing] (reduce) his/her consumption of products so that our resources will last longer.
The benefits of modern [consumer products] (farm technology) are more important than the pollution which results from their [production and] use.
All [consumers] (farmers) should be interested in the pollution aspects of [products] (inputs) they purchase.
I am [personally] (really not) interested (personally) in the pollution aspects of [products] (inputs) I buy.
Natural resources must be preserved even if [people must do without some products] (yields are reduced).

REGULATION AND SPENDING ITEMS

[It genuinely infuriates me to think that] The government [doesn't] (should) do more to help control pollution of the environment.
The government should force all products off the market that pollute.
I don't think we're doing enough to encourage manufacturers to [use recyclable packages] (develop nonpolluting inputs).
[Consumers] (Farmers) should be made to pay higher prices for products which pollute the environment.
Commercial advertising should be forced to mention the ecological disadvantages of products.

SOIL EROSION ITEMS

I feel people worry too much about soil erosion.
I think farmers should encourage their neighbors to use soil conservation tillage practices.
Quality topsoil will soon disappear if we don't take significant steps against erosion.

[2] Items for the first two indices above are from Gill et al. (1986). Where changes were made, the original wording is in brackets and our new wording is in parentheses. The first two items in the soil erosion index paraphrase items from the pollution index.

Results

Measuring the Independent Variable

The criteria for classifying farmers included both group membership and respondents' answers to three general questions about farming practices. Little elaboration is required on the group membership criterion, but respondents' answers to the general questions on farming practices provide additional insight into the types of farms in each category. The results displayed in Table 1 indicate that farmers classified as conventional typically use conventional farming practices on 98.6 percent of their cropland; farmers classified as no-till typically use no-till farming practices on 80.7 percent of their cropland; and farmers classified as organic typically use organic farming practices on 92.3 percent of their cropland. In other words, the average farmer reported practices which far exceeded the minimum cut-off value of 50 percent for each group.

These general questions were complemented with specific items designed to assess respondents use of commercial chemicals (insecticide, herbicide, fungicide, and commercial fertilizer), the use of common alternatives to commercial fertilizers (animal wastes and manures, and green manure), and the use of soil erosion controls. These results also are displayed in Table 1. Farm type is significantly related to all but one measure, use of animal manure, and even this measure comes very close to the .05 criterion ($p < .06$).

The pattern of means for these measures conform to the expectation that conventional and no-till farmers will be similar in their chemical practices and distinct from organic farmers. Duncan Multiple Range post hoc t tests revealed that no-till and conventional farmers use significantly more insecticide, herbicide, and commercial fertilizer than do organic farmers and significantly less green manure. No-till farmers also use significantly more fungicide than do organic farmers and significantly less animal manure, but

Table 1. Classification Criteria, Specific Farm Practices, and Matched Factors by Farm Type

Item	Conv. $\bar{X}$	No-Till $\bar{X}$	Organic $\bar{X}$	F
		CLASSIFICATION CRITERIA		
% Acres Conv.	98.6^{a}	19.9^{b}	10.6^{c}	371.11***
% Acres No-Till	$.6^{c}$	80.7^{a}	1.9^{b}	646.93***
% Acres Organic	2.5^{b}	$.8^{b}$	92.3^{a}	600.20***
		SPECIFIC CHEMICAL/EROSION PRACTICES		
% Acres Insecticide	13.5^{a}	13.8^{a}	$.0^{b}$	4.61*
% Acres Herbicide	68.8^{b}	93.1^{a}	4.3^{c}	91.33***
% Acres Fungicide	5.1^{b}	15.0^{a}	$.2^{b}$	4.47*
% Acres Comm. Fert.	57.2^{b}	87.2^{a}	4.3^{c}	52.88***
% Acres Animal Man.	$4.9^{a,b}$	3.0^{b}	7.8^{a}	2.98
% Acres Green Man.	1.1^{b}	1.3^{b}	14.2^{a}	24.96***
Erosion Controls				
Yes	12.5	28.1	9.4	
No	87.5	72.9	90.6	
Total	100%	100%	100%	
		MATCHED FACTORS		
% Livestock	27.4^{a}	7.4^{b}	29.6^{a}	5.15**
Acres Farmed	1,719	1,767	1,602	.09
Net Farm Income	14,332	9,073	11,674	.52
Region				
West	34.4	34.4	26.7	
Central	51.6	53.1	60.0	
East	14.0	12.5	13.3	
Total	100%	100%	100%	

* $p < .05$
** $p < .01$
*** $p < .0001$
NOTE: Different superscripts indicate significantly different means based on Duncan's Multiple Range t-test. Conventional N's range from 59 to 64, No-Till N's range from 30 to 32, and Organic N's range from 28 to 32.

the differences between conventional farmers and organic farmers on these two items are not significant (the average acreage use of either fungicide or animal manure is actually quite small for all farmers). No-till farmers even outdo conventional farmers on herbicide, fungicide, and commercial fertilizer use. Thus, these self-reported chemical use practices generally are consistent with the farming practices typically associated with each farm type.

Finally, the different farm types also should differ in soil erosion practices. The results in Table 1 indicate that farmers classified as no-till are marginally ($p < .08$) more likely to say they use such erosion control techniques as strip cropping, cover crops, contouring, grass strips, and field windbreaks than are the farmers classified as conventional or as organic. The latter two groups are very similar in self-reported soil erosion practices. Unfortunately, we do not have specific questions that address actual tillage practices (in a manner parallel to the questions on specific chemical use practices), but the results of this general, soil erosion question do conform to expected differences in concern with soil erosion by farm type. Thus, the results of these complementary measures of chemical and soil erosion practices validate our earlier farm-type classification scheme.

Assessing the Success of Matching

The results of our matching efforts also are displayed in Table 1. There were too many soils types to reasonably display the results of matching on this factor, but region is a rough indicator of soils type, and the results of matching by region indicate that this factor was successfully controlled, X2 = .72; df = 2,2; as. Similarly, farm type was matched as much as possible and is not significantly related to farm size, F = .09, df 2/124, us. However, farm type is significantly related to percent of sales from livestock even after matching, F 5.15, df = 2/114, $p < .01$. The Duncan's Multiple Range post hoc t test found that organic and conventional farmers did not differ, but no-till farmers had a significantly lower percent of sales from livestock than either of the other two groups of farmers. Thus, our efforts to control on a few extraneous variables through matching was generally, but not completely, successful.

Environmental Concern Indices

A one-way analysis of variance (ANOVA) with farm type as the independent variable was done on each of the three environmental concern dimensions. If a significant effect emerged, the ANOVA was followed by Duncan's Multiple Range post hoc t test to test for significant pairwise comparisons among the three farm types. The results for the three indices are presented in Table 2. The means and ANOVA results for individual items in each index are presented in Appendix 1.

Pollution/Natural Resources. Farm type significantly affected the pollution/natural resources dimension (Table 2). According to the Duncan's post hoc t test, the mean level of pollution/natural resources concern for organic farmers was significantly higher than the means of both no-till and conventional farmers. The means for the latter two types did not differ significantly.

Soil Erosion. Farm type also had a significant effect on the soil erosion dimension (Table 2). The Duncan's Multiple Range test found the mean level of soil erosion concern for no-till farmers and for organic farmers were significantly higher than that for conventional farmers. The means of organic and no-till farmers did not differ.

Regulation/Spending. Finally, farm type significantly affected the regulation/spending dimension (Table 2). Specifically, Duncan's test found the mean support for regulation/spending among organic farmers to be significantly higher than that found among either no-till farmers or conventional farmers. The means of conventional and no-till farmers did not differ.

Table 2. The Impact of Farm Type on Environmental Concerns

Concerns	Conventional	No-till	Organic	F
Pollution (N)	4.43^{a} (59)	4.77^{a} (28)	6.21^{b} (31)	56.33^{*}
Erosion (N)	4.80^{a} (60)	6.20^{b} (30)	6.24^{b} (30)	24.98^{*}
Regulation (N)	4.19^{a} (61)	4.17^{a} (30)	5.64^{b} (31)	22.25^{*}

* $p < .0001$
NOTE: Larger numbers indicate higher levels of concern (range 1 to 7). Different superscripts in each row represent significantly different means based on Duncan's Multiple Range t-test.

Discussion

The results support three general conclusions, First, organic and conventional farmers do differ significantly in their attitudes toward the environment. This difference appeared on all three dimensions; and, in each case, organic farmers were more pro-environment than conventional farmers. These results were not surprising for the pollution and the regulation dimensions, but they were somewhat surprising for the soil erosion dimension because the tillage practices of organic farmers are often similar to those of conventional farmers. More will be said about organic farmers' views of soil erosion later.

Second, the relation of no-till farmers to the other two groups differs from dimension to dimension. On the pollution and regulation dimensions, they were significantly less pro-environment than organic farmers and very similar to conventional farmers. Both of these dimensions either directly or indirectly address the use and regulation of commercial chemicals, and no-till conventional farmers apparently share similar orientations on these chemical concerns. In contrast, no-till farmers were significantly more pro-environment than conventional farmers on the soil erosion dimension. These findings are consistent with our expectations that farm types would align differently on the different dimensions,

However, we were surprised to find little difference between no-till and organic farmers on the soil erosion dimension. The surprise is organic farmers. Not only are organic farmers unexpectedly different from conventional farmers on this dimension (as we earlier noted), they are unexpectedly similar to no-till farmers. Organic farmers apparently view themselves as very concerned about soil erosion even though past research (Buttel and Gillespie, 1988) and our own data show little difference in the preferred tillage or soil erosion practices of organic and conventional farmers. Perhaps, organic farmers have an image of themselves as consistently pro-environment and answer all attitudinal questions about the environment from the perspective of this global self-image. Future research should examine whether organic farmers see a contradiction between their general, pro-environment orientation and their tillage practices.

Third, the results indicate that all groups share a general pro- environment orientation across dimensions. All means for all three indexes are on the positive side of the scale. This no doubt reflects a social desirability bias in proclaiming oneself as supportive of the environment, so private views may not be as supportive. At the very least, however, if these data do reflect a social desirability bias, the bias is pro- not anti-environment on all dimensions.

These conclusions have several implications for farm policy and farm politics. Current farm policy was developed with conventional farmers in mind. Government policies encourage soil conservation but do not emphasize minimum or no-till farming. Similarly, government regulations promote the safe use of agri-chemicals but do not directly discourage their use. Policies are aimed only minimally at preventing groundwater pollution and/or reducing the use of agri-chemicals.

Thus, government regulation does little to address some of the major concerns of alternative farmers, especially organic farmers. In fact, many of the regulations, such as base acreage policies, that are consistent with the farming practices of conventional and no-till farmers, hurt organic farmers by discouraging practices such as crop rotations and the use of green manures. These conflicts surfaced in the debate over the 1990 Farm Bill, and they will continue to challenge farm policy.

In this context, our results suggest that the politics of farm policy may increase in complexity as these issues are addressed. Prior research found that perceived similarity in attitudes is an important factor in the formation of political coalitions (Lawler and Youngs, 1974). Our data suggest that patterns of similarity in attitudes shift from dimension to dimension: conventional and no-till farmers share similar views on pollution, and no-till and organic farmers share similar views on erosion. Although these similarities often are obscured by public rhetoric (Haynes and Swift, 1984; Gillespie and Buttel, 1989; Madden, 1984), if the extant similarities are seen by group members, this may trigger shifting alliances as different aspects of farm policy, chemical use or tillage practices, come under scrutiny. This expectation of potentially complex and shifting alliances is consistent with evidence from a study by Hoiberg and Bultena (1981) which showed considerable variability in the level of support that farmers in general give to chemical, tillage, and/or safety regulations.

At a broader level, however, our data also suggest that agricultural politics will be played within the context of a generally pro-environment orientation across farm groups. The mean scores for all farm groups across the different environmental indexes were on the pro-environment side of the scales. This is consistent with research that shows that a plurality or majority of farmers support many nominally organic farm practices (Buttel and Gillespie, 1988), find many environment regulations "about right" (Hoiberg and Bultena, 1981; see also, Gillespie and Buttel, 1989) and support additional spending on research into organic farming (Lasley and Bukena, 1986). In fact, Poincelot (1990:33) predicts that "conventional farmers increasingly will adopt various practices mostly associated with organic farming, including conservation tilage, rotations, cover crops, legumes and natural pest controls." Thus, emerging political battles over environment-related farm policy issues are likely to be complex, to involve shifting alliances, and to be more subtle than the public dichotomy of pro- versus anti-environmental groups suggests.

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Appendix Table 1. Means and ANOVAS on Individual Index Items

Item	Conv. $\bar{X}$	No-Till $\bar{X}$	Organic $\bar{X}$	F
POLLUTION				
Pesticides on food	3.32^a	2.93^a	6.35^b	54.05***
Food contamination	3.28^a	2.93^a	5.50^b	21.71***
Harm to animals/plants	4.14^a	4.93^a	6.10^b	16.26***
Angry about pollution	3.07^a	3.39^a	5.61^b	26.15***
Pollution issue overrated	3.14^a	3.71^a	6.10^b	33.46***
Chemical spray and drift	5.53	5.29	6.26	2.55
Futile for individuals	5.75	6.32	6.23	1.99
Encourage neighbors to stop	4.90^a	5.18^a	6.26^b	8.98**
Reduce consumption	3.90^a	4.07^a	5.58^b	9.17**
Technology is more important	4.54^a	5.07^a	6.52^b	17.33***
Consider pollution of inputs	5.83^a	6.32^b	6.84^b	12.56***
Not personally interested	5.32^a	6.32^b	6.77^b	14.40***
Preserve natural resources	4.83^a	5.57^a	6.55^b	14.43***
SOIL EROSION				
Worry about soil erosion	4.53^a	5.90^b	6.23^b	12.84***
Encourage neighbors to stop	4.97^a	6.23^b	6.10^b	9.21**
Quality soil may disappear	4.90^a	6.47^b	6.40^b	15.62***
GOVERNMENT REGULATION				
Gov't should do more	3.92^a	$4.50^{a,b}$	5.03^b	4.41*
Force out polluting products	3.05^a	3.27^a	4.81^b	12.49***
Encourage nonpolluting inputs	5.36^a	5.30^a	6.58^b	9.22**
Should pay a higher price	3.66^a	3.53^a	5.77^b	15.69***
Ads mention disadvantages	4.98^a	4.23^a	6.00^b	7.32**

* $p < .05$
** $p < .01$
*** $p < .0001$
NOTE: Larger numbers are more pro-environment. Different superscripts represent significantly different means. Conventional N's range from 59 to 61, No-Till N's range from 28 to 30, and Organic N's range from 30 to 31.