Survey Finds Critical Development Gaps In Opinion Formation And Values Clarification On Soil Conservation By Agriculture Freshmen

Gerry Walter and Ann Reisner

Abstract

A survey of first-semester agriculture freshmen found that a substantial portion of those from non-rural areas or without farm backgrounds had no opinions about soil conservation issues. Smaller but still significant portions of students from rural backgrounds also offered no opinion on some conservation and other agricultural issues. The findings and discussion point out the need for more attention to opinion formation and values clarification in agricultural curricula.

Introduction

In the past twenty years, agricultural curricula have come under increasing scrutiny and criticism for failing to address the social and ethical issues of modern agriculture. As nonagricultural interests increasingly come to dictate agricultural policy, issues and values education becomes ever more critical if future agriculturalists are to live effectively with and help shape those policies.

Calls for more attention to values ask that educational activities give students handles on such issues as environmental protection and agriculture's relationship to the rest of society (1), helps them become citizens as well as agriculturalists (5), and should foster development of critical thought via synthesis of values and facts (2). Sampson (11) adds that sustaining a viable land ethic depends on an understanding of the social and environmental implications of economic forces, trade policy and farming practices. This understanding, he says, comes from education "not just in terms of dollars and cents, or chemical formulae, but also in a sense of what is right and wrong, what is good and bad" (p. 13).

The need for ethics and values in agriculture curricula increases as the proportion of students without agricultural backgrounds enrolling in agricultural colleges grows. Waldren et al. (14) found University of Nebraska-Lincoln agriculture students without farm backgrounds approached agricultural issues as consumers, while those from rural areas more closely mirrored a producer viewpoint. McCalla (10) says a "new" agriculture education must reach out to land grant university students with no connection to agriculture and help them understand the social context of agricultural production and marketing. Contributors to the North Central Regional Curricular Committee Project (3, 12, 13) also stress the inclusion of ethics and policy components in future agriculture curricula.

The knowledge and values students bring into the classroom can be important in determining their willingness to seek out, process and interpret course content. Kruglanski (8) holds that perception of a need or problem is a primary motive, and hence a precondition, for active information search. People's beliefs and opinions exist as hypothetical statements of what is or is not true; when alternative hypotheses emerge to challenge their confidence in their existing hypotheses, they seek evidence -- information -- to confirm or not confirm one or more competing beliefs. Information search is discontinued when confidence in a hypothesis satisfies some internal criterion, or when the need to render a final decision or opinion brings closure and "freezes" the belief (9). Information search is not begun if there is no challenge to existing hypotheses.

This "lay epistemology" suggests that a student believing soil erosion is a problem, for example, will be a more active seeker and processor of information about conservation solutions than those believing otherwise. One without an opinion, on the other hand, will actively seek information only when a need for an opinion becomes salient. The same holds true regarding policy issues: students whose confidence in their position on an issue is sufficiently challenged will be open to new information; those without opinions will seek information if an opinion is demanded.

According to this lay-epistemological model, the opinions students entering college hold on current agricultural issues have important implications for their ability to process and evaluate course content, as well as for the amount and kind of attention agricultural educators ought to give to opinion formation and values clarification. These concerns, along with the findings of Waldren et al. (14) findings, led to the following research questions:

Table 1. Demographic Characteristics (n=250).

	Percent
Major	
Production-related[1]	42.7
Other[2]	57.3
Residence	
Metro city (>100,000)	12.1
Suburb of metro city	20.2
Medium city (10,000-99,999)	17.0
Town or village (<10,000)	11.7
Rural nonfarm	3.6
Farm	35.2
Total Urban	49.3
Total Rural	50.7
Agricultural background	
Have done farm work	55.2
Have worked for other ag business	37.6
Parents or relatives have farm	53.2
Parents or relatives have other ag business	24.8
Have generalized ag background	75.6

[1] Agronomy, animal science, ornamental hort., horticulture, forestry, soil science.
[2] Ag. economics, ag. communication, ag. education, ag. science, food science, marketing.

Walter and Reisner are assistant professors in the Office of Agricultural Communications and Education, University of Illinois, Urbana IL 61801.

Table 2: Mean estimates[1] of soil erosion seriousness by locus of problem, selected groups[2] (1 = not serious, 7 = very serious.)

	Locus of problem:		
	Midwest	Illinois	home town
All students	5.4	5.1	3.9
n	181	183	199
Rural	5.4	5.1	4.5
Urban	5.5	5.2	3.0***
Ag background	5.5	5.2	4.1
No ag background	5.1[a]	5.1[a]	2.9***

[1] Students with opinions only.
[2] All means in each row significantly different at p<.001 unless marked with superscript "a."
*** Differs from mean immediately above at p<.001.

❶ How well-formed are the opinions of students entering the college of agriculture?

❷ Do urban students differ systematically from rural students in the formation and direction of their opinions?

Procedures

In October 1989, we administered a three-page questionnaire to students in Agriculture in Modern Society, a survey course required of all University of Illinois freshmen in agricultural majors. Because our study was a pilot to judge the feasibility of initiating a continuing assessment of student beliefs and values, we focused primarily on a single agricultural issue, soil conservation. We drew questionnaire items from studies of conservation attitudes (8, 9) and from UI agriculture faculty, and pretested the questionnaire with 25 agriculture faculty members.

Final wording of questions is included in the accompanying tables. Any question that called for an opinion also included a "no opinion" option, which students were instructed to select if they felt they had no opinion on the question, had not thought much about the issue, or lacked the knowledge to answer the question.

The students returned 250 usable questionnaires. We analyzed the data with SPSS/PC+ Version 2.0.

Demographic Characteristics

All but five of the 250 respondents were freshmen. Slightly more than one-third were in majors oriented toward commercial agricultural production; the remainder were in social science, forestry and service/processing sector majors (Table 1). Slightly more than one-third indicated they grew up on a farm. Nearly as many indicated they grew up in a large city or suburb. The group contained virtually equal urban (city or suburb of 10,000 or more) and rural components.

More than half the students reported having done one or more years of farm work, and 37.6 percent indicated they had worked for some other ag-related business. Slightly more than half have parents or relatives who are farm operators, and 24.8 percent have parents or relatives who run some other ag-related business. More than three-quarters have one or more of these four kinds of agricultural background.

Erosion Seriousness

The students indicated on three seven-point scales (plus the no-opinion option) how serious a problem they believe soil erosion is in the Midwest, in Illinois and in the area around their home town. Those offering opinions called

Table 3. Percentage of selected subpopulations giving "no opinion" responses to erosion seriousness, policy option and agricultural issues.

	Rural (n=125)	Urban (n=122)	Agricultural background (n=189)	No ag. background (n=59)
Erosion seriousness				
Midwest	8.8	47.5***	17.5	60.0***
Illinois	8.8	45.9***	16.9	58.3***
Home town	7.2	34.4***	12.7	45.0***
Problem definition				
Water quality	25.6	42.1**	28.0	50.8**
Present yields	16.0	44.3***	20.6	58.3***
Future productivity	19.2	36.1**	21.7	45.0***
Policy options				
Education	12.0	28.7**	15.9	33.3**
Tax credits	7.3	16.4*	7.4	25.0***
Yield insurance	12.0	24.6*	13.2	33.3***
Cost-sharing	12.8	25.4*	15.3	31.7**
Cross-compliance	12.0	24.6*	15.3	26.7*
Soil loss fines	9.6	25.4**	14.8	26.7*
Issues				
Pesticide use	5.7	14.9*	9.6	11.9
Profitability	4.9	9.9	5.9	11.9
Soil erosion	4.9	14.0*	5.9	20.3**
Family farms	4.9	8.3	4.8	11.9
Organic farming	21.1	31.4	21.4	40.7***
Sustainable ag.	23.8	31.4	24.2	37.3

* Differs from percentage immediately to the left at p<.05.
** Differs from percentage immediately to the left at p<.01.
*** Differs from percentage immediately to the left at p<.001.

Table 4: Agreement with selected definitions of erosion consequences and conservation policy options, in percents (n=250).

	Agree	Disagree	No opinion	Mean[3]
Problem definitions[1]				
Lowers water quality	55.0	11.6	33.3	1.2
Reduces current yields	63.2	7.2	29.6	1.1
Threatens future productivity	65.6	7.2	27.2	1.2
Policy options[2]				
Education	59.6	20.4	20.0	1.3a
Tax credits	73.2	14.8	11.6	1.2a
Yield insurance	66.8	15.2	18.0	1.2a
Cost-sharing	60.0	20.8	19.2	1.3a
Cross-compliance	45.2	36.8	18.0	1.4b
Soil loss fines	36.0	46.4	17.6	1.6b

[1] Items were worded as follows: Soil erosion is lowering water quality in many areas of the U.S. Many farmers are currently losing crop yields to soil erosion. If U.S. farmers don't control soil erosion, crop yields will be reduced in the next 30 years.

[2] Items were worded as follows: Spend more federal and state money to educate farmers about soil erosion. Lower property taxes for farmers who practice conservation. Provide low-cost crop yield insurance to farmers who use specified conservation practices. Increase funds to pay part of farmers' costs for increasing conservation. Deny price-support and other government program benefits to farmers who don't practice adequate conservation. Make farmers who don't meet state-set soil loss limits pay fines.

[3] Students with opinions only; lower scores signify greater agreement (1 = agree, 2 = disagree.) For policy options, means with different superscripts differ at p<.000.

erosion a moderate to serious problem in all three locations, though less serious as consideration moves from region to state to home town (Table 2). Residence and generalized agricultural background are associated with differences in estimates of problem seriousness only at the local level.

A significant number of students offered no opinion on one or more of the three items (Table 3). Most of these gave no opinion on all three items, though more offered opinions about local erosion than about state or regional erosion. Students from rural areas or with agricultural backgrounds were significantly more likely to offer opinions.

Erosion Consequences

The questionnaire asked the students to agree or disagree (with a no-opinion option) with statements about three soil erosion consequences: water pollution, present loss of soil productivity and future productivity loss. A majority agreed with each statement, though a slim majority in the case of water quality (Table 4). Neither residence nor generalized ag background explains differences in agreement with these erosion problem definitions. But students who consider erosion more severe in the region are also more likely to consider it a water quality problem (r=.27, p<.001). As with estimates of erosion's seriousness, farm residents and students with agricultural backgrounds were more likely to express an opinion on these items (Table 3).

Conservation Policy Preferences

The students also indicated their agreement or disagreement (again with a no-opinion option) with each of six conservation policy proposals. Three of the items propose economic incentives to encourage voluntary conservation, one is an education option, and two call for economic penalties or regulations to limit erosion.

A majority agreed with each of the non-penalty proposals, whereas opinions on the two restrictive measures were mixed (Table 4). Residence and agricultural background are unrelated to agreement with incentive and education policy options, but are modest predictors of agreement with penalty measures. Assessments of soil erosion seriousness appear to play at most a modest role in explaining conservation policy positions. (Local erosion seriousness is not significantly correlated with any policy opinions; regional severity's largest correlation is with cost-sharing: .30, p<.001.)

These items received relatively high proportions of no-opinion responses, between 10 and 20 percent each (Table 3). Residence and agricultural background are virtually equally reliable predictors of whether a student holds an opinion on any of the policy proposals. Assessments of problem severity and soil erosion consequences appear unrelated to policy opinion holding.

Program Priorities

The students ranked six items in terms of the relative amounts of government financial resources they should receive. As a group, they gave no single issue a consistently high ranking. Of the six, efforts to preserve family farms received the highest mean rank, followed by decreasing soil erosion, improving farm profitability and decreasing pesticide use (table 5). Promoting sustainable and organic agriculture ranked lowest and had large proportions of "no opinion" responses.

Residence and generalized agricultural background are the most reliable predictors of willingness or ability to rank agricultural issues, as they are for the other opinion items (Table 3). Residence does not predict opinion concerning either preserving family farms or supporting sustainable agriculture, suggesting that these issues are equally salient (or non-salient) for farm and nonfarm students.

Discussion

The survey findings indicate that, as a group, the students mirror farmers in estimating erosion to be a less serious problem locally than at the state and regional level (6, 7). A large majority of those with opinions sees erosion as a

Table 5: Mean ranks for spending government resources on six agricultural issues,[1] all students and selected subpopulations (1 = highest, 6 = lowest).

	Government should spend more money on:					
	Pesticide Use	Profit-Ability	Soil Erosion	Family Farms	Organic Ag	Sustainable Ag
All students	3.4	2.9	2.9	2.6	4.5	4.1
Rural	3.9	2.7	2.8	2.3	4.7	4.2
Urban	2.9***	3.2*	2.9	3.0***	4.1**	3.9
Ag background	3.7	2.9	2.8	2.4	4.6	4.2
No ag background	2.6***	3.1	3.3*	3.2**	3.8**	3.7

[1] Items were worded as follows: Decreasing pesticide use on farms. Improving farm profitability. Decreasing soil erosion on farms. Supporting programs to maintain family farms. Supporting programs to promote organic agriculture. Supporting programs to promote sustainable agriculture.

* Differs from mean immediately above at p<.05.
** Differs from mean immediately above at p<.01.
*** Differs from mean immediately above at p<.001.

complex problem involving not only soil loss but losses in crop productivity and water quality as well. A large majority also prefers incentives to penalties for encouraging conservation. Residential and experiential background account for relatively few differences in opinions on most of the survey items.

In terms of our research questions, the findings' most salient aspect is the large proportion of students answering "no opinion" to the opinion and attitude items. Most of these responses came from urban students or those without agricultural backgrounds. For example, almost half the urban students (compared with fewer than 10 percent of the rural students) declined to estimate the seriousness of soil erosion in the state or region, and more than 30 percent declined to rank sustainable agriculture among other program priorities. Proportions of "no opinion" responses are even higher among the nearly one-quarter of the students with no agricultural background.

This suggests that many UI agriculture freshmen, particularly those without farm experience or familial ties to agriculture, enter college with relatively unformed attitudes or opinions regarding some of U.S. agriculture's more important issues. Moreover, the absence of strong connections between estimates of erosion severity, problem definitions and policy preferences hints that many of those who do express opinions on these subjects also may not have well integrated systems of beliefs and opinions.

The survey does not, of course, say anything about freshmen of other years or at other colleges of agriculture. Where nonrural students make up a smaller portion of the freshman class, as may be the case at land grant universities in states less urbanized than Illinois, the proportion of students without opinions on agricultural issues may well be lower. Similarly, the level of student opinion holding may be greater when or where soil conservation is particularly prominent in the public policy or mass media agendas. Nonetheless, our finding of relatively weak associations across opinion items in both rural and nonrural categories suggests that, if this freshman class is otherwise typical of those elsewhere, many agriculture students are starting school poorly equipped to interpret course content in terms of social issues and values.

Curricular Implications

According to the lay-epistemological model, it should be no surprise that nonrural freshmen are less likely to offer opinions on soil conservation questions, since farmland erosion is likely a less salient concern in their home communities. Many may have never been called upon to form hypotheses regarding erosion seriousness or control. The task for agricultural curricula, then, is to make conservation and other agricultural issues salient by overtly challenging these students' epistemological hypotheses -- i.e., by requiring them to examine their opinions or lack of opinions. Such efforts should involve all students; no-opinion responses from rural freshmen frequently approached or exceeded 10 percent.

This need not entail handing students ready-made opinions, except for comparison and criticism. Rather, as Batie (2) has suggested, each major's curriculum ought to require students at some point to state publicly and defend their opinions on key issues for the field via some combination of classroom discussion and written and critiqued papers. The North Central Curricular Committee Project (13) recommends strong emphasis on issues and values during the junior year; we suggest as well that they receive explicit attention in most if not all agriculture courses.

Simply having opinions is no guarantee students will later get involved in agricultural issues. The case of soil conservation, for example, indicates conservation attitudes and environmental concern are not primary determinants of farmers' conservation behavior (6, 7). This weak link between attitudes and practice notwithstanding, it would seem a matter of institutional responsibility that all agriculture graduates at least have opinions to equip them as interested participants the agricultural policy process. As the proportion of urban students in agricultural curricula grows, it is even more critical that agricultural colleges make a conscious effort to aid students in understanding and forming opinions about agricultural issues.

References

1. Baer, R. A., Jr. 1978. "Values in Higher Education: The Crisis and the Promise." *NACTA Journal* 22(1): 4-10.

2. Batie, S. S. 1979. "Missions of Undergraduate Curriculum in the Agricultural Sciences." *NACTA Journal* 23(2): 8-11.

3. Bjoraker, W. T. 1987. "Concepts and Philosophical Issues in Food and Agriculture Undergraduate Education with Basic Guidelines for Curricular Planners." *Curricular Innovation for 2005 -- Planning for the Future of our Food and Agricultural Sciences*, pp. 5-32. Madison, Wis.: North Central Region Curricular Committee Project.

4. Harris, C. K. 1982. "Attitudes, Ideology and Choice of Farming Practices." In R. Haynes and R. Lanier (eds.), *Agriculture, Change and Human Values*, pp. 423-425. Gainesville: Univ. of Florida Humanities and Agriculture Program.

5. Hilenski, F. A. 1982. "Beyond the State University: Rethinking the Paradigm for Public Universities." In R. Haynes and R. Lanier (eds.), *Agriculture, Change and Human Values*, pp. 1163-1176. Gainesville: Univ. of Florida Humanities and Agriculture Program.

6. Karbon, J. K., G. L. Walter, L. Maurer, and L. Meiller. 1987. *Soil Conservation in Wisconsin*. Univ. of Wisconsin-Madison Dept. of Agricultural Journalism Report, Hatch Project #2879.

7. Korsching, P. F., and P. J. Nowak. 1983. "Soil Erosion Awareness and Use of Conservation Tillage for Water Quality Control." *Water Resources Bulletin* 19(3): 459-462.

8. Kruglanski, A. W. 1980. "Lay Epistemo-logic -- Process and Contents: Another Look at Attribution Theory." *Psychological Review* 87(1): 70-87.

9. Kruglanski, A. W., and T. Freund. 1983. "The Freezing and Unfreezing of Lay Inferences: Effects on Impressional Primacy, Ethnic Stereotyping, and Numerical Anchoring." *Journal of Experimental Social Psychology* 19(5): 448-468.

10. McCalla, A. F. 1982. "The Land Grant Agricultural Establishment: Prospects for Future Relevance." In R. Haynes and R. Lanier (eds.), *Agriculture, Change and Human Values*, pp. 1151-1162. Gainesville: Univ. of Florida Humanities and Agriculture Program.

11. Sampson, N. 1982. "Sustaining the Land Ethic in Agriculture Education." *NACTA Journal* 26(3): 11-13.

12. Sledge, G. W., and K. Wharton. 1987. "Alternative Educational Delivery Systems for the Future -- The Rationale and Process." *Curricular Innovation for 2005 -- Planning for the Future of our Food and Agricultural Sciences*, pp. 61-68. Madison, Wis.: North Central Region Curricular Committee Project.

13. Sledge, G. W., E. E. Darrow, E. F. Ellington, L. H. Erpelding, T. E. Hartung, and K. W. Reisch. 1987. "Futuristic Curricular Models/Designs for the Food and Agricultural Sciences." *Curricular Innovation for 2005 -- Planning for the Future of our Food and Agricultural Sciences*, pp. 115-130. Madison, Wis.: North Central Region Curricular Committee Project.

14. Waldren, R. P., A. M. Parkhurst, and J. K. Ward. 1983. "Differences Between Rural and Urban Students." *NACTA Journal* 27(4): 8-13.