

Farmers' attitudes toward land use planning

Gordon Bultena, Peter Nowak, Eric Hoiberg, and Don Albrecht

ABSTRACT: *Respondents in a 1979 survey of Iowa farm operators were divided in their attitudes on several land use planning issues, including whether or not government should undertake land use planning, what levels of government might be most appropriately involved in different planning activities, and the attractiveness of various programs for reducing the conversion of agricultural land to nonfarm uses. Presumably, respondents' attitudes on land use planning would correlate with some of their background and situational characteristics, specifically, age, education, income, and farm size. Age and education proved to be significantly related to several of the farmers' attitudes, but the other characteristics, overall, had little relevance to how farmers feel about land use planning issues.*

IN the past two decades, there has been growing sentiment in the United States for more effective land use planning. But what started as a relatively "quiet revolution" (3) has become increasingly controversial: Land use planning initiatives have been countered by opponents with a tenacious zeal for retaining private property rights. Despite repeated efforts, the U.S. Congress has yet to pass a comprehensive land use planning bill, and, after an initial flurry of interest, land use legislation has languished in all 50 states (10, 18).

A major objective of much land use planning is to preserve agricultural land, especially prime cropland. Each year, several million acres of farmland are converted to nonfarm uses to fulfill residential, industrial, transportation, recreation, wildlife, and energy needs (7, 13). In the absence of effective land use legislation, several states, including Florida, New Hampshire, and Rhode Island, are expected to lose nearly all their prime cropland (1).

Resistance to planning

Despite an obvious need for action, opposition to the philosophy and practice of

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land use planning has been widespread. Farmers especially have adamantly opposed planning (4, 14, 15, 19). This resistance seemingly springs from two sources. First, farmers have long espoused a set of values and beliefs known as the agrarian or Jeffersonian creed. Among the paramount tenets of this creed is a conviction that farmers have a God-given, inviolate right to use their land as they please and that the public purpose is well served when individual property owners pursue their own self-interest. Although many citizens now see this view as detrimental to the attainment of urgent national goals, farmers, as a group, continue to defend staunchly the sanctity of their property rights (2, 5, 11, 12, 16).

A second source of farmers' resistance to land use planning is their rational self-interest regarding the future uses of land. This self-interest can preempt the public interest (centralized, comprehensive planning), particularly if the benefits of public programs are not perceived as outweighing the personal costs these programs might impose on landowners (9). This is especially true for farmers on the urban fringe who may bitterly resist land use controls out of concern that controls will impair their future abilities to profit from the sale of farmland. In fact, many farmers plan their future operations on the assumption that they could and should sell their lands to a developer or speculator (6).

The extent to which farmers are united in their opposition to land use planning philosophies and programs, however, is unclear. Previous studies of citizens' attitudes toward land use planning generally have grouped together all farmers for purposes of making residential (rural-urban) comparisons. Land use planning issues often are cast in the context of the inherently different interests that characterize farm and city people (17). This procedure fosters the impression that farmers hold relatively similar views about land use, that they stand, in effect, united in their general opposition to land use planning. But given the considerable differences in farmers' backgrounds and situations, it seemed to us that this assumption of uniformity warranted examination.

Our study had two objectives. First, we investigated the nature and congruity of farmers' attitudes toward several land use planning issues, including the preservation of farmland. Our second objective was to test whether or not any discord in attitudes among farmers could be explained by differences in their personal characteristics and farm operations.

We posited four variables as essential to shaping farmers' reactions to land use issues: age, education, income, and farm size. There were several reasons for anticipating the importance of these characteristics. First, each has been shown to relate to farmers' support of the agrarian creed, a fundamental tenet of which is the sanctity of private property rights (8). Second, these characteristics are important in determining the level of citizens' support of environmental quality goals, which often means that social (collective) interests take precedence over individual rights (4). Finally, there is some evidence that these characteristics relate to sentiments toward land use planning. Generally, the strongest endorsement of land use planning has come from younger persons (9), better educated persons (4), persons with larger incomes (4, 9), and persons operating bigger farms (2).

Consequently, we hypothesized that the backgrounds and situational characteristics of Iowa farmers would relate to their receptivity to the philosophy and programs

of land use planning. Specifically, we expected that the greatest support for public initiatives in land use planning would be displayed by: younger as compared with older farmers (H_1), better educated as compared with lesser educated farmers (H_2), more affluent as compared with less affluent farmers (H_3), and farmers with larger as compared with smaller farm operations (H_4).

Survey sample and procedures

Our data are from a 1979 survey of farm operators in Iowa. The respondents consisted of persons who had been interviewed in 1977 in conjunction with another study. In that study a sample was drawn from a population of all Iowa farms operated by families or family corporations that had gross agricultural sales of at least \$2,500 in 1976. A self-weighting, multistage cluster sample was drawn, from which 933 personal interviews were completed. We sent mail questionnaires in 1979 to persons who had been interviewed.

Two forms of the questionnaire were used. Overall, the response rate, with three follow-ups (making adjustments for deceased farmers and undeliverable questionnaires), was 50 percent—441 completed questionnaires.

Attitudes toward land use planning. We selected several facets of land use planning for study. Table 1 gives the specific questions and response categories. First, we asked farmers how they generally felt about land use planning.

A second set of questions tapped the respondents' receptivity to the establishment of permanent agencies that could be responsible for land use planning. In addition to ascertaining the perceived need for these agencies, we examined the governmental levels at which farmers felt that such agencies might be most appropriately established.

Our third set of questions measured respondents' views about appropriate governmental levels for six specific land use planning programs. These programs included research on land use planning problems, public education about land use, preparation of land use guidelines, funding, enforcement, and final approval of land use plans.

A fourth set of questions probed the respondents' feelings about alternative policy approaches for preventing the conversion of farmland to nonfarm uses. These policies included use of the free market, differential taxation (where farmland is assessed at its use value rather than its market value), formation of agricultural districts, and governmental purchase of develop-

ment rights. We described these programs briefly and asked respondents for the intensity of their approval or disapproval of each policy.

Finally, we asked respondents which of several approaches to land use decision-making they favored. The approaches ranged from free choice among farmers to decide the best uses of land to mandatory governmental controls to ensure that farmland is not converted to nonfarm uses.

Measurement of background variables. We asked respondents for their age, which ranged from 19 to 81 (median, 50). Their educational attainment we measured by the highest level of formal schooling. This ranged from a few years of elementary school to graduate work (median, high school graduation). We also asked respondents to check one of eight income categories that fit average annual family income, before taxes, over the past three years. The income categories ranged from under \$5,000 to \$40,000 or more (median, \$20,000-\$25,000). Size of farm—the total number of acres operated (owned and rented)—ranged from less than 100 acres to more than 2,000 acres (median, 270 acres).

Results and discussion

Attitudes toward land use planning. More than three-fourths (77 percent) of the respondents reported that they generally favored land use planning. Only 16 percent expressed opposition (Table 1). This is clearly inconsistent with the widely held notion that farmers, as a group, oppose land use planning. But many more (48 percent) were "mildly favorable" than were "very favorable" (29 percent).

Farmers' acceptance of the concept of land use planning was not readily translated into support for creation of governmental bodies to carry out land use planning (Table 1). In fact, respondents were sharply divided in their opinions about the desirability of establishing permanent governmental agencies for this purpose (49 percent were favorable and 45 percent were unfavorable). Of those favoring the establishment of agencies ($N = 112$), most felt that the agencies should be kept at the county level (73 percent approved). Some persons also accepted the establishment of these agencies at the multicounty level (32 percent) or even the state level (26 percent). But only a handful (7 percent) felt that they should be placed at the federal level.

Overall, farmers preferred that most land use planning activities be the responsibility of local government, although state government also drew sizable support for

specific activities (Table 1). With the exception of funding responsibilities, respondents did not view the federal government as an appropriate level from which to administer land use planning programs. A majority of farmers (59 percent), for example, believed that final approval of land use plans should come from local government. Respondents also favored local government over state government, but often by slim margins, for research on land use problems, for preparation of planning guidelines, and for enforcement of land use regulations. State government was the preferred level for two activities—public educational programs and funding of land use planning efforts.

We found sharp differences of opinion in respondents' evaluation of policies for preserving farmland. Farmers divided evenly on whether or not the free market should determine land use—44 percent approved, and 48 percent disapproved (Table 1). Differential taxation was the most popular farmland preservation policy with 61 percent approval. Many persons who rejected this policy undoubtedly were reacting to the requirement that farmers pay a tax penalty (rollback provision) if the farmland is sold for nonfarm purposes.

Although a majority of respondents (55 percent) approved of agricultural districts, many also disapproved (37 percent). Governmental purchase of development rights drew the most negative response of the four policies (54 percent disapproved). But even here a substantial minority (38 percent) voiced approval.

As we expected, further analysis of responses to the farmland preservation policies revealed that persons who supported the free-market approach also tended to oppose each of the other three policies. But respondents showed considerable agreement in their approval or disapproval of differential taxation, agricultural districts, and governmental purchase of development rights (bivariate correlations between these items ranged from + .32 to + .51).

When asked how future use of farmland should be decided, nearly all respondents (91 percent) rejected governmental policies requiring mandatory compliance (Table 1). A majority (59 percent) favored voluntary public programs, but these respondents were split between having these programs formulated solely by farmers (27 percent) or by the government (32 percent). A sizable number of the farmers (32 percent) rejected any governmental initiative, insisting instead that land use decisions be the sole prerogative of individual landowners.

Table 1. Farmers' attitudes about land use planning.

A. Favorability to land use planning

"Taking into consideration all the factors involved in land use planning, which of the following statements best describes your feelings about it?"

	Number Percent	
1* Very opposed	23	5
2 Mildly opposed	48	11
3 Mildly favorable	211	48
4 Very favorable	127	29
No response	32	7
Total	441	100

B. Need for governmental action

(1) "Should there be a permanent government agency, board, or commission responsible for land use planning?"[†]

	Number Percent	
1* No	103	45
2 Yes	112	49
No response	13	6
Total	228	100

(2) "If yes to question B(1), at what levels would you like to see such land use planning groups formed?"[†]

	Number Percent			
	1*	2	3	No Response
	No Undecided Yes No Response (percent, N = 112)			
County	6	5	73	16
Multicounty	28	4	32	36
State	29	5	26	40
Federal	40	6	7	47

C. Focus of program responsibility

"If the following land use planning activities were undertaken, do you think they should be the major responsibility of local, state, or federal government?"

	1* Local	2 State	3 Federal	Undecided (percent, N = 441)	No Response
Final approval of land use plans	59	24	4	5	8
Enforcement of land use regulations	46	36	3	7	8
Preparation of guidelines for land use planning	45	37	6	3	9
Research on the nature and extent of land use problems	43	39	7	4	7
Public education about land use problems	37	44	8	3	8
Funding of land use programs	21	40	22	8	9

D. Farmland preservation policies

"Several programs have been tried in other states to cut down on the conversion of farmland to nonfarm uses. For each of the following programs, please circle the answer that best describes the degree of your approval or disapproval."

	1* Strongly Disapprove	2 Mildly Disapprove	3 Mildly Approve	4 Strongly Approve	No Response
	(percent, N = 441)				
Farmland is assessed for tax purposes at its value for agricultural production, but if sold for other uses, the seller is required to pay the higher tax assessment for a previous period, usually 3 to 5 years	16	15	33	28	8
Farmers who voluntarily agree to have their land included in "agricultural districts" are given reduced taxes, are exempted from some special assessments, and are partly protected against the taking of their land by eminent domain. However, once placed in an agricultural district, this land cannot be used or sold for nonfarm purposes without approval of the government	17	20	33	22	8
The government keeps farmland from being developed by paying farmers the difference between the market value of their land for nonfarm uses and its value for agricultural production. Participating farmers would then be prohibited from selling their land for nonfarm uses	31	23	25	13	8
Land use is determined solely by the free market. Farmers can sell their land to whomever they please, regardless of its future use	20	28	24	20	8

E. Preferred locus of decision-making

"Which of the following statements best reflects your views on the conversion of farmland to nonfarm uses?"

	Number Percent	
1* Each farmer should be free to decide the best uses of his own land	139	32
2 Farmers as a group should decide the best uses of farmland: the government should not make these decisions	119	27
3 The government should develop programs to encourage farmers to keep their land in agriculture, but these programs should be voluntary	140	32
4 The government should institute mandatory controls to ensure that farmland is not converted to nonfarm uses	34	8
No response	9	1
Total	441	100

*Scoring of response categories is given to facilitate interpretations of the correlations in Table 2.

†This question was asked only of a representative subsample of the respondents.

In summary, we found that while the concept of land use planning meets with acceptance in principle, farmers are divided as to how this planning should be implemented. Respondents tended to agree that land use programs should be voluntary rather than coercive, and they preferred that most planning activities reside at the local level. But despite this consensus, we did not find unanimity in farmers' opinions on many of the land use issues. Sharp divisions were the rule rather than the exception.

Correlates of land use attitudes. We used Pearsonian correlation to test relationships between farmers' receptivity to land use planning and some of their personal and situational characteristics, our second study objective. We considered individual hypotheses confirmed if the bivariate correlations were in the posited direction and were statistically significant at the .05 level of probability.

Our expectation that older farmers would display more conservative attitudes toward land use planning than would younger persons (H_1) was largely confirmed (Table 2). Older farmers were more insistent than others that land use programs be lodged at the local level. Older farmers also were less supportive than younger farmers of using agricultural districts and differential taxation (with rollback provisions) to preserve farmland. And

as we expected, they favored use of free-market mechanisms to determine future land uses much more than younger farmers.

Our second hypothesis was also supported in part by our discovery of significant relationships between educational attainment and land use attitudes. Better educated persons were more likely to support establishment of permanent governmental agencies for land use planning, and they preferred having various functional programs developed at the state and federal levels as opposed to the local level (Table 2). Those respondents with more education also were more supportive of two programs for preserving farmland—differential taxation and agricultural districts.

Contrary to our expectations, income had little effect on respondents' attitudes toward the several land use issues (H_3). We found significant relationships in only 4 of 17 income comparisons (Table 2). Similarly, we found that farm size (H_4) was of little importance to respondents' attitudes about land use planning. Only 4 of our 17 analyses produced significant relationships. As both income and farm size increased, however, we did discover a slight tendency for respondents to be more approving of governmental involvement in decisions about farmland conversion.

Overall, our data did not forcefully support the argument that differences in re-

spondents' age, education, income, and farm size would be important to their attitudes about land use planning. Even where we found statistically significant relationships, as with age and education, the magnitude of these relationships was small.

Conclusions

The land use attitudes we studied appear to be fairly independent of farmers' social and economic profiles. This suggests the need to look at characteristics other than personal ones to explain the variations in farmers' attitudes toward land use planning. Attention to their perceived self-interests would seem especially fruitful. For example, there is evidence from other research that the greatest participation in and presumable acceptance of farmland retention programs, such as agricultural districts, comes from farmers who are in the least viable position to sell or develop their land for nonfarm purposes.

Our data indicate that land use planning is not a consensus goal, at least in practice. Future mobilization of farmers' support for specific land use programs will require careful attention to diverse emotional and self-interest considerations. Clearly, some of the deep-seated beliefs and values that have been important historically in shaping farmers' reactions to policy initiatives now are on a collision course with new social imperatives for the use of farmland.

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Table 2. Correlations of farmers' characteristics and attitudes about land use planning.

Attitude	Characteristic			
	Age	Education	Family Income	Size of Farm
	—Pearsonian correlation*—			
A. Favorability to land use planning	-.07	+.03	+.09t	+.09t
B. Perceived need for governmental action				
(a) Formation of permanent agency	-.09	+.15t	+.06	-.03
(b) Level of agency, if supported its formation				
County	+.18t	+.07	+.01	-.06
Multicounty	+.04	+.22t	+.10	+.30t
State	-.04	-.17	+.02	+.14
Federal	+.31t	+.02	-.04	+.18
C. Focus of program responsibility (county, multicounty, state, or federal)				
Research	-.12t	+.20t	+.08	+.02
Public education		+.13t	+.04	+.02
Preparation of guidelines	-.14t	+.15t	+.01	+.03
Final approval -	-.06	+.05	+.101'	+.02
Funding	-.10t	+.07	-.01	+.05
Enforcement	-.13t	+.08t	+.04	-.02
D. Farmland preservation policies				
Differential taxation	-	+.12f	.00	+.01
Agricultural districts	.12t	+.09t	+.04	+.07
Development rights	+.03	-.03	+.09t	+.12t
Free market	+.11 t	-.06	-.04	-.02
E. Preferred locus of decision-making	.00	+.07	+.14f	+.09t

*The bivariate correlation is between the stated status characteristic and the response items for each question (exclusive of undecided and no response), as given in table 1. tCorrelation is statistically significant at or beyond the .05 level of probability.

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Livestock and vegetative performance on reclaimed and nonmined rangeland in North Dakota

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ABSTRACT: A major test of whether land strip-mined for coal has been successfully reclaimed is how the land's post-mining productivity and use compare with the productivity and use of similar, nonmined land. Among the criteria for making such a comparison are animal performance, vegetative production, vegetative composition and diversity, and plant and canopy cover. The relationship of plant and canopy cover to predicted soil loss is important also. A comparison of such data from a reclaimed site near Center, North Dakota, with similar data from nonmined sites showed productivity on the reclaimed site to be comparable to that on nonmined land, thus indicating effective reclamation.

IGNITE coal production may disturb L., 3,000 acres (1,215 hectares) of land a year in North Dakota by 1990. More than half this land is now pasture or rangeland (6). Adequate reclamation demands that pasture and rangeland be returned to a level of productivity and use equal to or better than before mining. An acceptable measure of success is a comparison of groundcover and productivity on reclaimed areas with similar data from nonmined areas (Federal Register, vol. 44, 1979).

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Our study began as a grazing study on reclaimed land in 1976. We were attempting to determine the effects of heavy, moderate, and light grazing intensity on the vegetative and steer performance. In 1979 we obtained vegetative and cover data from an adjacent, nonmined site for comparison. We also compared steer performance on the reclaimed land in 1977, 1978, and 1979 with similar data for the same years from studies on nonmined land at the U.S. Department of Agriculture's Research Center near Mandan, North Dakota.

Study methods

The mined-land pastures (4, 5) near Center, North Dakota, are part of a long-term study of land reclaimed in conformance with the 1969 North Dakota law requiring no topsoil replacement. Spoil materials at the site are silt loam, low in sodium (SAR = 2) and, therefore, suitable for revegetation. In contrast, spoils at

other North Dakota mine sites are high in clay content and sodium (SAR = 19 to 48), which limits establishment of vegetation unless the topsoil is replaced (6).

In the spring of 1973, the Baukol Noonan Coal Company seeded the Center site with a mixture of smooth brome grass (*Bromus inermis*), crested wheatgrass (*Agropyron desertorum*), intermediate wheatgrass (*Agropyron intermedium*), alfalfa (*Medicago sativa*) and biennial yellow sweetclover (*Melilotus officinalis*). The coal company applied 100 pounds per acre of 11-11-0 fertilizer at seeding. None has been applied since.

Stocking rates of one yearling steer per 0.6 (.24 ha), 1.2 (.49 ha), and 1.8 (.73 ha) acres provided heavy, moderate, and light grazing intensity, respectively. Cattle grazed the pastures an average of 45 days during the spring and early summer each year beginning in 1976. Grazing continued each season until the forage available on moderate pastures was half utilized. Two 50 x 100-foot (15.25 x 30.5-meter) exclosures within each pasture provided ungrazed controls.

We measured vegetation on two range sites within a native pasture immediately adjacent to the reclaimed area. Site I features a strongly rolling topography; site II is moderately rolling. Both sites were in good range condition (2).

Soils on the nonmined sites are Cabba (loamy, mixed, calcareous, frigid, shallow Typic Ustorthents) and Sen (fine-silty, mixed Typic Haploborolls), the same soils that existed on the reclaimed area before mining.

The nonmined sites were heavily grazed as part of a large pasture from mid-April to May 30 each spring by cows and calves, then deferred for the remainder of the year. We duplicated each reclaimed pasture and native site within limits of the physical restrictions at each location.

We determined pre- and post-grazing yields on reclaimed pastures and ungrazed exclosures from 3 x 10-foot (.9 x 3.1-m) mowed strips. Seasonal production was determined by hand clipping two 1 x 2-foot (.3 x .6-m) areas under a 4 x 5-foot (1.2 x 1.5-m) cage. We determined August 30 yields of reclaimed and native sites by hand clipping two 1 x 2-foot areas. All harvested material was oven dried and weighed. We analyzed the means of six subsamples as a randomized complete block design with two replications.

We calculated animal gains and performance from steer weights at the start of and immediately after grazing. We compared animal gains on reclaimed sites with gains of steers grazing nonmined pastures