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Personal, Farm and Value Orientations in Conversion to Organic Farming

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Despite the 20% annual increase in consumption of organic foods, the price premiums for organic produce, and the critical mass of organic production and producers in North Dakota, the level of adoption of organic farming remains quite low. The goal of this research is to assist organic farming agencies and organizations in developing programming targeted to potential adopters of organic farming. It accomplishes this by identifying variables which classify producers as either organic or conventional. While environmental-ethical motivating factors explained the classification of producers into organic and conventional farming categories, none of the farm structural variables and only one personal demographic variable were able to classify producers. In examining the logistic regression analysis, the three most important classificatory factors were environmental-ethical reasons, production orientation, and farming orientation. The implications of the results for programming to target potential adopters of organic farming are discussed.

KEYWORDS *classification, organic and conventional producers*

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INTRODUCTION

North Dakota is a leading organic agricultural producer. In 2001, North Dakota was the top state in terms of organic grain acreage, certified organic oilseed acreage, and certified organic oats and buckwheat acreage. It had the second most certified organic wheat acreage, and the sixth most certified soybean acreage (Greene and Kremen, 2003). Not only is the state a leading organic producer, but organic production is expanding in North Dakota. Between 1997 and 2005, certified cropland acres increased by 62%, certified pasture acres increased by 139%, and total certified acres increased by 100% (Economic Research Service, 2007).

With growing demand for organic food, opportunities for expansion of organic production exist. The growth in organic retail sales has grown more than 20% annually since 1990 (Dimitri and Greene, 2002). The growing demand for organic food is making organic farming more profitable. Strong demand for organic products, in addition to their greater labor and resource insensitiveness compared to conventional farm produce, has resulted in premium prices (Green and Dimitri, 2003). Organic farming provides opportunities for innovative small and midsize farmers to produce crops demanded by a rapidly expanding market segment that also includes sustainably and locally grown products (Budd, 2002; Kirschenmann et al., 2005).

While adoption of organic farming systems showed strong overall gains between 1992 and 2005, and the adoption rate remains high, the overall adoption rate is still low—only about 0.5% of all US cropland and 0.5% of all pasture was certified organic in 2005. (Economic Research Service, 2007). Organic livestock was beginning to catch up with produce in 2005, with 1% of US dairy cows and 0.6% of the layer hens managed under certified organic systems (Economic Research Service, 2007).

Given that North Dakota is a leading organic producer, that there exist growing demand and opportunities for expansion, that organic farming provides price premiums greater than conventionally raised produce, and that organic farming provides opportunities for small- and medium-sized farm, the main question might be why more farmers have not "gone organic." According to a review by Budd (2002), the answer seems to be partly financial and part cultural, complemented by a lack of information and research support on organic farming demand, techniques and marketing strategies. The USDA similarly identified obstacles to conversion as high managerial costs and risks of shifting to a new way of farming, limited awareness of organic farming systems, lack of marketing and infrastructure, and inability to capture marketing economies (Economic Research Service, 2007).

Despite the 20% annual increase in consumption of organic foods, the price premiums for organic produce, and the critical mass of organic production and producers in North Dakota, the level of adoption of organic farming is still quite low. The goal of this research is to identify variables

which classify producers as either organic or conventional. The outcome of this research would assist organic farming agencies and organizations in developing programming targeted to potential adopters of organic farming.

LITERATURE REVIEW

In this section, those individual, farm, and social system characteristics that have been found to explain conversion to organic farming, and those characteristics which explain the differences between conventional and organic farmers are discussed. These include personal characteristics, experiences with conventional agriculture, and personal motivations for conversion as well as farm structural characteristics.

A review of the literature about the characteristics of organic farmers found the strong influence of women in the decision to convert (Dettmer, 1986; Fischer, 1982, 1989; Ashmore, 1993). Other than gender, urban backgrounds, high levels of general academic education, being younger, and having less farming experience were found as characteristics of early organic farmers (Burton et al., 1997b, Duram, 1999; Harris et al., 1980; Henning et al., 1991; Lockertz, 1997; Murphy, 1991; Tovey, 1996; Vartdal, 1993; Vogtmann et al., 1993). Organic farmers often found a lack of social acceptance in their local communities (Fisher, 1982; Kramer, 1984; Wernick & Lockeretz, 1977; MacRae et al., 1990), while others did not find that social acceptance was all that important (Lockeretz & Madden, 1987). While organic farmers may not have been socially accepted in their community, they maintained a good relationship with their consumers (Vogtmann et al., 1993; Richter, 1990).

Organic farmers had different motivations for farming organically. Among them were the professional challenge, concerns about personal health, religious and philosophical concerns, environmental and political concerns, and economic issues. (MacRae et al., 1990; Duram, 1999; Maurer, 1997; Dettmer, 1986; Fischer, 1982; Rantzau et al., 1990; Svensson, 1991; Vine and Bateman, 1981; Vogtmann et al., 1993).

General concerns for adopting organic farming include religious, philosophical, environmental, and political concerns. MacRae et al., (1999) noted that a common although not prerequisite motivational change among transitioning farmers was how they viewed the farm and the practice of farming. Similar to the findings of MacRae and colleagues, Abaidoo and Dickinson (2002) found that conventional and organic farmers hold different world views. Conventional farmers' environmental values were more consistent with the Dominant Social Paradigm; those of alternative farmers were more consistent with the New Environmental Paradigm. Fairweather (1999) found that organic farmers were motivated by an organic philosophy which included a concern for chemicals in food and personal health. In early studies

the main concerns were religious and philosophical, and in later studies environmental and political concerns were more important (Ashmole, 1993; Brighton et al., 1988; Buchdal, 1982; Burton et al., 1997; Conacher & Conacher, 1982; Dettmer, 1986; Fischer, 1982; Halpin, et al., 1984; Rantzau et al., 1990; Svensson, 1991; Vine & Bateman, 1981; Vogtmann et al., 1993; Wernick & Lockeretz, 1997).

In regard to farm characteristics initially organic farms were smaller than conventional farms, but over time the size of organic farms has tended to increase, but it would eventually stabilize (Harris et al., 1980; Lockeretz & Anderson, 1990; Dubgaard & Sorensen, 1988; Henning et al., 1991; Burton et al., 1977; Murphy, 1992; Offermann & Nieber, 2000).

Some farmers began to farm organically because of problems they experienced with conventional farming—primarily soil erosion and deteriorating animal health (Fischer, 1982; Vine & Bateman, 1981; Vogtmann et al., 1993; Wenick & Lockeretz, 1977; Wynen, 1990; Fairweather, 1999). Others began to farm organically because of financial motivations (Brighton et al., 1988; Conacher & Conacher, 1982; Fischer, 1989; Lockeretz & Madden, 1987; MacRae et al., 1990; Svensson, 1991; Vogtmann et al., 1993; Wynen, 1990; Fairweather, 1999). However, non-financial motivations were still important in the decision to convert (Padell, 2000; Burton et al., 1997b).

THEORETICAL ORIENTATION

This research is informed by the middle-range theory of the adoption and diffusion of innovations, especially that concerning the characteristics of innovations and the characteristics of early adopters (Rogers and Shoemaker, 1971).

Organic Agriculture as an Innovation

Organic or sustainable agriculture is an innovation in the current context of northern Great Plains agriculture, but one that has historical precedence in the experience of pre-World War II agricultural practices which predated the advent of chemical agriculture. An innovation is defined as "an idea, practice, or object perceived as new by an individual" (Rogers, 1979, p. 19). Whether the innovation is actually new is not as important as is its perceived newness for the person adopting it. If it seems new to the person, it is an innovation. An innovation can be a technology, a practice, knowledge, or a belief. Organic farming as an innovation involves all four components of an innovation. Most research on the adoption of innovations has considered them to be material or technological, involving an object and an idea. All innovations have an ideational component, but not all have an objective component. Innovations that have only an idea component cannot be

adopted in a way that can be physically observed. In these instances, adoption is basically a symbolic decision (Rogers and Shoemaker, 1979, p. 21; Klonglan and Coward, 1970). As applied to organic farming, conversion to organic farming may require the symbolic adoption of a land ethos or stewardship ethic.

Beus and Dunlap (1990) summarize two different paradigms in regard to agricultural production which they labeled as alternative and conventional agriculture. In a survey designed to discover whether members of different groups (such as organic and conventional farmers) could be shown to adhere to a combination of values related to aspects of production agriculture, Beus and Dunlap (1991) found a strong correlation between group membership and the combination of beliefs. The differences between the two paradigms can be explained as six important contrasts with conventional agriculturalists identifying with the first item in each of the six contrasts and alternative agriculturalists identifying with the second item in each contrast: centralization vs. decentralization; dependence vs. independence; competition vs. community; dominance of nature vs. harmony with nature; specialization vs. diversity; and exploitation vs. restraint. The results point to a fundamental difference between organic and conventional farming.

Rogers (1983) differentiated between the "hardware" and "software" aspects of an innovation. Hardware includes the necessary technology, whereas software refers to the information on how to use the technology and information on how to evaluate its performance. Organic farming would be mainly a software based innovation. It requires new management skills such as planning diverse rotations, managing biological resources to control pests and diseases, as well as using mechanical or biological controls for weeds, pests, and diseases. Only a few new inputs and new machinery will be required for conversion typically for special equipment not commonly used on conventional farms (Padel and Lampkin, 1994a). Although low-input systems are information intensive, the information requirements for such systems have not been studied extensively (Lockeretz, 1991).

Organic Farmers As Innovators Or Early Adopters

Rogers (1983) stated that adopters of any new innovation or idea could be categorized as innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%), and laggards (16%). Some of the characteristics of the two innovative categories include: Innovators are venturesome, eager to try new ideas, cosmopolite, communicate with other innovators, substantial financial resources, ability to understand and apply complex ideas, able to cope with high degree of uncertainty, able to accept occasional setbacks, may be respected by members of their social system. Early adopters are respectable, more integrated, part of the local social system, are localities, have the highest degree of opinion leadership, serve as a role model and

gatekeeper, are more respected, are the embodiment of success, make discrete use of new ideas, make judicious decisions about innovations, and they decrease uncertainty about a new idea, and convey approval of it.

Whether the adopter categories based on hardware, profit-based innovations in conventional agriculture are appropriate for software, ideational innovations in organic agriculture has been questioned. Vartdal (1993) found three categories of organic farmers in Norway: Anthroposophists, Ecosophists, and Reformists. Anthroposopists were influenced by biodynamic agriculture and showed similarities to innovators such as strong commitment to their ideas. Ecosophists were motivated by green ideas and were part of the environmental and back to the land movements and showed some similarities to the early adopters. Reformists were 'normal' farmers with a pragmatic approach to organic agriculture. He described them as corresponding to the early majority. Vartdal (1993) concluded that the classification of organic farmers confirms the applicability of the model although reformists might represent early adopters category of agricultural opinion leaders whereas the other two groups would fall into category of innovators. If Vartdal is correct, then the generalizations about the characteristics of various adopter categories would be applicable to adopters of organic agriculture.

Based upon Fairweather's (1999) classification of types of organic and conventional farmers, Darnhofer et al. (2005) collapsed them into five categories which roughly correspond to Roger's adopter categories. The "committed organic" farmer category would be comparable with innovators, and the "pragmatic organic" farmer category would be comparable with the "early adopter" category. The "committed organic" farmers are deeply rooted in the founding philosophy of organic farming based upon the rejection of synthetic fertilizers and pesticides. The "pragmatic organic" farmers were not motivated by the same concerns as were the "committed organic" farmers, but they were instead motivated by financial and economic concerns.

That the farmers could be segmented by demographic characteristics in regard to their adoption of organic farming was demonstrated by Jolly et al. (2004). In distinguishing between innovators and early adopters of organic agricultural production technologies, they found that the key differentiating attributes were the use of technology, level of education, gender, level of farm revenues, and the management intensity of marketing.

In her review of the literature, Padel (2001) stated that much of the early research was conducted to demonstrate similarities between organic and non-organic farmers so it could be proven that organic farming had relevance beyond a small group. That research often found that organic farmers were different from average farmers: better educated, less farming experience, smaller farms, less emphasis on profit maximization. She interpreted that difference as one between early and later adopters. Organic farmers shared some characteristics with innovators such as higher education, wider social networks, and larger enterprises. They differed from early

adopters of commercial innovations, but showed similarities with innovators and early adopters of environmental innovations (Taylor and Miller, 1978;Vanclay and Lawrence, 1994).

Results of surveys of farmers converting since the late 1980s have indicated that they are better integrated socially, have increasing average farm size, and place increased emphasis on the importance of financial motivations. Padel (2001) suggests these results indicate that in some countries the stage of early adoption has been reached. That the early adoption stage had been reached was further supported by Fischer (1989) who was unable to establish a difference in personal characteristics between early and later adopters.

PROPOSITION

In terms of personal characteristics, relative to conventional farmers, we would expect organic farmers to be younger, have more education, have less farming experience, have more urban backgrounds, to be better able to deal with abstractions and complex ideas, to be venturesome, to enjoy the challenge of farming organically, and to have more women as farmers. Regarding their motivations, we would expect that financial, personal and family health concerns, religious and philosophical concerns, environmental and political concerns to motivate farmers to convert to or to adopt organic farming. Concerning farm size, we would expect that organic farmers would have smaller farms than conventional farmers. Lastly, concerning their social relationships, we expect organic farmers to be less integrated into and accepted by their local social systems but to be more integrated into extra-local social systems, especially with other organic farmers.

METHODOLOGY

Purpose

The study was conducted in collaboration with FAR^{R}MS—the Foundation for Agricultural and Rural Resources Management and Sustainability. The purpose of this analysis is to determine those factors that predict farmers' classification into organic/transitioning and conventional farming categories. The data for this analysis includes only those questions that were asked of both the conventional and organic/transitioning producers.

Population and Sample

The population for this study is all North Dakota farmers including those who farm organically and those who farm conventionally. The sampling

frame for conventional farmers consisted of the subscribers of *Farm and Ranch Guide,* a free weekly agricultural newspaper which has statewide circulation. The sample of conventional farmers was a proportionate random sample with respondents drawn in proportion to the distribution of farmers in counties in each of five areas of the state (Northwest, North Central, Red River Valley, Southwest, South Central) based upon Census of Agriculture data.

Because of a small and unknown percentage of organic farmers, we could not rely on the subscriber list to obtain an adequate number of organic farmers for comparison purpose by random selection alone. Therefore, we gathered lists of known organic farmers, and those lists were provided by the Northern Plains Sustainable Agriculture Society, International Certification Services, and the North Dakota Department of Agriculture list of organic growers. The lists were merged, duplicate names were deleted, and a final list of 243 organic farmers was obtained. From this list, whitepages.com was searched to find telephone numbers to match each of the names of the list. Because names could not be obtained for 29, the N was further reduced to 213.

Telephone interviews of 378 conventional producers and of 113 organic producers were conducted by the Social Science Research Institute at UND from February 20 through March 24, 2006. The response rate for conventional growers, based on the 512 farmers available for interview, was 74%, and the response rate for organic growers, based on the 202 farmers available for interview, was 56%. Overall, 840 phone numbers were classified as working numbers with residents eligible for interview and 491 of these were successfully interviewed. The overall response rate, based on the 714 residents available for interview, was 69%. Table 1. presents the disposition of the sampled telephone numbers.

Classification of Farms

The self-classification of farm operations does not always correspond with the sampling lists from which they were selected. Twenty-four farmers from the organic sample classified themselves as conventional, whereas six farmers in the conventional sample classified themselves as organic and seven classified themselves as transitioning to organic (Table 2).

TABLE 1 Sample Dispositions

	Overall	Organic	Conventional
Completed Interviews	491	13	378
Refusals	195	77	118
Terminated Interviews	28	12	16
Subtotal	714	202	512
Contacted, Not Interviewed	126	65	61
Total	840	267	573

TABLE 2 Farm Operation by Sampling Frame

Operation	Conventional Sample	Organic sample	Total
Conventional	365	24	389
Organic	6	75	81
Transitioning	7	14	21
Total	378	113	491

Comparison of Sample to Population

We had been assured by the editor of Farm and Ranch Guide that based upon their own readership surveys, their subscribers' farm and personal characteristics approximated that of the Census of Agriculture. To check on the representativeness of the subscriber list as a sampling frame, we compared answers to demographic and farm structural characteristics with data from the latest Census of Agriculture data. From a comparison of the census and sample data, the organic and conventional samples tend to represent the commercial farmers in the state. Whether by acres or sales categories, there are greater percentages of both the organic and conventional farmers in the larger farm size categories.

The average farm size for both organic and conventional samples is larger than that of the census. In the total percentages of first four sales categories, both the organic and conventional samples were less than the census percentage. In the $25K to $50K sales categories, the percentage of organic farmers was more than the census while the percentage of conventional farmers was almost equal to the census. In the $50K to $99K sales category, the percentages for both conventional and organic samples were greater than the census. For both the $100,000 to $249,999 and the $250,000 to $499,999 sales categories, the percentages of conventional and organic samples were greater than the census. Only in the largest sales category did the percentage of the conventional sample exceed that of the census while the percentage of the organic sample was less than the census.

The average farm size for organic and conventional farmers is larger than that of the census. In comparing farms by acres, in the less than 500 acres categories, the percentages of farms was lower than the census for both the organic and conventional samples. In the 500 to 999 acres category, the percentage of organic farms was higher than the census but the percentage of conventional farms was less than the census. The percentage of both conventional and organic farms in the 1000 to 1999 acres category was less than that of the census, but the percentage of both organic and conventional farms in the 2000 acres and more category was more than the percentage in the census.

The organic sample had a higher percentage of women than did the census and the conventional farmers. The average age for the census and

TABLE 3 Comparison of Sample and Census Figures for Farm and Demographic Characteristics

Variable	Merged	Census	Organic	Conventional
Ave. Farm Size	1429	1238	1300	2021
Farms by Sales				
<$5000	10.0%	33.7%	8.5%	3.2%
$5000–$9999	3.3%	4.8%	6.8%	3.6%
$10000–$19999	3.3%	7.1%	6.8%	5.9%
$20000–$24999	3.3%	3.0%	1.7%	4.1%
$25000–$39999	3.3%	6.4%	8.5%	6.8%
$40000–$49999	6.7%	3.6%	6.8%	4.1%
$50000–$99999	18.3%	12.5%	16.9%	13.1%
$100000–$249999	36.7%	17.0%	32.2%	27.0%
$250000-$499999	11.7%	7.8%	8.5%	15.8%
$500000 &>	3.3%	4.0%	3.4%	13.1%
Farms by acres				
0–179	5.1%	23.7%	7.8%	4.4%
180–499	11.0%	9.5%	12.7%	10.5%
500–999	13.8%	16.1%	20.6%	12.1%
1000–1999	16.1%	19.6%	16.7%	15.9%
2000 & >	54.4%	21.2%	42.1%	57.0%
Gender				
Male	91.8%	71.1%	67.6%	72.0%
Female	8.1%	28.9%	32.4%	28.0%
Average Age	54.4	51.3	51.2	54.2

organic sample was equal while the average age for the conventional sample was 3 years older. The comparisons are presented in Table 3.

MEASUREMENT

Dependent Variable

CLASSIFICATION BY FARM TYPE

Respondents were asked to describe their farm operation in accordance with the following definitions: 1) A conventional farming production system refers to a production system which employs a full range of pre- and post-plant tillage options (e.g., plow, disk, plant, cultivate), synthetic fertilizers, herbicides and pesticides. 2) An organic agriculture production system refers to particular farming practices that have been followed and certified by a third party inspector. Based on these definitions, 79% of farmers contacted classified their operations as conventional, 16% as organic and 4% as transitioning to organic. However, 14% of conventional farmers had considered organic production. For purposes of this analysis, the classification identified by the farmers themselves will be used and the 21 farmers transitioning to organic will be included with the organic producers (Table 4).

TABLE 4 Type of Operation

Operation	Number	Percent
Conventional	389	79
Organic	102	21

Independent Variables

Reasons to farm organically

All of the farm producers were asked whether or not 17 reasons to choose to farm organically was important for them in choosing to farm organically (Waltz, 2004). A range of responses was provided, ranging from 1 (not important) to 3 (moderately important) to 5 (very important). Table 4 summarizes these responses. Because these sixteen items may represent latent concepts, we subjected them to a factor analysis to discover if these items cluster together in such a way as to represent these concepts. The results are presented in Table 5a and 5b. This analysis revealed three factors which accounted for 65% of the variance in the 16 reasons. The first factor's

TABLE 5a Factor Analysis of Reasons to Farm Organically

Factor	Item	Statement
1	F	Represents good farming practices
1	G	Land stewardship, ecological sustainability
1	H	Chemical avoidance for environmental health
1	I	Chemical avoidance for family/farmworker health
1	J	To change practices in response to farm chemical regulation
1	K	Philosophical, spiritual or ethical reasons
1	L	Ecological principles–view farm as ecological system
1	M	Community values, tradition, quality of life
2	A	Organic price premiums–more money for product
2	B	Growing consumer demand for organic–to tap into market
2	C	To reduce input costs
2	D	To maintain economic sustainability of farm
2	E	Quality of organically grown products
3	N	Owner of land required it
3	O	Customer or buyer required it
3	P	Provides economic support on fewer acres than conventional

TABLE 5b Factors, Explained Variance, Indicators

Factor	Name	Variance	Indicators
1	Environmental/Ethical Reasons	46.7%	F through M
2	Economic Reasons	10.0%	A through E
3	Mandated Reasons	8.0%	N through P

common theme was environmental/ethical reasons, the second factor's common theme was economic reasons, and the third factor's common theme was mandated reasons.

ALTERNATIVE—CONVENTIONAL AGRICULTURE PARADIGM (ACAP) SCALE

We were interested in knowing whether farmers who were conventional, organic and transitioning to organic production differed in their responses to a scale measuring their support for alternative or conventional farming. The 24-item scale was developed by Beus and Dunlap (1990, 1991), and it is based on items designed to measure the various contrasting dimensions of conventional vs. alternative agriculture: centralization vs. decentralization, dependence vs. independence, competition vs. community, domination of nature vs. harmony with nature; specialization vs. diversity; and exploitation vs. restraint. Two items from each dimension were chosen based on their item-total correlations.

Responses to these twelve items were combined them into one scale. Because the complete scale comprised of 24 items was designed to measure the six dimensions of the alternative—conventional agricultural paradigm, it was assumed that the scale was multidimensional. To determine whether the reduced scale used in this analysis represented six or fewer dimensions, the 12 items were subjected to factor analysis to determine whether there was an underlying factor structure. The results are presented in Table 6a and Table 6b.

Rather than six dimensions, the factor analysis revealed three factors. The first factor includes one item from the dependence/independence dimension, the two items from the domination/harmony dimension, and the two items from the exploitation/restraint dimension. The underlying concept in these five items comprising this factor concerns inputs used in production as well as production practices. The second factor includes the two items from the competition/cooperation dimension and the two items from the centralization/decentralization dimension. The underlying concept in these four items concerns the nature of farming. The third factor includes the two items from the specialization/diversity dimension and one item from the dependence/independence dimension. The underlying concept for this factor concerns specialization

- *Acres farmed* was recorded as the actual number of acres a respondent farmed.
- *Total gross farm income* was recorded as one of 12 response categories.
- *Livestock on farm* was calculated as a recode of questions asking whether respondents had dairy cows, poultry, swine or cattle in their farm operation.

TABLE 6a Factor Analysis of ACAP Scale

Factor	Dimension	Item	Indicator
1	Dependence vs. Independence	B	High energy use makes US agriculture vulnerable and should be greatly reduced vs. Large inputs of energy into agriculture should be continued as long as it is profitable to do so
1	Domination vs. Harmony	E	Farmers should use primarily natural fertilizers and production methods such as manure, crop rotations, compost, and biological pest control vs. Farmers should use primarily synthetic fertilizers and pesticides in order to maintain adequate levels of production
1	Exploitation vs. Restraint	H	Soil and water are the sources of all life and should therefore be strictly conserved vs. Soil and water are the basic factors of production and should be used so as to maximize production
1	Domination vs. Harmony	J	The key to agriculture's future success lies in learning to imitate natural ecosystems and farm in harmony with nature vs. The key to agriculture's future success lies in the continued development of advanced technologies that will overcome nature's limits
1	Exploitation vs. Restraint	L	The abundance and relatively low prices of food in the US are evidence that American agriculture is the most successful in the world vs. High energy use, soil erosion, water pollution, etc. are evidence that US agriculture is not nearly as successful as many believe it to be
2	Competition vs. Cooperation	A	Meeting US food needs with fewer and fewer farmers is a positive outcome of technological progress vs. Meeting US food needs with fewer and fewer farmers is a negative outcome of our free market system
2	Centralization vs. Decentralization	C	The amount of farmland owned by an individual or corporation should not be limited, even if the ownership of land becomes much more concentrated than at present vs. The amount of farmland owned by an individual or corporation should be limited in order to encourage land ownership by as many people as possible.
2	Competition vs. Cooperation	D	Farming is first and foremost a business like any other vs. Farming is first of all a way of life and second a business
2	Centralization vs. Decentralization	F	Farmers should farm only as much land as they can personally care for vs. Farmers should farm as much land as they profitably can
3	Specialization vs. Diversity	G	Farms should be specialized in one or at most a few crops vs. Farms should be diversified and include a large variety of crops
3	Dependence vs. Independence	I	Farmers should purchase most of their goods and services just as other consumers do vs. Farmers should produce as many of their own goods and services as possible.
3	Specialization vs. Diversity	K	Most farms should specialize in either crops or livestock vs. Most farms should include both crops and livestock

TABLE 6b Factors, Explained Variance, Indicators

Factor	Name	Variance	Items	Dimensions
1	Production Orientation	22.8%	B	Dependence/Independence
			E & J	Domination/Harmony
			H & L	Exploitation/Restraint
2	Farming Orientation	11.4%	A & D	Competition/Cooperation
			C & F	Centralization/Decentralization
3	Specialization	9.8%	G & K	Specialization/Diversity
			I	Dependence/Independence

The recoded categories are 0 for No and 1 for Yes.

- *Age* was recorded as actual age of respondent in years.
- *Years farming* was recorded as number of years the respondent had been farming.
- *Highest level of education completed* was recorded as one of nine education categories.
- *Total household income* was recorded as one of 11 income categories.
- *Gender* of respondent was recorded as either male or female.

ANALYSIS

In this analysis, we employed logistic regression analysis. Logistic regression is used to predict a categorical (usually dichotomous) variable from a set of predictor variables. Among the variables in this analysis, we have both categorical and continuous variables. The categorical variables include education, gross farm income, household income, gender and livestock on farms. Logistic regression permits us to predict a discrete outcome such as group membership from a set of variables that may be continuous, discrete, dichotomous, or a mix. In this analysis, forward stepwise logistic regression will be used to predict a dependent variable, on the basis of continuous and/or categorical independent variables, to determine the percent of variance in the dependent variable explained by the independents, and to rank the relative importance of independents. We will use the odds ratio to interpret the results of the logistic regression. The results are presented in Table 7.

Hypothesis

In the logistic regression analysis, environmental-ethical reasons, economic reasons, ACAP production orientation, ACAP farming orientation, ACAP specialization orientation, acres farmed, total gross farm income, livestock on farms, educational level, age, years farming, total household income, and gender will classify cases into the two categories of the dependent variable.