

**CHARACTERIZATION OF DEMOGRAPHICS AND ATTITUDES  
OF FARMERS IN DUTCHESS COUNTY, NEW YORK**

A Final Report of the 1997 Tibor T. Polgar Fellowship Program

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## ABSTRACT

Agricultural watershed management programs based upon voluntary adoption of best management practices have met with limited or mixed success. Investigations of factors that influence the use of more environmentally sound practices are key to understanding problems, accomplishments, and future prospects. The heterogeneity of farmers, sites, and practices suggests a need to improve our understanding of this seemingly inherent variability. This will enhance the development of analytical tools to predict likely environmental consequences in relation to specific site characteristics, management practices, and farmer profiles. This study continued an investigation of background and attitudinal characteristics of farmers in the Saw Kill watershed in the Hudson River valley and expanded the sample to dairy farmers throughout Dutchess County, New York. It also contributed to continued development of a spatially distributed pollutant delivery model by reviewing livestock practices on field test sites. Dairy farmers tended to run larger, full-time operations – often on the family farm for several generations – while beef and sheep farms were more likely to be smaller, part-time enterprises. Similarly, dairy farmers were more likely to be making a profit from the farm in order to support their families. By contrast, beef or sheep farmers were not. Dairy farmers tended to be more at ease with the use of agricultural chemicals and more confident that voluntary initiatives would be sufficient to prevent environmental problems. Although some distinctions could be drawn between dairy farmers and beef, sheep or other (primarily crop) farmers, most of the observations supported earlier conclusions that farmers are characterized more by variability than consistency.

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## INTRODUCTION

National attention drawn to recent fish kills in the Chesapeake Bay caused by *Pfesteria piscicida* once again raises questions and accusations about the effects of farming on water quality. Meanwhile, ongoing pressure to secure minimum quality criteria for New York City's water is being addressed with a plan to promote voluntary adoption of Best Management Practices (BMPs) by farmers in upstate watersheds. Whether in regard to long-term goals or isolated incidents, questions are being raised by the general public about the ability of voluntary programs to reliably protect public interests (*Hartford Courant* 1997; *Poughkeepsie Journal* 1997). New York State has initiated a pilot study for a watershed-based management project called Agricultural Environmental Management. It is designed to work closely with *all* farmers in a given watershed to identify problematic sites and practices, then provide information and limited financial support to affect changes. Promotional materials for the program take pains to assure farmers that all participation is voluntary. Similar efforts in Wisconsin have yet to produce observable improvements in water quality (Wolf 1995).

The myriad combinations of farmer profiles, stock or crop types, and farm and watershed conditions yields an expansive range of problems and opportunities. Attempts to regulate these activities in order to meet water quality standards would, in theory, need to be restrictive enough to assure the most inappropriate practices on the most vulnerable sites are effectively controlled. Clearly, this approach would lead to excessive regulations for all other farms with less onerous pollution control problems – a politically and economically unpalatable situation. The alternative of promoting voluntary adoption

of BMPs, even when they are carefully tailored to specific farms, does not eliminate the risk of failing to meet water quality goals.

The potential for success in these efforts can be enhanced by identifying the most vulnerable sites and the most threatening activities. Farms vary in their potential to contribute to water pollution (Fraser *et al.* forthcoming). Farmers vary in the management practices they use which, in turn, can alter the potential for contamination (Pease and Bosch 1994). Efforts to promote more appropriate practices have relied heavily on financial incentives or disincentives to guide farmers' choices. These choices are, however, affected by more than finances. Ownership patterns, use of hired labor versus family labor, and access to differentiated markets within which a farmer could be recognized for particular products or production methods (e.g., organic) are being examined to consider the influence of structural factors on the ability of farmers to use more environmentally friendly production practices (Lighthall 1995; Welsh and Lyson 1997). But even within a structural framework supportive of adopting BMPs, there are reasons to be concerned that variations among the farmers will prompt a variety of responses, some of which will not be sufficient to meet environmental quality goals (Pinney and Barten 1997).

Attitudes held by individual farmers are significant determinants on soil conservation practices (Lyne and Rola 1988; Pease and Bosch 1994). Appreciating the variation in attitudes held by farmers and anticipating how this affects their practices may be more important than technologies and management prescriptions.

## OBJECTIVES

This study was undertaken to replicate and refine our pilot (1996) project to characterize livestock practices in the Saw Kill watershed in Dutchess County, New York (Pinney and Barten 1997). The first objective was to develop a more detailed and rigorous approach to measuring attitudes of farmers in regard to environmental issues. The second objective was to extend the effort beyond the Saw Kill watershed to the rest of Dutchess County in order to examine possible trends of regional interest. The third objective, as with the previous study, was to update livestock data used in testing model predictions of contamination of streams with fecal coliform bacteria (Fraser *et al.* forthcoming).

## METHODS

A new questionnaire was developed based in part on the experience with the pilot project (Figure 1). Responses to open-ended questions used in the 1996 study provided the means for developing categories to accommodate responses within a closed-ended question amenable to coding and analysis. Most of the attention focused on measuring attitudes. Responses to last year's survey suggested several key subject areas. However, developing questions that yield reliable and consistent data and information requires careful pre-testing (Babbie 1973). Therefore, we used salient questions from peer-reviewed literature to measure general satisfaction with the environment and governmental affairs (Pelletier *et al.* 1996) and others focused on agricultural and environment issues (Halstead *et al.* 1990). These questions had already been used in the field, establishing their validity. For each topic addressed — use of agricultural chemicals,

FIGURE 1: Questionnaire for interviews with farmers in Dutchess County, NY.

Agricultural Survey - 1997  
 Dutchess County, N.Y.

David Pinney  
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Questionnaire # \_\_\_\_\_  
 Farm name or Owner: \_\_\_\_\_  
 Location: \_\_\_\_\_

Farm characteristics and management practices:

1) Farm acreage (owned and leased)

- Total \_\_\_\_\_
- cropland \_\_\_\_\_
- hay \_\_\_\_\_
- pasture \_\_\_\_\_
- woodland \_\_\_\_\_

2) Are there streams or ponds on the farm? Yes or No

3) Livestock

- Cattle \_\_\_\_\_
- dairy \_\_\_\_\_
- beef \_\_\_\_\_
- Sheep \_\_\_\_\_
- Horses \_\_\_\_\_
- Others \_\_\_\_\_

4) Livestock location (check one from each set)

- \_\_\_\_\_ The animals are confined (barn or barnyard) most of the time
- \_\_\_\_\_ The animals are confined at times and pastured at times
- \_\_\_\_\_ The animals are pastured most of the time

5) Livestock density

- \_\_\_\_\_ The animals stay in one pasture
- \_\_\_\_\_ The animals rotate among several pastures
- \_\_\_\_\_ The most crowded pasture conditions would be \_\_\_\_\_ animals on \_\_\_\_\_ acres
- \_\_\_\_\_ The least crowded pasture conditions would be \_\_\_\_\_ animals on \_\_\_\_\_ acres

6) Livestock feed (check all that apply)

- \_\_\_\_\_ pasture
- \_\_\_\_\_ hay
- \_\_\_\_\_ grain
- \_\_\_\_\_ supplements (minerals, steroids, hormones)

7) Water (pick one)

- \_\_\_\_\_ stock tanks only
- \_\_\_\_\_ ponds or streams
- \_\_\_\_\_ either (depending on availability)

8) Manure (check those that apply)

- \_\_\_\_\_ Scrape and spread (daily or frequently)
- \_\_\_\_\_ Scrape and stockpile frequently, spread seasonally
- \_\_\_\_\_ Collect and spread seasonally
- \_\_\_\_\_ Leave on fields

9) Crops grown (check those that apply)

- \_\_\_\_\_ hay
- \_\_\_\_\_ field corn
- \_\_\_\_\_ other grains
- \_\_\_\_\_ sweet corn
- \_\_\_\_\_ other vegetables

\_\_\_\_\_ apples, other large fruit

\_\_\_\_\_ small berries

\_\_\_\_\_ Christmas trees

10) Tillage (check those that apply)

- \_\_\_\_\_ full tillage annually (moldboard)
- \_\_\_\_\_ full tillage occasionally, reduced tillage in-between
- \_\_\_\_\_ reduced tillage
- \_\_\_\_\_ no till
- \_\_\_\_\_ contour plowing
- \_\_\_\_\_ fall plowing

11) Materials used (check those that apply)

- \_\_\_\_\_ fertilizer, chemical
- \_\_\_\_\_ fertilizer, organic
- \_\_\_\_\_ herbicide
- \_\_\_\_\_ insecticides, chemical
- \_\_\_\_\_ insecticides, organic

Operator Data:

12) Age \_\_\_\_\_

13) Gender \_\_\_\_\_

14) Family status

- \_\_\_\_\_ married
- \_\_\_\_\_ children
- \_\_\_\_\_ children involved with farm

15) Farm profitability (check one)

- \_\_\_\_\_ this farm shows a profit most years
- \_\_\_\_\_ this farm shows a profit more years than not
- \_\_\_\_\_ this farm has a profitable year occasionally
- \_\_\_\_\_ this farm does not show a profit

16) Family finances (check one)

- \_\_\_\_\_ Earnings from farming are the only financial support for me and my family
- \_\_\_\_\_ Earnings from farming are the primary means of support
- \_\_\_\_\_ Earnings from farming are secondary to other sources of income
- \_\_\_\_\_ "I'm not in it for the money"

17) Education and experience

- \_\_\_\_\_ Highest level: \_\_\_\_\_ high school \_\_\_\_\_ college \_\_\_\_\_ graduate \_\_\_\_\_ no degree
- \_\_\_\_\_ Formal agricultural education: \_\_\_\_\_ none \_\_\_\_\_ vo-ag \_\_\_\_\_ college
- \_\_\_\_\_ Prior farm experience: \_\_\_\_\_ none \_\_\_\_\_ some \_\_\_\_\_ life-long
- \_\_\_\_\_ Ownership: \_\_\_\_\_ this farm purchased \_\_\_\_\_ years ago
- \_\_\_\_\_ \_\_\_\_\_ this has been my family's farm for \_\_\_\_\_ generations

18) Sources of information

For each of the following, please indicate the extent to which each is a source of new ideas or technical information that you use in your activities. Choose \_\_\_\_\_ among the following categories:

	Frequently	Occasionally	Rarely	Never
state agencies staff	_____	_____	_____	_____
extension service staff	_____	_____	_____	_____
sales people	_____	_____	_____	_____
paid consultants	_____	_____	_____	_____
other farmers	_____	_____	_____	_____
educational programs	_____	_____	_____	_____
farm magazines	_____	_____	_____	_____
other publications	_____	_____	_____	_____

19) To what extent have you done farm planning with state or federal agencies?

- \_\_\_\_\_ I have completed a whole farm plan, including production and financial aspects
- \_\_\_\_\_ I have worked on specific production or facilities issues with agents

\_\_\_ I have not done planning work with agents, but might in the future  
 \_\_\_ I am not interested in involving state or federal agents in my activities  
 20) Have you received government money to support production or facility expenses?  
 \_\_\_ Yes  
 \_\_\_ No, but it could be an important part of my interest and ability to improve my production or my facility  
 \_\_\_ No, but I am not interested in accepting government money to support my operation

21) Using a scale of 1 to 5, with 1 indicating low priority and 5 indicating high priority, please evaluate the following issues  
 \_\_\_ Supporting profitability in agriculture  
 \_\_\_ Diversifying agriculture in the Hudson Valley  
 \_\_\_ Attracting industry to the Hudson Valley  
 \_\_\_ Controlling commercial or residential development in the Hudson Valley  
 \_\_\_ Protecting water quality  
 \_\_\_ Preventing soil erosion  
 \_\_\_ Maintaining the viability of rural communities

22) For each of the following locations, please indicate how concerned you are that water quality may present problems for human health

	Level of Concern			
	Not at all	Somewhat	Very	Not sure
Nation as a whole	___	___	___	___
New York State	___	___	___	___
This county	___	___	___	___
My town	___	___	___	___
On my property	___	___	___	___

23) Please indicate the extent to which you agree or disagree with each of the following statements. The scale this time goes from -3 indicating no agreement at all, through 0 indicating neutrality or no opinion, to +3 indicating complete agreement.

- \_\_\_ Local environmental conditions are excellent
- \_\_\_ I am confident that agricultural chemicals, if used as directed, are not a threat to the environment.
- \_\_\_ In most ways, the quality of the government's environmental programs is very good.
- \_\_\_ Should water supplies become contaminated, I am confident scientists will develop ways to purify them.
- \_\_\_ So little agricultural chemicals enter the water, they could never pose a health problem.
- \_\_\_ The government policies developed to deal with the environmental situation are excellent.
- \_\_\_ Instead of worrying about the effects of agricultural chemicals, we should spend more time and effort in solving other problems of farming.
- \_\_\_ In most ways, the environmental conditions in my area are close to ideal.
- \_\_\_ For the most part, the programs developed by the government have addressed the most important environmental problems.
- \_\_\_ Animal agriculture accounts for more than half of any water quality problems.
- \_\_\_ In my opinion, the amount of attention given to the environment by the government has been satisfactory.
- \_\_\_ Crop-based farming accounts for more than half of any water quality problems.
- \_\_\_ Water quality is more of an issue for the future. Today, the threat from agricultural chemicals is quite small.
- \_\_\_ Pollution control requirements have gone too far. They have already cost more than they are worth.
- \_\_\_ So far, I am content with the state of the environment in my area.
- \_\_\_ Residential and commercial development accounts for over half of any water quality problems.
- \_\_\_ We must relax environmental standards in order to achieve economic growth.

\_\_\_ We already have too much regulation of agricultural chemicals.  
 \_\_\_ We cannot be too careful when it comes to putting new pesticides on the market.  
 \_\_\_ I worry about the purity of drinking water in this area.  
 \_\_\_ Protecting the environment is so important that the requirements cannot be too high and continuing improvements must be made regardless of costs.  
 \_\_\_ We must accept slower economic growth in order to protect the environment.  
 \_\_\_ Voluntary changes will provide sufficient response for any water quality problems.  
 \_\_\_ More regulation is not required.  
 \_\_\_ If I could change some aspect of the environmental condition in my area, I would change almost nothing.

regulation of chemical use, satisfaction with the environment, satisfaction with governmental involvement with the environment, and sources of water degradation - three or four attitudinal questions were included. Questions were presented in a random order in the attitudinal section of the questionnaire so that a response to one question on a given topic would be made independently of responses to closely related questions.

Potential respondents were represented by last year's group as well as a sample drawn from other farmers in the county. All of last year's 26 respondents were contacted; 16 were available to be interviewed with the new questionnaire. Dutchess County Soil and Water Conservation District, Cooperative Extension Service and Farm Service Agency offices were contacted to obtain listings of farmers. Concerns about confidentiality limited access (without a freedom of information request) to a list of dairy farmers compiled by the Extension Service. All 40 people were contacted; interviews were completed with 32. Another four interviews were done with farmers suggested by earlier respondents bringing the total to 52.

## RESULTS AND DISCUSSION

### Characteristics of the farms

As documented in the initial survey, farms included from the Saw Kill watershed represent a wide variety of livestock and crop operations. In addition to the 32 dairy operations there are 9 beef and 5 sheep farms. The remaining 6 farms surveyed are involved primarily with crop production, though one has eight horses and another keeps two cows and a horse.

Given the requirements of managing a dairy herd of any size, all dairy farms are full-time operations focused on making a profit. The remaining farms include full-time and part-time operations, some of which have no expectation of making a profit. The dairy farms, as shown in Table 1, tend to be larger in area and have more animals. The largest has a herd of 500 animals on 1600 acres, while the smallest dairy has 50 animals contained on a rented facility consisting of a barn and associated barnyards on four acres of land. Of necessity, this farm is one of only three that keeps the animals confined in yards. Five of the others keep only the milking cows confined, while the calves, heifers, and dry cows are pastured. Among the livestock operations, most (31 out of 46) confine some of the stock for some part of the day (e.g., milking) or at some point in the year (e.g., winter). The livestock are in the pastures the balance of the time. Only 14 of the 46 operations rotate livestock among pastures.

Where the animals spend their time is important in relation to water quality because it affects where and when manure is deposited. Rotating stock among pastures and temporarily relieving grazing pressure will usually promote more vigorous vegetative growth. This helps reduce overland transport of manure and associated pollutants during

storms. However, it often leads to higher stocking densities and more manure in a given pasture when the animals are present. Manure deposited in confined areas has to be removed at some point and is ultimately spread on each farm's own hay, crop or pasture land. The majority of the dairy farmers scrape their barnyards and spread the manure daily (Table 1). Some scrape daily or every few days but stockpile the manure to spread just before plowing. Avoiding manure spreading on frozen soil and rapid incorporation by plowing can greatly reduce the amount of manure carried off-site by overland flow. On the other hand, allowing manure to build up in yards with impervious surfaces or uncontained storage near waterways can increase contamination rates.

TABLE 1: The type and average size of farms surveyed in Dutchess County, NY, including livestock practices pertaining to pasture use, manure handling, and water supply.

Type	#	Mean area acres	Mean herd size	Pasture use <sup>1</sup>				Manure handling <sup>2</sup>				Water sources <sup>3</sup>		
				a	b	c	d	a	b	c	d	a	b	c
dairy	32	462	160	8	22	7	10	23	10	1	0	13	6	20
beef	9	82	28	0	4	5	4	0	4	1	4	2	4	3
sheep	5	263	114	0	3	2	2	0	0	5	2	0	0	5
other	6	219	N/A	0	2	0	0	0	1	0	1	0	0	2
Total	52	363	149	8	31	14	16	23	15	7	7	15	10	30

<sup>1</sup> a - confined in barns or yards; b - confined or pastured; c - pastured only; d - rotated between pastures

<sup>2</sup> a - scrape and spread daily; b - scrape frequently, spread seasonally; c - collect and spread seasonally; d - leave on fields

<sup>3</sup> a - stock tanks only; b - ponds or streams only; c - either, depending on availability

The extent to which livestock are in direct contact with surface water also affects potential for bacterial contamination. Fifteen farms have some or all of their animals



watered at stock tanks and kept away from streams and ponds (Table 1), while 40 farms allow some or all of their animals to have access to streams and ponds.

Virtually all farms are involved in some crop production (Table 2). The exceptions are the dairy farmer on the four rented acres who buys all of his feed and two sheep farmers who use their land only for pasture and do nothing to enhance forage. Most of the crops are grown to feed livestock but some of the livestock operations include crops (e.g., sweet corn) not related to livestock support. The non-livestock farms are focused exclusively on crops – vegetables or, in one case, Christmas trees.

TABLE 2: Crops grown by each type of farm, Dutchess County, NY.

Type	Hay	Field corn	Other grains	Sweet corn	Other vegg	Large fruit	Small fruit	Xmas trees
dairy	31	30	7	3	5	1	1	1
beef	9	3	2	0	0	0	0	0
sheep	3	0	0	0	0	0	0	0
other	3	2	1	2	3	3	0	1
Total	46	35	10	5	8	4	1	2

#### Tillage methods and chemical use

The potential for overland flow to carry soil and contaminants into surface waters can be affected by tillage methods. Thirty-seven of the 49 farmers raising crops use full moldboard plowing some or all of the time (Table 3). Some alternate with reduced tillage techniques while others use reduced till or no till techniques exclusively. None of these respondents contour plow. Two do some fall plowing, a technique that can leave soil exposed to erosion all winter.

TABLE 3: Crop practices by farm type, including plowing techniques and chemical use, Dutchess County, NY.

Type	Plowing Techniques					Chemical Usage					
	full till	full & reduce	reduce	no till	contour	fert. chem	fert. organ	herbi-cide	insect. chem	insect. organ	
dairy	17	10	6	7	0	2	31	0	31	2	0
beef	4	2	0	1	0	0	3	0	3	1	0
sheep	0	0	0	0	0	0	0	2	0	0	0
other	2	2	0	0	0	0	6	2	5	4	0
Total	23	14	6	8	0	2	40	4	39	7	0

Six of the nine beef farmers and three of the five sheep farmers add nothing to crops or pasture to promote growth (Table 3). Two sheep farmers use only manure to fertilize hay or pasture land. The large majority (77%) of the farmers use chemical fertilizers and herbicides. However, since hay and field corn rarely have significant insect problems, there is little use of insecticides among these operations.

#### Characteristics

While there is considerable variability among the survey respondents, the large block of dairy farmers represents less diversity than that represented across all types of farms. Given some of the capital and knowledge barriers to starting or sustaining a dairy operation, it is not surprising to find most of these farmers are members of farm families (Table 4). A larger proportion of other farmers have more post-secondary education. However, fewer have lifelong farming involvement or farm family backgrounds. Most

farmers are men, except for sheep operations, where the principals are more likely to be women.

TABLE 4: Characteristics of the farmers, including mean age, gender, level of education, prior farm experience and land tenure, Dutchess County, NY.

Type	Age <sup>1</sup>		Gender				Education <sup>2</sup>				Experience			Land Tenure		
	M	F	<12	HS	BS	Grad	none <sup>3</sup>	some	life	rent	bought	family				
dairy	52	31	1	2	10	10	1	2	3	27	5	5	22			
beef	54	9	0	0	4	5	0	1	4	4	1	3	5			
sheep	52	2	3	0	2	0	3	2	1	2	0	3	2			
other	48	6	0	0	1	5	0	1	3	2	0	4	2			
Total	52	48	4	2	26	20	4	6	11	35	6	15	31			

<sup>1</sup> Mean age for each group and for all respondents.

<sup>2</sup> Categories indicate: did not complete high school, high school diploma, college diploma, graduate degree.

<sup>3</sup> No prior farm experience.

Questions were included to explore the role of farm profits. While a large

proportion of dairy farmers indicated their operations were frequently profitable (Table 5), a similar number felt they were rarely coming out ahead. As an aside of interest, frustrations with the prospects of making a profit in dairy farming were the most frequent comments volunteered outside of the question and answer exchange. Almost all of the dairy farmers support themselves and their families exclusively or primarily from their farm.

Profits are not only less common among beef and sheep farmers, but also are less of a concern for each family's finances (Table 5). Sheep farmers, in particular, are not in the business for the money. In light of some large herd sizes (up to 600 animals), this is a somewhat surprising circumstance. On the other hand, crop farmers in the "other"

category rely on the enterprise to support their families. While their production activities may include hay, vegetables, fruit or Christmas trees, these farmers are more like the dairy farmers in devoting their full attention to agriculture.

TABLE 5: Financial circumstances of the farmers, Dutchess County, NY.

Type	Extent of profitability				Role in family finances			
	frequent	usually	some	none	only	primary	secondary	none
dairy	13	8	10	1	18	16	2	0
beef	0	2	1	6	1	1	4	3
sheep	0	0	2	3	0	0	1	4
other	4	1	1	0	1	3	2	0
Total	17	11	14	10	20	16	9	7

Another potential determinant of farm practices comes in the form of information

farmers may gain from a variety of sources and apply to their operations. Dutchess County has offices and staff for the Soil and Water Conservation District, local agents from the Cooperative Extension Service operated through Cornell University (New York's land grant institution), and agents from the Farm Services Agency (federal). All are housed in one facility and interact through some programs. Other sources of information farmers identified in last year's survey include sales representatives from agricultural supply companies, paid consultants, other farmers, educational programs of government agencies or supply companies, and a variety of farm-oriented publications.

Table 6 summarizes the relative frequency of contact with these sources by farm type. Historically, dairy farmers have had close relations with their county agents. However, many noted that agents do not come around as much as they used to unless the

farmer initiates the contact. Others, especially sheep and crop farmers, will contact county offices when they encounter a problem. They also interact with other farmers and subscribe to specialized publications.

TABLE 6: Mean frequency of contact with potential sources of information for 52 farmers in Dutchess County, NY.<sup>1</sup>

Type	County	Extension	Sales Reprs	Consultant	Other Farmers	Education Programs	Publications
dairy	2.5	2.6	2.3	1.6	2.8	1.7	2.9
beef	2.0	2.0	1.8	1.0	2.3	1.7	2.6
sheep	2.2	2.8	1.8	1.2	3.2	1.8	3.6
other	2.7	3.0	2.2	1.7	2.7	2.0	2.8
Total	2.4	2.6	2.1	1.5	2.4	1.7	2.9

<sup>1</sup> based on a scale of: 4 = frequently, 3 = occasionally, 2 = seldom, 1 = never

Initiatives to modify farm practices are usually implemented as opportunities for farmers to voluntarily adopt changes, accompanied at times with government cost sharing. Farmers were asked about past or prospective involvement with specific or whole farm plans, cost sharing or other direct subsidies (Table 7). Dairy farmers spoke primarily of soil conservation plans required to qualify for various subsidies; some have done more comprehensive planning. However, more than 30% are not interested in receiving government money. Among the other farmers most have been or would consider involvement in some planning activities. Again, 30% are not interested in receiving government money.

TABLE 7: Farmers' involvement with government planning and subsidies, Dutchess County, NY.

Type	Planned with government agency			Received subsidy money		
	Farm plan	Specific plan	Not yet interested	Yes	Not yet interested	Not interested
dairy	8	17	1	6	12	10
beef	1	1	4	3	1	4
sheep	0	5	0	0	3	2
other	1	4	1	0	3	1
Total	10	27	6	9	19	17

#### Attitudes

Because attitudes about farm and environmental issues may influence behavior, and hence, farm practices, a number of questions explored this domain. Each respondent was asked to indicate a priority ranking for seven issues (Table 8). The dairy and crop farmers, more focused and dependent on profits, tend to rank overall profitability as a higher priority issue than do beef or sheep farmers. The sheep farmers hold diversity in agriculture as a higher priority issue than other farmers. Beef farmers see attracting industry to the area as a higher priority issue. The concern noted by some who ranked this issue low – that industrial growth would increase pressure for land development – may not be captured by this question. Dairy farmers do not seem as concerned as others about controlling nearby commercial and residential development. Water quality and soil erosion are both viewed as high priority issues. Beef and sheep farmers are most concerned about water quality. Dairy and crop farmers are most concerned about soil erosion. For decades, government agencies have focused more on soil conservation and flood control, with water quality being a relatively recent direct concern. The dairy

farmers, at least, have a long-term connection to this perspective. It could also be a reflection of profit-oriented farmers devoting more attention to soil as part of the farm's capital than to off-site water pollution effects. Finally, supporting the viability of rural communities appears as a medium priority issue for all except sheep farmers who rated this issue a high priority. The tone of the conversations around these questions indicate that dairy farmers focus more narrowly on economic issues directly affecting their profitability. Others give more consideration to broader issues and concerns.

Table 8: Priority rankings of issues associated with farming for 52 farmers in Dutchess County, NY.<sup>1</sup>

Type	Farm profits	Farming diversity	Attract industry	Control develop.	Water quality	Soil erosion	Rural viability
dairy	4.8	3.4	2.9	2.8	4.3	4.3	3.6
beef	4.6	3.3	3.4	4.0	4.6	3.9	3.8
sheep	4.4	4.8	2.2	4.2	5.0	4.0	4.8
other	4.8	3.7	2.3	3.8	4.3	4.3	4.0
Total	4.7	3.6	2.4	3.9	4.3	4.1	3.6

<sup>1</sup> based on a scale of: 5 = high priority to 1 = low priority

Using questions developed by Halstead and others (1990), respondents were asked to rate their level of concern for water quality degradation as a threat to human health at five spatial scales: for the nation, New York State, Dutchess County, town, and their farm. They found decreasing levels of concern at local scales were associated with less environmentally friendly farm practices. In Dutchess County, the dairy farmers evidence decreasing concern the closer the issue came to their farm (Figure 2). Beef farmers approximate this progression as well. Crop farmers come close to this

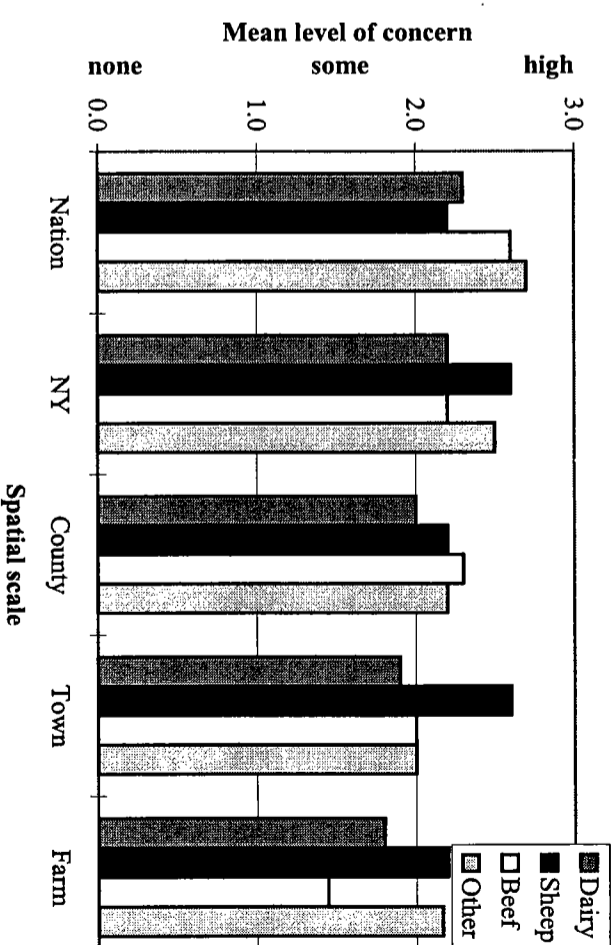


FIGURE 2: Farmers' concern about water quality by farm type, Dutchess County, NY.

pattern but the rise in concern on their farm may reflect a higher sensitivity in association with more active use of pesticides. Interestingly, sheep farmers do not display a pattern of concern based on locale. This may simply be a function of the small (n=5) sample size.

The questionnaire also asked for the level of agreement or disagreement with a variety of statements about agriculture and the environment. Several dealt with agricultural chemical use or economic issues associated with regulating chemicals. Some of the questions presented the perspective that chemicals were not necessarily a threat or that regulation of chemical use was burdensome. As Figure 3 indicates, beef and sheep farmers are less supportive of these positions than dairy and crop farmers. The latter

