Pesticide Use Water Quality

An Assessment of Claims

Sandy Rikoon and Doug Constance

Department of Rural Sociology
University of Missouri-Columbia

Columbia, Missouri
June 1997

SR505

This report discusses urban perceptions and opinions regarding pesticides and water quality issues and compares many of these urban views with farmer perceptions of the same issues. To capture an urban perspective, we cite data recently collected through a phone survey of 842 residents of St. Louis and Kansas City, Mo. Close to 58 percent of our sample resides in St. Louis and 42 percent in Kansas City. There are few regional differences between these groups, so we have combined them into one "urban" group.

To capture the farmers' perspective, we report on the aggregate results of a survey of approximately 740 farmers from 13 predominantly agricultural counties in north Missouri and three counties in the Bootheel.

The view often reported in the news media is that people living in urban areas are more concerned about water quality than the rural population, and that they lay most of the blame for water quality problems at the feet of the farmer.

The objective of this report is to assess the validity of claims that are often made about urban views, especially claims that contrast urban and farmers' views of the world. By the term "claim," we mean the assumptions that people have — especially about other people — that often drive their actions.

The claims assessed in this report are based on statements from articles printed in the popular press and the farm press, from conversations with farmers, urbanites and policymakers, and from our sense of the attitudes that characterize what seems to be a gulf between urban residents and the farm community about pesticides and water quality.

What we call claims other people might call "myths." But myth either implies absolute truth or certain falsehood, depending on your beliefs and on what side of the myth you stand. In contrast, we view claims as testable hypotheses. We will present nine claims, and for each we will show some descriptive data from our research that we believe either supports or disputes these claims. We also look at what we can learn from testing these claims, including implications for scientists, policymakers, farmers and educators.

General Feelings of Concern

Our first three claims relate to a larger sense that urbanites are more concerned about water quality than are farmers.

Claim Number 1

Urbanites rate the quality of their water substantially lower than farmers rate the quality of their own water.

EVIDENCE: Not true. As shown in Figure 1 *(below)*, the mean ranking of urbanites is sightly lower than for farmers, but this Figure also indicates that, in fact, more than 65 percent of both groups rate the quality of their water as high or very high. In our research, less than 10 percent of either urban or farmer populations rated their water quality as low or very low.

Figure 1. **Rating of Home Drinking Water Quality**

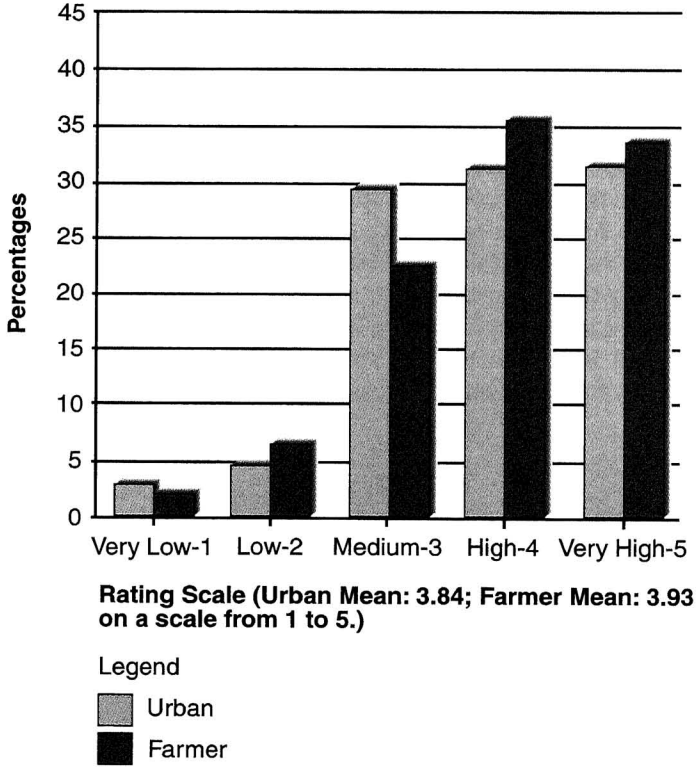
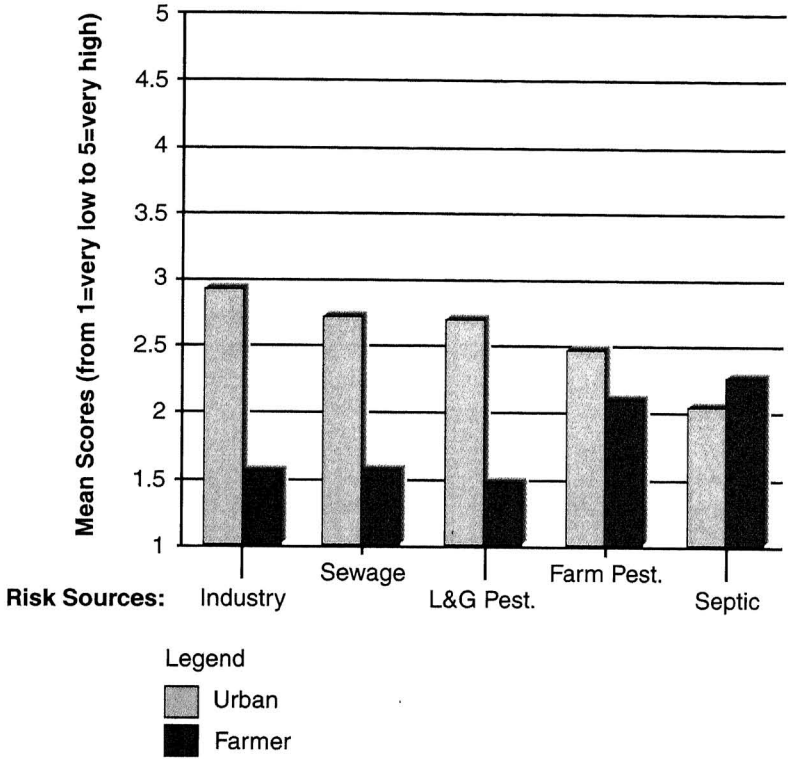


Figure 2. **Ratings of Selected Risks to Home Drinking Water Quality**



CLAIM NUMBER

Urban residents think farm pesticides are the greatest risk to their home drinking water; farmers do not consider pesticides as the greatest risk to their drinking water.

EVIDENCE: This claim about the saliency of pesticide risks to water quality is also not true. As indicated in Figure 2 *(above)*, urbanites rate industrial wastes, town and city sewage, and lawn and garden pesticides as posing greater risks than farm pesticides. In fact, another potential source of problems, landfills, (not shown here) is also rated a greater risk. Rural residents place pesticides as the second greatest risk to their water, with only septic systems comprising a greater risk.

In essence, urbanites so far seem to rank their water quality similar to farmers and do not see farm pesticides as the greatest risk to their own water.

CLAIM 2 NUMBER *Urban residents perceive greater risks to drinking water from the use of agricultural pesticides than do farmers.*

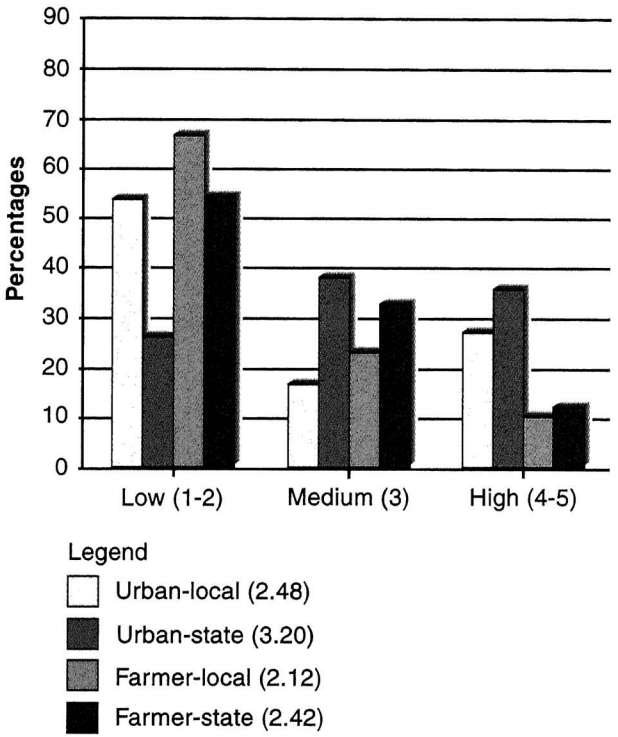
EVIDENCE: This claim is generally true, although it's a bit complex. With this claim, though, we are getting into that vague area of environmental "concern" where urban populations begin to separate themselves from farmers. As shown in Figure 2 *(page 3)*, urban residents perceive slightly higher risk to their own water from farm pesticides (a mean of 2.1 for farmers and 2.4 for urbanites on a scale of 1 to 5). Figure 3 *(opposite)*, however, reveals a critical trend.

When you change the wording of the question from pesticide risk about your own water to ask about risks to Missouri waters in general, urban ratings jump up the scale to a mean higher, in fact, than their mean for concern about any risks to their own water. In Figure 3, for example, notice that the percentage of urbanites expressing low concern drops from 55 percent when they are thinking about their own local water to about 25 percent when asked about statewide water. Much of this slack is taken into the medium risk category, and some into the high risk group. Farmer responses also generally increase on the statewide risk, but the change is not nearly so great.

On the basis of these first three findings, we can stop for a moment and ask what it means to make the claim that urbanites have more environmental concerns about water quality. If it means, *"anxiety that the present state of my water is poor,"* then urbanites are no more concerned than farmers. If it means, *"whether or not clean water is important to you,"* then we would suggest again that urbanites are no more concerned than farmers.

But if by concern you mean that one group seems to be more worried that something bad is going to happen out there to the water, then I think we are getting into an area where there are some differences. In a nutshell, urbanites are much more fearful than are farmers that disaster is waiting to strike.

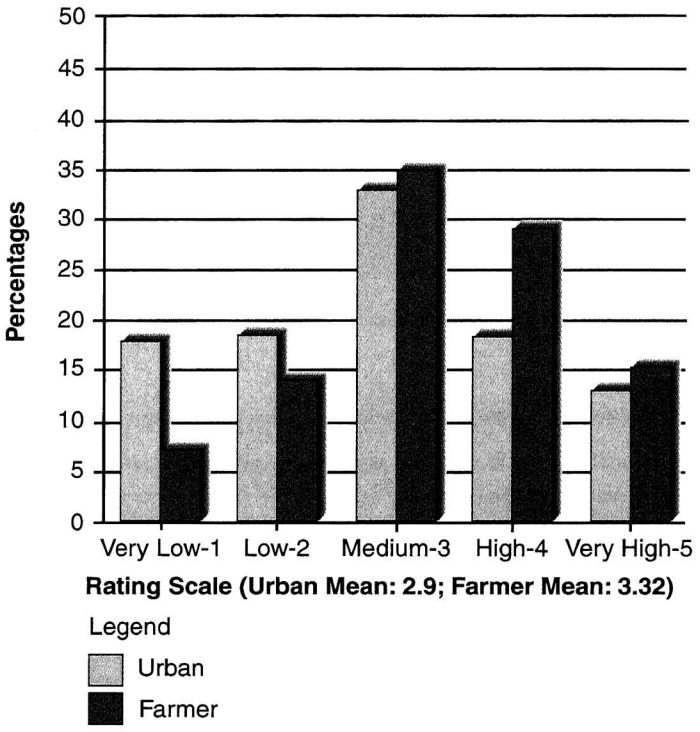
Figure 3. **Perceptions of Risk to Local and Statewide Water Quality from Farm Pesticides**



KNOWLEDGE AND RISK

Before moving into the reasons why urbanites might feel the way they do, we should briefly address the link between knowledge and risk. One might claim, for example, that people who know about the risks of second-hand smoke, use that knowledge to make decisions about public policy.

Figure 4. **Knowledge of Home Drinking Water Quality**

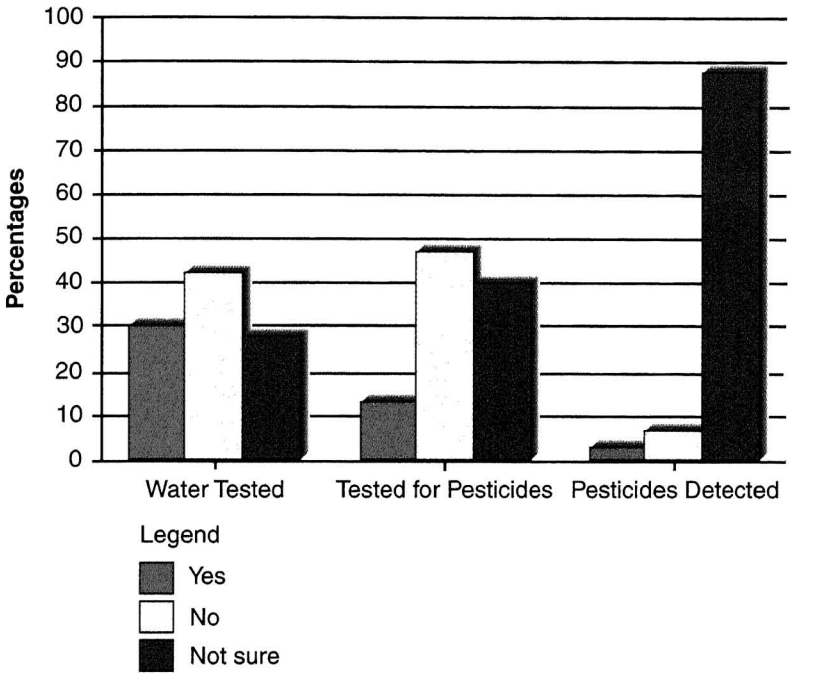


CLAIM NUMBER

Urbanites have greater knowledge of drinking water quality and this knowledge is a cause of their higher concerns about maintaining water quality levels.

EVIDENCE: False. First of all, Figure 4 *(above)*, reveals that urban residents rate their overall knowledge of water and water quality as fairly low, and actually significantly lower than farmers. Whereas about 30 percent of urban residents claim high or very high knowledge of their water, higher percentages self-rate their knowledge as low or very low.

Figure 5. **Urban Knowledge of Water Testing**



Perhaps a critical cause of this pattern is their knowledge of water testing. As Figure 5 *(above)* shows, more than 42 percent of urbanites claim their water has not been tested in the past two years, and 28 percent don't know if their water has been tested. Only 30 percent know of tests on their water, and of these, less than half know whether their water is tested for pesticide residues. Looking at the middle columns, we can note that only about 13 percent know of pesticide testing of their water, and of these, about 20 percent claim that there are pesticide residues in their water. So, from 800 urban dwellers, we have a total of 24 (or 3 percent) who acknowledge that there are pesticide residues in their water and another 7 percent who are convinced that there are not.

Frankly, what concerns us is not the 24 respondents who claim they know there are pesticide residues in their water, but the 70 percent who don't know their water is tested and the roughly 90 percent who don't know their water is tested for pesticides. This is a tremendously large group of people whose attitudes, and whose participation in elections and in the policymaking process are based on very little knowledge about their water, the testing mechanisms and the results of monitoring. We should note that urbanites may know little, but they are interested in knowing more.

Table 1. Interest in additional information on pesticides and water quality

	Urban	Farmers
Would like to have additional information	60.2%	50.4%
Type of information desired:		
General information on pesticides and water quality impacts	58.4%	50.5%
Impacts on human health	29.1%	4.4%
Properties and life cycles of pesticides	7.6%	26.7%

When we asked our samples about their desire for more information, two patterns emerged *(see Table 1, above)*. First, a higher percentage of urbanites (about 60 percent) than farmers expressed interest in learning more. Second, the two groups deviate somewhat in what they want to know about. Farmers are more concerned about the properties of pesticides, fate and transport and carryover issues — technical issues in general. Urbanites are less concerned about knowing more about the possible inputs to pollution or why farmers use pesticides, and much more interested in knowing if pollution exists, and if so, how does it or how might it affect their health.

What we are finding is not a case of knowledge driving increased concern, but rather a case of fear of the unknown driving a perception of increased risk. People hear stories about possible risks and about water contamination in Milwaukee or Gideon, and a lack of knowledge about their own water and what's being done to monitor it leads to higher anxiety. Certainly an implication of this is that more communication is needed between the people responsible for monitoring and testing water quality and the people affected by water quality. Given the comprehensive programs required by law and practiced as a part of research projects, why do most consumers only hear about testing when it shows problems? Why is this work such a mystery to the public?

Many situations require the public to put their trust in professionals trained to handle possibly dangerous situations. For example, many people do not understand radioactivity and nuclear power, but are not worried about living near a nuclear power plant because they feel confident that there are other people who understand the uncertainties and who have developed a good system for protecting the public. At this point, we need to ask whether the continuing concerns about pesticide risk indicates a lack of confidence in the management practices of farmers.

Table 2. Evaluation of farmers' capabilities

	Low (1-2) (%)	Medium (3) (%)	High (4-5) (%)
Farmers' knowledge to properly use pesticides:			
Urban (Mean: 3.37)	25.4	18.1	56.7
Farmer (Mean: 3.44)	7.8	46.1	46.1
Farmers' understanding of pesticide properties and life cycles:			
Urban (Mean: 3.20)	31.2	19.7	49.1
Farmer (Mean: 3.11)	20.1	50.2	29.6
Farmers have the equipment to properly use pesticides:			
Urban (Mean: 3.54)	18.4	23.1	58.6
Farmer (Mean: 3.50)	6.7	42.9	50.4
Farmers have the knowledge to properly dispose of pesticides			
Urban (Mean: 2.71)	44.1	27.3	28.6
Farmer (Mean: 3.30)	16.8	41.5	61.8
Farmers' effort to protect against negative environmental impacts of pesticide use:			
Urban (Mean: 2.98)	36.2	24.5	39.3
Farmer (Mean: 3.44)	12.0	38.1	49.8

CLAIM NUMBER *Urban residents perceive farmers as poor managers and unable and/or unwilling to protect against potential risks to drinking water from the use of agricultural pesticides.*

EVIDENCE: Is complex. There is some strong evidence that many urbanites do not attach their concerns to negative judgements about farming or farmers. As Table 2 *(above)* indicates, the positive news is that while some urbanites are very critical, many do not differ much from farmers in terms of their high ratings of farmers' knowledge to properly use pesticides, farmers' understanding of the properties, and farmers' possession of equipment to properly apply pesticides.

But that's only part of the story. The negative news is in the last two statements in Table 2, and that is negative urban perceptions of farmers being able to properly dispose of pesticides and, importantly, the mixed feelings about whether

farmers are making an adequate effort to protect against potential negative environmental impacts of pesticide use.

These results imply that more publicity is needed on new technologies, on pesticide recycling and containment programs, and on the myriad ways in which farmers are trying to protect against negative environmental impacts. While we would certainly condone such activities and expansion of existing efforts, we want to warn that such efforts will have limited impact on peoples' concerns because the core of urban anxiety does not reside in concern about farmers.

So, if it's not farmers, who or what are the core cause of urban anxieties? The next logical place to look is at claims about urban attitudes towards government, starting with the regulatory system in place for protection against health problems linked to contamination of public water supplies.

Urbanites believe that existing regulations that are supposed to protect citizens from health problems related to water quality are sufficient.

EVIDENCE: False. Right off the bat, Figure 6 *(opposite)* illustrates that almost 50 percent of urbanites we surveyed believe that present levels of regulations are not enough — the third set of bars in this figure. It is also not true that the other half thought present systems were sufficient — in fact, 30 percent of urbanites did not know if present regulations were sufficient or not. In other words, less than 20 percent of urbanites claim confidence in present regulatory levels. Almost identical patterns are revealed in urban attitudes towards governmental enforcement of regulations *(Figure 7, opposite)*. About one-half feel it's too weak, almost 30 percent have no idea, and only 20 percent are comfortable. Compare these findings with those for farmers, where the majority felt satisfied with present systems, and the balance is evenly split between those who think the government is doing too little and those who think the government is doing too much.

Figure 6. **Evaluation of Present Pesticide Regulations**

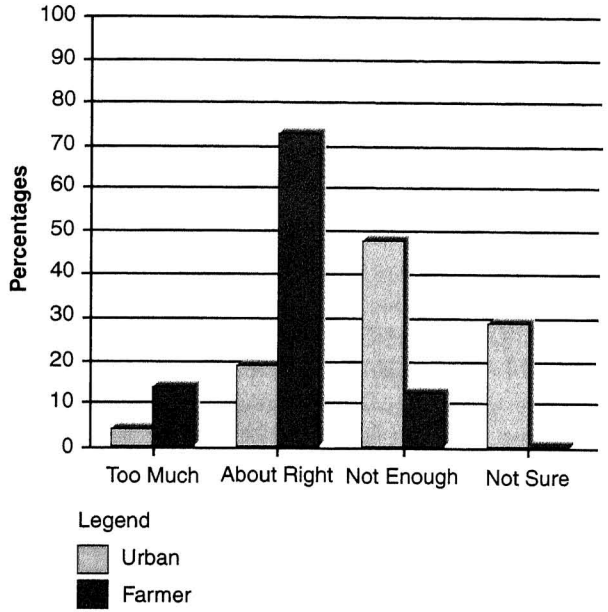
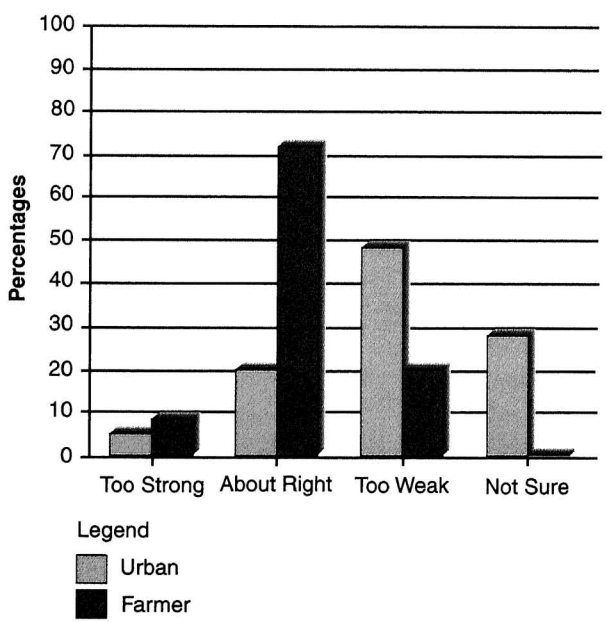


Figure 7. **Evaluation of Present Pesticide Regulation Enforcement**



Lack of faith in government regulations is seen in many areas. Consider the truth to the following claim that addresses what might be called risk adversity:

Urban residents are comfortable with the regulations that limit the amount of pesticides allowed in water and trigger governmental response.

EVIDENCE: Also untrue. As the lower half of Table 3 *(below)* indicates, more than half of urbanites believe that any pesticide found in drinking water at any trace level should be banned (in comparison to 24 percent of farmers who feel the same way). Whereas the farm community generally trusts government regulations about water quality to protect against the onset of health problems, a majority of urbanites are less confident. We have had to answer to urban residents and journalists who are outraged that atrazine residues are found in their water supply. Normally, we ask them what level of residues have been detected. Often they do not know, but as far as they're concerned, the answer is not necessarily important. What is important, is that there are pesticides in their water, the government knows this, and something ought to be done.

Table 3. Risk adverseness attitudes

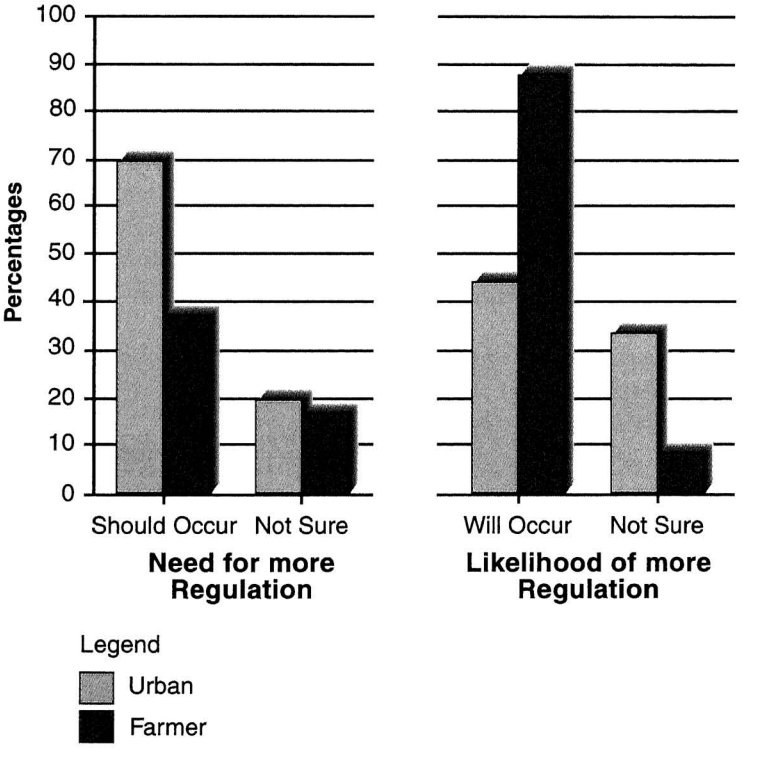
	Disagree (%)	Not sure (%)	Agree (%)
Any pesticide found in drinking water at levels exceeding EPA health safety standards should be banned from use:			
Urban	13.6	6.4	80.0
Farmer	35.2	13.6	51.2
Any pesticide found in drinking water at any trace level should be banned from use:			
Urban	30.8	15.1	54.2
Farmer	64.0	12.1	23.8

It is a difficult situation when people feel the agencies that are supposed to protect them against negative environmental impacts are not doing their jobs, and it gets to the heart of urban-farmer differences. Urbanites are much more strongly of the opinion that the government is not doing its job. Farmers believe present governmental oversight is adequate, if not more than adequate, and many fear the system will only become more regulated. Which brings us to claim number 8.

CLAIM NUMBER *If there's a problem, urbanites believe the government will try to fix it.*

EVIDENCE: Not true. The data results listed in Figure 8 *(below)* show that urbanites generally believe pesticide use should be more regulated and that it won't be; farmers generally believe pesticide use should not be more regulated but it will be. Among urbanites, close to 70 percent believe more regulation is necessary. Yet, in the same group, only about 45 percent think this regulation will happen. In contrast, 37 percent of farmers believe more regulation should occur, but close to 90 percent think it will occur. So, on the one side you've got farmers who don't think more regulation is necessary, but see it happening anyway (and blame government for becoming too regulatory). And on the other side you've got folks who believe more regulation is necessary, but that it is not going to happen.

Figure 8. **Evaluations of Need and Likelihood of Additional Regulations**



Let us address one final claim often attributed to urbanites:

CLAIM NUMBER 6

Urbanites believe this is an easily curable problem. We don't need to continue pesticide use at current levels, we don't need to use potentially harmful pesticides, and we can still have plenty of food at about the same cost.

EVIDENCE: That many urbanites think this is a possibility is generally true. Frankly, though, the first thing we would say about this claim is that it assumes that urbanites have an idea about the relationship between pesticide use and the food supply. For example, as Table 4 illustrates *(below)*, more than 40 percent of urbanites could not offer an opinion as to whether or not farmers could cut their use of pesticides in half and still produce the same amount of food. Of those who had an opinion, 66 percent thought this was possible and one-third disagreed. In other words, 80 percent of urbanites either think the food supply would not be threatened by substantial cutbacks in pesticide use or else they have no idea if it would. In contrast, 75 percent of farmers claimed that food production would definitely decrease under this scenario.

Table 4. Evaluations of selected impact issues

	Disagree (%)	Not sure (%)	Agree (%)
Farmers could cut their use of pesticides in half and still produce the same amount of food:			
Urban	19.2	40.5	40.3
Farmer	73.8	9.1	17.2
Banning potentially harmful pesticides will result in higher food prices for consumers:			
Urban	34.2	15.4	50.3
Farmer	29.4	14.6	55.9

On the relationship between a ban on potentially harmful pesticides and food prices, urbanites have remarkably parallel opinions to farmers. Although slightly less urbanites believed higher food prices would result, about 50 percent of urbanites and 56 percent of farmers cited this consequence. We are somewhat surprised by the resemblances between the groups on this issue.

Some members of the farm community believe that the fact that many urbanites support Claim #9 provides an opportunity to lower urban concerns about pesticide use and drinking water quality. The basic thinking is that we must convince consumers that major changes in the present system would disrupt the food supply and raise food prices by a significant percentage. Although this might result in increased urban awareness of the relationship of pesticide use to food costs and production, it neither addresses whether or not urbanites would trade higher food costs for decreased pesticide use nor the possibility that decreased food production in the United States may be temporary or may be balanced by importing food from abroad. More research is needed on these last scenarios, as well as on the issue of whether or not urbanites are concerned about who produces food. If consumers are not concerned about the location or structure of agriculture, they may not be concerned about a reduction of crop acres or yields in the United States.

CONCLUSIONS

1) Urbanites receive very little information on the quality of their water, and the testing and monitoring of their water.

2) Urban environmental concern over pesticides and water quality differs from farmers in that the former are more uncertain about the maintenance of present water quality and more anxious that negative impacts will occur.

3) Urban concerns over their water have a lot to do with a perception that the government is not doing enough — and will not do enough — to regulate the use of potentially dangerous substances or to enforce existing regulations. The credibility of the existing system is seen as suspect.

4) Urbanites do not see farmers' poor management as the core issue; they also do not blame the weather. Rather, they see the system as allowing unsafe products to be used in the first place and a lack of control and information about potential problems.

5) Urbanites are less concerned about the importance of pesticides to agriculture and farmers as they are about the links between pesticide use and water quality and the link between water quality and health.

SR505 New 5/97/1M