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Nebraska's Water: Perceptions and Priorities

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CENTER FOR APPLIED RURAL INNOVATION

A Research Report*

Nebraska's Water: Perceptions and Priorities

2004 Nebraska Rural Poll Results

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Center Research Report 04-2, June 2004.

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All of the Center's research reports detailing Nebraska Rural Poll results are located on the Center's World Wide Web page at <http://cari.unl.edu/ruralpoll.htm>.

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Executive Summary

Water has always been an important resource to rural Nebraska. This resource has become more scarce during the last few years amid a continuing drought throughout many counties of the state. Do rural Nebraskans feel the drought is over in their area? What priority do they place on various uses of water? Do they feel the quality or quantity of their household water supply has changed during the past ten years? If so, what has affected it?

This report details 2,915 responses to the 2004 Nebraska Rural Poll, the ninth annual effort to understand rural Nebraskans' perceptions. Respondents were asked a series of questions about water issues. For all questions, comparisons are made among different respondent subgroups, i.e., comparisons by age, occupation, region, etc. Based on these analyses, some key findings emerged:

- ***Many rural Nebraskans expect the drought will continue in their area for one or two more years.*** Thirty-nine percent think the drought will continue for one or two more years, while 12 percent believe it has probably ended in their area. Another twelve percent expect the drought will last for three to five more years while four percent expect it to last for more than five years. Thirty-three percent don't know how long the drought will continue in their area.
- ***Persons living in the Southeast and Northeast regions of the state are more likely than persons living in other regions of the state to believe the drought has probably ended in their area.*** Nineteen percent of the residents from the Southeast region and 17 percent from the Northeast region say the drought has probably ended in their area. However, only six percent of the persons living in the Panhandle and North Central regions share this opinion.
- ***Almost one-half of the farmers and ranchers expect the drought to continue in their area for one or two more years.*** Forty-seven percent of the farmers and ranchers have this expectation, compared to only 33 percent of the manual laborers.
- ***Rural Nebraskans rate indoor residential and agricultural uses as the highest priorities for water use.*** The proportions rating each of the following uses as high priority include: indoor use in existing homes (72%), use for livestock (drinking and waste management) (48%), irrigation of agricultural and horticultural crops (46%) and indoor use in new housing developments (34%). Uses receiving low proportions of high priority responses include: swimming pools for individual homes (2%), watering golf courses (3%), and transferring water to other states for their use (5%).
- ***Residents of the Southeast region are less likely than residents of other regions of the state to rate livestock use and irrigation of crops as high priority uses of water.*** As an example, 55 percent of the South Central residents rate irrigation of crops as a high

priority use, compared to only 32 percent of the Southeast residents.

- ***Almost one-third (31%) of rural Nebraskans believe the quality of their water supply has deteriorated during the past ten years.*** Fifty-six percent say their water quality has not deteriorated during the past decade and 13 percent don't know.
- ***Over one-third of those who believe their water quality has deteriorated during the past ten years say that agricultural chemicals have impacted their water quality to a great extent.*** The proportions that believe the following factors have impacted their water quality to a great extent include: agricultural chemicals (39%), chemicals used in lawns and landscaping (22%), livestock waste (21%), business and industry waste (20%) and naturally occurring contamination (10%).
- ***Panhandle residents are more likely than persons living in other regions of the state to say their water quality has deteriorated during the past ten years.*** Thirty-seven percent of the Panhandle residents believe their water quality has worsened during the past decade, compared to only 22 percent of the North Central residents.
- ***Over one-half of rural Nebraskans expect the quality of their water supply to either improve or remain the same during the next ten years.*** Twelve percent expect the quality will improve either slightly or significantly while 43 percent say it will remain the same as it is now. Twenty-two percent believe it will deteriorate slightly, but remain safe for drinking or other household uses and eight percent think their water quality will deteriorate to a potentially unsafe level. Fifteen percent don't know what to expect.
- ***Most rural Nebraskans don't think the quantity or amount of water available for their domestic use has been reduced during the past ten years.*** Seventy-six percent don't believe the amount of their water has been reduced, 15 percent say the amount of water available to them has been reduced and nine percent don't know.
- ***For those who believe the amount of water available for their domestic use has been reduced, the most common culprits named are cyclical weather patterns and irrigation use.*** Forty-three percent of the persons who say the amount of water available to them has declined during the past decade think that cyclical weather patterns have impacted this to a great extent while 39 percent say that irrigation use has impacted their water quantity to a great extent.
- ***Panhandle residents are more likely than residents of other regions to say the amount of water available to them has been reduced during the past ten years.*** Twenty-eight percent of the Panhandle residents say their water quantity has been reduced, compared to only nine percent of the residents living in the North Central region.

Introduction

Water has always been an important resource to rural areas. Competing demands for water come from communities, households, agriculture, industry and from the environment. Amid a continuing drought in many counties of the state, some of the demands for water cannot be met. Some communities have placed restrictions on water use and some NRDs (Natural Resource Districts) have implemented temporary bans on drilling new wells to help with water shortages.

Given all that, what priority do rural Nebraskans place on various uses of water? Do they feel the quality or quantity of their household water supply has changed during the past ten years? If so, what has affected it? Do their responses to these questions differ by their region, size of their community or occupation? This paper provides a detailed analysis of these questions.

The 2004 Nebraska Rural Poll is the ninth annual effort to understand rural Nebraskans' perceptions. Respondents were asked a series of questions about water issues.

Methodology and Respondent Profile

This study is based on 2,915 responses from Nebraskans living in the 84 non-metropolitan counties in the state. A self-administered questionnaire was mailed in February and March to approximately 6,300 randomly selected households.

Metropolitan counties not included in the sample were Cass, Dakota, Dixon, Douglas, Lancaster, Sarpy, Saunders, Seward and

Washington. The 14-page questionnaire included questions pertaining to well-being, community, work, water issues, and health care. This paper reports only results from the water issues portion of the survey.

A 47% response rate was achieved using the total design method (Dillman, 1978). The sequence of steps used follow:

1. A pre-notification letter was sent requesting participation in the study.
2. The questionnaire was mailed with an informal letter signed by the project director approximately seven days later.
3. A reminder postcard was sent to the entire sample approximately seven days after the questionnaire had been sent.
4. Those who had not yet responded within approximately 14 days of the original mailing were sent a replacement questionnaire.

The average respondent is 55 years of age. Sixty-nine percent are married (Appendix Table 1¹) and seventy-one percent live within the city limits of a town or village. On average, respondents have lived in Nebraska 47 years and have lived in their current community 31 years. Fifty-two percent are living in or near towns or villages with populations less than 5,000.

Fifty-six percent of the respondents reported their approximate household income from all sources, before taxes, for 2003 was below \$40,000. Thirty-one percent reported incomes over \$50,000. Ninety-three percent

¹ Appendix Table 1 also includes demographic data from previous rural polls, as well as similar data based on the entire non-metropolitan population of Nebraska (using 2000 U.S. Census data).

have attained at least a high school diploma.

Seventy percent were employed in 2003 on a full-time, part-time, or seasonal basis.

Twenty-five percent are retired. Thirty-two percent of those employed reported working in a professional, technical or administrative occupation. Thirteen percent indicated they were farmers or ranchers. The employed respondents who do not work in their home or their nearest community reported having to drive an average of 32 miles, one way, to their primary job.

Water Issues

The respondents were first asked their expectations about the current drought continuing in their area. The answer responses were: The drought has probably ended. I expect normal precipitation this year; I expect less than normal precipitation for 1 or 2 more years; I expect less than normal precipitation for 3 to 5 more years; I expect less than normal precipitation for more than five years; and don't know.

Many rural Nebraskans (39%) expect the drought will continue for one or two more

years (Figure 1). Twelve percent believe the drought has probably ended in their area. Another twelve percent think the drought will last for three to five more years while four percent expect it to last for more than five years. One-third (33%) don't know how long the drought will continue.

The respondents' expectations about the drought continuing are analyzed by region and occupation (Appendix Table 2). Differences are detected by both of these characteristics.

Persons living in the Southeast and Northeast regions of the state (see Appendix Figure 1 for the counties included in each region) are more likely than persons living in other regions of the state to believe the drought has probably ended in their area (Figure 2). Nineteen percent of the respondents from the Southeast region and 17 percent from the Northeast region think the drought has probably ended in their area. However, only six percent of the respondents living in the Panhandle and North Central regions of the state share this opinion.

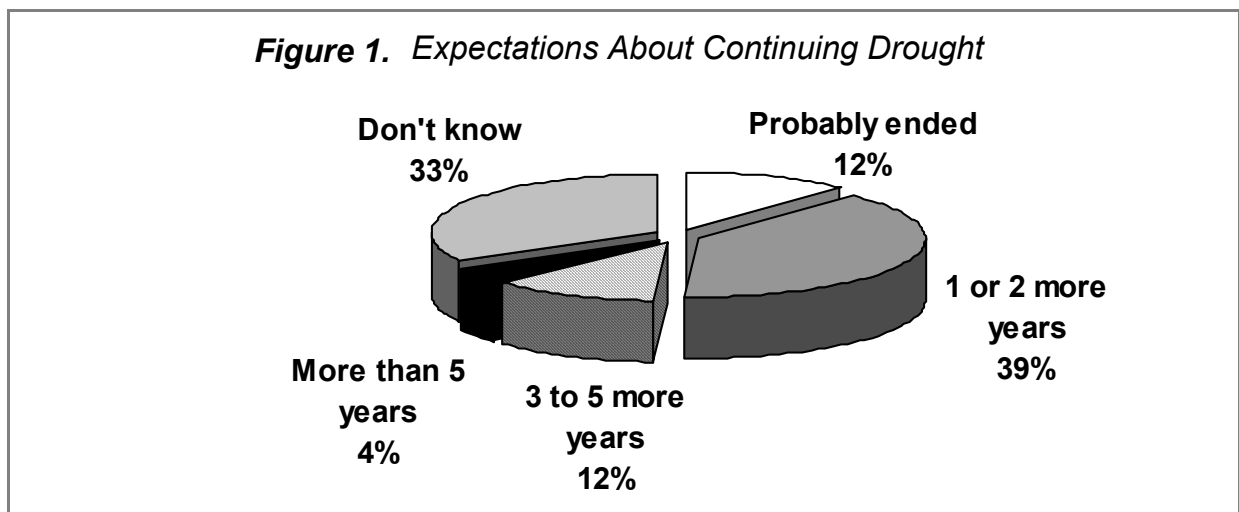
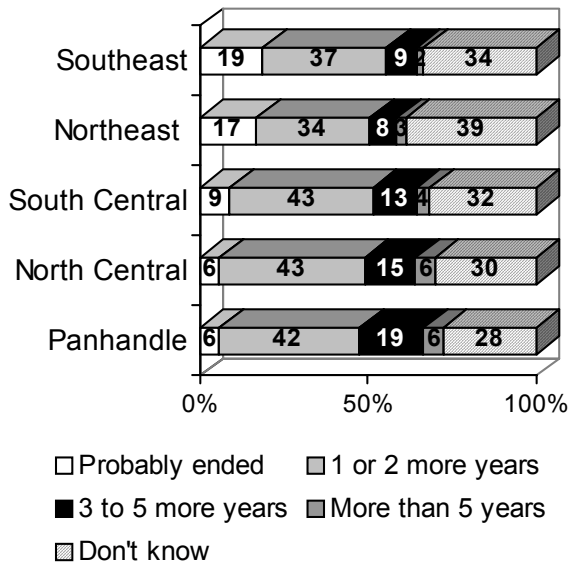


Figure 2. Expectations About Continuing Drought by Region



Farmers and ranchers are the occupation group most likely to expect the drought to continue in their area for one or two more years. Forty-seven percent of the farmers and ranchers have this expectation, compared to only 33 percent of the manual laborers. The manual laborers are the group most likely to say they don't know when they expect the drought to end.

Next, the respondents were asked to prioritize various uses of water. Residential and agricultural uses are rated as the highest priorities for water use. Indoor use in existing homes has the largest proportion rating it a high priority (72%) (Table 1). Other uses with larger proportions of "high priority" responses include: use for livestock (drinking and waste management) (48%), irrigation of agricultural and horticultural crops (46%) and indoor use in new housing developments (34%).

The prioritization of the water uses is examined by community size, region and occupation (Appendix Table 3). When examining responses by community size, the relative rankings of the various uses of water remains fairly constant across all community sizes. One exception to this pattern is preserving the habitat of threatened and endangered species. This use is ranked higher by both the residents of the smallest and largest communities than it is by residents of mid-size communities.

In addition, the proportion rating each use as a high priority generally increases as the size of the community increases for the following uses: preserving the habitat of threatened and endangered species; industrial use in existing businesses; and new industrial uses, such as manufacturing processes. For one use, though, the proportion viewing it as a high priority decreases as the size of community increases. This was the case for livestock use (drinking and waste management).

The relative rankings of the uses of water also remain fairly constant across the regions of the state. However, residents of the North Central and South Central regions rank industrial use in existing businesses as a higher priority than do residents of the Northeast region of the state.

The proportions rating each as a high priority did vary across the regions. Residents of the Southeast region are *less* likely than residents of other regions of the state to rate use for livestock and irrigation of agricultural and horticultural crops as high priority uses of water. As an example, 55 percent of the South Central residents rate irrigation of crops as a high priority use

Table 1. Prioritization of Water Uses

	<i>Not a Priority</i>	<i>Low Priority</i>	<i>Medium Priority</i>	<i>High Priority</i>
Indoor use in existing homes	3%	5%	21%	72%
Use for livestock (drinking & waste management)	2	7	42	48
Irrigation of agricultural and horticultural crops	4	10	40	46
Indoor use in new housing developments	8	17	42	34
Providing food and refuge for fish, birds and other animals	5	19	49	27
Industrial use in existing businesses	6	20	55	20
New industrial uses, such as manufacturing processes	6	24	50	20
Preserving the habitat of threatened and endangered species	14	29	38	20
Recreation, such as fishing and boating	11	32	39	18
Community parks, pools and sports fields	10	39	43	8
Watering existing yards and landscaping	15	39	39	8
Use for yards and landscaping in new housing developments	16	42	34	8
Transferring water to other states for their use	50	34	11	5
Watering golf courses	39	40	19	3
Swimming pools for individual homes	59	32	8	2

of water, compared to only 32 percent of the Southeast residents. The Southeast residents are also the regional group least likely to rate both providing food and refuge for fish, birds and other animals and recreation, such as fishing and boating as high priority uses. Residents of the North Central region are the least likely of the regional groups to rate indoor use in new housing developments,

preserving the habitat of threatened and endangered species, and new industrial uses, such as manufacturing processes as high priority uses of water.

When comparing responses by occupation, a few differences in the relative ranking of the water uses are evident. Farmers and ranchers rank preserving the habitat of

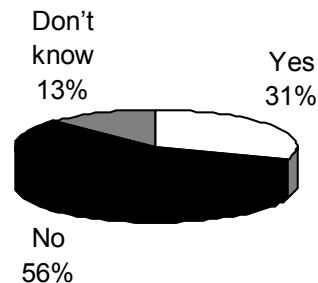
threatened and endangered species lower than do some of the other occupation groups. And, both the farmers and ranchers as well as persons with administrative support positions rank industrial use in existing businesses slightly higher than do the other occupation groups.

Also, the proportion of respondents who rate the various uses as high priority vary considerably across the different occupation groups. Farmers and ranchers are more likely than the other occupation groups to rate both use for livestock and irrigation of agricultural and horticultural crops as high priority uses. As an example, 64 percent of the farmers and ranchers rate the irrigation of crops as a high priority use, compared to only 38 percent of the skilled laborers. The farmers and ranchers are the occupation group *least* likely to rate the following uses as high priority: indoor use in new housing developments; providing food and refuge for fish, birds and other animals; preserving the habitat of threatened and endangered species; and recreation, such as fishing and boating.

To assess the quality of their water supply, respondents were asked, “Do you feel the quality of your domestic (household) water supply has deteriorated during the past 10 years?” Thirty-one percent believe their water quality has deteriorated, 56 percent say it hasn’t and 13 percent don’t know (Figure 3).

Those who answered yes were then asked, “To what extent do you feel the following factors have impacted the quality of your domestic (household) water supply?” The answer categories ranged from “not at all” to “a great extent.” The respondents

Figure 3. Do you feel the quality of your domestic water supply has deteriorated during the past 10 years?



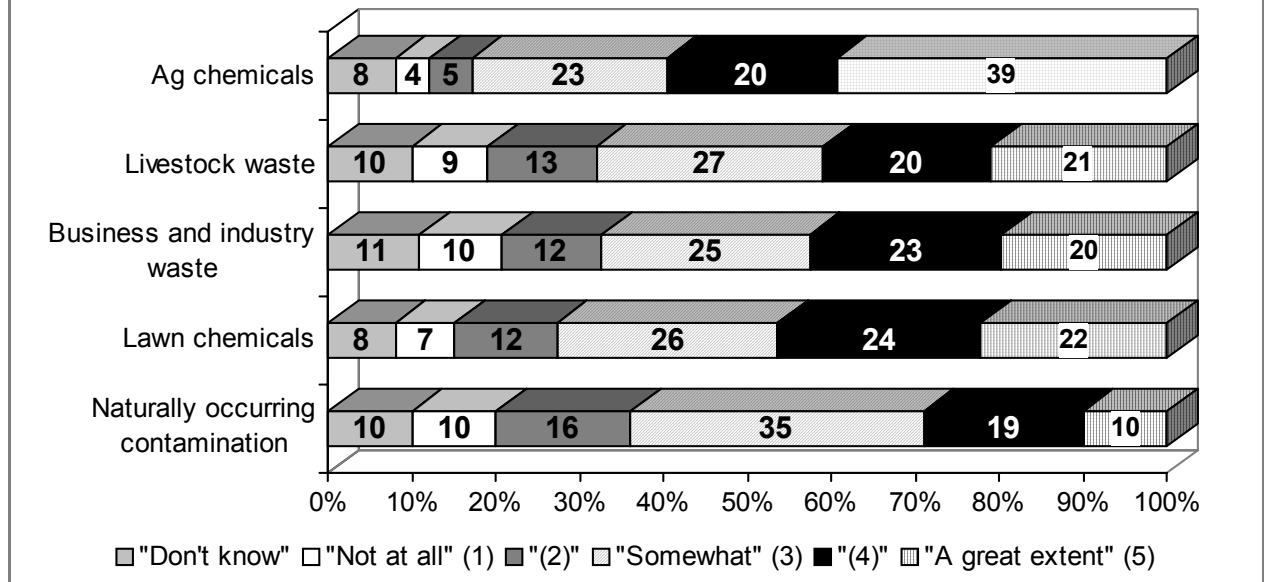
were also given the option “don’t know.” Agricultural chemicals (pesticides, fertilizers) and chemicals used in lawns and landscaping have the highest proportion of respondents saying they have impacted their water quality to a great extent (Figure 4).

The responses to these questions are analyzed by community size, region and various individual attributes (Appendix Table 4). Many differences emerge.

Persons living in or near communities with populations ranging from 5,000 to 9,999 are more likely than persons living in or near communities of different sizes to say their water quality has deteriorated during the past 10 years. Forty-one percent of the respondents living in or near communities of this size feel the quality of their water has deteriorated, compared to only 27 percent of the persons living in or near communities with populations ranging from 1,000 to 4,999.

Persons living in the Panhandle are more likely than persons living in other regions of the state to say their water quality has deteriorated during the past 10 years.

Figure 4. Extent to Which Various Factors Impacted Quality of Water



Thirty-seven percent of the Panhandle residents believe their water quality has worsened during the past decade, compared to only 22 percent of the residents of the North Central region.

The skilled laborers are more likely than persons with different occupations to say their water quality has decreased during the past 10 years. Thirty-nine percent of the skilled laborers say their water quality has declined, compared to only 17 percent of the farmers and ranchers.

The other groups most likely to believe their water quality has worsened during the past decade include: persons between the ages of 30 and 49, the divorced/separated respondents, and persons with some college education. When comparing the responses by income and gender, the persons with the lowest household incomes and females are more likely than persons with higher

incomes and males to say they don't know if the quality of their water supply has deteriorated during the past 10 years.

When asked which factors have impacted their water quality, residents in or near mid-size communities are the community size group most likely to say livestock waste has impacted their water quality to a great extent. Persons living in or near the larger communities are most likely to believe both business and industry waste as well as chemicals used in lawns and landscaping have impacted their water quality to a great extent.

Residents of the Northeast region are the regional group most likely to believe livestock waste has impacted their water quality to a great extent, while residents of the North Central region are the group most likely to say business and industry waste has affected the quality of their water supply.

The oldest respondents are more likely than the younger respondents to say that agricultural chemicals and livestock waste have impacted the quality of their water supply to a great extent. The respondents between the ages of 30 and 64 are the age group most likely to say that business and industry waste has impacted their water to a great extent. Females are more likely than males to say that naturally occurring contamination has impacted their water quality.

The respondents who have never married are more likely than the other marital groups to say that agricultural chemicals, business and industry waste, chemicals used in lawns and landscaping and naturally occurring contamination all impacted their water quality to a great extent. The widowed respondents are the group most likely to believe that livestock waste has impacted the quality of their water supply.

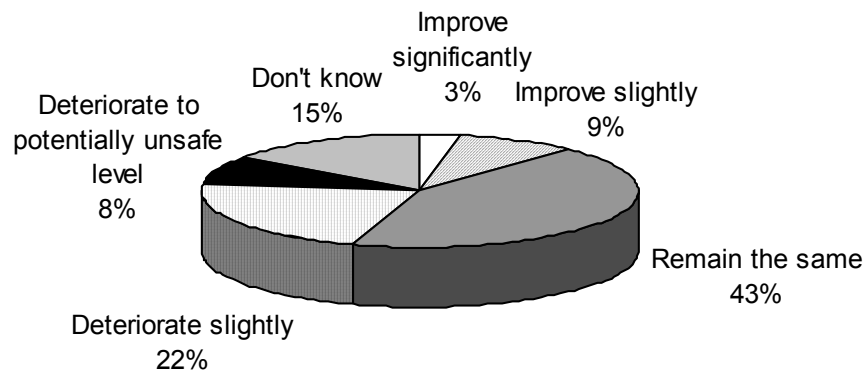
The persons with no high school diploma are more likely than the persons with higher

education levels to believe that agricultural chemicals and livestock waste have impacted their water quality to a great extent.

The respondents were then asked to give their expectations about the quality of their water supply in the future. The exact question wording is, “Which of the following statements best describes what you expect to happen to the quality of your domestic water supply (household well or community system) during the next 10 years?” Only 12 percent expect the quality to improve either slightly or significantly (Figure 5). Forty-three percent believe it will remain about the same as it is now. Twenty-two percent say it will deteriorate slightly, but remain safe for drinking and other household uses and eight percent believe it will deteriorate to a potentially unsafe level. Fifteen percent answered, “I don’t know.”

The responses to this question are analyzed by community size, region and various

Figure 5. Expectations About Water Quality During Next 10 Years



individual attributes (Appendix Table 5). Respondents living in or near the smallest communities are more likely than persons living in or near larger communities to believe the quality of their water supply will remain about the same as it is now. Approximately 47 percent of the persons living in or near communities with less than 5,000 persons believe their water quality will remain the same, compared to approximately 38 percent of the persons living in or near communities with populations greater than 5,000. The persons living in or near the largest communities are slightly more likely than the persons living in or near the smaller communities to believe their water supply will deteriorate slightly, but remain safe for drinking and other household uses.

Residents of the Southeast region are more likely than residents of other regions of the state to say their water supply will improve slightly. Residents of the North Central region are the most likely to say their water supply will remain about the same as it is now and the Panhandle residents are most likely to say they expect their water supply to deteriorate slightly, but remain safe for drinking and other household uses.

Other groups most likely to say their water quality would remain about the same include: persons with higher household incomes, older respondents, males, persons with higher education levels, the widowed respondents and the farmers and ranchers. The groups most likely to say their water supply would deteriorate slightly include: persons with higher incomes, persons between the ages of 40 and 49, males, persons with higher education levels, the persons who are divorced or separated and

the skilled laborers.

Finally, the respondents were asked two questions about water quantity. The first asked, “Has the quantity (amount) of water available to you for domestic (household) use been reduced during the past 10 years?” Fifteen percent say their water quantity has been reduced, 76 percent say it has not and nine percent don’t know (Figure 6).

Those who feel their quantity has been reduced were next asked, “In your opinion, to what extent have the following factors impacted the amount or cost of the water available to you for domestic (household) use during the past 10 years?” Over one-third believe cyclical weather patterns (43%) and irrigation use (39%) have impacted the amount of water available to them to a great extent (Figure 7).

The responses to these two questions are analyzed by community size, region and various individual attributes (Appendix Table 6). Many differences emerge.

Persons living in or near communities with

Figure 6. Has the quantity (amount) of water available to you for household use been reduced during the past 10 years?

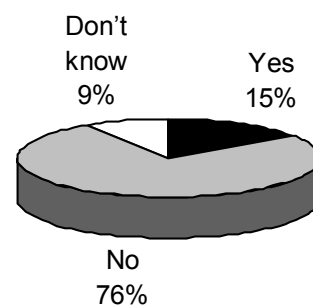
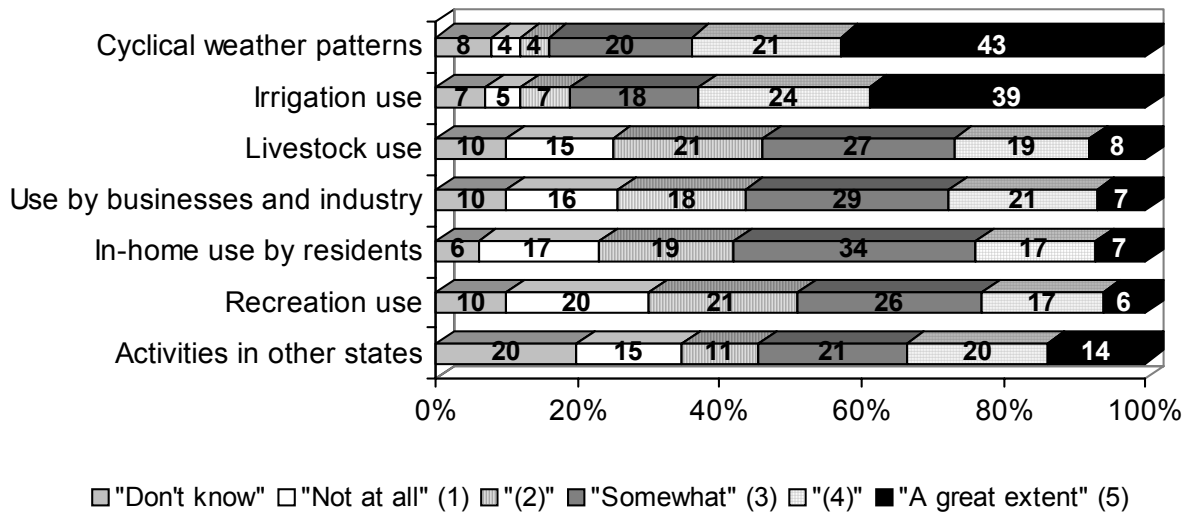


Figure 7. Extent Factors Have Impacted Amount or Cost of the Water Available to You for Domestic Use During the Past 10 Years



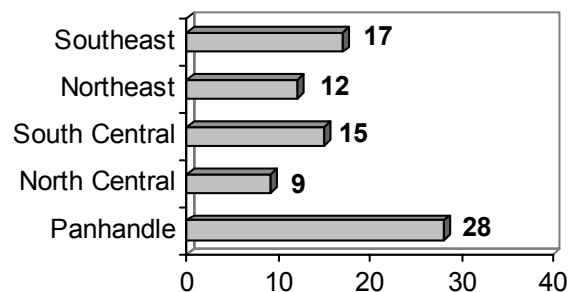
populations ranging from 5,000 to 9,999 are more likely than persons living in or near communities of different sizes to say the quantity of water available to them for domestic use has been reduced during the past 10 years. Twenty-six percent of the persons living in or near communities of this size feel the amount of their water has been reduced, compared to 11 percent of the persons living in or near communities with more than 10,000 persons.

Panhandle residents are more likely than persons living in other regions of the state to believe the amount of water available to them has been reduced. Twenty-eight percent of the persons living in the Panhandle say their water quantity has been reduced, compared to only 9 percent of the persons living in the North Central region of the state (Figure 8).

Persons with service occupations are more likely than persons with different

occupations to believe the amount of water available to them has been reduced during the past 10 years. Twenty-one percent of the persons with service occupations say their water quantity has been reduced, compared to only 10 percent of the farmers and ranchers.

Figure 8. Proportion Believing the Quantity of Water Available for Domestic Use Has Been Reduced During Past 10 Years by Region



Other groups most likely to say the amount of water available to them has been reduced include: persons with higher household incomes, younger respondents, females, persons who are divorced/separated and person with higher educational levels.

Persons living in or near communities with populations ranging from 5,000 to 9,999 are the community size group most likely to say that activities in other states has impacted the amount or cost of water available to them to a great extent. This same group, along with the persons living in or near communities with populations ranging from 500 to 999, is more likely than the other community size groups to say use by businesses and other industry has impacted the amount or cost of water available to them to a great extent. And, persons living in or near communities with more than 5,000 persons are more likely than persons living in or near smaller communities to say recreation use has impacted the amount of water available to them.

Panhandle residents are more likely than persons living in other regions of the state to believe that in-home use by residents and activities in other states have impacted their water quantity to a great extent. Persons with lower household incomes are more likely than persons with higher incomes to say that recreation use has impacted the amount or cost of water available to them to a great extent. Persons between the ages of 30 and 39 are the age group most likely to say that the following have impacted their water quantity to a great extent: cyclical weather patterns, livestock use and activities in other states.

Persons who have never married are the

marital group most likely to say that cyclical weather patterns have impacted the amount of water available to them. The divorced/separated respondents are most likely to say the following factors have impacted the amount of water available to them: livestock use, use by businesses and industry, recreation use and activities in other states.

Persons with the highest education levels are the education group most likely to say that cyclical weather patterns have impacted the amount of water available to them to a great extent, while the persons with the least amount of education are the group most likely to say that livestock use has impacted their water quantity to a great extent. Farmers and ranchers are the occupation group most likely to say that cyclical weather patterns have impacted the amount of water available to them to a great extent.

Conclusion

Many rural Nebraskans expect the drought to continue in their area for one or two more years. Many farmers and ranchers also share this opinion. Persons living in the eastern part of the state are more likely than persons living in the western part to believe the drought has probably ended in their area.

Rural Nebraskans place priority on indoor residential uses of water as well as use for agricultural purposes. Low priority is placed on uses such as individual swimming pools, watering golf courses and transferring water to other states.

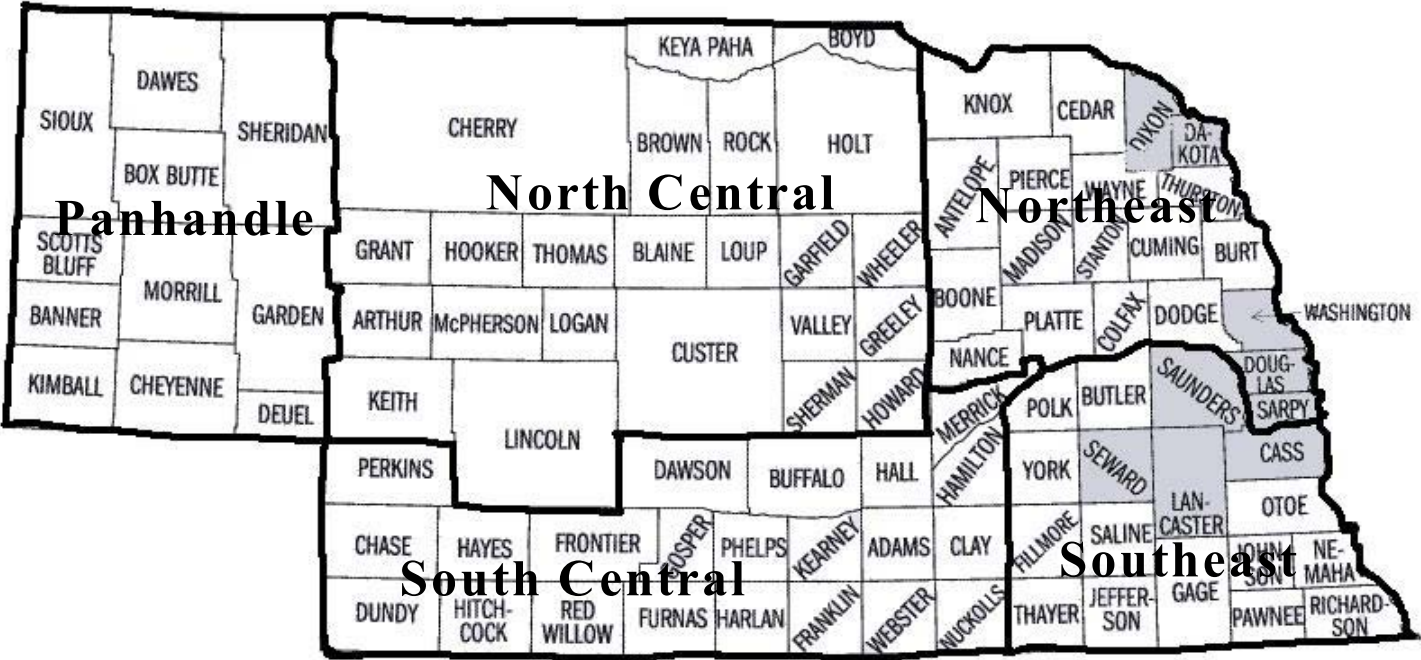
Almost one-third of rural Nebraskans say the quality of their domestic water supply has deteriorated during the past ten years.

But, over one-half expect their water quality to either improve or remain the same as it is now during the next ten years.

Only 15 percent say the amount of water available to them for household use has been reduced during the past ten years. The most common factors contributing to this, according to the respondents, are the weather and irrigation use.

The Panhandle residents appear to have more issues with water than do residents of other regions of the state. The residents of this region are most likely to say that their water quality has deteriorated during the past decade, that they expect the quality of their water supply to deteriorate slightly in the future and that the amount of water available to them for domestic use has declined during the past ten years.

Appendix Figure 1. Regions of Nebraska



■ Metropolitan counties (not surveyed)

Appendix Table 1. Demographic Profile of Rural Poll Respondents Compared to 2000 Census

	2004	2003	2002	2001	2000	2000
	Poll	Poll	Poll	Poll	Poll	Census
Age : ¹						
20 - 39	18%	18%	16%	17%	20%	33%
40 - 64	49%	51%	51%	49%	54%	42%
65 and over	32%	32%	32%	33%	26%	24%
Gender: ²						
Female	32%	51%	36%	37%	57%	51%
Male	68%	49%	64%	63%	43%	49%
Education: ³						
Less than 9 th grade	3%	2%	3%	4%	2%	7%
9 th to 12 th grade (no diploma)	5%	5%	4%	5%	4%	10%
High school diploma (or equivalent)	34%	34%	32%	35%	34%	35%
Some college, no degree	24%	23%	25%	26%	28%	25%
Associate degree	12%	11%	10%	8%	9%	7%
Bachelors degree	15%	16%	16%	13%	15%	11%
Graduate or professional degree	8%	9%	10%	8%	9%	4%
Household income: ⁴						
Less than \$10,000	9%	8%	8%	9%	3%	10%
\$10,000 - \$19,999	15%	14%	15%	16%	10%	16%
\$20,000 - \$29,999	16%	16%	17%	20%	15%	17%
\$30,000 - \$39,999	16%	16%	17%	16%	19%	15%
\$40,000 - \$49,999	13%	13%	14%	14%	17%	12%
\$50,000 - \$59,999	11%	11%	11%	9%	15%	10%
\$60,000 - \$74,999	10%	11%	9%	8%	11%	9%
\$75,000 or more	11%	11%	10%	8%	11%	11%
Marital Status: ⁵						
Married	69%	73%	73%	70%	95%	61%
Never married	9%	7%	6%	7%	0.2%	22%
Divorced/separated	10%	9%	9%	10%	2%	9%
Widowed/widower	12%	11%	12%	14%	4%	8%

¹ 2000 Census universe is non-metro population 20 years of age and over.

² 2000 Census universe is total non-metro population.

³ 2000 Census universe is non-metro population 18 years of age and over.

⁴ 2000 Census universe is all non-metro households.

⁵ 2000 Census universe is non-metro population 15 years of age and over.

Appendix Table 2. Expectations About Continuing Drought in Relation to Occupation and Region.

Which of the following statements most closely expresses your expectations about the current drought continuing in your area?					
	<i>The drought has probably ended. I expect normal precipitation this year.</i>	<i>I expect less than normal precipitation for 1 or 2 more years.</i>	<i>I expect less than normal precipitation for 3 to 5 more years.</i>	<i>I expect less than normal precipitation for more than 5 years.</i>	<i>Don't know</i>
Percentages					
(n = 2809)					
Region					
Panhandle	6	42	19	6	28
North Central	6	43	15	6	30
South Central	9	43	13	4	32
Northeast	17	34	8	3	39
Southeast	19	37	9	2	34
<i>Chi-square (sig.)</i>			$P^2 = 129.30 (.000)$		
Percentages					
(n = 1891)					
Occupation					
Sales	11	42	13	3	30
Manual laborer	11	33	12	4	40
Prof/tech/admin	13	44	15	4	25
Service	12	37	12	4	36
Farming/ranching	9	47	14	4	26
Skilled laborer	13	39	12	6	31
Admin. support	7	39	10	5	39
<i>Chi-square (sig.)</i>			$P^2 = 52.6 (.003)$		

Appendix Table 3. Prioritization of Water Uses by Community Size, Region and Occupation.

	Community Size Categories					<i>Total</i>
	<i>Less than 500</i>	<i>500 - 999</i>	<i>1,000 - 4,999</i>	<i>5,000 - 9,999</i>	<i>10,000 and over</i>	
	<i>Percent Rating Each Use as "High Priority"</i>					
Indoor use in existing homes	72	71	73	72	71	72
Use for livestock (drinking and waste management)	56	53	53	42	43	48
Irrigation of agricultural and horticultural crops	46	45	46	44	48	46
Indoor use in new housing developments	26	37	33	30	38	34
Providing food and refuge for fish, birds and other animals	26	27	25	27	29	27
Preserving the habitat of threatened and endangered species	16	16	19	19	23	20
Industrial use in existing businesses	15	19	20	20	22	20
New industrial uses, such as manufacturing processes	15	21	23	18	22	20
Recreation, such as fishing and boating	16	17	19	16	19	18
Use for yards and landscaping in new housing developments	7	8	6	6	10	8
Community parks, pools and sports fields	6	5	9	7	10	8
Watering existing yards and landscaping	7	7	7	7	9	8
Transferring water to other states for their use	6	3	5	6	5	5
Watering golf courses	2	1	3	4	2	3
Swimming pools for individual homes	2	0	3	2	2	2

Appendix Table 3 Continued.

	<i>Region</i>					<i>Total</i>
	<i>Panhandle</i>	<i>North Central</i>	<i>South Central</i>	<i>Northeast</i>	<i>Southeast</i>	
	<i>Percent Rating Each Use as "High Priority"</i>					
Indoor use in existing homes	72	72	71	72	70	72
Use for livestock (drinking and waste management)	46	56	46	50	44	48
Irrigation of agricultural and horticultural crops	51	51	55	41	32	46
Indoor use in new housing developments	31	29	35	38	31	34
Providing food and refuge for fish, birds and other animals	28	26	26	32	24	27
Industrial use in existing businesses	19	20	20	19	20	20
Preserving the habitat of threatened and endangered species	22	17	19	23	19	20
New industrial uses, such as manufacturing processes	19	17	19	23	22	20
Recreation, such as fishing and boating	17	19	17	21	15	18
Use for yards and landscaping in new housing developments	8	9	9	6	6	8
Watering existing yards and landscaping	10	10	7	6	5	8
Community parks, pools and sports fields	8	9	8	9	8	8
Transferring water to other states for their use	7	6	5	5	4	5
Watering golf courses	3	3	3	2	2	3
Swimming pools for individual homes	3	1	2	2	2	2

Appendix Table 3 Continued.

	<i>Occupation Categories</i>							<i>Total</i>
	<i>Sales</i>	<i>Manual laborer</i>	<i>Prof/tech/admin</i>	<i>Service</i>	<i>Farming/ranching</i>	<i>Skilled laborer</i>	<i>Admin support</i>	
	<i>Percent Rating Each Use as "High Priority"</i>							
Indoor use in existing homes	72	65	75	72	69	74	75	72
Use for livestock (drinking and waste management)	46	46	42	49	68	45	44	48
Irrigation of agricultural and horticultural crops	46	43	45	43	64	38	49	46
Indoor use in new housing developments	37	35	37	33	28	31	35	34
Providing food and refuge for fish, birds and other animals	27	29	26	32	23	30	22	27
Industrial use in existing businesses	17	21	17	18	21	16	24	20
Preserving the habitat of threatened and endangered species	21	28	20	27	11	18	14	20
New industrial uses, such as manufacturing processes	21	25	19	17	20	18	24	20
Recreation, such as fishing and boating	21	20	16	20	12	19	14	18
Use for yards and landscaping in new housing developments	5	6	6	9	4	6	8	8
Community parks, pools and sports fields	7	12	7	9	5	8	10	8
Watering existing yards and landscaping	6	9	5	7	5	6	9	8
Transferring water to other states for their use	6	9	3	3	5	4	5	5
Watering golf courses	4	3	2	2	3	2	1	3
Swimming pools for individual homes	1	2	0*	1	2	2	2	2

0* = Less than 1 percent.

Appendix Table 4. Perceptions of Changes to Water Quality by Community Size, Region and Individual Attributes

	<i>Do you feel the <u>quality</u> of your domestic (household) water supply has deteriorated during the past 10 years?</i>			<i>If yes, to what extent do you feel the following factors have impacted the <u>quality</u> of your domestic (household) water supply?</i>				
	<i>Yes</i>	<i>No</i>	<i>Don't know</i>	<i>Agricultural chemicals</i>	<i>Livestock waste</i>	<i>Business & industry waste</i>	<i>Chemicals used in lawns & landscaping</i>	<i>Naturally occurring contamination</i>
<u>Community Size</u>		<i>Percentages</i> (n = 2784)		(n = 835)	(n = 830)	<i>Percent saying "A Great Extent"</i>		
Less than 500	28	61	11	39	18	19	19	10
500 - 999	29	62	9	40	24	14	23	12
1,000 - 4,999	27	61	12	42	27	17	20	11
5,000 - 9,999	41	45	14	41	19	19	25	10
10,000 and up	31	55	14	37	20	26	23	10
<i>Chi-square (sig.)</i>		P ² = 39.13 (.000)						
<u>Region</u>		(n = 2828)		(n = 842)	(n = 835)	(n = 833)	(n = 829)	(n = 828)
Panhandle	37	48	15	32	13	17	18	10
North Central	22	66	12	40	23	24	16	11
South Central	34	53	14	42	23	23	22	9
Northeast	29	59	13	39	27	20	26	14
Southeast	32	56	12	38	15	15	25	8
<i>Chi-square (sig.)</i>		P ² = 32.61 (.000)						
<u>Individual Attribute</u>								
<u>Income Level</u>		(n = 2615)		(n = 793)	(n = 788)	(n = 785)	(n = 780)	(n = 782)
Under \$20,000	30	54	16	39	23	24	24	12
\$20,000 - \$39,999	31	55	14	36	20	19	24	10
\$40,000 - \$59,999	31	57	12	40	23	21	20	13
\$60,000 and over	32	60	8	41	19	18	18	6
<i>Chi-square (sig.)</i>		P ² = 17.94 (.006)						
<u>Age</u>		(n = 2844)		(n = 851)	(n = 844)	(n = 842)	(n = 838)	(n = 836)
19 - 29	26	47	27	21	17	19	21	15
30 - 39	35	51	15	31	12	22	20	13
40 - 49	35	53	12	40	20	21	22	7
50 - 64	32	60	8	44	25	21	21	12
65 and older	26	60	14	40	25	18	25	9
<i>Chi-square (sig.)</i>		P ² = 67.03 (.000)						

Appendix Table 4 Continued.

		<i>Do you feel the quality of your domestic (household) water supply has deteriorated during the past 10 years?</i>			<i>If yes, to what extent do you feel the following factors have impacted the quality of your domestic (household) water supply?</i>				
		<i>Yes</i>	<i>No</i>	<i>Don't know</i>	<i>Agricultural chemicals</i>	<i>Livestock waste</i>	<i>Business & industry waste</i>	<i>Chemicals used in lawns & landscaping</i>	<i>Naturally occurring contamination</i>
<i>Gender</i>			(n = 2809)		(n = 840)	(n = 834)	(n = 831)	(n = 827)	(n = 828)
	Male	31	58	11	41	22	19	21	8
	Female	31	52	17	36	20	23	26	15
	<i>Chi-square (sig.)</i>		P ² = 23.21 (.000)						
<i>Marital Status</i>			(n = 2812)		(n = 840)	(n = 834)	(n = 831)	(n = 827)	(n = 828)
	Married	31	59	11	40	22	19	20	10
	Never married	29	48	23	43	16	31	32	15
	Divorced/separated	37	48	16	34	17	25	19	9
	Widowed	26	58	17	34	27	20	31	12
	<i>Chi-square (sig.)</i>		P ² = 49.01 (.000)						
<i>Education</i>			(n = 2806)		(n = 839)	(n = 832)	(n = 830)	(n = 826)	(n = 826)
	No H.S. diploma	29	48	23	44	25	21	28	9
	H.S. diploma	29	56	14	40	24	21	20	11
	Some college	34	54	12	35	20	19	22	9
	Bachelors/grad deg	28	62	10	43	20	22	24	11
	<i>Chi-square (sig.)</i>		P ² = 36.29 (.000)						
<i>Occupation</i>			(n = 1905)		(n = 609)	(n = 604)	(n = 606)	(n = 601)	(n = 603)
	Sales	35	53	12	38	19	21	21	7
	Manual laborer	31	49	21	55	23	30	28	14
	Prof/tech/admin	33	58	10	40	20	17	19	10
	Service	38	52	10	43	25	14	25	9
	Farming/ranching	17	76	8	37	18	23	28	13
	Skilled laborer	39	50	11	34	17	19	19	7
	Admin. support	32	48	20	31	22	19	28	14
	<i>Chi-square (sig.)</i>		P ² = 79.17 (.000)						

Appendix Table 5. Expectations About Future Water Quality by Community Size, Region and Individual Attributes

<p style="text-align: center;">Which of the following statements best describes what you expect to happen to the <u>quality</u> of your domestic water supply (household well or community system) during the next 10 years?</p>							
	<i>Improve Significantly</i>	<i>Improve Slightly</i>	<i>Remain About the Same</i>	<i>Deteriorate Slightly, but Remain Safe</i>	<i>Deteriorate to Potentially Unsafe Level</i>	<i>Don't Know</i>	<i>Significance</i>
<i>Percentages</i>							
Community Size							
	(n = 2757)						
Less than 500	3	9	47	22	7	13	
500 - 999	1	7	50	18	11	14	
1,000 - 4,999	2	10	47	20	7	13	
5,000 - 9,999	4	10	38	23	12	13	P ² = 43.57
10,000 and up	3	10	39	23	7	18	(.002)
Region							
	(n = 2800)						
Panhandle	4	6	41	26	8	16	
North Central	2	6	52	20	7	12	
South Central	3	10	41	24	8	15	
Northeast	3	10	40	20	8	19	P ² = 49.94
Southeast	3	12	46	18	8	12	(.000)
Individual Attributes:							
<i>Income Level</i>							
	(n = 2593)						
Under \$20,000	4	9	40	18	8	20	
\$20,000 - \$39,999	3	9	45	22	8	13	
\$40,000 - \$59,999	2	10	43	24	8	14	P ² = 28.67
\$60,000 and over	2	9	45	24	8	12	(.018)
<i>Age</i>							
	(n = 2816)						
19 - 29	4	16	39	20	5	17	
30 - 39	3	11	43	21	9	14	
40 - 49	2	9	40	26	10	14	
50 - 64	2	9	45	22	9	13	P ² = 58.16
65 and older	4	8	45	19	6	19	(.000)
<i>Gender</i>							
	(n = 2784)						
Male	2	10	45	23	8	12	P ² = 61.84
Female	4	9	39	18	7	23	(.000)
<i>Education</i>							
	(n = 2780)						
No H.S. diploma	2	7	28	22	12	30	
High school diploma	4	9	43	19	8	16	
Some college	3	10	43	22	7	15	P ² = 67.20
Bachelors or grad degree	2	9	48	23	7	10	(.000)
<i>Marital Status</i>							
	(n = 2785)						
Married	2	9	45	22	8	13	
Never married	4	11	34	23	8	20	
Divorced/separated	4	10	36	24	12	15	P ² = 77.15
Widowed	4	8	46	11	6	25	(.000)

Appendix Table 5 Continued.

<p><i>Which of the following statements best describes what you expect to happen to the <u>quality</u> of your domestic water supply (household well or community system) during the next 10 years?</i></p>							
	<i>Improve Significantly</i>	<i>Improve Slightly</i>	<i>Remain About the Same</i>	<i>Deteriorate Slightly, but Remain Safe</i>	<i>Deteriorate to Potentially Unsafe Level</i>	<i>Don't Know</i>	<i>Significance</i>
<i>Occupation</i>	(n = 1893)						
Sales	1	12	39	25	7	15	
Manual laborer	2	14	36	19	11	18	
Prof./technical/admin	2	12	44	23	8	12	
Service	3	8	37	26	9	17	
Farming/ranching	2	11	63	16	3	6	
Skilled laborer	1	6	40	27	11	15	P ² = 108.24
Admin. support	4	6	45	17	9	20	(.000)

Appendix Table 6. Perceptions About Water Quantity by Community Size, Region and Individual Attributes

	<i>Has the quantity (amount) of water available to you for domestic use been reduced during the past 10 years?</i>			<i>If yes, in your opinion, to what extent have the following factors impacted the amount or cost of the water available to you for domestic (household) use during the past 10 years?</i>							
	<i>Yes</i>	<i>No</i>	<i>Don't know</i>	<i>Cyclical weather patterns</i>	<i>Irrigation use</i>	<i>Livestock use</i>	<i>Use by businesses and industry</i>	<i>In-home use by residents</i>	<i>Recreation use</i>	<i>Activities in other states</i>	
		<i>Percentages</i>			<i>Percent saying "A Great Extent"</i>						
Community Size		(n = 2788)			(n = 371)	(n = 371)	(n = 365)	(n = 361)	(n = 370)	(n = 364)	(n = 361)
Less than 500	15	77	8	40	36	3	3	2	6	6	
500 - 999	16	78	7	54	45	13	11	5	5	13	
1,000 - 4,999	13	79	8	39	34	7	4	6	4	10	
5,000 - 9,999	26	65	9	51	49	8	11	12	8	22	
10,000 and up	11	79	10	39	31	11	7	8	8	15	
<i>Chi-square (sig.)</i>		P ² = 54.22 (.000)									
Region		(n = 2832)			(n = 377)	(n = 375)	(n = 369)	(n = 367)	(n = 376)	(n = 370)	(n = 366)
Panhandle	28	65	8	55	52	4	6	17	10	19	
North Central	9	83	9	44	29	3	9	3	6	12	
South Central	15	76	10	40	42	11	7	4	4	16	
Northeast	12	77	11	33	29	7	2	1	1	6	
Southeast	17	77	6	45	32	7	11	9	9	12	
<i>Chi-square (sig.)</i>		P ² = 67.52 (.000)									
Individual Attribute		(n = 2620)			(n = 357)	(n = 353)	(n = 350)	(n = 345)	(n = 353)	(n = 348)	(n = 347)
<i>Income Level</i>											
Under \$20,000	14	73	13	39	38	13	13	5	8	11	
\$20,000 - \$39,999	13	77	9	37	39	5	2	9	6	12	
\$40,000 - \$59,999	17	75	8	49	43	9	9	7	8	15	
\$60,000 and over	15	79	5	53	34	7	5	4	3	16	
<i>Chi-square (sig.)</i>		P ² = 25.38 (.000)									
Age		(n = 2848)			(n = 384)	(n = 382)	(n = 376)	(n = 372)	(n = 382)	(n = 376)	(n = 372)
19 - 29	16	63	21	45	20	3	7	7	7	10	
30 - 39	18	69	13	53	47	17	7	7	7	17	
40 - 49	16	75	9	41	32	3	9	4	9	16	
50 - 64	15	79	6	47	46	9	6	9	4	17	
65 and older	12	80	8	33	36	9	5	7	6	6	
<i>Chi-square (sig.)</i>		P ² = 66.16 (.000)									

Appendix Table 6 Continued.

		<i>Has the quantity (amount) of water available to you for domestic use been reduced during the past 10 years?</i>			<i>If yes, in your opinion, to what extent have the following factors impacted the amount or cost of the water available to you for domestic (household) use during the past 10 years?</i>						
		<i>Yes</i>	<i>No</i>	<i>Don't know</i>	<i>Cyclical weather patterns</i>	<i>Irrigation use</i>	<i>Livestock use</i>	<i>Use by businesses and industry</i>	<i>In-home use by residents</i>	<i>Recreation use</i>	<i>Activities in other states</i>
<i>Gender</i>			(n = 2814)		(n = 374)	(n = 373)	(n = 367)	(n = 363)	(n = 373)	(n = 367)	(n = 363)
	Male	14	78	7	46	41	8	7	6	6	15
	Female	16	72	12	39	31	9	6	8	6	11
	<i>Chi-square (sig.)</i>		P ² = 21.27 (.000)								
<i>Marital Status</i>			(n = 2817)		(n = 375)	(n = 374)	(n = 368)	(n = 364)	(n = 374)	(n = 368)	(n = 364)
	Married	15	79	7	46	37	7	5	6	6	13
	Never married	15	68	17	50	36	0	7	7	3	10
	Divorced/separated	16	70	14	40	53	20	23	12	12	28
	Widowed	12	76	13	19	26	8	4	10	0	0
	<i>Chi-square (sig.)</i>		P ² = 49.46 (.000)								
<i>Education</i>			(n = 2811)		(n = 375)	(n = 373)	(n = 368)	(n = 364)	(n = 374)	(n = 367)	(n = 364)
	No H.S. diploma	11	70	19	35	53	20	15	5	5	5
	H.S. diploma	14	77	9	36	35	4	6	7	8	13
	Some college	15	77	9	42	38	8	8	10	6	17
	Bachelors/grad deg	16	78	6	57	41	11	5	4	5	12
	<i>Chi-square (sig.)</i>		P ² = 32.80 (.000)								
<i>Occupation</i>			(n = 1910)		(n = 287)	(n = 287)	(n = 284)	(n = 282)	(n = 283)	(n = 281)	(n = 281)
	Sales	18	73	8	22	22	3	3	11	3	11
	Manual laborer	14	73	12	42	31	4	8	0	4	13
	Prof/tech/admin	16	77	8	44	42	11	11	9	7	18
	Service	21	69	10	49	42	7	4	4	7	9
	Farming/ranching	10	84	6	55	41	5	0	0	0	10
	Skilled laborer	19	75	7	47	47	4	6	6	4	13
	Admin. support	16	76	8	53	20	7	0	7	7	20
	<i>Chi-square (sig.)</i>		P ² = 31.94 (.004)								

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