

Economic and Environmental Issues in Arkansas: A Policy Perspective

Assessing Residents' Perceptions of Air and Water Quality in Northwest Arkansas and Northeast Oklahoma

Executive Summary

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Introduction

The Northwest Arkansas and Northeast Oklahoma area has a thriving economy. It includes a significant poultry production sector with numerous poultry grow-out houses in open-country, along with the necessary feed complexes, hatcheries, and processing plants. Agriculture plays a very important role in Arkansas and Oklahoma's economies.

Even though agriculture can provide many benefits, it can also have negative environmental impacts on surrounding areas. Ammonia, sulfide and particulate matter released when poultry houses are vented may cause problems for the neighboring areas that range from simple odor issues to more serious health issues such as breathing problems and nervous system impairments. The runoff from poultry litter applied to pastures can pollute nearby streams with nitrogen and phosphorous, causing algae to grow and kill the fish.

While poultry industry has created economic growth in the area, this growth, needs to be balanced by environmental quality. In establishing effective environmental policy, it is important to know how the residents perceive current air and water quality, what they believe to be potential sources of pollution, and who is responsible for paying for the improvements. The goal of this study is to examine residents' perceptions of air and water quality in the Northwest Arkansas and Northeast Oklahoma area. The specific objectives of the study are to: 1) examine the perceptions of residents in the study area regarding air and water quality and potential sources of pollution; 2) estimate, using the contingent valuation method, the respondents' willingness to pay (WTP) in dollars for improved air and water quality; and 3) examine the relationship between respondents' air and water quality perceptions, their WTP for improved quality, and their socio-demographic characteristics.

Methodology

The study area consisted of four counties in Northwest Arkansas (Benton, Carroll, Madison, and Washington) and six counties in Northeast Oklahoma (Craig, Delaware, Mayes, Nowata, Ottawa, and Rogers). In April and May 2007, a random sample of 2,000 urban and rural residents was chosen to complete a mail survey. The survey contained questions regarding:

1) perceptions of air and water quality, 2) perceptions of causes of air quality degradation, 3) willingness to pay for improved air and water quality, and 4) household demographics.

The contingent valuation dichotomous choice method was used to determine residents' WTP for improved air and water quality. Each questionnaire was randomly assigned a dollar amount of \$2, \$5, \$10, \$20, or \$40 (bid amount) for improved air quality and then again for improved water quality. The survey stated these sums would be paid as part of the respondent's state income tax to improve air or water quality using best available practices.

Four hypotheses were tested in this study:

- Residents are not willing to pay for improved air and water quality.
- There are no differences in small and large town residents' willingness to pay.
- The factors town size, perception of air and water quality, perception of who should pay for improved air and water quality, use of outdoor recreation amenities, number of children in the household, household income level, contributions to environmental causes, education and the bid amount have no influence on WTP.
- There are no differences in responses of Oklahoma and Arkansas residents in how they perceive the current level of air and water quality or who is responsible for any negative impacts on air and water quality.

The survey response rate was 36.9%; 682 completed surveys were used in the analysis. Summary statistics were calculated across all survey variables. Log-it regression was used to identify factors that influenced WTP. Chi square tests were used to test for differences between respondent groups to WTP and perceptions on air and water quality.

Key Findings

Perceptions of Air Quality and Water Quality

For most respondents (91%) air quality was either totally acceptable or moderately acceptable for normal daily activities. Visibility was never a problem for 44%, and odor was never a problem for 32%. Poultry farms (52% of respondents) and cars and trucks (68% of respondents) were the most often cited as potential sources of extreme negative impacts to air

quality. Of the 589 respondents who had lived in the area for five years or more, most (61%) thought air quality had stayed the same, but 35% thought it had worsened over time. In identifying potential causes of air quality degradation in the region, non-agricultural sources were mentioned by 86% of longtime residents, and agricultural sources were mentioned only by 27% of longtime residents.

Respondents were also asked their opinion on water quality for outdoor recreation. Seventy-five percent stated it was either totally acceptable or moderately acceptable. Only 24% of respondents believed water clarity was never a problem, and only 36% believed that odor was never a problem. Potential sources most often identified as having extreme negative impacts were roads and highways (60% of respondents) and pasture and hay fields (48%). Of the longtime residents, 57% thought water quality had stayed the same, but 39% thought it had worsened. Fifty-five percent of longtime residents suggested agricultural sources as causes of worsening water quality, while 78% suggested non-agricultural sources.

Willingness to Pay for Improved Air and Water Quality

Fifty-six percent of respondents stated that they were willing to pay for improved air quality. The mean WTP was \$6.97 per year. The median WTP was \$2.00. Statistical tests showed large town residents were more likely to pay for air quality improvements than small town residents. Six factors (being from a large town, having an income of \$75,000-\$100,000, donating to environmental causes, a bid amount of \$2, perceiving responsibility to pay for improved air quality and perceiving air quality as totally acceptable) significantly contributed to WTP. All factors except perceiving air quality as totally acceptable had a positive influence on WTP.

Fifty-one percent of respondents stated they were willing to pay for improved water quality. The mean WTP was \$9.10 per year. The median WTP was \$5.00. Large town residents were significantly more likely than small town residents to pay for improvements. Eight factors (being from a large town, having an income of less than \$25,000, using water for recreational activities, a bid amount of \$2, a bid amount of \$20, perceiving responsibility to pay for improved water quality, perceiving water quality as totally acceptable and perceiving

water quality as moderately acceptable) significantly contributed to WTP. All factors, except perceiving water quality as totally acceptable, bid amount of \$20 and income of less than \$25,000, had a positive influence on WTP.

Differences in Responses across Arkansas and Oklahoma Residents

Results also suggest Oklahoma residents perceive air quality is worse than Arkansas residents do. However, Arkansas residents felt more strongly that poultry operations contributed to degrading air quality than the Oklahoma residents did. Oklahoma residents were more likely to state that air quality had declined over the past five years. Oklahoma respondents were more likely to blame agricultural sources than Arkansas residents. Arkansas respondents were more likely to blame non-agricultural sources than Oklahoma residents.

Significant differences were also found in responses regarding water quality. Oklahoma residents perceived a greater decrease in water quality due to clarity and odor problems than Arkansans did. Arkansas residents were more likely to state that water quality has changed over the past five years. Oklahoma residents were more likely to point to agricultural sources as the cause than Arkansans. Arkansas residents were more likely to point to non-agricultural sources as the cause than Oklahomans.

Results of Hypotheses Testing Summarized

Through use of statistical analyses, all null hypotheses were rejected. That is:

- Residents are willing to pay for improved air and water quality.
- Large town residents are more likely to state a WTP for improved air and water quality than small town residents.
- Factors including town size, perception of air and water quality, perception of who should pay for improved air and water quality, use of outdoor recreation amenities, household income level, contributions to environmental causes and the bid amount influence willingness to pay for air and water quality.
- Significant differences exist in Oklahoma and Arkansas residents' perception of current air and water quality as well as responsible sources for degradation in air and

water quality. In all cases, Oklahoma residents were more likely to perceive degradation in air and water quality and also more likely to believe agricultural sources were responsible for air and water quality problems.

Conclusion

Our study reveals the perceptions of a sample of regional residents at one point in time on air and water quality issues. It has produced the following three findings that may be helpful to policy makers who seek to develop appropriate air and water quality policies for the region. First, water quality was of greater concern to the respondents than air quality. Evidence exists not only in their perception of current air and water quality, but also in their willingness to pay. A greater percentage of respondents felt air quality was totally acceptable than water quality. Mean willingness to pay for water quality improvements was greater than mean willingness to pay for air quality improvements. Agricultural sources were more frequently cited as sources of diminished water quality. Second, residents across both states more often associated agricultural sources with water quality problems. Third, however, overall survey respondents implied that non-agricultural sources are equally or even more responsible than agricultural sources for pollution problems. Perceptions on air and water quality from this study can be used to begin a dialogue with affected parties to discuss concerns and develop strategies to address their concerns. Meanwhile, more research is needed to determine if these findings hold across a larger representative sample of respondents as well as across time.