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# Preferences for Rural Amenities in Lancaster County

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PREFERENCES FOR RURAL AMENITIES IN LANCASTER COUNTY

by

Katja Koehler-Cole

A THESIS

Presented to the Faculty of

The Graduate College at the University of Nebraska

In Partial Fulfillment of Requirements

For the Degree of Master of Science

Major: Natural Resource Sciences

Under the Supervision of Professors James Brandle and Charles Francis

Lincoln, Nebraska

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# PREFERENCES FOR RURAL AMENITIES IN LANCASTER COUNTY

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University of Nebraska, 2008

Advisors: James Brandle and Charles Francis

Agricultural land provides many services that the public values. These rural amenities are positive externalities of agriculture and as such underprovided in the market. Options to enhance the provision of rural amenities include subsidies to farmers and establishing markets that capitalize on these amenities. Essential information for any publicly funded program that targets rural amenities includes identifying the public preferences and demands for these amenities. This study researches the preferences of Lincoln, Nebraska, residents for the rural amenities that Lancaster County offers and measures the frequency with which people engage in outdoor recreation, agritourism and purchasing locally grown foods. Environmental amenities (air and water quality) are the most important amenities. Using contingent valuation methods, we found that people were willing to pay additional taxes for programs that enhance the provision of environmental amenities but not for programs that compensate farmers for creating opportunities for outdoor recreation on their land. To enhance the provision of rural recreational amenities (outdoor recreation, agritourism), market-based approaches should be used.

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## Chapter 1

### Introduction

Agriculture is inherently multifunctional, meaning that it has numerous outputs which can achieve multiple goals simultaneously (OECD, 2001). It produces both non-commodities and commodities (food, fiber, and renewable energy). Non-commodities of agriculture include ecosystem services (water and air quality), rural development services (providing income and employment) and social and cultural services (Kroeger and Casey, 2007; Hellerstein et al., 2002). Hellerstein et al. (2002) define these services which are produced in rural locations and do not have a “market” character as *rural amenities*. Rural amenities are considered externalities and often have public goods character: they do not have a market price, are nonexcludable and nonrival. When producers are not compensated for the provision of positive externalities, they have no incentive to maintain or enhance their supply. For this reason, private markets usually fail to account for the value of amenities, requiring government intervention to ensure their adequate provision (Hellerstein et al., 2002; OECD, 2001).

In the United States rural areas have long been seen mainly as a means of food, fiber, and fuel production. With an ever-growing share of the American population living in urban areas and the importance of agriculture for the rural economy decreasing, there is evidence that this perspective is changing (Freshwater, 2002). Several studies have documented that the public values rural amenities and is willing to pay to protect farmland that provides rural amenities. Kline and Wichelns (1996; 1998) found that for Rhode Island residents environmental objectives such as the protection of groundwater, wildlife habitat, and the preservation of natural places were the most important reasons

for protecting farmland from development. For Delawareans, Duke and Aull-Hyde (2002; 2004) found that agricultural objectives were most important, closely followed by environmental objectives. Other evidence that rural amenities such as access to locally grown foods and recreational opportunities are becoming more popular can be seen in the nationwide emergence of Farmer's Markets and different types of agritourism (Batie, 2003).

Currently, the bulk of subsidies to agricultural producers in the U.S. is geared towards commodity production. In the European Union, on the other hand, farmers receive subsidies based on their compliance with standards set to reduce negative externalities and enhance positive externalities. Recognizing the multifunctional character of agriculture, the European Union addresses a wide range of agricultural externalities from water and air quality issues, to maintaining an attractive landscape, rural heritage and rural development (Baylis et al., 2007).

The concept of multifunctional agriculture seems to be gaining acceptance in the U.S. (Batie, 2003). For example, the USDA has created several conservation programs targeting negative externalities of farming (Baylis et al., 2007). The Conservation Reserve Program (CRP) reduces soil erosion by planting perennials on highly erodible lands. The Wetlands Reserve Program aims at improving the quality of water from agricultural lands by protecting and restoring wetlands on agricultural land. Other benefits derived from these programs are improved wildlife habitat, scenic views, and recreational opportunities (NRCS, 2007). The Farm and Ranch Lands Protection Program targets the loss of farmland to development. Through this program, farmers can sell or donate conservation easements to their land and in return have to keep their land in

agriculture. However, conservation programs constitute only a minor percentage of expenditures on agriculture (Baylis et al., 2007).

Clearly, there is a discrepancy between the public preferences for amenity outputs of agriculture and agricultural policies favoring commodity production. Not only does this discrepancy lead to unwise spending of tax money, it also indirectly increases the negative externalities associated with commodity production (OECD, 2001). As noted above, the USDA possesses tools to increase the quantity and quality of environmental amenities from farmland. For other rural amenities, including outdoor recreation and access to locally grown foods, markets can be established. Depending on local specifications, residents of different areas exhibit different demands for rural amenities (OECD, 2001). This illustrates the need for research into local preferences and demands for rural amenities. Local policy makers need to know what it is that people demand from agricultural land in a certain area in order to create programs that supply these amenities most cost-efficiently. This study's objectives were to obtain some of this knowledge, in particular:

- 1) To identify which rural amenities were the most important for the residents of Lincoln.
- 2) To investigate the demand for rural amenities, i.e. which rural amenities needed to be provided in greater quantity and/or quality.
- 3) To assess people's willingness-to-pay for programs which improve the provision of those amenities in demand.

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## Chapter 2

### **Valuing non-market outputs from local rural lands: A survey of the population of Lincoln, Nebraska**

#### Introduction

Rural lands supply an abundance of goods and services beyond food, fiber, and fuel. Farmland and other undeveloped rural land is essential in recharging the groundwater, it provides wildlife habitat, has aesthetic functions and offers opportunities for outdoor recreation. These non-market goods and services, united under the term *rural amenities* are positive externalities of agriculture (Hellerstein et al., 2002). Positive externalities are distinguished by the following characteristics: the lack of markets, nonrivalness (no one can be prevented from consuming them) and nonexcludability (one person's consumption does not diminish the availability of this amenity to another person) (Edwards-Jones et al., 2000). Private firms have no monetary incentive to produce these positive externalities, resulting in the underprovision of rural amenities in the market (Hellerstein et al., 2002). This calls for government intervention to ensure that socially desirable rural amenities will be provided in sufficient quantities.

The purpose of this study was to accurately describe which rural amenities are most important to and most in demand by the people of Lincoln. As part of the study, we assessed people's willingness-to-pay for programs that provide different types of rural amenities. Using contingent valuation methods (willingness-to-pay questions), we elicit monetary values people place on different amenities. Contingent valuation methods were used because they allow measuring the value of amenities even if they possess only nonuse values (Lipton et al., 1995; Swinton et al., 2007). The information obtained

through this study can be a valuable tool to Lancaster County policy makers in developing land use concepts that provide the optimal amount of rural amenities. With the prospective of establishing markets for outdoor recreation, agritourism, and local foods in mind, we also identified preferences, willingness-to-pay, and a potential customer base for these amenities.

#### Providing rural amenities through agriculture

The positive goods and services that agriculture provides are manifold. They range from ecosystem services over cultural and historical services to growth control. Table 1 has a comprehensive listing of rural amenities, focusing on those that were selected for this study. Some rural amenities exhibit market character: several types of outdoor recreation (hunting, camping) can be provided by private firms. Others, like scenic views, can be used to attract tourists to an area. Some have public goods character, like drinking water quality and flood control (Hellerstein et al., 2002; Daily et al., 1997).

The quantity and quality of rural amenities that agriculture provides are influenced by land management practices. Soil management that focuses on maintaining or improving soil fertility provides positive ecosystem services while less sustainable soil management practices that cause erosion, are negative externalities of agriculture (Kroeger and Casey, 2007).

Certainly, natural ecosystems are superior in their provision of ecosystem services. The conversion of natural landscapes to agriculture resulted in profound degradations of many ecosystem services (Kroeger and Casey, 2007). Yet, Swinton et al. (2007) point out that agroecosystems function as well as natural ecosystems in the

provision of certain rural amenities such as the quantity of groundwater recharge, even though the groundwater's quality might be negatively impacted by agricultural production. The conversion of agroecosystems to developed landscapes diminishes the output of these amenities greatly. Swinton et al. (2007) suggest that there is a "human-impact continuum" with unmanaged natural ecosystems on one end of the spectrum, agriculture in the middle, and developed landscapes on the other end of the spectrum. The provision of ecosystem services from agriculture has to be seen in the context of what ecosystems agriculture replaced and what agriculture will be replaced with. Indeed, ensuring a sufficient output of rural amenities is the primary reason in several states for preventing the conversion of farmland to development (Hellerstein et al., 2002).

There are several programs in the United States that target different types of rural amenities. The majority of these programs are conservation programs that aim to mitigate negative outputs of farming such as nutrient or pesticide runoff and soil erosion. One example is the Conservation Reserve Programs (CRP) that compensates eligible farmers for returning marginal or fragile lands back to permanent vegetation, reducing soil erosion and nitrate leakage, and enhancing habitat for wildlife. In contrast, the Farm and Ranch Lands Protection Program, targets the loss of farmland to development. Through this program, farmers can sell or donate conservation easements to their land and in return have to keep their land in agriculture (Baylis et. al, 2007). Purchase of development rights (PDR) programs seek to improve the financial viability of farming and reduce the pressure from soaring land prizes in the fast-growing suburban areas (Hellerstein et al., 2002; American Farmland Trust, 1997). However, Kline and Wichelns (1994) argue that the multiple objectives of PDR programs sometimes conflict with one

another. For example, when PDR programs focus on protecting land with intensive crop production, amenities like the provision of clean water from that farmland might actually decrease. Instead of trying to achieve the provision of rural amenities indirectly by protecting farmland, Kline and Wichelns (1994) suggest addressing the goals that society wants to achieve with farmland protection programs (i.e. the provision of rural amenities) directly.

### Preferences for rural amenities

When creating programs that target rural amenities, it is crucial to determine what the amenities are that are in demand. Several studies have attempted to identify preferences for rural amenities (see table 2). Kline and Wichelns (1996) surveyed people in Rhode Island and Pennsylvania about the goals of farmland preservation programs and found that protecting groundwater and wildlife habitat were the most important preferences.

Krieger (1999) states that for residents of Chicago suburbs the most important reasons for preserving farmland were the protection of family farms and maintaining food supplies. In a study conducted by Duke and Aull-Hyde (2002) in Delaware, residents of urban counties preferred environmental attributes (protecting water quality, wildlife habitat, and natural places) over agricultural attributes. In the rural counties, agricultural attributes were most important, followed by environmental attributes.

Sparsely populated states are less concerned about preserving rural amenities, possibly because of the perceived abundance of rural land and the absence of rapid development (Hellerstein et al., 2002). Nebraska is not among the states that develop



considerable amounts of farmland; however, the Farmland Information Center (2004) classified Lancaster County's farmland at high risk for being developed. Lancaster County has high-quality farmland and high development which are the main factors determining whether an area is likely to experience farmland conversion (Farmland Information Center 2004; 2006). Lincoln's population growth is spurring high development rates (table 3). From 1960 to 2006, the population grew by 88% (U.S. Bureau of Census, 1998; 2000a; 2006a), and the land area the city covered grew by 233% (City of Lincoln Planning Department, 2007).

#### Survey design and data collection

To obtain an overview of the public's preferences for rural amenities, a mail survey was conducted in March and April of 2007. The design of the survey follows the Tailored Design Method as described by Dillman (2000).

The questionnaire contained 25 questions which were divided into six sections (see Appendix 1 for the questionnaire). The most salient questions were placed at the beginning, the more objectionable questions (such as the ones asking for willingness-to-pay) towards the middle of the survey, and the demographic questions at the end (Dillman, 2000; Babbie, 1990). The survey instrument was pretested to ensure it was clear, concise, and yielded usable data.

In the first section, participants rated the importance of rural amenities that were taken from a list compiled by Hellerstein et al. (2002) from studies on farmland preservation and rural amenities (see table 1). Section two estimated the demand for rural environmental amenities (open space, wildlife habitat, scenic views, water quality, and

air quality). To estimate the value people place on these amenities, the contingent valuation method (CVM) was used. Contingent valuation involves directly asking individuals for their willingness-to-pay (WTP) for a given good or service, contingent upon a constructed market (Lipton et al., 1995). Answer categories (\$0 to \$50 or more) were given to avoid uncertainty about how much to pay. The sections on outdoor recreation, agritourism, and purchasing locally grown foods were constructed similarly. Each section started with closed-ended questions with ordered response categories that measured the frequency with which participants engaged in these activities. It then asked participants how important these activities were for them. Demand for more recreational amenities was estimated using open-ended questions. The questions in the demographic section were designed to be comparable to the data from the U.S. Census Bureau by using the same categories for education and income questions.

The study also examined the potential for combining agriculture with outdoor recreation. A theoretical program was constructed that would compensate farmers for allowing the public to access their land for outdoor recreation. Participants were given a choice of payment vehicles (taxes or user fee) and asked how much they would be willing to pay to fund such a program.

The survey population in this study was the public of Lincoln, Nebraska. In 2006, the U.S. Census Bureau estimate for the number of households in Lincoln was 96,849 (U.S. Census Bureau, 2006b). According to Dillman (2000), for a population this size, 383 completed questionnaires are needed to make estimates with a sampling error of no more than  $\pm 5\%$ , assuming the maximum variation respondents can have on a yes/no question (50/50 split) and a confidence interval of 95%.

Addresses were obtained from the Marketing Systems Group, a professional survey research group. Only households were sampled. The U.S. Census Bureau (2000b) defines a household as all the people (single persons, families, unrelated people living together) sharing a housing unit (i.e. a house, apartment or mobile home) and that live and eat separately from other people living in the same building. Household addresses were randomly sampled from the white pages of the Lincoln phone directory. For 2007, the Marketing Systems Group stated the number of households in Lincoln with 98,331. Forty-three percent of all Lincoln households (42,359) were listed in the phone directory and constitute the sampling list for the survey (Elizabeth Nelson, Marketing Systems Group 2008, personal communication).

To determine the starting sample size, it was assumed that 90% of the addresses from the telephone directory were usable, 50% of the participants would return completed questionnaires and 90% of the completed questionnaires would be usable. Based on these assumptions, 946 questionnaires would need to be sent to result in the minimum sample size of 383 surveys for analysis (Dillman and Salant, 1994). This number was rounded up, leading to the selection of 1,000 Lincoln households for this study.

In accordance with the UNL requirements for research involving human subjects, this project had to be approved by the IRB. The IRB number for this study is 2006-11-126 EX.

To test the survey instrument and implementation plan, a pilot study was conducted in February of 2007. Pilot studies should mimic the main study using a smaller sample size (Dillman, 2000; Babbie, 1990). The pilot study achieved a response rate of

53%. Because the questionnaire was not changed for the final study, the data obtained from the pilot was used in the final analysis. The pilot was carried out using first class postage on all mail. However, due to the cost of mailing 1,000 letters, surveys and postcards by first class, bulk mailings and business-reply envelopes were used for the final survey even though it would likely decrease the response rate.

The implementation of the survey followed recommendations by Dillman (2000), Babbie (1990) and Baker (1999) which stress the importance of multiple contacts with the participants to increase the response rate. On March 21, 2007, prenotification letters were mailed to everyone in the sample, informing them that they had been selected to be in the study. On March 28, participants were sent the questionnaire together with a cover letter that explained the subject of the survey, why their response was important, and whom to contact in case of questions. On April 3, a thank-you postcard was mailed that also reminded people who had not returned their questionnaire to do so. Questionnaires contained numbers so that the addresses of people who had returned their questionnaire could be deleted from the address list. On April 19, a final mailing consisting of a replacement questionnaire with a second cover letter was sent to non-respondents, urging them to return a completed questionnaire.

In accordance with the TDM, all correspondence was personalized. University of Nebraska stationary and real names in the salutation were used for the accompanying letters. Each of the prenotification and cover letters was personally signed (see Appendix 2 for survey correspondence).

### Survey data analysis

This survey collected mainly categorical data (nominal and ordinal variables). Nominal variables, such as gender, preferences for landscape elements, whether respondents have children living with them and whether people are members of conservation organizations, have no numerical relationship to each other. However, they were assigned numbers for coding purposes. Observations that are ranked, such as the importance of amenities, willingness-to-pay, education and income, are ordinal data. The only numerical data collected was the age of the participants. Frequencies and percentages were calculated for all observations. The mean willingness-to-pay was calculated by multiplying the midpoint of each WTP category (i.e. 5 for \$1 - \$9) with the frequency of observations for this category, summing up the products and then dividing it by the total number of observations. To illustrate the relationship between independent and dependent variables, contingency tables were constructed. Chi-square tests are a way of testing for statistically significant relationships between categorical variables. Chi-square tests of independence were used to determine whether the row variables (the dependent variables) in a contingency table were independent of the column variables (the independent variables). If p-values were 0.05 or smaller (significance level  $\alpha \leq 0.05$ ), the null hypothesis was rejected and it was concluded that the row variables and the column variables are dependent. SAS proc freq was used for the statistical analysis.

## Results and Discussion

### *Response rate*

The survey achieved a response rate of 49%, yielding 435 completed and usable questionnaires. To make estimates with a  $\pm 5\%$  sampling error and a 95% confidence interval, 383 questionnaires were needed. The 23 completed questionnaires from the pilot study were included in the analysis, bringing the total number of responses to 458.

### *Demographic information*

In 2006, the last year for which complete socioeconomic statistics were available, the U.S. census estimated there were 238,302 people living in Lincoln. There were 96,849 households in Lincoln and 221,423 residents lived in households (U.S. Census Bureau, 2006a; 2006b). The demographic data collected in the questionnaire revealed several differences between survey participants and the general public (see table 4). The median age for survey participants was 55 years, whereas the median age for the Lincoln population (20 years and over) is in the age group of 35 to 44 years (age in the census data is shown in categories rather than means). The age group from 20 to 24 years which constitutes 14.23% of Lincoln's residents was not represented in the sample (U.S. Census Bureau, 2006a).

The deviation between the census demographic data and the survey demographic data most likely stems from limitations in the sampling method. Many younger residents only use cell phones. Cell phone numbers are not listed in the telephone directory, making it impossible to include this population in the sampling list. The younger age group is also more likely to live in institutionalized housing (dormitories) which were not sampled for the survey. The Lincoln phone directory listed only 30 residents younger

than 25 years and the probability that anyone from this age group was selected for the study is low (see Chapter 3). Male respondents were overrepresented (66% versus 34%), because most telephone numbers were listed under a male name. Survey respondents had higher education and income levels than the census data. Kanuk and Berenson (1975), in a literature review on response to mail surveys, found that there was a positive correlation between education and survey response.

#### *Preferences for landscape elements*

Respondents revealed a preference for cultivated landscape elements. They identified “forests and woodlands” (16.4%), followed by “cropland” (14%) and “farms and farmsteads” (13.4%) as the landscape elements they most like to see in the countryside (see figure 1). This preference for cultivated lands and land with surface water bodies is in accordance with several studies that found that the land uses the public most likes to see are cropland and land adjacent to water (Kline and Wichelns 1994; 1996; 1998; Rosenberger and Walsh, 1998). Golf courses, new housing developments, and commercial developments ranked lowest in preferences.

#### *Preferences for rural amenities*

Participants tended to find all of the listed amenities (open space, wildlife habitat, recreational opportunities, scenic views, locally grown foods, preservation of rural character, water quality, and air quality) that can flow from rural areas important. Rankings showed that water and air quality were the most important amenities, followed by open space and wildlife habitat (see figure 2). In fact, many respondents combined water and air quality, saying that “they cannot be separated” and “pure water and air are vital to all” (respondents’ quotes). They stated a clear preference for environmental

amenities (water and air quality, wildlife habitat, and open space) over recreational and agricultural amenities (locally grown foods, preservation of rural character) which is rather typical of urban populations (Duke and Aull-Hyde, 2002, Kline and Wichelns, 1996). Lincoln residents ranked rural character, scenic views, and local foods as the three least important rural amenities. The perception is that farmland is not scarce; therefore people do not value rural character as much. Judging from comments, people found the scenery of Lancaster County's landscape of rather low quality.

#### *Demand for rural environmental amenities*

Respondents' ranking of the demand for rural amenities with environmental attributes revealed that water quality was the amenity most in demand, followed by wildlife habitat (see figure 3). Hence, water quality emerged as the amenity that people valued the most, and perceived as needing the most improvement.

It was hypothesized that preferences and demands for amenities are associated with gender, income, education level, and membership in environmental organizations. Chi-square tests of independence were conducted to test for associations between the variables. Demand for rural amenities depended on gender. More men identified a need for water quality and open space than women, while women were more concerned with wildlife habitat, scenic views, and air quality (see figure 4). The chi-square test for independence between the gender and demand for amenities gave a p-value of 0.026. This is below the significance level of  $\alpha = 0.05$ , so the null hypothesis (demand for amenities was independent of gender) was rejected and we concluded that the demand for amenities depends on gender. Educational attainment was also associated with differences in the demand for amenities at the significance level  $\alpha = 0.05$  (p-value 0.031)



(see figure 5). Open space becomes more important with higher educational attainment (8.7% for high-school only versus 24.2% for professional degrees) while participants with lower educational attainment found water quality to be in higher need (27.5% for professional degrees versus 44.9% for high school only). Participants in the higher income levels saw more need for open space, but less need for water quality than the lower income levels (figure 6). Yet, the association between income and demand for amenities was not significant (p-value 0.768).

#### *Willingness-to-pay for rural environmental amenities*

Using the contingent valuation method, willingness-to-pay (WTP) for the environmental amenity that individuals perceived to be in highest demand was measured. The overall WTP was relatively low (\$16.65/year and household). Table 5 shows the mean WTP for each environmental amenity. Participants who selected water quality as the amenity that was in highest demand had the lowest mean WTP (\$14.69). Those who selected open space had the highest WTP (\$19.12). Chi-square tests of independence were conducted to test for independence between the amenity in demand and WTP. The p-value of was above the significance level of  $\alpha = 0.05$  (p-value 0.667), therefore it was concluded that WTP did not depend on the amenity in demand. Chi-square tests of independence showed that income and WTP are dependent (p-value 0.04). With rising income, WTP increased (see table 6). WTP also increased with a higher education level, but this association was not significant (p-value 0.161). The strongest influences on WTP were the importance of outdoor recreation (p-value 0.007) and membership in conservation organizations (p-value 0.0004).

For higher income and education groups, the WTP for amenities was higher and they demand different amenities than the lower income and education groups. Water quality was significantly more important in the lower education and income groups which make up 55% of Lincoln's population. Amenity provision in Lancaster County should focus on improving water quality since this is the amenity most people perceive as needing improvement. Scenic and open space amenities are more sought after by the higher education and income groups and often influence household location decision. Amenity-rich counties experience higher rates of population and job growth. They attract larger proportions of high-income and highly educated people. Improving the supply of scenic and open space amenities in Lancaster County could make the region more attractive to persons with high incomes and education.

#### *Rural recreational amenities*

We measured the frequency with which people engaged in outdoor recreation, agritourism, and purchasing locally grown foods. The most popular *outdoor recreational activity* was walking/hiking/biking, followed by taking scenic drives, watching wildlife, and watching birds (see table 7). Outdoor recreation was important when compared to other recreational activities (3.26 on a scale from 1 to 4, with 1 = "not at all important" and 4 = "very important"). Participants saw a greater demand for some recreational activities; most notably opportunities to walk/hike/bike, to hunt/fish, and to swim in lakes. Comments made in this section suggest that the water quality of lakes in Lancaster County needs to be improved. Participants felt it was not safe to swim or do other water-related activities in Branched Oak Lake, Holmes Lake, and Pawnee Lake.

Recreationists contribute considerably to the economy. In some areas, the value of land for fishing, hunting or watching wildlife can exceed the value of land for agricultural production. Still, Nebraska's recreation industry is one of the smallest in the nation. Much of the land is privately owned and landowners see land and water primarily as a means of commodity production (ECONorthwest, 2006). Our results suggest that there is potential for private landowners to capitalize on rural amenities for example in the form of nature tourism. Nature tourism provides certain types of outdoor recreation, traditionally supplied through the public sector, such as hunting/fishing, wildlife watching, trail hiking/biking. Cost-share programs such as the Conservation Reserve Program (CSP) can facilitate in starting up a nature tourism operation. CSP compensates private landowners for retiring marginal and highly erodible farmland and planting it in native grasses and trees. Farmers can sell the right to hunt on this land, adding an additional source of revenue to the farm operation.

Public access to private land is often cited as a benefit of protecting rural land. Survey respondents, however, did not indicate a greater demand for public access to private land. When asked for their WTP for programs that compensate landowners for allowing public access for outdoor recreation on their land, the most frequently given WTP was "none" (see table 8). The preferred payment vehicle for these programs is user fee (82.3%). Only 10.9% of respondents favored taxes to fund public access to privately owned lands and 6.8% chose some other form of funding (usually a combination of both).

Chi-square tests of independence showed that WTP for outdoor recreation programs depended on membership in conservation organizations ( $p \leq 0.0001$ ), importance of outdoor recreation ( $p\text{-value} \leq 0.0001$ ), age ( $p\text{-value} 0.0002$ ) and gender ( $p$ -

value 0.037). Men were more willing to pay than women and older people were less willing to pay than younger people. People opting for a tax to fund such a program had a higher mean WTP than people favoring a user fee or other option. This difference was significant at  $\alpha = 0.001$  level. Willingness-to-pay was not dependent on income (p-value 0.129). With higher education, WTP increased (p-value 0.059), but this is above the significance level of  $\alpha=0.05$ , so it was concluded that WTP does not depend on education.

Comments on this question were overwhelmingly anti-tax. This suggests that people in Lincoln adhere to the dominant paradigm of private property that prohibits public access to privately owned land, unless the user pays a fee for access. As discussed, Lincoln's residents see a greater demand for opportunities for outdoor recreation, especially hiking and biking trails. Nevertheless, Lincolniters might not be willing to accept a tax increase to enhance outdoor recreation on private lands. Funding such a program through user fees, on the other hand, will hardly result in sufficient funding, given the low annual dollar amount people were willing to pay. If there is a need to increase opportunities for outdoor recreation, monetary compensation might convince some farmers to open their land to the public. The primary compensation for the land should be earmarked for conservation, such as protecting the water quality and wildlife habitat, since these are amenities for which the public is willing to pay higher taxes.

*Agritourism* provides people with the chance to experience the workings of a farm. The most popular agritourism activity in this study was "wine tasting on vineyards" (see table 9). Vineyards make use of the natural resources occurring in the area, but also of the presence of a target group of people with higher income and education. More

traditional types of agritourism, such as pumpkin patches and pick-your-own berry farms or orchards are less costly to customers, but can still increase earnings for landowners. Types of agritourism that participants wished to see in Lancaster County were “dude farms” or “dude ranches” where the city population can experience the operation of a working farm. Agritourism was not as important as outdoor recreation when compared to other leisure activities (2.61 on a scale from 1 to 4, with 1 = “not at all important” and 4 = “very important”). A frequent comment was “I just don’t know what [type of agritourism] is out there”, hinting at the lack of information available about agritourism in the area.

Being able to purchase *locally grown foods* is becoming increasingly important. This can be seen in the surge of the outlets marketing locally grown foods. Seventy percent of participants reported visiting farmers’ markets at least once per year, 35% went to farm stores at least once in the last year and 38% went directly to a farmer at least once per year. The most commonly frequented outlet for locally grown foods were groceries stores that carry local foods and roadside stands (see table 10).

Commentaries from the survey suggest that there is demand for homegrown, fresh produce, but people also wanted to buy meat, eggs, and dairy products locally. When purchasing food, the characteristic “grown locally” was of medium importance to people (2.63 on a scale from 1 to 4, with 1 = “not at all important” and 4 = “very important”).

### Conclusion

This study contributes to the knowledge of public preferences and valuation of non-market benefits rural landscapes offer. Lincoln residents have a visual preference for

natural and agricultural landscapes in the Lancaster County countryside. They find environmental services that these landscapes provide more important than recreational or agrarian services. Participants stated that there is a need for better water quality and more wildlife habitat in Lancaster County. The majority of people (70%) are willing to pay additional taxes to improve the provision of environmental amenities for which they see a demand. The mean WTP is \$16.65 per year and household.

Several options exist to ensure the continued provision of rural amenities. Which options to choose depends mainly on the amenities most in demand and the funds that can be allocated to providing these amenities. Clearly, the public demands many types of rural amenities. To produce the highest output of desired amenities with the least cost to taxpayers, policies should concentrate on those lands that supply the desired amenities most efficiently. Land that is essential for maintaining a clean water supply should be protected, for example by conservation easements. It is likely the public will accept slight tax increases to fund conservation, given their WTP. Crucial wildlife habitat in Lancaster County should also be protected by conservation easements.

In much of the literature on rural amenities, protecting farmland from conversion to development has been named as the main method of ensuring a continuing provision of rural amenities. Specifically, these studies suggest implementing Purchase of Development Rights programs (PDR) that buy the development rights to parcels of farmland (see Krieger, 1999; Hellerstein et al., 2001). However, this study as well as others (Kline and Wichelns, 1994, 1996) finds that the rural amenities urban populations demand most are those with environmental character. Their provision often conflicts with agriculture, for example where farming contributes to nitrates and pesticide residues in

the groundwater. Purchase of Development Right programs (PDR) can achieve environmental objectives, when they are combined with provisions requiring sustainable farming methods or setting aside some of the land as wildlife habitat.

The Environmental Quality Incentives Program (EQIP) and CRP programs minimize some of the external outputs of farming and increase environmental objectives. Due to the higher demand for environmental services in urban areas, these programs should be implemented on suburban farmland. Public funds should not be used to compensate farmers for providing the public access to their land for outdoor recreation. People prefer user fees to pay for these services. If greater access to open space is required, conservation easements or CRP contracts could include stipulations allowing public access. Considering the strong property rights mindset, neither private landowners nor the urban population might be ready to embrace the concept of multifunctional farmland. Public access in the form of hiking or biking trails might be best achieved by buying rights-of-way or buying land parcels.

The private market can be effective in enhancing the provision of rural recreational amenities through agritourism and marketing locally grown foods. Improved market information about the supply and demand for these goods and services is essential for private landowners establishing such an enterprise. This study is an important contribution to improved market information, because it quantifies the frequency of outdoor recreation and agritourism and identified which types are most popular. Agritourism, nature tourism, and marketing locally grown foods not only offer rural amenities to urban dwellers; they also result in additional income to private landowners and support local agriculture.

Rural amenities add to the quality of life for residents of Lancaster County. Their preservation should be a priority for County government. The private sector is able to provide certain amenities, but for those that evade market tradability, the public sector should employ strategies to make sure rural amenities continue to be generated. Further studies are needed to evaluate the impact rural amenities have on the economy of Lancaster County and the County's ability to attract businesses and a highly educated workforce.



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Table 1 – Comprehensive list of positive externalities produced by rural lands and those included in the study (modeled after Hellerstein et al., 2002 and Swinton et al., 2007)

Positive externalities produced by rural lands	Selected for the study
Ecosystem services <ul style="list-style-type: none"> <li>• Hydrologic services (Water purification and groundwater recharge, flood control)</li> <li>• Air quality services</li> <li>• Pollination services</li> <li>• Biodiversity maintenance</li> <li>• Wildlife habitat</li> <li>• Preservation of soil fertility</li> <li>• Waste assimilation (Waste decomposition and detoxification)</li> <li>• Open space</li> <li>• Carbon sequestration</li> </ul>	Water quality  Air quality  Wildlife habitat  Open space
Rural recreational amenities <ul style="list-style-type: none"> <li>• Hunting, fishing</li> <li>• Swimming</li> <li>• Walking/hiking/biking</li> <li>• Pleasure driving</li> <li>• Birding/wildlife watching</li> <li>• agritourism</li> </ul>	Outdoor recreation  Agritourism
Aesthetic services <ul style="list-style-type: none"> <li>• aesthetically pleasing views</li> </ul>	Scenic views
Social and cultural heritage <ul style="list-style-type: none"> <li>• preservation of rural character</li> <li>• family farms</li> <li>• farming as a way of life</li> </ul>	Preservation of rural  character
Rural development <ul style="list-style-type: none"> <li>• rural income and employment</li> <li>• supports rural communities</li> </ul>	
Access to locally grown foods	Local foods

Table 2 – Results of surveys on public preferences for rural amenities (modified after Hellerstein et al., 2002)

<b>Authors</b>	<b>Region and Method</b>	<b>Sample Size and Response Rate</b>	<b>Findings</b>
Kline and Wichelns (1994, 1996)	Rhode Island, Pennsylvania	Intercept survey, 515	Environmental reasons are most important, followed by agrarian reasons (local food supply, preservation of rural communities)
Bowker and Didychuk (1994)	New Brunswick, Canada	140 66%	Willingness to pay for farmland protection is correlated with membership in environmental organizations
Rosenberger and Walsh (1997)	Routt County, CO	320 57%	Low WTP to protect open space
Krieger (1999)	Chicago suburbs	1681 45%	Quality of life concerns most important reason for farmland protection (reduce sprawl, protect family farms, maintain food supply)
Racevskis et al. (2001)	Several states	N/A	Protection of family farms, protecting land with water on it, and land with active farming
Duke and Aull-Hyde (2002)	Delaware	Intercept interviews, 129 54%	Agrarian reasons for preserving farmland most important in rural counties, environmental reasons for preserving land most important in urban counties

Table 3 – Lincoln’s population and area growth from 1960 to 2006 (U.S. Census Bureau, 1998; 2000a; 2006; Lincoln Planning Department, 2007)

<b>Year</b>	<b>Population</b>	<b>Land area in sq. miles</b>	<b>Density (average population/sq. mile)</b>
1960	128,521	25.86	4970
1970	149,518	50.29	2973
1980	171,932	60.06	2837
1990	191,972	63.60	3018
2000	225,581	76.76	2939
2006	241,167	86.04	2803

Table 4 – Comparison of the 2006 American Community Survey demographic information and the study demographic information (U.S. Census Bureau, 2006)

<b>Demographic data</b>	<b>2006 American Community Survey data</b>	<b>Study data</b>
<b>population</b>	238,302	457
<b>Gender</b>		
male	50.3%	66.15%
female	49.7%	33.85%
<b>Age (only population 20 and older)</b>	173928	
20 - 24 years	14.23%	0%
25 - 34 years	23.44%	8.46%
35 - 64 years	48.13%	67.26%
>65 years	14.20%	24.28%
Median Age in years	32.1	54.82
<b>Number of households</b>	96849	N/A
<b>Households with children under 18</b>	30.48%	32.44%
<b>Level of Education</b>		
Less than High School	7.43%	0.66%
High School Graduate	25.00%	16.37%
Some College, no degree	22.99%	24.34%
Associate degree	10.03%	11.06%
Bachelor's Degree	23.63%	25.00%
Graduate or professional Degree	10.91%	22.35%
<b>Annual Household Income</b>		
< \$14,999	14.46%	4.93%
\$15,000 to \$24,999	13.28%	10.56%
\$25,000 to \$34,999	10.87%	12.44%
\$35,000 to \$49,999	15.27%	18.78%
\$50,000 to \$74,999	21.78%	22.30%
\$75,000 to \$99,999	11.36%	13.62%
>\$100,000	13.00%	17.37%
Median Household Income	\$45,982	Code 5: \$50,000 - \$74,999

Table 5 – Willingness-to-pay for each type of amenity demanded (includes mean WTP for each amenity). Means were calculated by multiplying the midpoints with the frequency, taking the sums of the products and dividing them by the total frequency for this category.

Amenity Midpoint	Willingness – to – pay					Total
	None 0	\$1 - \$9 5	\$10 - \$24 17	\$25 - \$49 37	\$50 or more 50	
<b>Open space</b>						
Frequency	18	9	24	7	13	71
Row percent	25.35%	12.68%	33.8%	9.86%	18.31%	17.49%
WTP	0	45	408	259	650	1362
Mean WTP						\$19.18
<b>Wildlife habitat</b>						
Frequency	22	21	21	11	10	85
Row percent	25.88%	24.71%	24.71%	12.94%	11.76%	20.94%
WTP	0	105	357	407	500	1369
Mean WTP						\$16.11
<b>Scenic views</b>						
Frequency	12	13	15	3	11	54
Row percent	22.22%	24.07%	27.78%	5.56%	20.37%	13.30%
WTP	0	65	255	111	550	981
Mean WTP						\$18.17
<b>Water quality</b>						
Frequency	45	35	40	13	18	151
Row percent	29.8%	23.18%	26.49%	8.61%	11.92%	37.19%
WTP	0	175	680	481	900	2236
Mean WTP						\$14.81
<b>Air quality</b>						
Frequency	9	4	11	6	4	34
Row percent	26.47%	11.76%	32.35%	17.65%	11.76%	8.37%
WTP	0	20	187	222	200	629
Mean WTP						\$18.5
<b>Total</b>						
Frequency	106	82	111	40	56	395
Row percent	27.09%	20.44%	28.08%	10.34%	14.04%	100%
Mean WTP	0	410	1887	1480	2800	\$16.65



Table 6 – Willingness-to-pay for environmental amenities is dependent on income (the original 7 income categories were merged into 3 groups: less than \$35,000 annually, \$35,000 to \$74,999 annually and more than \$75,000 annually to simplify comparisons. Mean Willingness-to-pay is calculated by the sum of products of the WTP midpoint and frequency for each row).

Income	Willingness-to-pay					Mean WTP
	None	\$1-\$9	\$10-\$24	\$24-\$49	\$50 and more	
<b>Less than \$35,000</b> <b>Frequency</b> <b>Row percent</b>	31 31.62	28 28.57	20 20.41	11 11.22	8 8.16	1273/98= \$12.99
<b>\$35,000 - \$74,999</b> <b>Frequency</b> <b>Row percent</b>	46 30.07	31 20.26	41 26.80	12 7.84	23 15.03	2430.5/153= \$15.86
<b>More than \$75,000</b> <b>Frequency</b> <b>Row percent</b>	24 19.51	19 15.45	42 34.15	15 12.20	23 18.70	2504.5/123= \$20.36

Table 7 – Frequency of outdoor recreation (measured in percent of people engaging in the different types of outdoor recreation annually).

<b>Type of outdoor recreation</b>	<b>Never</b>	<b>Once</b>	<b>Two to five times</b>	<b>More than five times</b>
<b>Walking/hiking/biking on trails or in parks</b>	16	9	25	50
<b>Went on a picnic</b>	36	27	26	11
<b>Watched birds</b>	35	13	23	29
<b>Watched wildlife other than birds</b>	24	13	33	30
<b>Hunting/fishing</b>	59	9	14	18
<b>Rode a snowmobile/ATV</b>	89	4	4	3
<b>Took a scenic drive</b>	14	10	41	35
<b>Went swimming in a lake</b>	71	8	12	9

Table 8 – Willingness-to-pay for outdoor recreation and favored method of payment  
(percentages of people willing to pay either as user fee, taxes or “other”  
method of payment)

Method of payment	Percentage favoring method	Willingness-to-pay				
		None	\$1-\$9	\$10-\$24	\$24-\$49	\$50 and more
User fee	82.27	33	23	26	9	9
taxes	10.91	10	19	44	4	23
other	6.82	54	13	20	3	10
total	100	32	22	27	8	11

Table 9 – Frequency of agritourism (percentage of people participating in these types of agritourism annually)

<b>Type of Agritourism</b>	<b>Never</b>	<b>Once</b>	<b>Two to five times</b>	<b>More than five times</b>
<b>Horseback riding</b>	89	9	1	1
<b>Picked fruit on berry farm/orchard</b>	64	26	9	1
<b>Visited pumpkin patch</b>	57	36	6	1
<b>Pet farm animals</b>	70	18	8	4
<b>Hay-rides, corn maze</b>	75	21	3	1
<b>Wine tasting at vineyard</b>	64	22	10	4
<b>Went to Christmas tree farm</b>	74	22	4	0

Table 10 – Frequency of purchasing locally grown foods from different outlets (percentages of participants reporting how often they purchase local foods from these outlets per year).

<b>Types of outlet</b>	<b>Never</b>	<b>A few times a year</b>	<b>About once a month</b>	<b>About once a week</b>	<b>More than once a week</b>
<b>Stores on farms</b>	65	31	2	2	0
<b>Directly from local farmer</b>	62	28	5	3	2
<b>Roadside stand (during season)</b>	27	42	10	14	7
<b>Farmer's market (during season)</b>	30	36	14	17	3
<b>Grocery store that sells locally grown foods</b>	23	39	17	15	6

Figure 1 – Preferences for landscape elements (participants selected 3 landscape elements for which they had visual preferences).

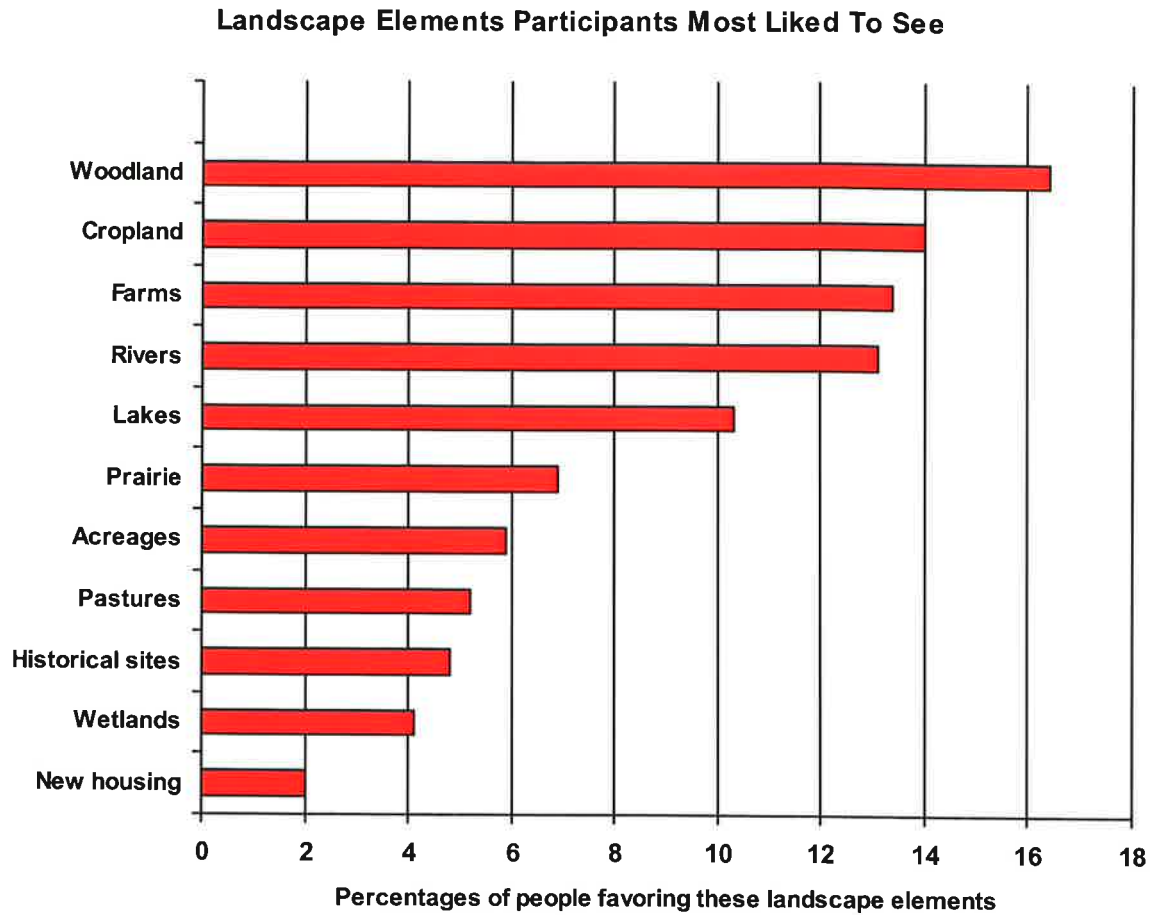


Figure 2 – Preferences for rural amenities (ranking of rural amenities according to the percentages of people choosing these amenities as the most important ones).

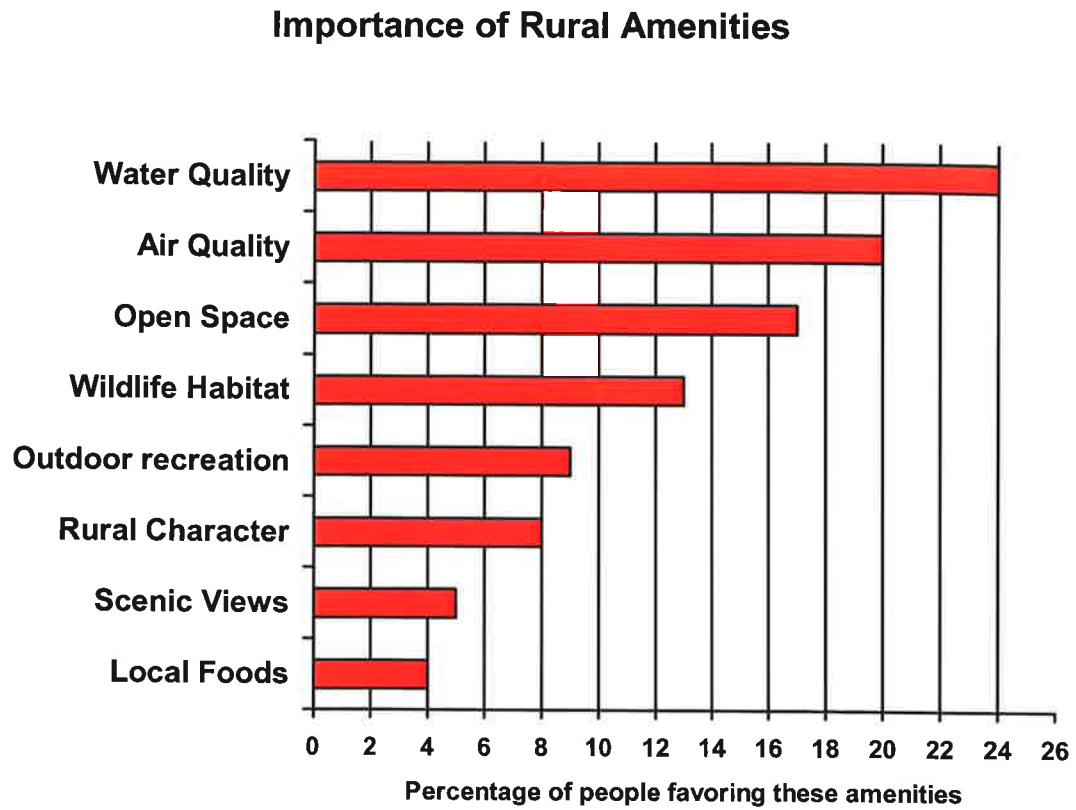


Figure 3 – Demand for environmental rural amenities (percentages of the demand for the different amenities, each respondent selected only one amenity).

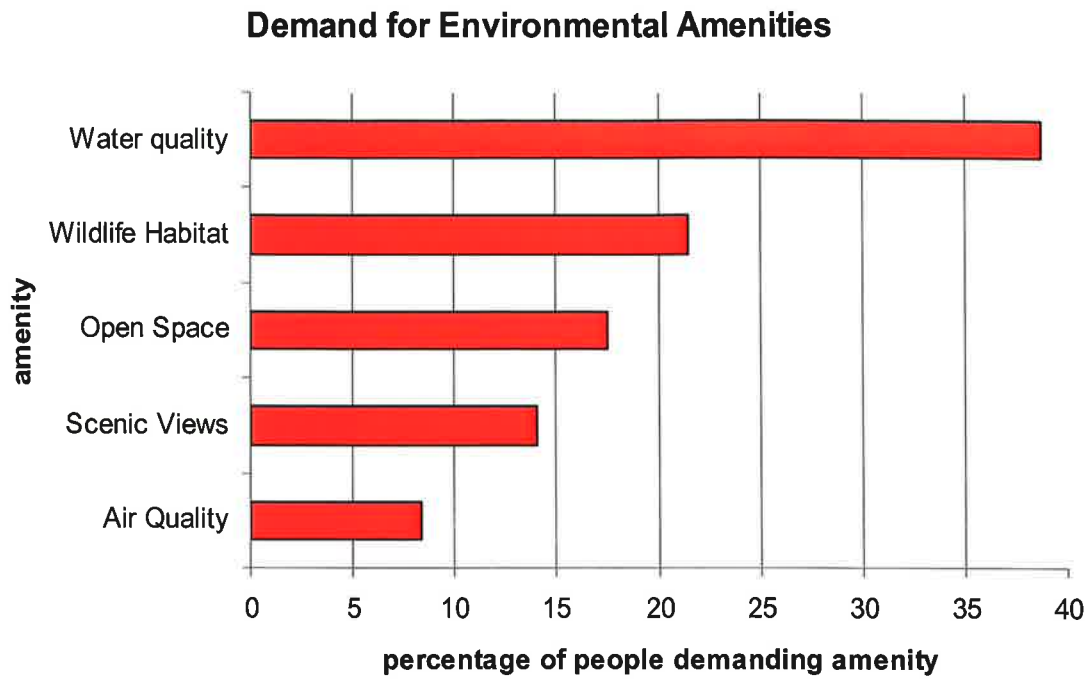




Figure 4 – Demand for environmental amenities depending on gender (percentages of males versus females that demand these amenities)

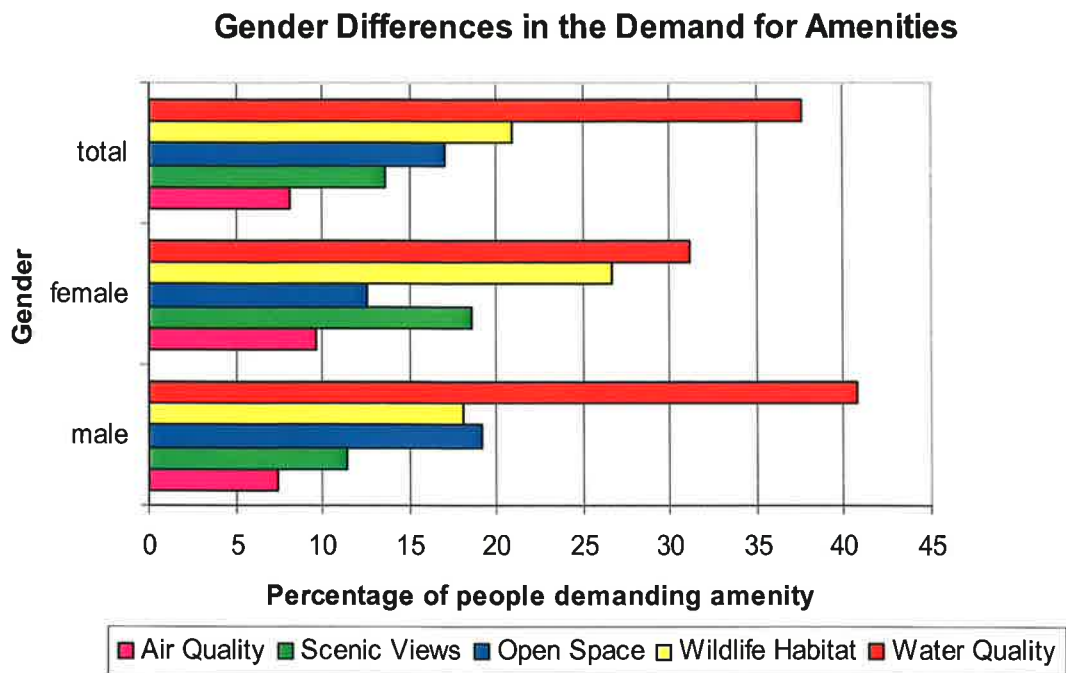


Figure 5 – Demand for environmental amenities depending on education (percentage of participants selecting the amenities and their educational attainment).

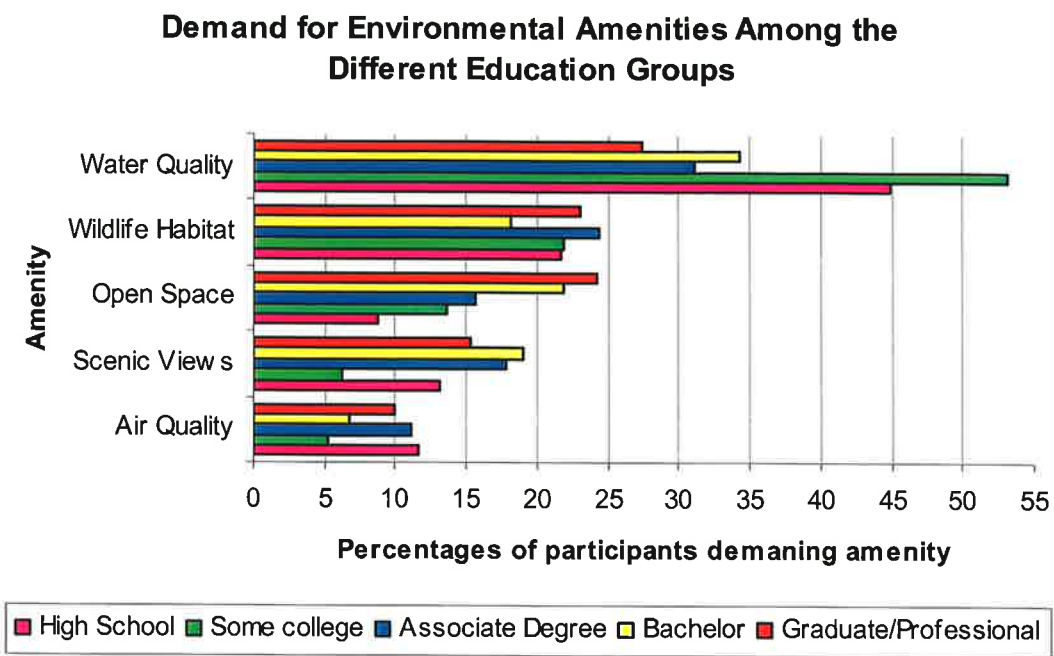
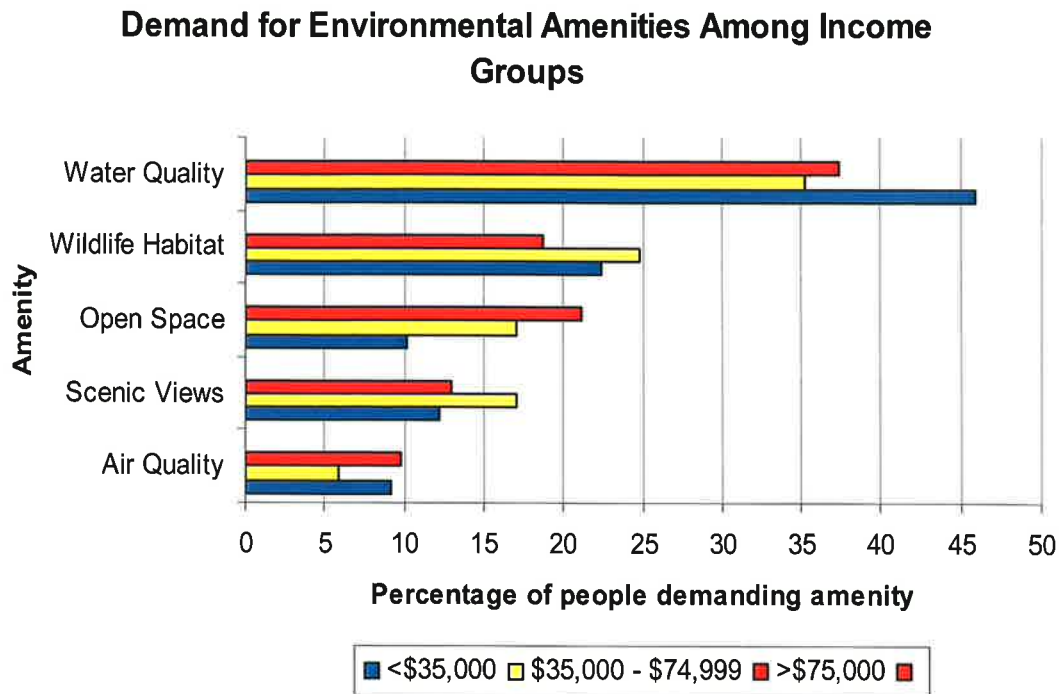


Figure 5 Demand for environmental amenities depending on income (Income categories have been merged into 3 groups).



## Chapter 3

### Limitations of the study

The study suffered from a few unintended shortcomings. In the following chapter, I will explain errors and limitations associated with this study and show how they could be corrected.

The demographic data collected in the study is not representative of the Lincoln population. While mail surveys in general tend to have a higher response rate among the older age groups, and demographic groups with higher income and education, sampling from the phone directory is associated with coverage error. While 94.7% of the people in Lincoln have telephone service (U.S. census, 2006c), the rate of unlisted phone numbers is 57% (Elizabeth Nelson, Marketing Systems Group 2008, personal communication), meaning that more than half of the population did not have a chance of being sampled for this survey. People that are older have a much higher chance of being sampled, because they are more frequently listed in the phone directory. Younger residents are more likely to have only cell phones which are not listed in the phone book. Many of Lincoln's younger population live in dormitories, thus not being included in the sampling pool. For example, the Marketing Systems Group shows that only 30 residents between the age of 20 and 24 were listed in the phone directory in 2007, whereas the census numbers from 2000 show that this age group makes up 12% of the Lincoln adult population (Elizabeth Nelson, Marketing Systems Group 2008, personal communication). On the other hand, some households have several listed numbers, therefore increasing the chance of being selected for this study. Coverage error is also associated with our choice of only sampling households, meaning that people living in institutionalized quarters (dormitories, nursing

homes) which make up about 5% of the Lincoln population (US census, 2000), were not included in the sampling frame. However, we decided on sampling only households since they pay a much higher share of taxes which was relevant for the willingness-to-pay questions. Coverage error can be reduced by getting a more accurate listing of households. The postal service maintains lists of all households, however, these addresses lack names, making personalization of the letters impossible and are more expensive which is why we did not use them. The local Department of Motor Vehicles keeps records on all people who have registered cars or obtained driver's licenses. This could constitute a more complete sampling frame.

Nonresponse error did also occur in this study. Some groups of people that did not respond had different opinions than people that did respond. For example, the lower income and education groups differed in their demand for environmental amenities from the higher income and education groups, which were represented in higher proportions. Nonresponse error can be reduced by increasing the response rate. The design of this survey was intended to achieve a high response rate (see Chapter 2). Adding a final last contact by phone would have likely increased the response rate, but was not done due to budget restraints. Sending out a one dollar bill with the questionnaire as a token of appreciation would also have increased responses, but was not done for the same reasons.

The contingent valuation questions do not conform to recommendations set by the National Oceanic and Atmospheric Administration (NOAA). The contingent valuation questions in this survey should have included as a first question: Are you willing to pay? Then only those that were willing to pay should have answered the questions for the dollar values. Instead of dollar ranges, a payment card that lists dollar values (\$5, \$10,

\$15, \$20...) would have provided more accurate data (discrete data). Volunteering a number between for example \$0 and \$200 would have resulted in continuous data which gives more accurate results.

In surveys of the public, there is always a risk that questions are not understood because people have incomplete information. While the questionnaire explained some of the functions of rural lands, it is likely that many people do not understand the underlying physical and biological processes. This might be a reason for the low WTP for improving rural amenities.

The survey implementation process faced some challenges as well. The first round of questionnaires was sent out through bulk mail. After questionnaires started to return, it was noticed that there were no questionnaires returning that were undeliverable. In a sample of 1,000 surveys, we would expect between 15% and 30% of the surveys returning due to the fact that the addresses were not living there any longer, the addresses were incorrect, or similar problems. When we inquired about the undeliverable surveys, the postal service informed us that when using bulk mail, these surveys would not be returned to the sender. The next round of surveys was sent out with the note "Return Service Requested" and 94 surveys were returned to us because they were undeliverable. The undeliverable rate for this survey is therefore 9.4% which is unusually low. It is possible that surveys with addresses of people no longer living at a residence were tossed by the new owners of the residence.

To summarize, the main limitation this survey faced was the choice of sampling frame. With a more complete sampling frame, coverage error in this study could have been decreased. The WTP questions should have been rephrased in order to yield discrete

or continuous data which would allow more detailed analysis. The survey implementation would have benefitted from sending at least the first round of surveys out by first class mail instead of the bulk mail option. Yet, the relatively high response rate that was achieved is probably a sign of the salience and overall clarity of the survey instrument. Compared to more typical survey response rates (between 25% and 35%) this survey likely has a lower rate of nonresponse error.

## Chapter 4

### Summary and conclusions

This study consisted of a mail survey to the public of Lincoln, Nebraska with the purpose of obtaining information about people's preferences for rural amenities and the monetary value placed on them. Most research on rural amenities has been conducted in the more populous states of the east and west coast. This study is unique in that it took place in Nebraska, a sparsely populated state. Lincoln is the state's second largest city and almost doubled its population since 1960. However, compared to other metropolitan areas, Lincoln has been relatively successful in containing growth within defined borders and has largely avoided uncontrolled sprawl. Considerable amounts of farmland are left in Lancaster County and the adjacent counties that provide many of the sought after rural amenities. It was for that reason that we expected the findings from this survey to differ noticeably from survey findings carried out in regions where farmland is being rapidly developed.

Lincoln residents value environmental amenities highly, particularly water quality. Agriculture in the region has impacted water quality. Nitrates and pesticide residues are showing up in the drinking water more frequently. Participants' comments suggest they are concerned about the water quality of Lancaster County's lakes which have experienced toxic algae and E.coli problems. Still, participant's willingness-to-pay to improve water quality was only \$14.81 per year. There are several possible reasons for this low WTP. It is likely that due to the strong opposition to taxes, people cast "protest votes" which did not reflect their real valuation of these amenities, but rather their disliking of taxes. The contingent valuation scenario could have instead asked people



how they wanted money to be spent that had already been set aside by the County government.

The survey did not specify water quality as drinking water quality or surface water quality. Lincoln's drinking water meets all requirements, so improving the water quality in the County should probably focus on improving the surface water quality. This can be done by reducing the fertilizer runoff from farmland, for example by planting buffer strips around surface water bodies and protecting wetlands. These measures at the same time improve wildlife habitat which was the second most demanded environmental amenity.

Capitalizing on rural amenities such as scenic views and wildlife habitat, the private sector can provide several rural amenities, i.e. agritourism or opportunities for outdoor recreation. Marketing amenities can increase income for farmers and landowners, drive rural development, and maintain scenic amenities. There is a large potential customer base in Lincoln. Yet, the public lacks information about what types of agritourism and nature-tourism (outdoor recreation on private lands) are available in the area. The Nebraska Department of Economic Development has a website ([visitnebraska.org](http://visitnebraska.org)) with information about opportunities for nature and agritourism in Nebraska. To make this information more available, newspapers could feature articles on local agritourism and nature tourism.

This survey shows that the externalities agriculture produces are important to people. With increasing incomes, people favor open space and aesthetic amenities of agriculture more. More research is needed to identify which programs the public prefers to provide important amenities and how much they are willing-to-pay for specific

programs. There are wide differences in the scope of programs that could be used to protect the supply of amenities. Purchase of Development Right programs are very successful in protecting land areas, but are also very expensive. Some rural amenities might be better conserved by CRP or similar programs that are less costly. With the increasing urbanization, pressure on farmland will rise. Exploring options that combine land uses, for example farming with outdoor recreation, is a way for cities to meet the demands society places on scarce natural resources. Many European cities, for example, have successfully incorporated green belts in their city landscapes. Greenbelts are protected from development and are used for agriculture, nature conservation and recreation. They serve important environmental purposes in cleaning the air, cooling the city climate and recharging the groundwater.

The United States is currently lacking a national strategy to limit land development. Economic growth is widely accepted as beneficial to society. Yet economic growth does not have to mean an increase in developed areas. Sometimes the best and highest use of land might well be in agriculture or in combined uses. When making land use decisions the local government needs to take into consideration the amenities land produces and its accrued benefits to society. It might be in the public's best interest to limit the conversion of farmland to development. There are signs that environmental stewardship is becoming more important in the planning process. The Lincoln/Lancaster County comprehensive plan includes guiding principles for maintaining the County's environmental resource features. This study can provide valuable information to the City government on the types of amenities that public finds most important. Future research should focus on how people want to protect these amenities. Further studies should also

investigate other options of funding programs for amenity provision. Landowners need to be included in future research on amenity provision to identify their willingness to provide amenities to the public.

We predict that rural amenity provision will become increasingly important, and counties investing in means that protect and enhance amenity output will have a competitive advantage in the future. Maintaining clean air and water should be priorities for Lancaster County. Improving scenic and open space amenities will give Lancaster County a competitive advantage in attracting a highly educated, high-income workforce and in keeping the young population in the County.

Appendix 1 Questionnaire



## **Survey on Preferences for Rural Amenities in Lancaster County**

Katja Koehler-Cole  
218 Hardin Hall, South Wing  
Lincoln, NE 68583-0982



The University of Nebraska-Lincoln does not discriminate based on gender, age, disability, race, color, religion, marital status, veteran's status, national or ethnic origin, or sexual orientation.

## Preferences for Rural Amenities in Lancaster County

Thank you for taking the time to complete this survey. Your answers will provide important information about how people in Lincoln value the rural countryside of Lancaster County and the services it provides. Results of this study can help to shape public policies to better fit your needs.

**Q1.** When you think about Lancaster County, which of the following features of the countryside (the landscape outside the city of Lincoln) do you like to see? *(Please check the three that you most like to see)*

1. Acreages (single homes on large lots)..... ( )
2. Land with crops (for example fields with corn and soybeans) ..... ( )
3. New housing developments..... ( )
4. Forests and woodlands..... ( )
5. Rivers and creeks..... ( )
6. Land with livestock (for example cows or horses)..... ( )
7. Lakes..... ( )
8. Commercial development (for example shopping centers)..... ( )
9. Wetlands..... ( )
10. Prairie preserves..... ( )
11. Golf courses..... ( )
12. Farms and farmsteads..... ( )
13. Historical sites and buildings..... ( )
14. Other, please specify:\_\_\_\_\_ ( )

**Q2.** The following are amenities that can be provided by rural areas. Some people find these amenities valuable while others do not. In the table below, please indicate how important these amenities are to you. (Please circle the corresponding number for each line: 1=not at all important, 2=not important, 3=important, 4=very important, 5=don't know)

	Not at all Important	Not Important	Important	Very Important	Don't Know
1. Open space..... (parks, fields, forests)	1	2	3	4	5
2. Wildlife habitat.....	1	2	3	4	5
3. Recreational opportunities... (hiking, hunting, picnicking etc)	1	2	3	4	5
4. Scenic views.....	1	2	3	4	5
5. Locally grown foods.....	1	2	3	4	5
6. Preservation of rural character	1	2	3	4	5
7. Water quality.....	1	2	3	4	5
8. Air quality.....	1	2	3	4	5
9. Other: _____	1	2	3	4	5

**Q3.** From the list above, which three amenities are most important to you?  
(Please rank your three choices with 1. = most important, 2. = second most and 3. = third most important)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Q4. Which of the following rural amenities do you think we need less of, more of, or about the same of in Lancaster County? (Please circle one response on each line)**

	Less	More	About the same
1. Open space.....	1	2	3
2. Wildlife habitat.....	1	2	3
3. Scenic views.....	1	2	3
4. Water quality.....	1	2	3
5. Air quality.....	1	2	3
6. Other: _____	1	2	3

**Q5. From the list above, please pick the one amenity you think is most needed in Lancaster County: \_\_\_\_\_**

**Q6. For this amenity, how much would you be willing to pay per year in additional taxes to fund a program that improves the provision of this amenity? (Please check one box)**

1. None ( )
2. \$1-\$9 ( )
3. \$10-\$24 ( )
4. \$25-\$49 ( )
5. \$50 or more ( )

**Q7. Would you like to make any comments about questions 1 through 6?**

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**Q8. How often did you participate in the following types of outdoor recreation in Lancaster County or neighboring counties in the last year? Your best estimate is fine. (Please circle one number on each line)**

	Never	Once	Two to five times	More than five times
1. Went walking/hiking/biking..... on trails or in parks	1	2	3	4
2. Went on a picnic.....	1	2	3	4
3. Watched birds.....	1	2	3	4
4. Watched wildlife other than birds	1	2	3	4
5. Went hunting/fishing.....	1	2	3	4
6. Rode a snowmobile/ATV.....	1	2	3	4
7. Took a scenic drive.....	1	2	3	4
8. Went swimming in a lake.....	1	2	3	4
9. Other: _____	1	2	3	4

**Q9. Which of the types of outdoor recreation listed above do you think we need more opportunities for in Lancaster County? Please list two types of outdoor recreation for which we need more opportunities.**

1. \_\_\_\_\_
2. \_\_\_\_\_

**Q10. Compared with other recreational or leisure activities that you are enjoying, how important are outdoor recreational activities to you?**

1. Not at all important ( )
2. Not important ( )
3. Important ( )
4. Very important ( )



**Q11. Some forms of outdoor recreation, such as hiking and biking, wildlife watching, or hunting and fishing can take place on farmland. Suppose there was a program in Lancaster County that pays farmers for allowing the public to access their land for outdoor recreation. This program could be funded by a user fee (that is, people who use these activities pay for them) or through taxes (paid for by all people of Lancaster County). What do you think would be the best way to fund such a program? (Please check one box)**

1. User fee (paid for by the people who use the outdoor activities).... ( )
2. Taxes (paid for by all people)..... ( )
3. Other (please specify): \_\_\_\_\_ ( )

**Q12. How much money would you be willing to pay per year to fund such a program, either through a user fee or through taxes? (Please check one box)**

1. None..... ( )
2. \$1-\$9..... ( )
3. \$10-\$24..... ( )
4. \$25-\$49..... ( )
5. \$50 or more... ( )

**Q13. Would you like to make any comments about questions 8 through 11?**

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**Q14. Agritourism is tourism that takes place on farms. Some examples include hay-rides, pumpkin patches and Christmas tree farms. How often did you take part in the following activities in Lancaster County or neighboring counties in the last year? (Please circle one number on each line.)**

	Never	Once	Two to five times	More than five times
1. Went horseback riding.....	1	2	3	4
2. Picked fruit on a berry farm or orchard..	1	2	3	4
3. Visited a pumpkin patch.....	1	2	3	4
4. Pet farm animals.....	1	2	3	4
5. Hay-rides, corn maze.....	1	2	3	4
6. Wine tasting at vineyard.....	1	2	3	4
7. Went to a Christmas tree farm.....	1	2	3	4
8. Other: _____	1	2	3	4

**Q15. Compared with other recreational or leisure activities that you are enjoying, how important are agritourism activities to you?**

1. Not at all important... ( )
2. Not important..... ( )
3. Important..... ( )
4. Very important..... ( )

**Q16. What other forms of agritourism would you like to see offered in Lancaster County?**

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**Q17. Locally grown food is food produced in Lancaster County or the neighboring counties. Please indicate how often in the last 12 months you purchased locally grown foods from the outlets listed below. (Please circle one number on each line)**

	Never	A few times a year	About once a month	About once a week	More than once a week
1. Stores on farms.....	1	2	3	4	5
2. Directly from local farmer.....	1	2	3	4	5
3. Roadside stand (during the season)	1	2	3	4	5
4. Farmer's market (during the season)	1	2	3	4	5
5. Grocery store that sells local foods	1	2	3	4	5
6. Other:_____	1	2	3	4	5

**Q18. When purchasing food, how important is it to you that the food is grown locally (that is in Lancaster County or the neighboring counties)?**

- 1. Not at all important... ( )
- 2. Not important..... ( )
- 3. Important..... ( )
- 4. Very important..... ( )

**Q19. What, if any, locally grown foods would you like to buy?**

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If you have any questions about your rights as a research participant that have not been answered by the investigator or to report any concerns about the study, you may contact the University of Nebraska-Lincoln Institutional Review Board, telephone (402) 472-6965.

This concludes our survey. Thank you again for your cooperation with this study! Your help is greatly appreciated. If you have any additional comments, please write them below.

**Please return your completed questionnaire in the postage paid envelope to:**

Katja Koehler-Cole  
218 Hardin Hall, South Wing  
Lincoln, NE 68583-0982  
Phone: 402-472-2114

If you would like to receive a copy of our final report, please contact me at the address above or by e-mail, at [katja@bigred.unl.edu](mailto:katja@bigred.unl.edu).

Appendix 2 Survey correspondence  
2.a Prenotification letter

SCHOOL OF NATURAL RESOURCES

[First name] [Last name]  
[Address]  
[City], NE [Zip Code]

[Date]

I am writing to you because I would like to know your opinion on the amenities that rural landscapes in Lancaster County provide. We are trying to learn how people in Lincoln value these amenities and how we can improve their provision.

You were selected from a random sample of the population of Lincoln. Your response to this survey is important. Only by hearing from many different people will we be able to accurately describe the opinions of the people of Lincoln. The results of this survey will be used to help shape public policies to better fit your needs.

Your participation in this study is completely voluntary. You are free to decide not to participate or to refrain from answering any specific questions without affecting your relationship with the investigators or the University of Nebraska-Lincoln. However, you can help us very much by filling in the enclosed questionnaire and returning it in the self-addressed stamped envelop that has been provided. This should take less than 15 minutes of your time. Your answers will be kept strictly confidential and will be combined with all the other answers so that no individual names can be identified. The number on the back of each survey is for mailing purposes only.

Please feel free to contact me or my advisor Dr. James Brandle with any questions or comments about this study. My phone number is 402-472-2114 and my e-mail address is [katja@bigred.unl.edu](mailto:katja@bigred.unl.edu). Dr. Brandle can be reached at 402-472-6626. If you have any questions about your rights as a research participant that have not been answered by the investigators, or to report any concerns, you may contact the University of Nebraska-Lincoln Institutional Review Board at 402-472-6965. The IRB number for this project is 2006-11-126 EX. There are no known risks involved in participating in this study.

Thank you very much for helping with this study.

Sincerely,

Katja Koehler-Cole  
Project Director  
School of Natural Resources  
218 Hardin Hall, South Wing  
Lincoln, NE 68583-0982

## Appendix 2.b Cover letter

SCHOOL OF NATURAL RESOURCES

[First name] [Last name]  
[Address]  
[City], NE [Zip Code]

[Date]

I am writing to you because I would like to know your opinion on the amenities that rural landscapes in Lancaster County provide. We are trying to learn how people in Lincoln value these amenities and how we can improve their provision.

You were selected from a random sample of the population of Lincoln. Your response to this survey is important. Only by hearing from many different people will we be able to accurately describe the opinions of the people of Lincoln. The results of this survey will be used to help shape public policies to better fit your needs.

Your participation in this study is completely voluntary. You are free to decide not to participate or to refrain from answering any specific questions without affecting your relationship with the investigators or the University of Nebraska-Lincoln. However, you can help us very much by filling in the enclosed questionnaire and returning it in the self-addressed stamped envelop that has been provided. This should take less than 15 minutes of your time. Your answers will be kept strictly confidential and will be combined with all the other answers so that no individual names can be identified. The number on the back of each survey is for mailing purposes only.

Please feel free to contact me or my advisor Dr. James Brandle with any questions or comments about this study. My phone number is 402-472-2114 and my e-mail address is [katja@bigred.unl.edu](mailto:katja@bigred.unl.edu). Dr. Brandle can be reached at 402-472-6626. If you have any questions about your rights as a research participant that have not been answered by the investigators, or to report any concerns, you may contact the University of Nebraska-Lincoln Institutional Review Board at 402-472-6965. The IRB number for this project is 2006-11-126 EX. There are no known risks involved in participating in this study.

Thank you very much for helping with this study.

Sincerely,

Katja Koehler-Cole  
Project Director  
School of Natural Resources  
218 Hardin Hall, South Wing  
Lincoln, NE 68583-0982



Appendix 2.c Thank-you postcard

[Date]

Last week, a questionnaire seeking your opinion on the value of amenities provided by the rural countryside of Lancaster County was mailed to you. Your name was randomly selected from a list of all residents of Lancaster County.

Thank you so much for completing and returning the questionnaire to us. If you have not yet returned your questionnaire, please do so soon. We are especially grateful for your response because we believe the information you provide will be helpful to local policy makers in shaping programs better targeted to your needs.

If you did not receive a questionnaire or it was misplaced, please call me at 402-472-2114 or e-mail me at [katja@bigred.unl.edu](mailto:katja@bigred.unl.edu) and I will mail another one to you immediately.

Thank you kindly,

Katja Koehler-Cole  
Project Director  
School of Natural Resources  
218 Hardin Hall, South Wing  
Lincoln, NE 68583-0982

## Appendix 2.d Second cover letter

SCHOOL OF NATURAL RESOURCES

[First name] [Last name]  
[Address]  
[City], NE [Zip Code]

[Date]

Dear [first name, last name]

About three weeks ago a questionnaire was mailed to you regarding your opinions on the rural countryside of Lancaster County. To the best of our knowledge, it has not yet been returned.

Many people have responded to this questionnaire and gave us their opinions on what is important about the rural area of Lancaster County and what can be done to improve the amenities it provides. We think the results obtained from this questionnaire will be very useful for local public policy makers and others.

If you no longer live in Lincoln, please let us know on the cover of the questionnaire and return it in the enclosed envelope and we will delete your name from our mailing list.

Your opinion is very important for being able to accurately describe the value the rural landscape of Lancaster County has for the people in Lincoln. That is why we are sending you another questionnaire with the request to fill it in and return it soon. If, for any reason, you prefer not to answer the questionnaire, please let us know by returning a note or a blank questionnaire in the enclosed envelope.

Thank you very much for helping with this study.

Sincerely

Katja Koehler-Cole  
Project Director  
School of Natural Resources  
218 Hardin Hall, South Wing  
Lincoln, NE 68583-0982

P.S. The questionnaire should take less than 15 minutes to complete.

Appendix 3 Comments from participants

“Government should never be involved in land development. Let the free market determine.”

“As long as Lincoln quits growing, many of the above will be preserved. Also do not need housing development (large area of homes) in rural areas.”

“Water is a great amenity that all citizens require for daily intake - we must preserve and provide quality water.”

“I would be willing to give to some cause, but I chose none because I feel that I'm over taxed and under served. Which means that the tax moneys are being used inefficient.”

“If urban sprawl doesn't stop who will farm what will we eat”

“The water in all of LC is horrible. Better quality and/or source is needed.”

“Need more access to open space beside the state lakes. most fishing, hunting...areas are privately owned, and not accessible.”

“Nebraska already top 10 highest taxed states in the nation-I may move”

“We have nothing in this state except the Huskers”

“... I would like to see more science-based outdoor activities available such as astronomical observance, fossil-digs, geologic hikes etc. especially if they were led by local professors and/or experts.”

“Having grown up on a farm, agritourism is important for urbanites to find a connection to agriculture beyond the grocery store.”

“Generally speaking, this state suffers in tourism interest and dollars because of this [I80 is long and without visual variety] and Lancaster County is no exception. Since we have few natural attractions the obvious answer is to create more and draw more attention to the few opportunities we do have.”

“I’m afraid Lincoln perimeter cannot be both rural and efficiently developed. The concept of a core downtown a low density suburban landscape will produce a community split on the basis of economics.”

“This is a beautiful survey. Thank you for selecting me to participate. It helped clarify for me how much I love the outdoors and how much more time I want to spend doing outdoor things.”

“I am concerned about the water quality in our county. Sediment runoff and farming practices are destroying our water quality. Residential areas are also contributing to water quality issues through yard chemicals and pet waste...”

“I wish all city teenagers could spend a year on a farm through all seasons. I grew up on a farm. I didn't like some of the things I had to do. But I am glad I had the experience. I appreciate what the farmer have to go through.”

“We have a lot of low income and middle income people that need things to be able to do with their families but can't effort to spend much doing it.”

“Whenever a place is donated for racing, is is shot down by city/county officials - Why? Residents whose hobby is racing have to go outside the county/state to participate.”

“The private land is the only respected area because you have to asked permission so they know who you are and you have to respect their land. Not a good idea to make public regardless of profit to be made. We pay a lot for park passes and very few lakes have been usable. My husband and I are very exited to see how Yankee Hill and Wild Wood turn out. Hope we can help our two mud swamps - Branched Oak and Pawnee.”