

***Improved Information in Support of a National Strategy for
Open Land Policies:
A Review of Literature and Report on Research in Progress***

**Laila Racevskis, Mary Ahearn, Anna Alberini, John Bergstrom, Kevin Boyle,
Larry Libby, Robert Paterson and Michael Welsch¹**

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¹ Respectively: Research Associate, Swank Program in Rural-Urban Policy, Department of Agricultural, Environmental and Development Economics, The Ohio State University, corresponding author; Economic Research Service, USDA; Associate Professor, Agricultural and Resource Economics, University of Maryland; Professor, Agricultural and Applied Economics, University of Georgia; Professor, Resource Economics, University of Maine; Professor and C. William Swank Chair in Rural-Urban Policy, Department of Agricultural, Environmental and Development Economics, The Ohio State University; Research Associate, University of Maine; Christensen Associates, Madison, Wisconsin

1. Introduction

The aesthetic and environmental services of farmland are not fully accounted for in the market. Farmers produce such products as milk, eggs and livestock, as well as intangible products, such as pastoral scenes and rural heritage. These intangible products and services are not exchanged in markets, yet are much in demand. The structure of farming in the United States has changed dramatically over the past 50 years.

Technological advances have made large corporate farms much more competitive than small family farms, and the loss of viability of smaller farming operations has pressured many farmers to sell their land to developers. Because of the rapid conversion of farmland to commercial or residential development, issues such as land use, urban sprawl and agricultural land protection have been increasingly attracting the public interest in the United States.

Farmland provides amenities in the form of open space, aesthetically pleasing pastoral scenes, improved water quality and wildlife habitat. Very little is known about public preferences for the provision of open land amenities through agricultural land protection. Policy makers have inadequate indications of what people really want from farmland to guide policy proposals and implementation. Their decisions are often based on assumptions about the public's preferences for farmland and open space attributes. Policy makers responding to public concerns over farmland protection could benefit greatly from information about the specific characteristics of farmland that motivate public support of farmland protection programs. Further, such information could aid in targeting funds allocated for farmland protection under existing programs.

Land use policy in the United States, for the most part, is conducted at the state and local levels. The federal government has had a limited role in farmland protection policy (see Lehman), and there is no likelihood of a national plan to protect farmland. However, federal money and programs can help support state and local initiatives to support farmland protection. This research project will identify and quantify public preferences for the provision of open land amenities from agricultural lands, and will investigate how the attributes of agricultural land, including agricultural systems employed, affect those preferences. The overall goal of this research project is to inform public policy design at the national level regarding state and local farmland protection programs.

The specific objectives of the research project are to:

1. Identify the role the public perceives for agricultural land in the provision of open land.
2. Identify the attributes of agricultural land that the public desires in the provision of open land.
3. Link the desirable attributes of agricultural land to specific agricultural systems.
4. Review the current literature on public preferences for open land to identify gaps in the policy-relevant information provided.
5. Design a conjoint study to quantify public preferences for open land provided by agricultural land and the agricultural systems employed on these lands.
6. Investigate if, and to what extent, public preferences for open land vary by region of the country.

7. Clarify the federal role, relative to state and local governments, in providing open land amenities through agricultural lands.
8. Identify the types of public policies, and joint government, nonprofit and private arrangements that can be successful and cost effective in promoting the provision of open land through agricultural lands.

2. Review of Literature

Farmers are involved in a joint production of services because they produce commodities (corn, wheat, soybeans) as well as amenity services (agricultural landscapes, rural character). However, the market fails, or does not exist, for many of the rural amenity services provided by the farmer. These goods are non-excludable (individuals cannot be excluded from consuming the good) and non-rivalrous in consumption (consumption by one individual does not affect the next individual's ability to consume the same good or service). Therefore, the proprietor of the landscape does not receive monetary compensation for the public goods he provides.

There are numerous studies in the economic literature that address the amenity services provided by farmers (See Appendix A for summary table). Kerry Smith provides a good overview of nonmarket environmental amenity valuation studies, including both indirect and direct valuation methods. The studies in the contingent valuation literature that address the amenity value of farmland and open space are generally limited to specific geographic regions. Beasley et al. estimate the benefits of preventing moderate and high levels of housing development in south central Alaska. Bonnieux and LeGoffe estimate the public value of restoring the agricultural landscape in

Lower Normandy, France. The study by Bowker and Diychuck reports public willingness to pay to protect farmland from economic development in New Brunswick, Canada. Breffle et al. focus on one specific undeveloped parcel of land in Boulder, CO and estimate the neighborhood's willingness to pay to preserve the land. Dillman and Bergstrom find relatively low estimates of the public value for protecting prime agricultural land in Greenville County in South Carolina's Piedmont region. Halstead, however, found that citizens of Franklin and Hampden counties in Massachusetts are willing to pay relatively high amounts to preserve agricultural land in the area.

Drake estimates the willingness to pay by citizens across Sweden to protect agricultural land from spruce forest conversion. Garrod and Willis estimate the use and non-use values of the environmental services provided by the Environmentally Sensitive Areas (ESAs) of the South Downs in southeastern England. Their benefit-cost analysis concludes that the benefits to the public outweigh the costs of maintaining the ESA schemes. Hackl and Pruckner evaluate current government subsidy programs in place in Austria that grant compensation to farmers for their provision of landscape-enhancing services. They conclude that subsidies under the compensation program have been underestimated by not including demand side values that indicate the recreation value of landscape attributes.

Pruckner addresses the joint production of commodity and landscape amenities provided by farmers and uses CVM to estimate the value the public places on agricultural landscape amenity services. Molnar and Smith, Furuseth, Lembeck et al. and Kline and Wichelns identify public motivations for supporting farmland preservation programs. These studies, however, do not measure the value the public places on farmland

protection. The support for farmland protection programs, as indicated by these studies, may be motivated more highly by the expectation of receiving amenity services from open space preservation and environmental protection, rather than the goal of preserving farming operations for whatever commodity benefits they generate. The preservation of agricultural land for open space qualities is a factor that influences the public perception of preservation policies and programs.

Although there are several studies from the United States and numerous countries in Europe that value the importance of agricultural and open land preservation to the public, there are very few studies that identify and value the specific characteristics of farmland or open lands that are most important. Hanley and Ruffel determine the value of forest characteristics in the UK and explain consumer surplus variation across forest types. They find that the features of the forest used in the study significantly increase consumer surplus from forest visits. Hanley et al. (1998a) use the contingent valuation method to estimate non-use value for Environmentally Sensitive Areas (ESAs) in Scotland and employ the choice experiment method to measure the marginal value of individual environmental attributes of ESAs. Lockwood and Carberry use the CV and CE methods to estimate the value of remnant native vegetation conservation in New South Wales and Victoria, Australia.

The Choice Experiment method (CE), based on random utility theory, elicits individuals' preferences for attributes of a consumption bundle, as opposed to preferences for a specific good or service (Adamowicz et al., 1998). A comprehensive review of choice experiment (CE) literature is presented in Hanley et al. (1998b). According to the authors, there are certain advantages of CE over Contingent Valuation Method (CVM)

approaches. These advantages are the following: 1) CE methods facilitate the estimation of the value of individual attributes of an environmental good or service; 2) CE allows estimation of attributes' marginal values; 3) CE results may be preferable for use in benefits transfer studies; 4) The “yea-saying” problem found in Dichotomous Choice CVM studies is avoided; 5) The embedding problem can be avoided; and 6) There is internal data consistency as a result of repeated sampling. The CE method reveals the factors that influence individuals' choices and the study design requires a careful definition of attribute levels and ranges.

Adamowicz et al. employ the CE and CV methods in their estimation of passive use values of a woodland caribou management program in Alberta, Canada. They find that using the CE approach enables the researcher to value individual attributes of the good, determine endowment effects, and identify the effects on welfare measures of the use of different functional forms. Results from the study lead the authors to conclude that CE methodology can serve as an alternative or complementary approach to CV in economic analyses.

The study by Boxall et al. also provides a good overview of the advantages of CE over CVM studies. They point out that CE analyses rely less on the accuracy with which the good or service is described (as in CVM) and more on the accuracy with which the characteristics or attributes of the good or service are described. Their case study of the value of attributes of moose hunting areas in Alberta, Canada employs both a CE and a CVM. Our study will use the CE method (we will refer to it as conjoint analysis) in order to “quantify the relationship between agricultural lands in the provision of open land and

the economic value the public places on specific attributes of open land provided by agricultural lands” (NRI Proposal).

3. Research methodology

The methods used in this research project thus far have been qualitative in nature. Focus groups have been conducted in three of the five U.S. states in which the study will be conducted (Ohio, Georgia, Colorado, Oregon and Maine). Group members are routinely selected in three different residential categories: urban, suburban and rural. There are two objectives associated with the focus groups. First, they help determine the role the public perceives for agricultural land as provider of open space amenities, and they identify which open land attributes the public finds desirable. Second, the focus groups serve as a venue in which to pretest and refine survey instruments to be used in the quantitative analysis.

Some general perceptions of farmland that were revealed by focus group participants are somewhat surprising. First, there is a very strong, positive feeling for family farm operations and the rural heritage and nostalgia associated with them. That same support does not flow to what are perceived as “corporate farms” or what participants refer to as “commercial farms.” When presented with pictures of different farmsteads, people react favorably to well-kept farms, even if they are not aesthetically pleasing, because they symbolize a strong work ethic and positive “family values.” The sight of livestock is favorable to most people, but large confinement operations are not. Well-kept farm buildings, such as silos and homes, elicit positive reactions, while the sight of farm equipment and cleared or cut trees invokes a negative response. Overall,

people react very favorably to the presence of a water feature in the landscape and variations in topography, such as rolling hills or a mountain. These insights will be employed in survey design.

Because farmers are involved in the joint production of goods and services, the provision of open space through agricultural lands can be viewed as the production of a complex good. The attributes of this good are defined by the agricultural landscape and the farming systems employed. The following list of preliminary landscape attributes has been compiled based on results from the focus groups:

- Open land
- Forest
- Animals/livestock
- Farm buildings or silos
- Home
- Row crops
- Standing water
- Horticultural activity (nursery, tree farm, etc.)
- Farm equipment or machinery
- Cut/cleared trees
- Topography
- Fence

The conjoint questions in the survey will be based on the attributes identified by the focus groups. Survey respondents will be presented with pairs of different combinations of randomly assigned attribute levels and asked to select their preferred alternative from each pair. Six survey instruments will be designed. One survey will be national and will be distributed to a randomly selected national sample as well as subsamples of the five selected regions. The remaining five surveys will be designed specifically for each of the five selected geographic regions.

The data obtained from the mail surveys will be used to estimate the benefits to the public from open land provision through agricultural lands. It will be possible to

determine if these benefits vary among geographic regions and to identify how different agricultural systems affect the quality of open land amenities. The policy analysis component of the study will use this information, as well as conclusions from the focus groups and literature and policy review, to determine which farmland protection efforts have been successful in addressing public preferences and which have not been successful.

On the basis of these analyses, it will be possible to make recommendations for programs and policy strategies that can effectively address state and local public preferences for open space provision through agricultural land protection. The determination of the appropriate level of government to be involved in farmland protection programs will also be an important part of the recommendations. Policies that would minimize the negative impacts of agricultural systems on the quality of open land will also be proposed.

4. Conclusions

The federal role in this process is likely limited but important. State and local governments, however, play a strong role in developing farmland preservation policies but lack timely and defensible information. All fifty states have some form of farmland protection, but there are few data on relative performance of these programs. An important federal role could be to foster research in this national and state laboratory of policy experiences. This project can be an important step in that direction.

Other research might include detailed policy appraisals in different states. It seems clear that there is little knowledge of farmland protection issues among the general

public. Another important role of the federal government could be to encourage the development of state outreach and education programs on the topic of farmland preservation policy options.

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Appendix A

Summary of Studies Estimating the Nonmarket Value of Agricultural Land and Open Space

Authors	Title	Resource	Mean WTP	Location
Beasley, Workman and Williams	“Estimating Amenity Values of urban fringe farmland”	Agricultural land: protection from housing development	\$76/HH/year for mod dvpt prev \$144/HH/year for high dev prev	Alaska, United States
Bonnieux & LeGoffe	“Valuing the benefits of landscape restoration: A case study of the Cotentin in Lower-Normandy, France”	Hedgerows and agricultural landscapes	200 FF/hh/year for landscape restoration	Lower Normandy, France
Bowker & Diychuck	“Estimating the nonmarket benefits of agricultural land retention in eastern Canada”	Agricultural land protection against development	Mean annual HH WTP: \$49.07 for 23,750 acres; \$67.64 for 47,500 acres; \$78.49 for 71,250 acres; \$86.20 for 95,000 acres	Moncton area of New Brunswick, Canada
Breffle, Morey and Lodder	“Using contingent valuation to estimate a neighborhood’s willingness to pay to preserve undeveloped land”	A parcel of undeveloped land purchased by a construction company	\$192/HH (one-time payment)	Boulder, Colorado, U.S.
Dillman and Bergstrom	“Measuring environmental amenity benefits of agricultural land”	Prime agricultural land under threat of urban-industrial development	Mean annual HH WTP: \$5.70 for 18,000 acres; \$6.78 for 36,000 acres; \$7.86 for 54,000 acres; \$8.94 for 72,000 acres	Greenville County in South Carolina’s Piedmont region, U.S.
Drake	“The nonmarket value of the Swedish agricultural landscape”	Agricultural land to be converted to spruce forest	78 ECU/HH/year	Sweden
Garrod and Willis	“Valuing the benefits of the South Downs environmentally sensitive area”	Environmentally Sensitive Areas (ESAs)	Mean annual HH WTP: £36.65 general public; £27.52 residents; £19.47 visitors	The South Downs, Southeastern England

Hackl and Pruckner	“Towards more efficient compensation programmes for tourists’ benefits from agriculture in Europe”	Landscape-enhancing services provided by farmers	Mean WTP/ person/day of vacation: 0.70 ECU	Austria
Halstead	“Measuring the nonmarket value of Massachusetts agricultural land”	Agricultural land under threat of development	\$28-\$60/HH/year to prevent low levels of dvpt.; \$70-\$176/ HH/year to prevent high levels	Massachusetts, U.S.
Hanley and Ruffel	“The contingent valuation of forest characteristics”	1)Proportion of broadleaved trees, 2)Height diversity and 3)presence or absence of water	WTP for feature: 1)£0.49/visit; 2) £0.33/visit; 3)£0.69/visit	United Kingdom
Hanley, MacMillan, Wright, Bullock, Simpson, Parisson and Crabtree	“Contingent valuation versus choice experiments: Estimating the benefits of environmentally sensitive areas in Scotland”	ESAs		Scotland
Hasund	“Valuable landscapes and reliable estimates”	Biological diversity, historical artifacts, recreational access and aesthetic quality of agricultural areas	Mean annual HH WTP for 3 surveys administered over 3 different years: 864, 772, and 626 SEK	Sweden
Kline and Wichelns	“Public preferences regarding the goals of farmland preservation programs”	Farmland and open space	This study used focus groups to rank reasons to protect farmland; The 3 most impnt were groundwater protection, wildlife habitat protection and natural place preservation	Rhode Island, U.S.
Kline and Wichelns	“Measuring heterogenous preferences for preserving farmland and open space”	Farmland and open space		Rhode Island, U.S.
Krieger	“Saving open spaces: public support for farmland protection”	Farmland	Mean annual HH WTP: \$484 for five years	Kane, McHenry and DeKalb counties outside Chicago, Illinois, U.S.

Lockwood, Loomis and DeLacy	“The relative unimportance of a nonmarket willingness to pay for timber harvesting”	Timber production in unreserved national parks	Mean annual HH WTP for DC question: \$38 and for OE question: \$19	Southeastern Australia
Lockwood, Tracey and Klomp	Analyzing conflict between cultural heritage and nature conservation in the Australian Alps: A CVM approach	Alpine ecosystems and cultural heritage value of cattle grazing	Ecosystem: parametric WTP \$33, nonparametric WTP \$37; Cattle grazing: Parametric \$81, nonparametric \$106	Bogong High Plains, Australia
Lockwood and Carberry	Stated preference surveys of remnant native vegetation conservation	Remnant native vegetation on private property	CV: NSW \$86.79; Victoria \$98.40 CE: NSW \$80.69; Victoria \$77.35	New South Wales and Victoria, Australia
Pruckner	Agricultural landscape cultivation in Austria: an application of the CVM	Amenity services provided by agricultural land	Mean WTP/person/day: 9.20 ATS (Austrian shillings)	Austria
Ready, Berger and Blomquist	Measuring amenity benefits from farmland: A comparison of hedonic pricing and contingent valuation techniques	The number of horse farms in Kentucky	Median WTP to prevent loss of 1 farm: \$0.49; 25% of farms: \$24.84; 50%: \$89.56; 75%: \$681.05	Kentucky, U.S.
Rosenberger and Walsh	Nonmarket value of western valley ranchland using contingent valuation	Agricultural land	\$141.13/HH/year	Yampa River Valley, Routt County, Colorado, U.S.
Willis, Garrod and Saunders	Benefits of environmentally sensitive area policy in England: A contingent valuation assessment	ESAs	South Downs: Residents: £27.52/year Visitors: £19.47/year Somerset Levels&Moors: Residents: £17.53/year Visitors: £11.84	The South Downs and The Somerset Levels and Moors, England