

NAREA Awards

*Outstanding Master's Thesis Award*

## **Optimal Design of Voluntary “Green” Payment Programs to Limit Nitrate Contamination under Price and Yield Risk**

**Jeffrey Peterson**

**Cornell University**  
**Advisor: Richard Boisvert**

A model of a voluntary “green” payment program is developed to control nitrate leaching and runoff from corn production. Farmers who volunteer for the policy would receive compensation payments in exchange for applying environmentally safe levels of nitrogen fertilizer. The policy model considers randomness in prices, production, and environmental damage. Farmers maximize expected utility, and the government regulates environmental quality through chance constraints on severe levels of nitrate loss.

The model was applied empirically to two groups of corn producers in three New York farming regions, based on estimated yield and environmental damage relationships from New York soils data. Estimated payments in the policy simulations ranged from less than \$1 to \$28 per acre, depending on the region in question and on the stringency of environmental standards. On an aggregate basis, significant improvements in environmental quality would not be costly in New York compared with the cost of past farm programs. The cost of a 40% reduction in nitrate leaching and runoff would be about 15% of total government payments in 1992, while a 20% reduction would cost only 3% of the same total.

A complication of the policy design is that information between farmers and the government may be asym-

metric. The government knows there are groups of farmers who differ in the productivity and environmental characteristics of their soils, but it does not know which farmers belong to which group. In this case, the government must offer a “menu of policies” to all producers and attempt to design the items so that each farmer voluntarily selects the fertilization level appropriate for his/her own group. For self-selection to occur, one of the groups must be compensated by more than its loss in net returns. Empirically, this additional program cost is as high as \$11 per acre, but the group receiving the higher payment represents less than 10% of total corn acreage; thus, the overall cost of asymmetric information in New York would not be large. The government can eliminate this cost, but only at the expense of collecting enough information to assign policies to each farmer.

The effect of risk aversion on program payments is an empirical question that is difficult to generalize, since it depends on whether nitrogen fertilizer is a risk increasing or risk reducing input. For the New York case studied, nitrogen was a risk reducing input for the group with higher yielding soils, and a risk increasing input for the other group. Higher levels of risk aversion increase payments for the first group and decrease payments for the second group.

## *Master's Thesis Award of Merit*

# **Valuing the Benefits of Protecting Groundwater from Nitrate Contamination in Southeastern Pennsylvania**

**Willard A. Delavan**

**Pennsylvania State University  
Advisor: Donald Epp**

Nitrate contamination of groundwater poses a serious threat to the safety of drinking water supplies. Agricultural communities are particularly vulnerable because of the volume of animal wastes and application of nitrogen fertilizers as well as the porosity of agricultural soils. Growing concern about the effects of nitrate contamination on human health and ecosystems has motivated research designed to measure how people value changes in environmental quality in general and water quality specifically.

This study is part of a collaborative effort of group W-133, an eight-member economic valuation group. The first part of the study uses a contingent valuation method (CVM) mail survey, modeled on the work of prior CVM groundwater studies, to estimate the willingness to pay (WTP) for groundwater protection from nitrate contamination in Lebanon and Lancaster counties, Pennsylvania. The estimated mean household WTP of \$27.46–67.33 per year is consistent with similar studies. Income, edu-

cation level, children in the household, number of years living in the community, and averting actions positively affected WTP.

The study's second part tests the effectiveness of different valuation question formats and addresses ways to improve the validity and reliability of CVM. The most surprising result shows that an informed open-ended question format yields higher and less variable WTP estimates than does the modified dichotomous choice format. The use of dollar incentives contributed to a robust (79%) response rate. These results demonstrate instances where well-designed, relatively inexpensive CVM studies can effectively measure the economic value of changes in environmental quality. Effective measurement helps decision makers better assess the benefits of protecting groundwater from nitrate contamination and may prevent irreversible damage to human health and this vital resource.

## *Master's Thesis Award of Merit*

# **Analysis of Swine Industry Expansion in the United States: The Effect of Environmental Regulation**

**Yin Mo**

**Pennsylvania State University  
Advisor: Charles W. Abdalla**

Along with the industrialization process in the U.S. swine industry, environmental degradation has become a concern. As a result, new laws and regulations have been created to address animal waste problems in the swine industry and other livestock sectors. This thesis investigated the relationship between the stringency of state environmental rules and recent change in the swine industry. Specifically, the thesis tested the hypothesis that

the stringency of environmental rules influences the growth rate of hog inventories across the states.

Thirteen states were included in the analysis covering the 1988/89–1994/95 period. Four categories of independent variables, including a state's natural endowment, economic factors, business climate, and regulations, were used to explain the growth or decline in hog inventories. A variance component model was used.

Overall, the analytical results did not strongly support the hypothesis that the stringency of environmental regulations impacted hog sector growth. Five variables measuring the stringency of environmental regulations and their enforcement were used to test this hypothesis. These included two established general environmental regulation indices; three new variables specific to animal waste regulations were obtained through surveys.

An interesting finding is that the existence of the capability of local governments within a state to regulate livestock operations through their zoning powers appears to have impacted hog industry growth. States with local governments actively involved in regulating hog farming have made their regulatory environments less uniform and perhaps unstable, possibly discouraging operators' investment in the hog business.

### *Journal Article of the Year for 1997*

## **Economic and Political Considerations in Regional Cooperation Models**

**Ariel Dinar and Aaron Wolf**

**World Bank and University of Alabama**

Cooperation among players requires a realization of economic benefits to all players and a meeting of efficiency requirements through economically driven allocations. Cooperation among political (and sometimes hostile) players may not meet these requirements. Political considerations, usually ignored in economic analyses, can hinder or even block possible arrangements. A framework is proposed that includes both economic and political considerations for evaluating transfers or trades of

scarce resources. This method quantifies both the economic payoffs using  $n$ -person game theory and the political likelihood of any of the coalitions actually forming, using the PRINCE Political Accounting System. The economic-political approach is applied to a case of a potential water transfer in the western Middle East. Results suggest that incorporating political considerations in the analysis stabilizes the regional solution suggested by economic-related allocations.

### *Honorary Life Member Award*

**Dr. Gerald L. Cole**

**University of Delaware**

Dr. Gerald L. Cole received his B.S. degree in agricultural education from Michigan State University in 1957, his M.S. degree in agricultural economics from the University of Delaware in 1959, and his Ph.D. degree from Michigan State University in 1967. He served the University of Delaware as a research associate from 1959 to 1961 and was appointed assistant professor in the Department of Food and Resource Economics in 1963. Since then, he has served as assistant, associate, and full professor in the department. Dr. Cole also served as chair of his department for ten years, from 1984 to 1993.

Over the last three decades, Dr. Cole has been an active member and supporter of the Northeastern Agricultural and Resource Economics Association and its predecessor organizations. He was active in the Northeast Agricultural Economics Council (NAEC) and was

president of the council in 1977. He also chaired the Northeast Agricultural Economics Assembly, comprising the agricultural economics chairs in the region, in 1989. He has been an active participant in the regional project NE 170—Rural Land Policy in the Northeast—and chaired the Northeast Public Policy Education Committee in 1988 and 1994. In addition, he has served on numerous NAREA committees. Dr. Cole plans to retire in 1998 after thirty-five years of service to the University of Delaware and the agricultural economics profession.

The Northeastern Agricultural and Resource Economics Association wishes to honor Dr. Gerald Cole for his meritorious service throughout his professional career as a faculty member and administrator through awarding him the 1998 NAREA Honorary Life Member Award.

## ***Distinguished Member Award***

### **Dr. Donald Epp**

#### **Pennsylvania State University**

Dr. Donald Epp has been a strong contributor to the Northeastern Agricultural and Resource Economics Association for twenty-five years. In his early years of service to NAREA and its predecessor organization, Dr. Epp served on the Editorial Board of the *Journal of the Northeastern Agricultural Economics Council* from 1973 to 1975. Later, he served as chair of the Local Arrangements Committee for the 1989 annual meeting hosted by Pennsylvania State University. He has served on numerous committees of the association, including the Outstanding Masters Thesis Award Committee, the Audit Committee, and the Selected Papers Committee. He chaired many papers sessions at the NAREA annual meetings, and he and his graduate students continue to be frequent participants in presenting papers at the annual meetings. Dr. Epp has actively encouraged faculty and student support of the association both at Penn State University and in the Northeast region.

Dr. Epp was elected as an NAREA Director in 1988 and served a three-year term through 1990. In 1994, he was elected to the position of president-elect of NAREA, and served as president-elect, president and past-president through 1996. Under his leadership, the NAREA Web page was initiated, and the association engaged in renewed discussions about membership services with the AAEA. In addition, he initiated negotiations with the AAEA and two other regional agricultural economics associations regarding NAREA's cosponsorship of the new journal *Review of Agricultural Economics*.

Dr. Donald Epp has made significant and sustained contributions through public service, teaching, and research to the Northeastern Agricultural and Resource Economics Association and the agricultural economics profession. The association is pleased to select him to receive the 1998 NAREA Distinguished Member Award.

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