Abstracts of Selected Papers

# Farmland Preservation and Land Values
**Session Chair: Gerald L. Cole, University of Delaware**

**An Analysis of Land Acquisition and Financing Decisions Using a Nested Logit Procedure,** Charles B. Dodson, USDA/ERS

A nesting logit procedure was used to evaluate the land purchase/financing decisions of commercial farmers in 1991–92. Results suggest that farmers who purchased land were more profitable, wealthy, and older than average. The probability of purchasing farmland was sensitive to changes in operator age, with older operators being more likely buyers. Also, farmers with greater amounts of nonfarm wealth and greater profitability were more likely to buy land. Results indicate that credit is an important source of capital to farmers who may lack liquidity or collateral to purchase farmland.

**The Effects of Conservation Land on Nearby Property Values,** Douglas E. Morris, University of New Hampshire, and Richard M. Simons, WEFA Group Inc., Burlington, Mass.

The effects of conservation land on nearby property were estimated for three towns based upon 1993 to 1996 sales. Roughly 40% of the current owners were aware of the nearest protected land. Simply that knowing the nearby land was protected had some importance to 70% of the owners, while 52%, 57%, and 75% by town felt that the protected land added value to their property. A probit model based on telephone survey data indicated that distance from protected lands was the only important determinant of knowledge of the nearest conservation land.

**A Bootstrap Estimate of the Willingness to Pay for Farmland Preservation in New Castle County, Del.,** Derald E. Wentzein and Gerald Cole, University of Delaware

The purpose of this paper is to provide methodology that facilitates analysis and measurement of the public's willingness-to-pay (WTP) for farmland preservation. Specifically, a conjoint design was used to analyze the utility values residents of New Castle County (NCCo), Delaware, placed on alternative hypothetical future development scenarios. Each scenario (conjoint object) documented how the land in NCCo would transition in the next ten years and the annual increase in taxes residents would pay to support a Purchase of Development Rights (PDR) program. The model equation was estimated using an ordered logit and the coefficients of the variables used to calculate the WTP for farmland preservation. Bootstrap techniques were then employed to assign a measure of accuracy to the WTP statistic.

**The Impacts of Preservation Efforts on Local Public Finance and Municipal Services: The Pinelands Experience,** Margaret F. Brennan, Donn A. Derr, William R. Preston, Fang Du, Tugrul T. Temel, and Edmund Tavernier, Rutgers University

Many states have implemented or are considering the adoption of regional or statewide growth management programs to provide open space and agricultural preservation, as well as efficient suburban development. The impacts, if any, of regional open space preservation efforts on public finance characteristics and levels of municipal services in these communities are examined, using the New Jersey Pinelands as a case study. A sample of communities subject to growth re-

strictions is compared with a nonrestricted group regarding their public finance and municipal service characteristics in 1980 and 1990. Differences were indicated in 1980, but the gap was closed by 1990.

# International Agricultural Trade Issues

**Session Chair: Christine Bolling, USDA/ERS**

**Modeling U.S. Broiler Exports and Imports with Policy Implications,** Crispin Kapombe and Dale Colyer, West Virginia University

This analysis of U.S. exports of poultry products focuses on importer's responsiveness to U.S. export prices, impacts of currency realignments on imports from the United States, per capita incomes in importing countries, prices of substitutes, and government interventions. The analysis indicates that in addition to these explanatory variables, a trend component has been vital during the study period. The results suggest that the United States can increase its broiler exports more effectively by extending efforts on international macroeconomic policy coordination in addition to domestic sectoral policies and working toward elimination of trade distortion practices through NAFTA, GATT, and bilateral trade negotiations.

**The Trade and Welfare Analysis of the World Rice Market with a Special Reference to China,** Juan Yang and Tsoung-Chao Lee, University of Connecticut

By partitioning the world rice market into four regions—China, the United States, the EC, and the rest of the world—this paper estimated the parameters of the demand and supply functions of each area under the framework of spatial equilibrium in order to study the trade impact of current Chinese rice trade policies. The welfare loss from the Chinese rice trade protection policy is calculated in terms of the change in the net social payoff defined by Samuelson. The empirical results might serve as a reference to current trade policies of China.

**The Impact of EU/Eastern Europe Integration on U.S. Agricultural Trade: Preliminary Results from a General Equilibrium Model,** Silvia Weyerbrock, University of Delaware

This paper studies how integration between the European Union (EU) and Eastern Europe will affect U.S. agricultural trade. We use six-region, thirteen-sector general equilibrium (CGE) model with explicitly modeled policies. We find that East-West integration in Europe leads to an increase of U.S. agricultural exports to Eastern Europe but to a decrease of U.S. exports to the EU. If Eastern Europe adopts the EU's Common Agricultural Policy (CAP) or enters a customs union with the EU, the United States will face stronger competition from Eastern Europe on world agricultural markets.

**Input Use and Environmental Effects of Increased Trade between the United States and Mexico,** Jorge Fernandez-Cornejo, USDA/ERS

This paper estimates the impact of the increased trade of major agricultural commodities between the United States and Mexico on agricultural input use. This information may be used to examine the potential environmental effects of increased agricultural trade and NAFTA on agriculture. The overall impact of an increase in U.S. (corn and soybean) exports to Mexico and an increase in Mexican (tomato) exports to the United States is a reduction in agricultural land use and a decrease in pesticide and fertilizer expenditures. Consequently, overall pesticide and fertilizer loadings to the environment will decrease and, as land use decreases, salinization/land erosion problems are likely to be lessened.

# Economics of Dairy Production
**Session Chair: Robert Yonkers, Penn State University**

**A Simulation of Potential Economic Impacts of the Northeast Interstate Dairy Compact on Vermont Dairy Farms,** Rick Wackernagel, University of Vermont

Downward trending and volatile milk prices are financial challenges for New England dairy farmers. A Dairy Compact has been established to stabilize milk prices there. Simulation models of Vermont dairy farms were subjected to milk-price trajectories potentially resulting from the Dairy Compact. Increasing Class-1 prices from $15.83 to $17/cwt and increasing them gradually had a greater impact than did stabilizing these prices. Doubling the rate of productivity growth, as an alternative to regulating prices, had an intermediate impact. Impacts on farms of different sizes were proportional. Impacts on moderate-profit farms were smaller than on those of low profitability.

**Intensive Rotational Grazing on Dairy Farms: What We Know and Do Not Know,** Robert L. Parsons and Gregory D. Hanson, Penn State University

Twenty-five studies of intensive grazing are summarized. All but one of the studies found intensive grazing increased profit, reaching a maximum of $284 per cow. These studies found a surprisingly wide range of adoption patterns and impacts. Little influence of capital rationing was found as a motivation for grazing adoption. Milk production tended to decrease with transition to grazing. The studies identified few quantifiable impacts from grazing on farm family quality of life or on the environment, even though both are frequently cited in the literature. The review indicates further need for empirical research to examine impacts of intensive grazing on milk production levels, ration balancing, profitability, and farm capital structure.

**Efficiency Measures of Nova Scotia Dairy Farms,** Rita K. Athwal, J. Stephen Clark, and Gerald Post, Nova Scotia Agricultural College

The efficiency of seventy-seven Nova Scotia dairy farms in 1994 is studied using nonparametric methods developed by Fare, Grosskopf, and Lovell (1994). Several different measures are used, including input, output, and input/output (graph) efficiency measures. These measures involve the solution to mathematical programing problems. The results indicate that, for the most part, dairy farmers are efficient. Most farms were within 5% of efficient, while almost all were within 15% of efficient. Maintaining efficiency for the highly regulated dairy industry in Nova Scotia could be related to the existence of a market for dairy quota, which would tend to weed out inefficient producers in favor of efficient producers.

**Profitability and Sustainability of Moderate-Intensive Grazing of Dairy Cows: Evidence from New York and Pennsylvania,** Gregory D. Hanson, Lydia C. Cunningham, Mitchell J. Morehart, Robert Parsons, and Jonathan Winsten, Penn State University

Empirical analyses of moderate-intensive grazing are presented based on two samples of Northeast dairy farms. Returns to management and owner equity were higher for moderate-intensive grazing than for corn silage or hay enterprises. Positive dairy profits were related to lower feed costs. Milk production was lower on moderate grazing farms compared with extensive grazing farms. Logit regression analysis characterized moderate-intensive grazing as cow-focused, with lower culling rates and greater dependence on milk sales as a share of total sales. Reduced use of fertilizers and chemicals suggest that moderate grazing has environmentally sustainable features.

# Community Development and Economic Impacts

**Session Chair: Gerard D'Souza, West Virginia University**

**Community Economic Development Activeness and Manufacturing Employment Change,** Stephen M. Smith and Willis Lewis, Jr., Penn State University

Most rural economic development policies and programs focus on manufacturing, with debated effectiveness. From surveys of local officials and development personnel, this paper calculates measures of economic development activeness in a sample of Northeast nonmetro countries. These factors are combined with a set of variables based on standard location theory to examine their influence on manufacturing employment change from 1980 to 1990. The sample of counties includes those both losing and gaining manufacturing employment over the period. The results show that economic activeness was not a statistically significant influence on manufacturing employment change, but that standard economic factors were.

**From Agriculture to Tourism: The Economic Transformation of California's Coachella Valley,** Lynndee Kemmet, Levy Economics Institute

As an industry, agriculture has often been cited as the best example of government subsidization to benefit a few. But the economic history of California's Coachella Valley shows that government support of agriculture can spread benefits far beyond this industry. Government did much to provide the region's agriculture with key production factors, but it did not give the industry exclusive right to them. Because of this, the tourism industry was able to tap into those factors and grow. The economic history of the Coachella Valley is an example of government support for agriculture that ended up having far wider repercussions. Government provided and protected many important production factors but did not exclude other industries from using them. The result is that agriculture has had to compete for these factors, and the region's economy has grown and diversified. In some ways, this industry competition has been harmful for agriculture. But in other ways, it has been beneficial.

**Strengthening University and Community Linkages in Rural Economic Development: A Framework and Case Study,** Pauline Sullivan, Catherine Chan Halbrendt, Qingbin Wang, and Lawrence Forcier, University of Vermont

To revitalize the economies and quality of life in rural Vermont communities, the University of Vermont's Department of Community Development, Applied Economics, and Extension System are seeking to improve resident and extension faculty links with communities. A conceptual framework has been designed, describing how to foster a faculty-UVM student collaborative process that enhances involvement with community leaders. Through this process faculty participate in leadership training and economic development. This paper uses the possibility for shared intermunicipal services in Barton, Vermont, to illustrate how the model can be applied.

**The Green Industry in Delaware: A Profile and Assessment of Economic Contributions,** Rodolfo V. Tanjuakio, Auditya Madiraju, and Steven E. Hastings, University of Delaware

This study provides a profile of the Delaware green industry—describing its growth, components, and contributions to the local economy. Over the past decade, the production, service, and trade sectors of the industry have grown at rates surpassing national and local averages and establishing the industry as one of the bright spots among agriculture-based industries. Its economic contribution measured through input-output analysis, however, is relatively small, at less than half a percent share of the state's gross regional product, and barely 1% of the state's employment in 1993.

# Production Economics and Efficiency
## Session Chair: Robert L. Parsons, Penn State University

**Technical Efficiency and Agrarian Reform: The Chilean Case,** Teodoro E. Rivas, Boris E. Bravo-Ureta, and Stephen Smith, University of Connecticut

Maximum Likelihood was used to estimate a trans-log stochastic production frontier model using two cross-sectional data sets for a sample of Chilean farms. One data set is for the year 1965–66, before agrarian reform, and the other is for 1970–71, after the agrarian reform program. Firm-level technical efficiency was then estimated. The results show no statistical differences on efficiency between reformed and nonreformed farms. These findings support the notion that, even though agrarian reform brought about profound changes in the land tenure structure in a short period of time, efficiency was not adversely affected.

**Efficiency, New Technology, and Other Factors Affecting Poultry Production,** Kristin Michel, Conrado Gempesaw, John Pesek, and Richard Bacon, University of Delaware

A detailed poultry production data set was provided by a poultry integrator on the Delmarva Peninsula over a time period encompassing the addition of a new drinking technology. The objective was to measure the effect of this new technology and other factors on the production efficiency of contract growers. Two regression models were estimated, and results showed that the technology, along with other production variables, did contribute to the efficiency of poultry production.

**Endogeneity of Supply Response Behavior,** Adesoji Adelaja, Ramu Govindasamy, and Eric LoPresti, Rutgers University

This paper hypothesizes that supply response is endogenous and systematically varies across commodities and specifies the relationship between commodity supply elasticity and its determinants. Validity of the hypothesis is tested by estimating supply elasticities for various commodities and second stage decomposition models of supply response determination. Results suggest a greater degree of endogeneity of supply response in the long-run than in the short-run. Long-run supply elasticity is found to increase with price stability and farm size, lower government payments with decreased perishability. Short-run supply elasticity is found to decrease with yield variability and time to maturity.

**Adoption Rates for Selected Crop Management Practices: Implications for Precision Farming,** Stan Daberkow, USDA/ERS

Despite optimistic forecasts, farmers may be reluctant to adopt precision farming technologies. Their reluctance likely stems from uncertainty surrounding their profitability and questions about their compatibility with current production practices. Commodity-specific surveys by USDA indicate that farmers have taken a conservative approach to adopting several cultural, nutrient, and pesticide management practices promoted by public and private organizations. Modest adoption rates for such practices as soil testing and crop scouting are of particular concern because this information is an integral part of most precision farming technologies. Adoption of several cropping practices seems to be more widespread among high value crops, instead of large acreage, bulk commodity crops, which are the focus of precision farming.

**Profit Maximizing Rates of Nitrogen Application for Corn Silage Production in Connecticut,** Haddis Tafari, Boris Bravo-Ureta, and Thomas Morris, University of Connecticut

The general objective of this paper was to analyze the response of corn silage output to alternative nitrogen fertilization rates, controlling for population density, soil nitrate concentration, and year

and management effects. The data were obtained from sixteen Connecticut farms for the years 1993, 1994, and 1995. Farmers followed their own management practices but in all fields nitrogen fertilizer (N) was sidedressed at 0, 30, 60, 90, 120, and 150 lbs/acre. The translog functional form was found to be the most robust specification for the data under analysis. The profit-maximizing application rates derived from the translog model were significantly higher than the agronomically recommended rates, which is consistent with risk-averse behavior. Sensitivity analysis revealed, however, that under relatively higher input-output price ratios, the optimal rates are close to recommendations made by the Extension Service.

# Contingent Valuation and Environmental Economics

**Session Chair: Stephen Swallow, Rhode Island University**

### What Were You Thinking? An Experiment in "Debriefing" Contingent Valuation Survey Respondents,
John Halstead, Thomas Stevens, and Laura Gilbert, University of New Hampshire

This paper used the results of a survey of users of the Parker River National Wildlife Refuge in Massachusetts to explore the question of motivation behind CMV bids. By adding a short "debriefing" section to the end of a standard intercept survey, information was collected on why respondents answer questions the way they do. This exploratory analysis found that, in a small sample of debriefed CVM respondents, noneconomic factors may have been influencing WTP bids. While no definitive conclusions can be drawn from such a small sample with such an unfocused debriefing tool, the results do point to the need for further examination of the issue.

### Monetary Incentive Response Effects on Contingent Valuation Mail Surveys,
William Wheeler, Jeffrey Lazo, Matthew Heberling, Ann Fisher, and Donald Epp, Penn State University

Monetary incentives are one approach for increasing response rates in contingent valuation surveys. We present the results of a case study designed to assess the effect of incentives on response rates and respondent behavior. We compare response rates and quality of answers for five incentive levels. Including incentives increased the response rate, decreased item nonresponse rates, but had no effect on stated willingness-to-pay.

### External Costs of Aquaculture Production: An Application to West Virginia,
Stephen C. Smearman and Gerard E. D'Souza, West Virginia University

With aquaculture production rapidly expanding, so is the potential for waste generation and the motivation to examine downstream economic impacts of the effluent. Using an externality framework and a combination of primary and secondary data, this study quantifies the external costs of aquaculture production as a prelude to guiding its sustainable growth.

### Measuring Public Values and Priorities for Natural Resources: An Application to the Peconic Estuary System,
Marisa J. Mazzotta and James Opaluch, University of Rhode Island

This paper describes a contingent choice survey to identify public values and priorities for resource protection and enhancement, undertaken as part of a series of studies for management of the Peconic Estuary under the National Estuary Program. It focuses on the estimation of values and priorities for a set of important natural resources of the area—farmland, undeveloped land, wetlands, shellfishing areas, and eelgrass. The paper discusses the development of the survey and presents a comparison and discussion of different estimation models, including two specifications of the conditional logit model and the nested logit model.

**The Design of Environmental Policy under Uncertainty,** Nii A. Abrahams and James S. Shortle, Penn State University

A simulation of U.S. corn production compares the impacts of agricultural commodity programs on environmental policy for controlling agricultural nonpoint source pollution. The effects of public uncertainty about key economic parameters are also considered. With commodity programs, input taxes outperform excess nitrogen tax. The reverse is true without the commodity programs. Taxes are preferred to standards under uncertainty. The elasticity of substitution between land and fertilizer is more important in the design of fertilizer-based instruments. The runoff coefficient is more important in the design of excess nitrogen instruments. Agricultural research benefits are also sensitive to agricultural environmental policy choices.

# Water Quality and Nonpoint Pollution

**Session Chair: Stephen Clark, Nova Scotia Agricultural College**

**Water Quality Damages: Nitrate Contamination of Municipal Drinking Water Supplies,** Mark E. Smith, USDA/ERS

Nitrate contamination of U.S. groundwater used for municipal drinking water supplies incurs additional treatment costs. A hedonic cost function found that high nitrate levels increase yearly operating and maintenance costs by about $59 million. While national variable costs appear higher for sediment treatment than for nitrate, per unit costs for nitrate treatment exceed those for sediment, implying potentially high local costs due to excessive nitrate levels. High nitrate concentrations may also require additional capital costs not estimated here.

**Using Property Owner Surveys to Value Water Quality Changes in Suburban Lakes,** Kara Fishman, Robert Leonard, and Farhed Shah, University of Connecticut

Mail surveys of property owners at three suburban lakes in Connecticut are used to assess and analyze the impact of hypothetical water quality changes on property values. This contingent valuation data show that, for each lake, loss of swimmability is associated with a greater drop in property value than loss of edibility of fish caught. Interestingly, the percentage drop in property value for a given type of water quality change is about the same across lakes. Also, regression analysis shows that the contribution to property value of a dock or a sandy beach declines more substantially with loss of swimmability.

**On-Farm Costs of Timing Nitrogen Applications to Reduce Nitrogen Losses,** Wen-yuan Huang, David Shank, and Tracy Hewitt, USDA/ERS

Timing nitrogen fertilizer application to the biological need of a crop is an effective way to reduce nitrogen losses to the environment. Such a strategy, however, may carry a substantial production risk and may conflict with a farmer's economic objectives. For a risk-neutral farmer in the White River Basin in Indiana, the estimated cost is $5 per acre with a reduction of residual nitrogen of 8 pounds per acre. For a risk-averse farmer in the basin, the estimated cost is $83 per acre with a reduction of 56 pounds per acre of residual nitrogen.

**Private Costs and the Acceptability of Nonpoint Source Pollution Control Programs,** Christopher Miller, University of Rhode Island

Contingent valuation method studies that focus solely on valuing the public good and do not ac-knowledge the private damages or benefits associated with abatement practices may limit the appli-

cability of willingness-to-pay to nonpoint source pollution management. This paper describes a contingent valuation study that acknowledges private costs and benefits associated with nonpoint source pollution abatement using a case study involving septic system management in Potowomut, Rhode Island. The results provide evidence that private abatement costs or benefits can affect WTP for water quality protection programs as a whole, and that cost-sharing is feasible in NPSP abatement programs.

**Economic Implications from Estimating Economic Benefits Using Irrigation Water Applied,** C.S. Kim and Glen Schaible, USDA/ERS

There exist controversies surrounding the estimation of net economic benefits resulting from irrigation water use, where the rate of the irrigation water application differs from the consumptive irrigation water use. This research responds to the needs to identify the source of a model misspecification problem and its effects on the estimation of economic benefits. Results of a case study indicate that net economic benefits ensuing from irrigation groundwater would be overestimated by 61% in cotton production and 188% in sorghum production in the Northern Texas High Plains.

# Consumer Preferences and Market Surveys

Session Chair: Alberto Manalo, University of New Hampshire

**Predicting Consumer Preferences for Seafood: What's in a Label?** Daniel Holland and Cathy Wessells, University of Rhode Island

A rank-ordered logit model is estimated using data collected by a mail survey of consumers in the Northeastern and Mid-Atlantic U.S. The methodology, based on conjoint analysis, determines the average relative importance and value of three product attributes (seafood inspection, production method and price), and estimates the relative attractiveness of particular products to consumers. When used in combination with demographic data and responses to questions on perceptions, the analysis suggests market segmentations and potential marketing strategies based on the heterogeneity in preferences among consumers.

**Willingness-to-Pay for Hemp-Based Products: Evidence from a Vermont Survey,** Matthew Mole, Catherine Halbrendt, Qingbin Wang, and Jane Kolodinsky, University of Vermont

This study analyzes public attitudes toward industrial hemp and willingness-to-pay for hemp-based products using data collected from a Vermont survey. Survey results indicate that there is strong public support for hemp production in Vermont, while the logit analysis results suggest that a large proportion of the surveyed individuals are willing to pay a premium for hemp jeans and hemp papers and the willingness-to-pay is affected by a set of sociodemographic variables such as age and education.

**Analysis of Factors Affecting the Purchase of Fruits and Vegetables at Delaware's Direct Markets: A Predictive Logit Model,** James Gallons, Ulrich Toensmeyer, Richard Bacon, and Carl German, University of Delaware

With growing interest in alternative marketing for farm output, it is important that the key reasons consumers shop at direct markets be conveyed to producers. The four types of direct markets that are analyzed include roadside stands, farmers' markets, tailgate markets, and pick-your-own farms. Using data from a consumer survey in Delaware, a logistic model was developed to rate the importance of marketing factors such as farm atmosphere, locally grown, organically grown, like to

help farmers, using produce for canning and freezing, and produce selection. The model results reflect the varying effects of sociodemographic and other attitudinal variables.

### Has the Trend to More Dining Out Affected Red Meats and Poultry Differently? Implications to Northeast Poultry Industry, Chinkook Lee and Gerald Schluter, USDA/ERS

An economywide view of 1972–93 food demand illustrates that while away-from-home eating is the fastest growing food expenditure category, the fastest growing food-processing sectors rely more on meals-at-home food expenditures. At the commodity level, red meat production relies more heavily upon away-from-home food spending than does processed poultry.

### The Market Potential of Kenaf Core as a Soilless Growth Media, Judy McDermott, Richard Bacon, Conrado Gempesaw, and H. Tilmon, University of Delaware

Conjoint analysis was used to evaluate the preferences of greenhouse growers for soilless growth media that contained varying levels of renewable inputs. In terms of attribute relative importance, price was ranked highest by growers, followed by drainage, bulk density, and water retention. Tobit results indicate that growers prefer a soilless medium that contains 75% renewable inputs, with moderate bulk density, drainage, and water retention. A readily available medium containing preplant fertilizers is also preferred. Price appears to be the determining factor, as grower preference ratings of all soilless media profiles declined rapidly once the price exceeded $.75 per cubic foot.

# Methodological Issues
**Session Chair: C.S. Kim, USDA/ERS**

### Asymmetric Test of Employment Cycles in West Virginia, Qingshui Zhou and Dale Colyer, West Virginia University

Asymmetric behavior of employment, at both national and subnational levels, was analyzed. Using the statistical theory of finite Markov processes, it was found that total nonfarm employment was significantly asymmetric over the business cycle both in West Virginia ($\alpha < .05$) and in the United States ($\alpha < .01$). Analysis of the industrial subsectors showed that the sources of asymmetry in West Virginia came from four of the eight subsectors—services, government, trade, and mining. The conclusion is that cyclical asymmetry of employment appears to be a general feature in the United States and that model fitting and policymaking should consider this cyclical behavior.

### A Markov Chain Model of Convergence of Agricultural Labor Income: Evidence from the Northeast and South, Edmund Tavernier and Tugrul Temel, Rutgers University

The study examines convergence in agricultural labor income for the Northeast and South over the period of 1978–92. The long-run distribution of income is characterized using the Markov model. The results support convergence in the Northeast to its regional average income. The South shows a clustering of labor income around a level less than its regional average. The analysis also supports the conclusion of sharply differing regional labor demands.

### Optimizing Pickle Harvests Using Feedforward Neural Networks, Brian Adams, University of Delaware

A statistical model is developed for pickle growing to enable an accurate prediction of the optimal harvest time to be made. This model uses a feedforward neural network with logistic output nodes. Assuming that the model is being used for a single grower, all of the inputs are meteorological. These

are temperature, rainfall, and daylight. The outputs are the weight fractions for each of the five standard USDA size classifications. In addition to the predictive capabilities of the network, parametric methods are used to test the significance of the explanatory inputs and the model's logistic outputs.

**Information Access and Rationality of Alternative Price Expectations in the U.S. Soybean Market,** Duncan Chembezi, Annette Coward, and Joseph Befecadu, Alabama A&M University

Price expectations play a critical role in agricultural markets where producers must make input decisions before output is realized. Access to information is pivotal to formulating producer price expectations included in production decisions. Empirical results confirm the existence of both rational and naive expectations in the U.S. soybean market. Rationality coefficients are significantly different from zero and one, suggesting that no expectations specification is singly the "best." Naive expectations are not rational in that they are biased predictors of actual values.

# Resource and Experimental Tests

**Session Chair: Andrew Plantinga, University of Maine**

**Some Simple Analytics of Eco-Labeling of Wood Products: Are the Market and Ecosystem Implications Clear?** Stephen Swallow and Roger Sedjo, University of Rhode Island

International environmental and government organizations propose eco-labeling as a market incentive to cause industry to manage forests in an ecologically sustainable and biodiversity-friendly manner. A microeconomic analysis questions whether eco-labeling will cause producer profits in a competitive industry to decline, even under a voluntary system, and whether eco-labeling will necessarily improve ecological quality worldwide. Results identify conditions that may exist when firms lose profits, even under a voluntary system, and when ecosystem quality may not improve, even under a mandatory system. Without empirical analysis, the intuitive benefits of eco-labeling for forestry may prove elusive.

**Testing the Increasing Scarcity Hypothesis,** J. Stephen Clark and Kevin J. Dunlevy, Nova Scotia Agricultural College

Resource scarcity is reexamined from the point of time series analysis. If the time path of nonrenewable prices is consistent with increasing scarcity, the data must be nonstationary. The primary focus of testing should concentrate on determining the order of time series. Empirical methods applied to twelve time series nonrenewable resources included Cressie's method and Dickey-Fuller tests. Results indicated that most of the series are first order. A deterministic trend was found in only three time series. We conclude that theoretical models need to be developed to explain why data do *not* include deterministic trends rather than why they do.

**Market Power, Industrial Organization, and Tradeable Quotas,** Adesoji Adelaja, Julia Menzo, and Bonnie McCay, Rutgers University

Individual Transferable Quotas (ITQs) were introduced into the mid-Atlantic surf clam and ocean quahog fishery to reduce overcapitalization while conserving clam populations. Because the number of operators in the fishery has declined drastically since the introduction of this policy, there is concern about its effect on competitiveness. This paper utilizes Bertrand pricing models to show that monopoly power is absent from the surf clam and ocean quahog markets. Concentration ratios, Lorenz curves, and Gini coefficients estimated for the fishery for periods before and after ITQ introduction support the results of the Bertrand model.

**Field and Laboratory Tests of a Provision Point Mechanism: An Application of Green Pricing,** Steven Rose, Jeremy Clark, Gregory Poe, Daniel Rondeau, and William Schulze, Cornell University

Attempts by the private sector to provide public goods have been plagued by low participation levels despite evidence that there is broad consumer interest. This paper proposes a provision point mechanism as a tool for solving the free rider problem. The mechanism is tested in field and laboratory experiments in an application to customer-financed renewable energy programs, commonly known as green pricing programs. Relatively high participation is found in the field, while laboratory results suggest that demand revelation is achieved by the mechanism. We conclude that this mechanism would effectively facilitate the funding of public goods by better capturing demand.

# Environmental and Production Topics

**Session Chair: J. Richard Bacon, University of Delaware**

**The Diffusion of IPM Techniques among Fruit Growers in the United States,** Jorge Fernandez-Cornejo and Christian Castaldo, USDA/ERS

This paper examines the diffusion paths of selected Integrated Pest Management (IPM) techniques for twenty-four fruit crops in nine states, forecasts when the adoption of IPM techniques will reach 75% of the fruit-bearing acres, and examines the determinants of the rate of diffusion. The adoption of IPM techniques follows the logistic, and 75% adoption of most IPM techniques will be reached before the year 2035, if current conditions prevail. Differences in adoption can be accounted for by the type of crop, the region where the crop is grown, revenues per acre, and level of research investment.

**Organic Cotton Supply Decisions under Price and Yield Uncertainty: Evidence from Experimental Data,** R. Wesley Nimon and John Beghin, North Carolina State University

This paper investigates the effect on the supply of organic cotton due to further price stabilization policies as well as innovations that reduce yield variability. Experimental data and a mean variance analysis are used to model risk-averse farmers' land allocation decisions between organic and conventional cotton farming. Assuming constant returns to scale, changes in the quantity of land devoted to organic cotton have commensurate supply effects. While the supply effect of further organic cotton price stabilization policies appear negligible, there are significant effects to innovations that reduce yield variability.

**Empirical Support for the Production-Smoothing Model from the U.S. Fertilizer Industry,** Harry Vroomen and Frederick Joutz, Fertilizer Institute

If demand varies over time and there are costs involved with changing output, firms would be expected to smooth production to minimize costs. With a multiperiod planning horizon, firms can smooth production by resorting to inventory accumulation or liquidation. Although well grounded in theory, the production-smoothing model typically does not fare well when subjected to empirical investigation. This study applies both simple statistical tests and econometric tests of the model to monthly data for ten materials from the U.S. fertilizer industry. Results from both sets of tests indicate strong support for the production-smoothing hypothesis.

**The Impact of IPM for Apple Production in the United States,** Sharon Jans and Jorge Fernandez-Cornejo, USDA/ERS

This paper analyzes the impact of Integrated Pest Management (IPM) on pesticide use, yields, and profits for apple growers in seven states. The paper uses a methodology that accounts for self-

selectivity and simultaneity and is theoretically consistent with a restricted profit function. Preliminary results indicate that no significant differences exist between IPM adopters and nonadopters when measuring yields profits, and the number of insecticide applications. However, nonadopters are substantially more likely to be engaged in off-farm labor activities than are adopters, reflecting the intensive management needs of IPM and confirming that off-farm work is an important barrier to IPM adoption.

# Organized Symposium

**Foreign Direct Investment: Bridge to the Twenty-first Century**
Organizer: Christine Bolling, USDA/ERS

Foreign direct investment has proved to be one of the most important bridges for global expansion of the U.S. food-processing industry. It appears that this trend will continue well into the next decade. The United States is not alone in using this vehicle for expansion, since multinational companies in Europe and Asia have used the same strategy. Foreign direct investment is intertwined with trade. So far, sales from foreign affiliates of U.S. companies have exceeded U.S. exports of processed food, indicating that foreign direct investment is a powerful tool for increasing U.S. balance of payments. However, many of the other economic linkages in the U.S. economy have not been explored.

This symposium sets the stage by describing U.S. investment abroad and foreign direct investment in the U.S. food-processing industry. The U.S. experience in the Western Hemisphere is contrasted with the U.S. experience in Asia. The CGE model framework is discussed as a tool for exploring the interrelationships between foreign direct investment and the overall U.S. economy.