

## **Agricultural Profitability—Enterprise Feasibility and Constraints**

Session Chair: Brian Roe

**A Financial Simulation of a Delmarva Cucumber Pickle Grading Shed, J. Richard Bacon, University of Delaware, David Goldner, RAFAEL Missile Division, Haifa, Israel, Conrado M. Gempesaw II, University of Delaware, and W. Edward Kee, Jr., University of Delaware**

This study analyzes the viability of a cucumber pickle grading shed with a potential volume of 1,200,000 bushels requiring an investment of \$1,040,000. Two simulation models were used to evaluate the efficiency (ProModel) and profitability (FABSIM) of the grading shed under different volume and cull disposal scenarios. Results indicate the grading shed has the potential to be profitable. This is especially true if the investors realize a scenario that has high volume and the culls are used for relish. The ProModel and FABSIM simulation models provided a comprehensive framework for evaluating the feasibility of the pickling cucumber grading shed.

**Economic Feasibility of Substituting Fresh Poultry Litter for Ammonium Nitrate in Cotton Production, J.O. Bukenya\*, West Virginia University, and A. Baiyee-Mbi, J. Befecadu, H.S. Jones, and K.C. Reddy, Alabama A&M University**

Chickens broilers are Alabama's number one agricultural commodities, based on total state cash receipts of \$1.7 billion in 1997. This broiler industry produces enormous amount of litter, which has been utilized as a fertilizer in crop production. The paper evaluates the economic feasibility of substituting broiler litter for ammonium nitrate in cotton production. Data utilized was from a field experiment conducted at Bell Mina Research Station, Alabama 1996–97. Simple linear programming was used for the analysis and sensitivity analysis was performed to determine the level of stability of the results of the basic models. The results indicate that at a maximum distance

of 124 miles, fresh litter is a feasible substitute for ammonium nitrate in northern Alabama.

**Credit Market Constraints and Profitability in Tunisian Agriculture, Jeremy Foltz, University of Connecticut**

This work provides an analytic model of dual credit markets and develops the links between credit access and agricultural productivity. Using data collected from rural Tunisia, this work provides direct estimates of credit rationing and its effects. Econometric estimates using a switching regression framework are run for agricultural profitability as a function of credit access. The investigations of credit constraints and their effects suggest that the presence of credit market constraints reduces farm profitability.

**Simulating the Economic Viability of Crawfish Production: A Two-Stage Approach, Amy C. Hasegawa and Conrado M. Gempesaw, University of Delaware, and William H. Daniels and Bernard R. Petrosky, Delaware State University**

The purpose of this study is to determine if raising eastern white river crawfish (*Procambarus acutus acutus*) in the Mid-Atlantic region year-round is economically feasible. The possibility for economic success, or even survival, will be examined with the use of a two-stage dynamic-stochastic simulation modeling framework. Six simulation models were created in ProModel 4.0 to mimic crawfish farms with different components. Simulations were also run in @Risk, a Microsoft Excel add-in, in order to determine the economic viability of crawfish farms using capital budgeting methods. Preliminary results suggest that crawfish farming in the Mid-Atlantic region can be feasible, assuming adequate consumer demand exists.

## **Local Economic Development Issues and Strategies**

Session Chair: John Halstead

**Characteristics Analysis for Vermont Lodging Industry, Tun Lin, Catherine Halbrendt, Chyi-lyi (Kathleen) Liang and Nancy Wood, University of Vermont**

Over 70% of Vermont lodging establishments have twenty rooms or less. Small bed and breakfast lodging services present different characteristics when compared to large hotel chains. This study categorizes Vermont lodging businesses into three categories—small, medium, and large, and collects primary data from them.

With the survey information, the study evaluates the differences between different sizes of lodging businesses in occupancy rate, room rate, guest information, cost and revenue information, and the percentage of the operational inputs purchased from local markets. Using this information, the study also estimates the impacts of the operation from three sizes of the lodging businesses on Vermont economy.

### **Group Preference Aggregation Approaches in Community Economic Development: A Case Study, Yi Zheng and Catherine Halbrendt, University of Vermont**

This paper presents several group preference aggregation approaches used with AHP in the context of prioritizing community economic development goals. The weights of goals are key parameters for the Community-Business Matching Model for identification of desirable target industry sectors. Three approaches, Geometric Mean of Judgment, Arithmetic Mean of Weights, and Geometric Mean of Weights, are evaluated through a case study on the basis of their influence on the final Goals priority, the business Desirability scores, and the rank order desirable business sectors. Results show that different approaches have different impact, though not sizeable for the study at hand.

### **Infrastructure and Economic Development: What is Their Relationship in West Virginia? Kristen Sagath Corwin and Alan R. Collins, West Virginia University**

The purpose of this study is to determine what type of relationship exists between infrastructure investment and economic development. County level data were used to estimate this relationship. Water and sewer infrastructure variables served as explanatory variables for gross domestic product (GDP) growth. These infrastructure vari-

ables either did not explain GDP growth or had a negative impact. The highway infrastructure variable, however, had positive impact in explaining employment demand. Our analysis of historical data from West Virginia indicates that water and sewer infrastructure, by itself, was not sufficient to promote a region's economy. Water and sewer infrastructure, however, must be part of an overall development strategy to attract and retain businesses and other institutions, which generate economic activity. Therefore, the use of infrastructure as a tool in an integrated economic development strategy should not be discontinued based upon the results of this study.

### **High School Dropouts: Implications in the Economic Development of West Virginia, Semoa C.B. De Sousa and Tesfa G. Gebremedhin, West Virginia University**

An ordinary least squares (OLS) regression method was used to evaluate the relative importance of high school dropout rates and other economic factors that could explain the economic development in West Virginia, as represented by the employment rates. The empirical results revealed that an increase in the high school dropout rates and the State GDP increased the employment rates while the increase in unemployment compensation decreased employment rates. Thus, the increase in the employment rates may likely be on unskilled and low paying jobs.

## **Groundwater Pollution and Protection**

**Session Chair: Carmen Sandretto**

### **A Benefits Transfer Application of Artificial Neural Nets: The Case of Groundwater Protection, Willard Delavan and Donald J. Epp, Penn State University**

This paper compares the predictive performance of an artificial neural network (ANN) to that of a multivariate regression in a benefits transfer exercise using contingent valuation survey results of the benefits of protecting groundwater from nitrate contamination at three study sites in Georgia, Maine, and Pennsylvania.

The results show that, in terms of predicting dichotomous choice responses, and backing out willingness to pay estimates, ANN are promising. In addition, results from ANN may be used as a supplement to multivariate techniques for identifying difficult to detect nonlinearities in data.

### **Groundwater Pollution, Information and Property Values, Denise Jarvinen, Marine Policy Center, Woods Hole Oceanographic Institution**

Based on residential property sales occurring from 1994 to 1998, this hedonic analysis reveals property value patterns consistent with local groundwater contamination. Preliminary results suggest that proximity to groundwater pollution is correlated with lower residential property sales prices. Subsequent research will refine

and expand the spatial and temporal coverage of the database.

### **Does One Size Fit All? The Case of Nonpoint-Source Groundwater Pollution, C.S. Kim and Carmen Sandretto, ERS/USDA, and Donna Lee, University of Florida**

This research investigates cost-effective approaches designed to improve or protect groundwater quality in agricultural areas characterized by intensive cropping with supplemental irrigation from shallow aquifers where nitrate leaching and associated groundwater contamination from nitrate-nitrogen above the EPA mandated safe drinking water standard of 10 ppm is a potentially serious problem. The policy options evaluated include two types of regulatory measures, a constant-user fee and a variable-user fee based on nitrogen fertilizer applied, and an incentive program for encouraging farmers to adopt improved irrigation technology. A competitive dynamic model of nitrogen fertilizer use was used to analyze three different groundwater contamination situations: the first where the level of contamination is rising but currently below the EPA standard of 10 ppm; the second where the level is currently slightly above the standard at 11 ppm; and the third where the level is currently well above the standard at 18+ ppm.

# Agricultural Profitability—Input Adoption and Mix

Session Chair: Jeremy Foltz

**Empirical Relationships and Economic Benefits of Fungicide Use in Fresh Market Spinach, Naoufel Kouki and Conrado M. Gempesaw, University of Delaware, and Kathryn L. Everts, University of Maryland**

This study evaluates the economic benefits of fungicide applications on foliar diseases in spinach production. A two-stage modeling framework was used to meet the objectives of the study. The first stage specified the level of spinach diseases observed in the experiments as a function of the various foliar fungicide treatments and yield. The second stage specified the experimental yield as a function of the foliar diseases, location of production and season of the year. For the whole-farm analysis, the Mississippi State Budget Generator (MSBG) software program was utilized to quantify the costs and returns of a representative Mid-Atlantic spinach farm. The results indicate that for fresh market spinach production, considering the dominance of white rust in spinach production, the foliar fungicide Syllit provided the highest economic benefit for all three spinach varieties.

**The Farm Level Financial Impact of Phosphorus Reduction on Different Sizes of Vermont Dairy Farms: The Case of the Little Otter Creek Watershed, Budy Resosudarmo, Alyssa Dodd and Catherine Halbrendt, The University of Vermont**

Excessive phosphorus loading has been identified as the primary cause of lowering water quality in Lake Champlain. Dairy farms are cited to be the major source of phosphorus pollution to the lake and have been targeted to reduce phosphorus run-off. The goal of this paper is to determine the farm level financial impact of phosphorus management on different types of Vermont dairy farms. Farm financial performance following implementation of manure management is simulated by farm size (60 cows, 150 cows, and 350 cows) over a ten-year time horizon using the Farm Level Income and Policy Simulation Modeling System (FLIPSIM). Results indicate implementation of manure management may slightly im-

prove the farm financial performance of small (~60 cow) farms.

**The Adoption of Integrated Pest Management in the Green Industry in Delaware, Ferdinand DiFurio, Thomas Ilvento, and Steven E. Hastings, University of Delaware**

Integrated Pest Management (IPM) consists of a set of techniques designed to address environmental concerns within the agricultural industry. The objective of this study was to provide Cooperative Extension Professionals and other interested parties information about the use of IPM in the "green industries" in Delaware. An Integrated Pest Management/Nutrient Management Survey was developed and sent to professionals in horticultural, landscaping, nursery and turf management firms in the state. Data collected were used to determine the use of IPM practices; categorize professionals according to their extent of IPM use; and determine the opinions of professionals about factors that influence the adoption of IPM techniques.

**The Viability of Community Supported Agriculture in the Northeast, Daniel A. Lass, Sumeet Rattan and Njundu Sanneh, University of Massachusetts**

Survey data analysis for 1995–97 indicated that Community Supported Agriculture (CSA) operations earned modest net income. However, when all operators were paid wages, average net income was negative. The effects of farm, operator and CSA characteristics on viability were explored using regression analysis. Output, acreage, presence of a core-group, operator education and experience, soil organic content, and share price affected net income and costs.

A Nash bargaining model of optimal CSA share price was applied to explain observed behavior. Impacts of farmer and consumer warm-glow, market price, wholesale price, and costs on the optimal solution for  $p$  were derived. The model offered plausible explanations for observed CSA operator behavior.

## Local Economic Development and Household Welfare

Session Chair: Doug Morris

**Inequality as Measured by Household Expenditures, Sam Berhanu, U.S. Dept of Justice, Dale Colyer, West Virginia University, and Laura Blanciforti, U.S. Department of Health and Human Services**

The BLS surveys of consumer expenditures for 1980–94 are used to calculate Gini ratios for overall household expenditures and those for eight major components of expenditures. Household expenditures indicate less in-

equality than is typical for personal income since consumers tend to maintain expenditures when incomes temporarily decrease and do not increase expenditures proportionately to temporarily increased incomes. Expenditures shares for food and beverages, housing, and transportation account for over 50% of the inequality in total expenditures.

### **The Role of Informal Economic Activities in Non-Metropolitan Wisconsin, John Larrivee, University of Wisconsin-Madison**

Examines informal activity (activities done to make money, save money or barter typically not recorded) in rural Wisconsin by participation, hours and value, as well as by socioeconomic status of those involved. Approximately 60% participate. Most spend only about 100 hours per year, though 10–25% spend more than 500 hours. Such hours are only 5–10% of formal work hours, but greatly exceed hours spent on second jobs. The imputed value of these activities is \$4000–5000 per household. Informal activities are common among low income and public recipient households, among whom they are the most commonly used option after formal labor.

### **Evaluation of Tax Policy Changes: An Econometric Approach, Qingshui Zhou and Dale Colyer, West Virginia University**

A general tax burden model is derived from a simple regression function. A feature of this model is that it requires relatively little information to estimate tax burdens among the income groups of the population in question. A key component of the model is the income elasticities of taxes, which may be estimated empirically or specified explicitly. The other information needed in the model is the tax revenues targeted of each tax type of the system and the pretax income distribution. The model can be used to evaluate incidence and equity aspects of tax policy changes. Numerical examples are given.

## **Watershed Management**

**Session Chair: Joshua M. Duke**

### **An Assessment of Organizational Effectiveness: A Study of West Virginia Watershed Associations, Sarah A. Cline and Alan R. Collins, West Virginia University**

Recently, federal and state government agencies have advocated a watershed approach that addresses water quality and use on a watershed level and advocates public participation in watershed protection issues. In many communities, watershed associations have formed as an avenue for public involvement. This paper examines factors impacting watershed association effectiveness in reaching their intermediate goals (activities conducted and financial resources obtained for watershed protection) to achieve their final outcomes. The analysis is conducted at the watershed level using eight digit HUC code watersheds designated by the USGS. Results show the number of watershed associations significantly impacts activities conducted and financial resources obtained in a watershed.

### **Combining Multi-Criteria Decision Making and GIS for Watershed Management and Planning, Michael P. Strager, and Jerald J. Fletcher, West Virginia University**

The analysis of spatial information for decision making requires large amounts of data and the ability to analyze, store, interpret and display the relationships to the resource manager or decision maker. Geographic information systems (GIS) are designed to meet these requirements but most fall short in the critical area of decision support. This paper demonstrates how to use geographic data within a multiple-criteria decision-making framework to prioritize the conflicting objectives that arise in watershed management. The main contribution of this proposed technique is to address uneven spatial distribution of criteria values in the evaluation and ranking of alternatives.

### **Stated Preference Method Applied to Watershed Restoration, Matt Heberling, Willard Delavan, James Shortle, and Steve Smith, Penn State University**

The stated preference method (SPM) is a valuation technique that can be applied to issues concerning changes to streams affected by acid mine drainage. This method involves collecting preference data by asking respondents to choose between pairs or triplets of alternatives described by a number of attributes (price or cost is one attribute). Using SPM will provide a ranking of attributes, willingness to pay for a unit increase/decrease in an attribute, and a potential method to rank streams for cleanup. Results from the SPM questionnaire will be part of a cost-benefit analysis of site restoration in Pennsylvania.

### **A Quantitative Framework for Analyzing Total Maximum Daily Load Policies for Acid Mine Drainage Affected Watersheds, Sujittra Rodsomboon and Jerald J. Fletcher, West Virginia University**

Acid mine drainage (AMD) from active mines and abandoned mine lands (AML) is a problem in northern West Virginia, Pennsylvania, and other high sulfur coal areas in Appalachia. To correct water quality deficiencies, Total Maximum Daily Loads (TMDLs) focus on overall stream quality by setting limits for pollutant loads, by identifying load contributors and by setting load allocations across sources. This paper discusses the development and implementation of a multiperiod mixed integer programming model for analyzing the cost effectiveness of TMDL implementation for AMD affected watersheds. A chance constrained programming approach to account for uncertainty is proposed.

# Regional Economic Modeling

Session Chair: John Larivee

**A Multi-Sector Export Base Model of Long-Run Regional Economic Growth, Brian Lego, Tesfa Gebremedhin and Brian Cushing, West Virginia University**

The relationships between intersectoral export and local employment and regional economic growth are analyzed in a long-run equilibrium framework. Dynamic location quotients decompose regional employment into export and local components for multiple sectors. Johansen's Full-Information Maximum Likelihood (FIML) approach is used to identify the existence and resultant rank of the cointegrating relationship between sectoral export and local employment in West Virginia's four metropolitan areas. Empirical results indicate intersectoral basic and nonbasic employment form a cointegrating system of equations. This analysis shows that intersectoral shocks to local and export employment may cause multipliers to be positive or negative in magnitude.

**Bringing Fiscal Impact Modeling to the Community Level: The FIT-4-NH Model, Tracey L. Farrigan, John M. Halstead, University of New Hampshire, Martin Shields, Penn State University, and Douglas E. Morris and Edmund F. Jansen, University of New Hampshire**

This paper describes the development of a fiscal impact tool for New Hampshire communities (FIT-4-NH). FIT-4-NH belongs to a family of computer generated fiscal impact assessment models designed to estimate the impacts to local government revenues and expenditures that result from economic changes. In the past, work in this area has centered on the completion of county level models for the midwestern states. FIT-4-NH is unique in that it was designed for community level use in the

smaller, more rural oriented northeastern region of the country.

**Regional Economic Effects of Proposed Environmental Regulations On the Delmarva Poultry Industry, Brenna Gray, Conrado Gempesaw, Silvia Weybrock, University of Delaware**

This paper studies (1) the economic contribution of the Delmarva poultry industry to the regional economy and (2) the economic effects of stricter environmental regulations on this industry. We survey federal and state regulations that affect the poultry industry. The Impact Analysis for Planning (IMPLAN) input-output modeling system is used to assess the output, employment, income, and value added effects of two hypothetical output reduction scenarios, which may arise because of stricter regulations.

**The Spatial Allocation of Employment Growth: An Analysis of Commuting by Industry, Martin Shields, Penn State University**

Hoping to generate employment opportunities for residents, communities often offer businesses location incentives. But many newly created jobs may go to commuters rather than local residents, resulting in a higher cost per local job. I examine the allocation of employment across space, emphasizing the propensity of commuters to "capture" jobs. I develop an industry-level model where in-commuters balance employment and wage opportunities with relative housing prices and travel costs. Empirical results suggest that there is a tendency for "good jobs" to be filled by commuters. Thus communities courting employers should consider regional agreements when offering incentives to reduce risk.

# New Directions Agricultural Policy

Session Chair: Jeremy Foltz

**Preventable Food Borne Illness with Dose-Response Damages: Optimal Sharing of Prevention between Consumers and Processors and the Effect of Product Liability, Brian Roe, Ohio State University**

Product liability laws may serve as efficient means to induce socially optimal levels of care in potentially injurious situations. However, a growing area of public concern that features large liability settlements—consumer foodborne illnesses—features two characteristics not commonly considered in standard liability prescriptions: dose-response damage functions and victim damage prevention. Dose-response damage functions are shown to yield social objectives with multiple optima

that may dictate diametrically opposite policy prescriptions in terms of prevention sharing between consumer and processor. Also, rules that don't recognize both parties' contribution to damage may cause private decisions to differ discretely from socially optimal behavior.

**Universities, Agricultural Biotechnology Patents, and Local Spillovers, Jeremy Foltz, University of Connecticut, and Bradford Barham and Kwansoo Kim, University of Wisconsin-Madison**

Using patent data, this work provides an initial empirical

investigation into university production of agricultural biotechnology patents. We develop a consistent theoretical methodology for understanding the university patent production process and then estimate econometric models of university-owned agricultural biotechnology patents on a series of explanatory variables. The analysis then considers spillover effects from university patenting in the form of licenses and the potential importance of "star" scientists in patent production. The results demonstrate the importance of the U.S. land grant university infrastructure, technology transfer offices, and star scientists.

### **An Examination of PAC and Lobbying Activities in the U.S. Food and Tobacco Industries, Sanjib Bhuyan, Rutgers University**

Businesses participate in political activities, such as campaign contributions and lobbying, to influence public policy formulation and implementation. Using a sample of U.S. food manufacturing industries, this study empirically examines the factors that influence the extent of food industry participation in the political rent-seeking activities. Empirical analysis shows corporate political activities were higher in those industries that were highly concentrated, large in employee size and sales, and deeper in debt.

## **Demand for Agricultural Products**

Session Chair: Keithly Jones

### **Consistency and Separability Testing in Demand Analysis: Nonparametric Results, Kang E. Liu and Wen S. Chern, The Ohio State University**

Consistency and separability are two important hypotheses in demand analysis. Before applying the analysis, it is necessary to check the validity of the hypotheses. Two approaches are available. One is the parametric approach; the other is nonparametric. The time-series data of food consumption in the United States is used to examine separability. The results show that, from the nonparametric approach, only the sequential data from 1989–94 and 1990–95 are consistent with utility maximization. In addition, there are a few selected food groups satisfying the weak separability hypothesis.

Analysis of State Purchasing Agents in the United States.

### **The Long Run Demand for Poultry: A Test for the Presence of a Cointegrating Relationship in a Demand Model, Brian Lego and Tim Phipps, West Virginia University**

This paper tests for the existence of a long run cointegrating relationship for U.S. poultry consumption over the 1966–1996 time period. We estimated a modified state-adjustment model using a two lag autoregressive model. A cointegrating relationship was indicated by the Augmented Dickey-Fuller statistic. The model was used to derive both short and long run price and income elasticities. All elasticities had the hypothesized signs and all estimated parameters were statistically significant with the exceptions of fish price and income. In addition, long-run elasticities were higher in absolute value than short run, in accordance with Le Chatelier's Principle.

### **Chinese Urban Consumer Demand for Dairy Products and Implications for the Dairy Industry in the Northeast, Qingban Wang and Guannming Shi, University of Vermont**

Tree-Free Paper Products in the Public Sector: A market

## **Valuing Non-Market Goods**

Session Chair: Robert Johnson

### **Analysis of Willingness to Pay and Scope in a Contingent Valuation Study of State Parks, Brittany Horn, Andrea Soltysik and Donald J. Epp, Penn State University**

Contingent valuation is used to describe the characteristics of respondents in the Williamsport, Pennsylvania area that are related to willingness to pay for state park protection. The study also tests WTP for scope. An open-ended valuation question was used in a mailed survey. Results show income, volunteerism, and probability of future visits as the most important variables in determining willingness to pay. WTP responses did not exhibit scope.

### **Valuation of Visibility: A Conjoint Analysis Study in the White Mountain National Forest, Wendy Harper, John Halstead and James Hall, University of New Hampshire, L. Bruce Hill, Appalachian Mountain Club, and Thomas H. Stevens, University of Massachusetts**

New Hampshire's White Mountain National Forest is well known for its mountain scenery as well as its many recreational opportunities. Upcoming changes in the electric utility industry (as well as changes to the Clean Air Act) may work to change the average level of visibility in the White Mountain National Forest. This study examines the value of potential changes in visibility to

visitors of the national forest. This paper will present the results of a conjoint analysis survey administered during 1998 at the Pinkham Notch Visitor Center at the Base of Mount Washington.

**Objective Verses Subjective Measures of Environmental Quality in Hedonic Property-Value Models, P. Joan Poor and Kevin J. Boyle, University of Maine, Laura O. Taylor, Georgia State University, and Roy Bouchard, Maine Department of Environmental Protection**

Economists assume people know their preferences with certainty and that associated choices are based on objective measures for the goods they consume. However, when hedonic-price models are used to estimate implicit prices of public goods, subjective perceptions of the purchaser may be more appropriate.

We investigate the convergent validity of objective and subjective measures of water quality in a hedonic property-value model that estimates implicit prices. We examine water clarity in Maine lakes where clarity is compromised by eutrophication due to non-point source pollution.

We conclude that using objective measures appears a

suitable proxy of a purchaser's subjective internal assessment. However, rather than assuming objective measures are valid proxies for the quality of public goods associated with a property, researchers could gain valuable insight to strengthen their hedonic research results using consumer survey information.

**What Pollutants Matter For Consumers of Water Based Recreation? Lynne G. Tudor, U.S. EPA, Elena Besedin, Abt Associates, Inc., Michael Fisher, Hagler Bailly, Inc., Stuart Smith, Abt Associates, Inc., and Lori Snyder, Abt Associates, Inc.**

The present study focuses on a state-wide case study to evaluate recreational benefits from forthcoming effluent limitation guidelines for the Metal Products and Machinery Industry. The study combines water quality modeling and a random utility model to assess how changes in water quality from the regulation will affect consumer valuation of water resources. The study addresses a wide range of pollutant types and effects, including water quality measures not often addressed in past recreational benefits studies. The estimated model allows policy makers to more fully analyze recreational benefits from reducing nutrients and toxic pollutants.

## Land Use Conflict and Policy

Session Chair: Janelle Larson

**Spatial Characteristics of Brownfields: Implications for Sustainable Land Use, Donald Crocker, Resources for the Future, and Gerard D'Souza, West Virginia University**

We examine the spatial and socioeconomic characteristics of brownfields. The study area (six northeastern states) has a mix of manufacturing, farming, and recreational activities, and is one that is densely populated. Environmental concerns, including possible brownfield contamination are quite prevalent. A spatial econometric approach is used, with zip codes as the unit of analysis. Contrary to conventional wisdom, brownfields are not located predominantly in minority dominated urban core areas. Instead, there is a higher incidence of sites in urban fringe and low income areas regardless of racial composition. An implication is that existing remediation activities must be expanded to include areas not currently targeted by policy makers. The results should be useful in policy formulation and serve to guide sustainable land use decisions.

**Critical Lands Conservation with Development: Using Contingent Choice to Establish Impact Fees for Open Space, Stephen K. Swallow, University of Rhode Island**

This study estimates the value of open space preservation to residents in a southern New England township

and proposes a policy structure to conserve open space. Value estimates are derived from a contingent choice survey mailed to 340 registered voters, producing a 76% response rate. The choice model was significant ( $P < 0.01$ ), and willingness to pay (WTP) to preserve land parcels varied with respect to land-cover type, location, ecological and scenic uniqueness, and public access. WTP ranged from \$0 up to \$30 per parcel per household per year. The paper proposes an "impact fee" system to encourage developers to conserve critical lands.

**An Evaluation of Delaware's Mediation Program for Nuisance Conflicts, Joshua M. Duke and Ryan P. Jost, University of Delaware**

Since 1982, the New Castle County Superior Court in Delaware has promoted a formal mediation program, which attempts to resolve filed conflicts prior to trial. This paper evaluates how spatial land-use conflicts channel through mediation and litigation. Data suggest that mediation often fails because one of the private disputing parties does not play a direct role in mediation and litigation. The data then inform a predictive model of litigated outcomes in which disputants share in the responsibility for conflict. By alleviating some of the uncertainty of litigation and proposing win-win mediated outcomes, the model should facilitate future mediations.

## Marketing and Value Added

**Character Marked Wood Furniture and Sustainable Rural Development: A Marketing Study of Hardwood Chairs in the Northeast, Guanming Shi and Qingbin Wang, The University of Vermont**

A major problem faced by the wood product industry is a shortage of high-grade hardwood and a surplus of low-grade hardwood. This study evaluates the market potential for character marked hardwood chairs through a consumer survey in the Northeast. A conjoint analysis is conducted to examine consumer preferences for major chair attributes (design, price, density of marks and guarantee policy). Results indicate that 48% of the respondents are likely to be the potential buyers of the character marked chairs with attractive design and competitive price and guarantee policy. It suggests that there is likely a niche market for character marked wood furniture.

**Estimating the Effect of Demographic Characteristics on the Willingness-to-Pay a Premium for Integrated Pest Management Produce, Ramu Govindasamy, John Italia and Adesoji Adelaja, Rutgers University**

This study documents the effect of socio-demographic characteristics on the willingness-to-pay a premium for IPM grown produce. Of the 291 participants that responded, 60% felt that pesticides posed a very serious risk to human health while only 3% felt they were not hazardous. Willingness-to-pay was not constant across the population but varied among demographic segments. The results of this study suggest that many consumers would be willing to pay a premium to obtain IPM produce; specifically, females, higher earning households, younger individuals, and those who frequently purchase organic produce appear to be among the most likely to pay a 10% premium for IPM produce. Conversely, households with four or more residents were 17% less likely to pay the 10% premium for IPM produce than were smaller households.

## Agricultural Trade and Price Reform

Session Chair: Sanjib Bhuyan

**The Effects of Deregulation on Australia's Dairy Industry, James W. Dunn, Penn State University, and Elton Li, University of Adelaide**

Australian Competition Policy Review requires that laws have net public benefit. It is unlikely that any state's regulations of milk prices and dairy markets can survive review. An economic model estimates what might occur if the policies end. These results showed the price in each state determined by the efficiency of the manufactured product processors. Quota states will produce drinking milk and will face the largest price effects from deregulation. Other states will produce manufacturing milk and will have less price shock and exit of dairy farms. The net domestic cost of the regulations is over \$350 million per year.

**Impacts of the Northeast Dairy Compact on Retail Prices, Daniel Lass, Mawunyo Adanu and P. Geoffrey Allen, University of Massachusetts**

Mark-up price models were estimated for Boston and Hartford and farm-retail price asymmetry was investigated. Individual parameter tests indicated farm price increases affected retail prices more rapidly than farm price decreases. However, tests comparing the sums of rising and falling farm price coefficients indicated retail prices do return to the same level when adequate time was allowed for upward and downward adjustments. Out-of-sample forecasting was conducted for June 1996—December 1997. The model forecasted actual

prices well; mean forecast errors were 3.7% (Boston) and 3.4% (Hartford). The forecasting performance suggests no structural change in the farm-retail price relationship during the out-of-sample period.

**Agricultural Policy Reform in Eastern Europe: A General Equilibrium Analysis of the Sectoral and Trade Implications, Tian Xia and Silvia Weyerbrock, University of Delaware**

This paper studies the sectoral and trade implications of agricultural policy reform in Eastern Europe using a general equilibrium model featuring explicitly modeled policies and selected characteristics of reforming economies. Because Eastern European countries wish to enter the European Union, we explore two reform packages that allow them to adjust their agricultural support levels to EU levels. We find that if Eastern Europe matches EU support levels using its current policies, its agricultural output and exports increase. If it adopts the EU's Common Agricultural Policy, a sectoral change towards agriculture does not occur because of the CAP's supply management programs.

**The Role of Foreign Direct Investment in NAFTA and MERCOSUR Countries, Christine Bolling and Agapi Somwaru, ERS/USDA**

The role of foreign direct investment as a complement or substitute for foreign trade in regard to the food process-

ing industry continues to be debated in regard to the food processing industry. This work extends earlier work based on the Barrell-Pain model to NAFTA and MERCOSUR countries to demonstrate that some macroeconomic factors, such as the exchange rate, act differently

among countries. The product mix, the level and direction of trade with the United States, and economic stability of the host country are especially important in determining these macroeconomic effects on FDI and trade in NAFTA and MERCOSUR countries.

## Supply of Agricultural Products

Session Chair: J. Stephen Clark

### **Estimation of Economic Relationships in the Pennsylvania Hog Supply, Keithly G. Jones and M. C. Hallberg, Penn State University**

The study evaluates short-run and long-run responses to hog prices throughout the production chain. Structural changes associated with hog supply is also pursued. The model is based on the duality between profit and production. Equations were estimated over the 1960–97 sample period by seemingly unrelated regression. Results show that the relations estimated for hog supply were economically meaningful and explained a high proportion of the variation in the dependent variables of interest. No evidence of differences between short-run and long-run elasticities were observed. Significant structural shifts were observed in marketing and importing of hogs, but none was evident in farrowings.

### **The Implications of Captive Supplies for Spot Market Participants, Brian Roe, Ohio State University**

Agricultural markets are increasingly characterized by contractual arrangements and thinning spot markets. Research in contractual agriculture has focused mainly on the motivations for contracts and the strategic interplay of principles and agents. However, public interest in the broader social implications of this contractual evolution in agriculture is growing. One possible social implication involves changes in the market volatility faced by captive and spot market suppliers as captive supplies increase. Analytical and simulation results on spot market bias and comparative volatility for spot and captive suppliers are presented for several market structures and contractual specifications.

### **Fundamental and Induced Biased Technological Change in Central Canadian Agriculture: 1926–1985,**

**J. Stephen Clark, Nova Scotia Agricultural College**  
This paper develops a model induced versus fundamental technological change using the innovations possibilities frontier (IPF) developed by Ahmad. The theoretical model shows how fundamental versus induced technological change can be tested as parametric restrictions on a general econometric model. Methods are applied to Central Canadian agriculture for the period 1935–1985 for land, machinery, fertilizer and labor. Since unit root non-stationarity was found in the data, parameters were estimated using cointegration techniques. Tests for neutral technological change could not be rejected, indicating all observed factor biases in Central Canadian agriculture were induced and none were fundamental.

### **An Econometrically Based Measure of Pest Management: The Case of Soybeans, Jorge Fernandez-Cornejo and Sharon Jans, ERS/USDA**

This paper proposes and develops a methodology to obtain an operational measure of IPM using a point system where the weights are calculated on the basis of the contribution, obtained econometrically, of each bundle of practices to IPM objectives. To illustrate, we present preliminary estimates for IPM for weeds used by soybean growers in seventeen states and assume that the main IPM objective is to reduce herbicide use while maximizing profits.

## Issues of Agricultural Land Use

Session Chair: Alan R. Collins

### **Farmland Preservation and Differential Property-Tax Assessment: Evaluating Optimal Policy Under Conditions of Uncertainty, Robert J. Johnston, University of Rhode Island**

Community officials often choose differential assessment rates given substantial uncertainty and a lack of information regarding landowners' objective functions. This paper examines optimal property tax policy for a parcel of agricultural land facing uncertain development.

Optimal tax rates are characterized given three possible causes of uncertain development—exogenous offers from developers; tax-related reductions in landowner wealth; and a combination of these factors. Optimal tax policy is derived in each case and compared to the case in which there is no development risk. For each cause of development, the model allows for varying levels of net tax benefits, amenity values of farmland, and benefits of developed property.

**The Effects of Local Fiscal Pressures on Farmland Preservation, Lynndee Kemmet, Bard College**

In recent years, not only farmers but also urban residents have expressed increasing concern over the rapid disappearance of American farmland. States have long sought to protect agricultural lands through property tax subsidization, and increasingly local governments are seeking to stem the loss through zoning regulations and other forms of growth controls. But the number of local governments acting to protect their local agricultural industries is still limited. The study of the effects of local fiscal pressures on the agriculture industry in California's Coachella valley shows that those pressures often force local governments to sacrifice farmland for shopping malls and resort hotels. Thus, policies aimed at preserving America's farmland by setting curbs on growth will not be effective unless those policies address the fiscal situation of local governments in ways that will make it affordable for them to protect their local agricultural industries.

**Agricultural Adaptation to Urbanization in Southeastern Pennsylvania, Janelle M. Larson, Jill L. Findeis, Stephen M. Smith, Penn State University**

In the Northeast, most agricultural output comes from counties that have experienced significant development. This study examines how farmers are adapting to development in this region. A grain- and livestock-producing region in southeast Pennsylvania was selected for study. Multinomial logit models were used to determine what factors influence farmers' decisions to change practices. We examined changes in land ownership and enterprises. Land ownership was likely to increase (or less likely to decrease) for farms with these characteristics: land under differential assessment, no complaints about agricultural practices, off-farm income, high value of sales and young owner. Grain or hay production was likely to increase for farms in rural counties with young owners.