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## Abstracts of Organized Symposia

# The Need for an Integrated Farm and Non-Farm Rural Development Program

**Organizers:** T.G. Gebremedhin (West Virginia University) and D.A. Lass (University of Massachusetts)  
**Moderator:** T.G. Gebremedhin (West Virginia University)

"The Role of Federal Government in Rural Development Programs" M. Ahearn (USDA, Economic Research Service); "The Role of State and Local Governments in Rural Development Programs" D.K. Smith and T.G. Gebremedhin (West Virginia University); "The Contribution of Land Grant Universities in Rural Development Programs" G.L. Cole and S.E. Hastings (University of Delaware); "The Participation of Local Community Organizations in Rural Development Programs" J.L. Findeis and L. Singletary (Pennsylvania State University).

The integration of farm and non-farm rural development programs could be the critical first step

toward the revitalization of rural communities. The interests of the agricultural sector and the needs of the rural non-farm population would be better served by promoting rural development policies that integrate the objectives of the agriculture sector and non-farm rural communities. Therefore, economic and political relationships should undergo fundamental restructuring to assure more vigorous federal and state responsibilities and the participation of other public and private organizations in rural development programs.

# Rotational Grazing Changing Northeast Dairying: How Far and How Fast?

**Organizers:** S. Ford and G. Hanson, Pennsylvania State University  
**Moderator:** A. Condon, University of Vermont

"Pasture in the Feeding System" S. Ford (Penn State); "Cash Flow Impacts of Seasonal Rotational Grazing" R. Wackernagel (University of Vermont); "Rotational Grazing as a Farmer Response to Capital Rationing" G. Hanson (Penn State); "Long-Term Impacts of Grazing on Dairy Markets and Structure: How Much?" M. Stephenson (Cornell).

The symposium addressed issues central to the successful implementation of rotational grazing technology on Northeast farms. Rotational grazing consists of intensive utilization of small paddocks of pasture in a rotated framework. For example, a 40-acre pasture that is split into 10 four-acre paddocks (where cows are rotated every three days and the management input is increased) can significantly increase cow

carrying capacity. Anecdotal evidence indicates that with superior management of rotational pasture, cow numbers can be doubled compared to traditionally managed unit pastures. The benefits of grazing involve forcing the cattle to eat varieties of grass that are not the most preferred, including harvest of the paddock, permitting the paddock to "rest" the majority of the time without being trampled by hooves, and using concentrated hoof action to more effectively distribute and work manure waste into the soil. Rotational grazing is often contrasted to confinement feeding of cattle in barns or feedlots. Rotational grazing was popularized by New Zealand dairy farmers during the 1980s as an effective way to lower feed costs.

## Abstracts of Selected Papers

### **Econometric Analysis of Price and Income Demand Elasticities for Food Commodities**

**(Chair: Laura Blanciforti, West Virginia University)**

**"Are Price Elasticities and Flexibilities Reciprocal?" K.S. Huang (USDA, Economic Research Service)**

The relationships of price elasticities and price flexibilities are examined with particular emphasis on comparing the sizes of differences between a directly estimated demand matrix and an inverted demand matrix. The results show that by using the inverted

elasticities to represent flexibilities or vice versa, sizable measurement errors may be made. For agricultural policy and program analyses, a directly estimated demand matrix should be used.

**"The Demand for Specialty Products and their Mass Market Counterparts: The Case of Pure Maple Syrup" J. Iskow, J. Kolodinsky, and D. Russo (University of Vermont)**

To begin to analyze the demand for specialty food products and their mass market counterparts, we examine the case of pure versus imitation maple syrup. We perform a GLS estimation of seemingly unrelated demand equations to estimate price, income, promotion, and other selected elasticities. The Infoscan (R) grocery (scanner) data from the northeastern United States are

used in the estimation. Results indicate that demand for pure maple syrup is more elastic than for nonpure; consumers base decisions more on price than on promotional efforts of retailers; and promotional efforts of either type of syrup will increase sales of both types of syrup.

**"Rural Chinese Food Consumption: The Case of Jiangsu" W. Tan, C.K. Halbrendt, W. Latham (University of Delaware), and F. Tuan (USDA, Economic Research Service)**

This study analyzes Chinese consumer behavior based on rural Jiangsu household survey data using the AIDS model. The estimated own-price elasticities for most food items were inelastic. Substitution among commodities due to price changes was inelastic for grain

but elastic for poultry, 'other foods', and durables. Commodities most responsive to changes in expenditures were meat, poultry, fruits, sweets, and 'other foods'.

### **Environmental Impacts of and on Agricultural Production**

**(Chair: Robert Leonard, University of Connecticut)**

**"The Impact of Air Pollution on Corn Yields in the Eastern United States" D.A. Westenbarger and G.B. Frisvold (USDA, Economic Research Service)**

While there has been extensive estimation of the impacts of air pollution on crop yields on experimental field plots, relatively few studies have attempted to estimate air pollution impacts under actual farm production conditions. This study uses multivariate regression analysis to estimate the impact of air pollution and other variables on corn yields in the eastern U. S. using cross-sectional, farm level data from 1990. The hypothesis that ozone pollution and acidic (sulfate) depositions do not reduce crop yields was rejected. Convex pollution

damage functions fit the data slightly better than linear ones. A 10 percent reduction in the ozone index from its mean spring 1990 level would result in a 3.6 percent increase in corn yields. A 10 percent reduction in summertime sulfate wet depositions would lead to a 3.9 percent increase in corn yields. Evaluation of policies to curb ambient air pollution should consider the agricultural productivity benefits of cleaner air.

**"Agricultural Land Uses and Nitrate Contamination of Groundwater: A GIS and Spatial Regression Analysis"**  
J.L. Sparco and J. Mackenzie (University of Delaware)

Although numerous analyses have demonstrated linkages between agricultural land uses and groundwater contamination in specific hydrogeological contexts, few of these micro-level analyses are readily generalized to macro-level context in which groundwater protection policies are formulated. This paper presents a county-wide analysis of the spatial linkages between agricultural

land uses and nitrate contamination of groundwater. The objective is to estimate a mathematically tractable model to support formulation of county-level contaminant control policies. Geographic information systems and spatial analysis software are integrated to establish a clear linkage between land uses proximate to wells and groundwater quality.

**"Assessing Exogenous Adaption in a Climate Change"** A. Ranese (University of California) and M. Tsigas (Purdue University)

We investigate farmer adaptation to global warming in this paper not only as a form of a parallel supply shift, but also as a slope change in the long run the marginal cost curve. Thus, altering own price elasticities of a good changes the level of technology in a region, thereby making it more sensitive to world prices. We find that

our definition of adaptation causes world prices to drop to such an extent that ROW producers will increase more their supply of tradeable goods. But the drop in prices was not sufficient enough to benefit ROW consumers such that producer surplus exceeds consumer surplus.

**"Adoption of Conservation Tillage in the Lower Susquehanna Basin"** K.O. Fuglie and C.A. Klotz (USDA, Economic Research Service)

The adoption of conservation tillage may have important implications for water quality. This paper uses a multinomial logit model to investigate the choice of tillage technique in the Lower Susquehanna River Basin of Pennsylvania and Maryland. The model incorporates

two environmental indices to examine whether farmers consider water quality consequences in their tillage adoption decisions.

## **Dairy Production Systems and Financial Performance**

(Chair: Loren Tauer, Cornell University)

**"Economic Analysis of Bovine Somatotropin on the Profitability of Representative Dairy Farms in the Northeast"**  
A. Elbehri and R.D. Yonkers (Pennsylvania State University)

The study evaluated the impacts of BST on the profitability of representative Pennsylvania dairy farms using a stochastic simulation model under three levels of milk response to BST, two initial milk production levels, and two milk price forecast scenarios. Results showed that farm profitability was improved with BST, but the magnitude of the benefits from BST depended on the

level of milk response to BST and the farm's initial milk output per cow, both related to the quality of management. However, modest price declines due to BST-induced additional supplies of milk would have a small offsetting effect on the farm profitability.

**"An Econometric Analysis of New York Dairy Farm Financial Performance"** K.E. Jack (Cornell University)

A pooled cross-section time-series econometric model was developed to examine factors influencing variation in four financial performance measures on farms with

similar resource bases. Business summaries from 164 specialized dairy farms from 1989 to 1992 were used to analyze factors, including: technical performances, size,

capital and debt efficiency, cost control, milk price, cropping practice, and farm and operator characteristics. Empirical results suggest a core of explanatory factors

exist which is useful in explaining variation in financial performance, regardless of which measure is selected.

**"Cost Efficiency in Milk Production for Selected States in the United States: Econometric and Growth Accounting Estimates" H. Cocchi and B.E. Bravo-Ureta (University of Connecticut)**

Econometric and index number procedures were employed to derive cost efficiency measures over time, farm sizes, and across states using dairy data for Michigan, Connecticut, Pennsylvania, Maine, Vermont and New York. The overall annual rate of cost reduction attributed to technological change was 1.06% according to the econometric approach and 1.8% according to the indexing procedure during the 1968-1988 period. Both approaches yielded similar measures of elasticity of cost with respect to output, ranging from around 0.75 to .89.

Thus, increasing returns to scale were found to prevail. Interstate comparisons indicated that Pennsylvania had a distinct competitive advantage, while Maine and to a less extent Michigan exhibited a competitive disadvantage in producing milk relative to New York. The similarity of the performance of both approaches suggests that the production technology appears to be sufficiently uniform so as to make the econometric estimation unnecessary.

## **Long-Run and Cooperative Marketing: Conceptual and Empirical Issues**

(Chair: Andrew Condon, University of Vermont)

**"Risk and Grain Marketing Behavior of Large-Scale Farmers: An Exploratory Analysis" D. Eckman and G.F. Patrick (Purdue University) and W.N. Musser (Pennsylvania State University)**

Participants in the 1993 Top Farmer Crop Workshop had marketed about 23 and 41 percent of expected 1993 corn and soybean production, respectively, by July 15, 1993. Forward contracting was the primary pricing technique, followed in importance by hedging, options, and minimum price contracts. With long-run marketing strategies, the maximum percent of expected production priced before harvest were affected primarily by risk

attitudes. Age, education, and net income change affected short-run, 1993, marketing decisions. Producers using options and/or minimum price contracts, instruments which do not eliminate price enhancement opportunities, had marketed significantly more by July 15. Support was found for alternative theories of risk behavior.

**"Vertical Ties in the Agro-food System" D.R. Henderson (USDA, Economic Research Service)**

Much has been written about the demise of spot markets and the rise of contracts as the preferred method of vertical coordination lends itself to specification in a manner that is analytically useful. That is, can vertical organization be treated as a variable or parameter in analytical models concerned with what gives rise to vertical ties and/or their economic consequences?

Analytical attention is directed to the economic incentives for and performance implications of the use of linkages or ties other than spot market transactions for coordinating vertically interdependent stages in the production-distribution process.

**"Alternative Marketing Strategies for Vegetable Packing Operations in Jordan" R.F. Hattar, J.R. Bacon, U.C. Toensmeyer, and C.M. Gempesaw (University of Delaware)**

This study considers the profitability of a Jordanian vegetable packing house designed to meet the quality requirements of the European market. Specifically, four transportation scenarios were evaluated using a comprehensive firm-level, dynamic and stochastic, multiple-year, capital budgeting computer simulation model. The results show that the medium sized

vegetable packing house is viable when serving the European markets. Also, the economic performance of the packing house improved when shipping by refrigerated truck. Furthermore, the stabilizing effect of land transport was captured in the much lower variability in the expected returns.

## **Industry Impacts of Trade and Regulatory Reform**

**(Chair: Julie Iskow, University of Vermont)**

**"An Economic Analysis of Canadian Broiler Growout Returns With Unrestricted Markets" C. Gempesaw, F. Albay, J. Bacon (University of Delaware), J. Corman and S. Narayanan (Agriculture Canada)**

The costs and returns associated with broiler growout production are estimated for Canadian enterprises. In view of the ongoing U.S.-Canada Free Trade agreement and the recently approved North American Free Trade Agreement, this study evaluates the profitability of Canadian broiler farms under various free market scenarios and in comparison with representative U.S. farms. A comprehensive, farm-level, capital budgeting, Monte Carlo simulation model, CHICKSIM III, was

used to analyze the production and financial performance of representative broiler farms for both countries. The result show substantial differences in investment returns and profitability of broiler growout production in the U.S. and Canada. Several impact scenarios were also developed to ascertain the effect of unrestricted market access policies on the economic performance of Canadian broiler farms.

**"Impact of Trade Reform on China's Crop Sector" C.K. Halbrendt, S. Jundong, R. Aull-Hyde (University of Delaware), and S.-E. Webb (Winrock International Institute)**

A spatial equilibrium model was developed to evaluate the possible impact of trade liberalization and infrastructural improvements on crop demand and supply, interregional tradeflow, transfer cost, and consumer and producer surpluses within various regions of China. The model constructed in this study differs from past empirical studies in that it incorporates multiple commodities by endogenously accounting for

cross-commodity price effects. Results indicate that current constraints to interprovincial trade result in large economic cost. To intensify its current reform to sustain economic growth, China should focus on improving infrastructure and encouraging free trade within and outside China.

**"Environmental Regulation and Industry Structure in the Pesticide Industry" J. Fernandez-Cornejo and M. Ollinger (USDA, Economic Research Service)**

This paper examines the impact of pesticide regulation on the number of pesticide firms and the foreign-based company market share of U.S. pesticide companies. It also investigates merger choice. Simultaneous equation systems and multinomial logit regressions are used. The principal finding is that greater research and regulatory costs affected negatively small innovative pesticide

companies more than large innovative ones and encouraged foreign company expansion in the U.S. pesticide market. It was also found that firms that remain in the industry have greater price cost margins, lower regulatory penalties costs, and greater multinational business presence than those that departed.

# Modeling and Eliciting Public Opinion on Environmental Issues

(Chair: Thomas Grigalunas, University of Rhode Island)

**"Effects of Additional Information on Willingness to Pay Values: How Much is 'Too Much'?"** J.M. Halstead and L.A. Gilbert (University of New Hampshire)

One of the major issues in survey construction in the contingent valuation method (CVM) is how much information on the good being valued should be given to respondents. Using a visitor survey of the Parker River National Wildlife Refuge in Massachusetts, it was found that willingness to pay for admission was not influenced by additional information regarding the number of

annual visits and refuge characteristics. Results indicate that estimates are fairly robust with respect to the type of information provided. This is encouraging as it may lend more validity to CVM studies, without undue concern over standardization of bid questions.

**"Cognitive Survey Design and Contingent Valuation: Are You Really Answering the Question I Thought I was Asking"** W.J. Wheeler and J.K. Lazo (Pennsylvania State University)

The cognitive survey design literature is surveyed and applied to contingent valuation. This literature, as well as the more general survey methodology literature, provides a number of implications and hypotheses about error in CV. Previously identified errors are discussed,

as well as some possible unrecognized errors. Methods from cognitive survey design are discussed, with applications from the CV literature. Throughout, suggestions are made for further research.

**"Citizen Response to Siting of Noxious Facilities: An Application of Prospect Theory"** A.R. Collins, S. Hunter, and K. Leyden (West Virginia University)

Models were formulated to examine citizen opinion, attitudes, and political participation for siting of a hazardous waste incinerator. Individual perceptions for both environmental risk and political efficacy explained citizen opinion about the incinerator and attitude towards

their participation in environmental decision-making. However, participation behavior was explained by only political efficacy beliefs. Thus, the free-rider effect of public decision-making was confirmed.

# Regional Economic Growth Factors and Measurement

(Chair: Daniel Lass, University of Massachusetts)

**"Local Economic Contributions of Entrepreneurs: Hardwood Processors in the Northeast"** S.M. Smith and K.J. Black (Pennsylvania State University)

Two bases of economic development have received renewed attention in recent years: (1) small businesses and entrepreneurship, and (2) the local natural resource base. For many areas, the combination of the two may provide promise. This paper examines the economic contribution of locally owned and operated hardwood

manufacturing entrepreneurs in the Northeast, using logit analysis to determine the characteristics of entrepreneurs and their businesses that relate to higher out-of-state exports and to employment expansion.

### **"Interstate Tax Differentials and Employment Growth" S. Berhanu and D. Colyer (West Virginia University)**

Many states are engaged in tax and nontax competition to attract new businesses or to retain existing enterprises. This study evaluates the impacts of tax and other types of incentives on employment growth in selected industrial categories during the 1980s. There are some statistically significant relationships between incentives and employment growth but taxes did not seem to be

important. Two more consistent relationships were between wages (negative) and population density (also negative). A relatively consistent positive relationship was found between per capita state income and employment growth.

### **"A Stochastic Shift-Share Analysis of Industrial Growth in the Delmarva Peninsula" S.E. Hastings and R.V. Tanjuakio (University of Delaware)**

This study, using the Arcelus version of the basic shift-share model, analyzed the growth of 13 industry groups in the 14 counties of the Delmarva region. Using 1981 and 1990 employment data, the shift-share parameters were estimated within the two-way analysis of variance framework, implemented through a general linear regression model. The growth differentials for the

industries except transportation and utilities were significant while most regional effects parameters were not. When recast in terms of the composition of actual total county growth, the local county effects accounted for a sizable portion compared to the industry mix effects.

### **"Household Income Inequality and Economic Change in West Virginia Counties" J. Lozier (California University of Pennsylvania) and D.K. Smith (West Virginia University)**

Changes in household income distributions in West Virginia between 1979 and 1989 were measured using Gini Index ratios and graphic quintile analysis. During the period, there was an increase in inequality in all but three counties of the state. Shares of total income to the middle-income population classes declined everywhere,

while upper-income households gained. Changes toward greater inequality were found to be negatively related to changes in population and per capita income, and positively related to changes in earnings from work and earnings from the service sector.

## **Farm Management/Production Topics: Research and Extension**

(Chair: Howard Leathers, University of Maryland)

**"A Survey of Extension Educators on Training Needs and Modes" R.L. Christensen (University of Massachusetts), M.R. Sciabarrasi and W. Zweigbaum (University of New Hampshire), R. Wackernagel (University of Vermont), and C. Arms (University of Maine)**

The recent creation of the New England Extension Consortium prompted the region's farm management specialists to consider collaboration in conducting in-service training programs. A survey of Extension educators was conducted with the purpose of eliciting rankings of training needs and approaches. Respondents were also asked for their perceptions of the needs for farm management education by farmers. Rankings of suggested topics were determined with some interesting

findings. The survey results indicated preference for approaches that emphasize applications in economics and business management, yet some specific applications received low rankings. Results with respect to feasibility and effectiveness of alternative training modes were also instructive and will be used in the design of in-service training programs.



### **"Economic Demands from Dairy Farming and Milk Biotechnologies" J.W. Wysong (University of Maryland)**

Future demand in the dairy industry will be approached from two broad points of view in this paper. First, the changed demand for breeding cattle will be discussed together with the changed supply of breeding cattle. Secondly, the consumer demand for milk and milk products will be discussed in relation to the changing supply of milk and milk products. Major economic and

technical adjustments have occurred already in the U.S. dairy industry during the post-World War II period. More changes are contemplated in the future as dairy farm managers face changing financial and technological possibilities.

### **"Variation in the Cost of Producing Milk" R. Wackernagel (University of Vermont)**

Costs of producing on a sample of ELFAC dairy farms in Vermont ranged widely - from \$7 to \$21 /cwt - during the 1988-1990 period. Capital purchases, inventory changes, and total labor made the largest contributions to variability. Low- and high-cost farms differed most in interest, other operating expenses, total labor, and

inventory changes. All cost components, except trucking, were negatively related to aggregates of other costs. Two cost components appear to have deserved more attention as sources of improved cost efficiency - other operating expenses and labor.

### **"Factors Influencing Herbicide Use in Corn Production" H. Taylor, B.H. Lin, H. Delvo, and L. Bull (USDA, Economic Research Service)**

Identification of less chemical -intensive production practices is an important step towards reducing farm chemical use. Knowledge of the demand price elasticity and the effect of government programs are also needed for evaluating policy options. An analysis of herbicide use on corn suggests that: (1) herbicide demand in corn production is own-price inelastic; (2) commodity programs increase herbicide use; (3) herbicide use can

be greatly reduced by switching from broadcast to band applications; and (4) switching from conventional tillage with the moldboard plow to other tillage systems increases herbicide use, but switching from conventional tillage without the moldboard plow to conservation tillage does not increase herbicide use.

## **Consumer Perceptions and Preferences for Food Attributes**

(Chair: Kuo Huang, USDA, Economic Research Service)

### **"Dietary Fiber Intake in the United States: Influence of Socioeconomic and Demographic Factors" R.M. Nayga (Rutgers University)**

This paper examines the impact of socio-economic and demographic factors on individual intake of dietary fiber. Factors considered are urbanization, racial ethnicity, region, weight, height, sex, food stamp participation, employment status, diet status, day of consumption, household size, age, and income. Empirical results

generally indicated that weight, urbanization, region, ethnicity, sex, employment status, food stamp participation, diet status, household size, age, day of consumption, and income significantly affect dietary fiber intake.

### **"Product Perceptions of Nine Non-Alcoholic Beverages" H. Miles, J.E. Lenz, and S.J. Schwager (Cornell University)**

We use principal component factor analysis to identify three perceptual dimensions that influence consumer's choice among whole, lowfat, and skim milk, regular and diet soft drinks, fruit juice, hot coffee, iced tea, and bottled water. The identified perceptual dimensions

capture 1) satisfaction and versatility, 2) health and nutrition, and 3) taste-related attributes. Products are mapped in perceptual space to reveal their perceived advantages and disadvantages.

**"An Economic Analysis of the Impact of Lower Saturated Fat Pork on the Pork Industry" C.K. Halbrendt, L.G. Sterling, O.S. Snider, and A. Folly (University of Delaware)**

The economic impact of low saturated fat (LSF) pork on market demand, price, and economic gains was evaluated. In order to (1) estimate willingness to consume, (2) estimate willingness to pay, and (3) estimate the net economic gain from product acceptance, data were collected from a nationwide telephone survey. Effects coding (EC) regression analysis was used to

evaluate product acceptance. Results show there is potential to increase the consumption of fresh pork if its level of saturated fat is reduced. As the quality of the pork improves, price as well as demand for value-added pork increases.

**"Consumer Preferences for Farm-Raised Trout: An Application to West Virginia" S.C. Smearman, L.A. Blanciforti, G.E. D'Souza (West Virginia University), and C.M. Gempe saw (University of Delaware)**

Aquaculture is an expanding industry in many parts of the U.S., with demand for some species such as trout increasing at a faster rate than that for other species. Little is known about the factors influencing this demand. Using a probit model and consumer survey data, this study identifies factors having a significant

influence on consumer preferences for farm-raised trout. The results have implications for aquaculture producers and retailers in the study area (West Virginia) and elsewhere.

## **Productivity Factors and Efficient Resource Use**

**(Chair: Greg Hanson, Pennsylvania State University)**

**"Input Substitution Possibilities in the Long Island Sound Oyster Industry: A Dual Approach to Allen and Morishima Elasticities" E.I.S. Ajuzie and M.A. Altobello (University of Connecticut)**

This paper uses a non-homothetic dual translog cost function to analyze input substitution possibilities for the period 1980-1992 for 14 firms in the Long Island Sound oyster industry. Using panel data, own- and cross-price elasticities of input demand as well as Allen and Morishima elasticities of substitution (AESs and MESs) were computed. Results indicate that fringe firms respond to input price changes more than dominant

firms. Labor is a substitute for all other factors and capital and energy are substitutes. Significant differences exist between AESs and MESs. Overall, the AESs, on average, overstate both the substitution and complementary relationships among inputs and should be interpreted with care.

**"Estimation of Resource Allocation in Multiple Crop Farms in the Growing Economy of Taiwan" C.-P. Shih (National Taiwan Normal University) and T.-C. Lee (University of Connecticut)**

An aggregate time series-cross section input data for different farms in Taiwan covering the period 1972-1978 are used to find out how farmers allocate inputs among crops in a fast growing economy. Dummy variable regression equations based on cropping acreage relation and profit maximization condition are estimated to capture the effect of farm size and time in allocating

input resources across crops. Empirical results consistently show that farmers are spending more capital and machinery and less hired labor and water across crops, particularly after 1974 when the government of Taiwan started the sixth economic plan.

### **"Age and Farmer Productivity" L.W. Tauer (Cornell University)**

Farmer productivity by age was estimated, allowing for differences because of efficiency and returns to scale. Using Census of Agriculture data, estimates vary by state, but returns to scale average 1.07. Efficiency

increases average 4.5 percent every ten years of age up to the age interval 35 to 44, and then decreases at that same rate.

### **"A Decomposition Analysis of Dairy Output Growth Based on Fixed Effects and Stochastic Frontier Production Models" B.E. Bravo-Ureta (University of Connecticut) and M. Ahmad (Agriculture University of Faisalabad)**

Fixed effects production functions and stochastic production frontiers are used to decompose dairy farm output growth into technological progress, technical efficiency, and increased input use or the size effect. Unbalanced panel data for 96 Vermont dairy farmers for the 1971-1984 period are used. The results show a 2.5% annual increase in milk output. About 56% of this growth is attributed to the size effect and the remaining

44% to productivity growth. Technological progress contributed about 94% to total productivity growth while technical efficiency accounts for 6%. Hence, the results indicate that the size effect played a greater role than productivity growth in increasing milk production during the period studied.

## **Emerging Issues in Agricultural and Resource Policy**

**(Chair: John Mackenzie (University of Delaware))**

### **"Stochastic Modeling of Land Use Transitions: A Land Use Policy Tool" D.E. Wentzien (University of Delaware)**

A discrete time Markov chain is proposed and conceptualized to demonstrate how land use policies can influence land use conversions and the scenic appearance of the land in an area of interest. A land use transition matrix is constructed to describe and analyze how land use changes have occurred during a discrete time interval. A stochastic process is defined and

justified for use in the study of land use transitions. A discrete time Markov chain transition matrix is developed and used to demonstrate its usefulness to a land use policy administrator. One proposed application is the ability to determine the impact of proposed land use policy before actual implementation.

### **"The Self-Employment Health Insurance Deduction, Farm Sole Proprietor, and Health Care Reform" M. Compson (USDA, Economic Research Service)**

Since the Tax Reform Act of 1986, qualified self-employed individuals, including farm sole proprietors, have been able to deduct up to 25 percent of their health insurance premiums. Since 1988, the number of farm proprietors claiming the deduction, the amount they claimed, and their resulting tax liabilities has risen steadily. The Clinton Administration has proposed

increasing the deduction 100 percent of premiums. Under this proposal, the number of farm proprietors eligible to claim the deduction is likely to increase. However, the net impact of the provision to increase the deduction depends on numerous factors and the mechanics of the overall reform proposal.

**"Health Insurance Coverage for Pennsylvania Dairy Farmers" S.I. Gripp and S.A. Ford (Pennsylvania State University)**

A survey of over 1200 Pennsylvania dairy farm managers showed that almost 20 percent of those managers do not have health insurance. In addition, of those farms with health insurance, only 67 percent had insurance acquired through the farm business. Farm characteristics and demographic information were used to determine indicators of health insurance coverage.

Age, education, off-farm income, coop membership, farm business organization, and intensity of hired labor all had significant effects on the likelihood of having health insurance and whether it was provided by the farm business.

**"Innovation and Regulation in the Pesticide Industry" M. Ollinger and J. Fernandez-Cornejo (USDA, Economic Research Service)**

Using instrumental variables in Quasi-likelihood and SUR analyses, we examine the hypothesis that regulation negatively affects innovation, causes pesticide companies to introduce more harmful pesticides, and discourages firms from developing pesticides for small volume crop markets. Our findings are consistent with

past studies in that regulation adversely affected innovation and encouraged firms to develop proportionately more pesticides for major crop markets. We also found, however, that regulation encouraged rather than discouraged the development of less toxic pesticides.