ABSTRACTS

PAPERS PRESENTED
Annual Meeting, SAEA, New Orleans, Louisiana, January, 1995

TITLE: Incorporating Risk into Farm Resource Management Models (Moderator: *Pierre-Justin Kouka. Univ. of Ark., Pine Bluff*).

"Risk-Efficient Tillage Systems and Program Participation Strategies for a Southern Plains Wheat Farm" *Francis M. Epplin and Ghazi A. Al-Sakkaf, Okla. St. Univ.*

Millions of acres in the Southern Plains have been classified as highly erodible and are subject to conservation compliance to maintain eligibility for deficiency payments. The objective of this study was to determine risk-efficient tillage, program participation, and stocker strategies for a representative farm with land subject to conservation compliance. A Target MOTAD model was constructed and used to generate farm plans. The results indicate that the expected cost of noncompliance for the representative farm is approximately $4 per acre. Plans which include participation are included in the risk-efficient set for all risk aversion intervals considered.

"Economic and Water Quality Tradeoffs of Alternative Farming Systems: A Chance-Constrained Programming Approach" *Tony Prato, Feng Xu and Minkang Zhu, Univ. of Mo.*

This paper examines the importance of distribution of the factors being constrained in using a chance-constrained programming (CCP) model. While normality is often implicity, if not explicitly, assumed, it needs to be tested rather than assumed. Normal and lognormal distributions are evaluated for their appropriateness for a data set. Bias of assuming normality when the distribution is not normal is reported. When the deterministic equivalent of a chance constraint is binding, assuming normality underestimates farm net returns compared to the actual lognormal distribution. Future studies on applied research using CCP should be cautious about the bias of using a normal distribution when a lognormal is the true distribution.

"A Risk Programming Model of a Pennsylvania Crop/Dairy Farm" *Beth Pride Ford, Penn. St.; Wesley N. Musser, Wen-Chi Huang, James S. Shortle and Richard H. Fox, Univ. of Md.*

This paper evaluates the use of discrete stochastic programming (DSP) in modeling a Pennsylvania crop/dairy farm. Four alternative risk specifications for yields and input and output prices are considered. The model is solved using risk neutral and risk averse preferences. Results indicate that crop production and expected income are overstated under certainty versus uncertainty. Although optimal production decisions do not differ dramatically as sources of uncertainty are varied, inclusion of all risk sources is necessary to correctly estimate farm profits and their variability. Finally, optimal farm organization is more consistent with observed practices under risk neutrality versus risk aversion.

"Chance-Constrained Programming Evaluation of Economic and Water Quality Impacts of Alternative Farming Systems" *Shunxiang Wu, Univ. of Idaho; and Tony Prato, Univ. of Mo.*

Economic and water quality impacts of six farming systems (FSs) from Missouri's Management Systems Evaluation Area project are evaluated using chance-constrained programming model for a watershed characterized by claypan soil. The study showed that not all Fss have identical water quality effects. When levels of pollutant reduction and achievement reliability are raised, Fss must be altered. Marginal and average costs of water quality restrictions can be efficiently minimized by controlling soluble nitrogen concentrations in runoff. However, targeting this pollutant has unintended effects on other water quality indicators. Finally, lower opportunity cost and higher cost effectiveness of pollution control cannot be achieved simultaneously.

"A Target MOTAD Analysis of Double Cropping and Alternative Crop Rotations" *Robert O. Burton, Jr., Mario F. Crisostomo, Patrick T. Berends, Orlan H. Buller, Kansas St.; and Kenneth W. Kelley, SE Kan Branch Expt. Sta.*

A Target MOTAD model was used to evaluate double-cropping in the southeastern Great Plains. Crop rotations involving wheat-soybean double-cropping and single-cropping of wheat, soybeans, and grain sorghum were considered with and without participation in the government commodity programs. Results clearly favored double-cropping. Solutions that included participation in commodity programs exhibited larger incomes and less risk than solutions without participation.

TITLE: Farmers' Policy Preferences and the Role of Government (Moderator: *Michael Bowker USDA, Forest Service*).

"Crop Diversity, Credit, Government Programs, and Income Variability. Is Risk Preference Exogenous?" *Ashok K. Mishra and Barry K. Goodwin, NC St. Univ.*

This paper examines various factors such as farm and operator characteristics, leverage, farm income variability, and government programs that affect farm diversification decisions. Also, the question "Is risk preference exogenous?" is tested. Results from this study show that leverage, government programs, hiring of technical consultants and free trade are significant factors that affect farm diversification decisions. Also, Wu-Hausman test statistics show that risk preference is an endogenous variable in diversification decisions.

"The Role of Government in the Value of Seasonal Climate Forecasts" *James W. Mjelde, Troy N. Thompson and Clair J. Nixon, Tex. A&M Univ.*

Previous studies have estimated the value of improved climate forecasts for agricultural producers. None of these previous studies, however, address how forms of government intervention may influence this value. The objective is to determine how government intervention affects the value of seasonal climate forecasts at the farm level. Results indicate that the disaster assistance and farm program provisions have the greater impact on the value of improved climate forecasts. Federal taxes appear to modestly increase the value of improved climate forecasts. Crop insurance appears to have little effect on the value of improved climate forecasts.

"Comparative Policy Preferences of Oklahoma Producers 1989-1994" *J. Bob Wells, Michael R. Dicks and Roy Attaway, Okla. St.*

This paper provides a summary of current Oklahoma producer views on price and income policy. It compares the responses with producer views obtained in a 1989 survey. Survey questions focus on major policy issues: farm price and income, conservation, environment, and water quality, crop insurance, and disaster assistance. Results of the 1994 survey reflect producer opinion today. Comparison of producer opinions over time may provide a basis for evaluating changing needs. Selected survey questions are compared, and some significant shifts in preference have occurred during the period.

"Federal Budget Deficit, Optimal Policy Choices and Trade Competitiveness: Some Evidence for U.S. Wheat Trade" *Jamal B. Othman, Lewell F. Gunter and Fred C. White, Univ. of Ga.*

Very little is known about the impacts of the ongoing debate over the federal budget deficit and high farm program costs on policy choices and trade competitiveness. This paper develops a one country optimization model for the US wheat sector that endogenously determines optimal policy choices for varying assumptions about the influence of the various interest groups. Evidence shows that a combination of consumer tax and export subsidies on wheat are desirable policies for US in the wake of increasing taxpayers' concerns about the deficit. Taxpayers concerns about the deficit are also found to affect US wheat competitiveness substantially.

"The Structure of Farmers Perceptions of Groundwater Pollution" *A.H. Elnagheeb and J.L. Jordan, Univ. of Ga. - Griffin.*

Statistics from a 1992 Georgia Farm Practices survey concerning farmers perceptions of the quality of groundwater in Georgia are presented. The data were used to examine the structure of respondents' perceptions and attitudes regarding water quality. Estimates of the influence of farms' and farmers' characteristics on perception and preferences for action were computed using a multiple-indicator model. Results show that the willingness to change farm practices to protect groundwater is positively related to how an operator perceives the seriousness of the problem. Regulatory policies that negatively affect farmers' income are likely to be opposed by farmers.

TITLE: Topics in Farm Management and Resource Economics (Moderator: *Chieng-Feng Tai, Auburn University*).

"Estimating the Short-Run Welfare Effects of Herbicide Withdrawals on Agricultural Production" *Shiping Liu, Iowa St. Univ.; Gerald A. Carlson and William E. Foster, NC St. Univ.*

The study presents a methodology for estimating consumer and producer benefit losses in an agricultural commodity market following a herbicide cancellation. Producer and consumer benefit losses are estimated for the seven corn herbicides and three soybean herbicide cancellations. Changes in the elasticities of the demand and supply only have small effects on the losses from the cancellations relative to changes due to weed density. The total effect of multiple cancellations are much stronger than those for cancelling all related herbicides independently.

"An Analysis of the Impact of a Ban on Methyl Bromide on the U.S. Winter Fresh Vegetable Market" *M. S. Deepak, Thomas H. Spreen and John J. Vansickle, Univ. of Fla.*

This paper evaluates the economic impact of a ban on methyl bromide on Florida's winter fresh vegetable industry. Seven major crops are included: tomatoes, green peppers, cucumbers, squash, eggplant, strawberries and watermelons. Mexico, Texas and California are the competing suppliers of the five vegetable crops, peppers, and strawberries, respectively. Leontief technologies represent both monocrop and double-crop production systems; linear inverse demand functions represent four demand regions in the U.S. and Canada. By increasing production costs and reducing yields, a ban on methyl bromide decreases Florida's FOB revenues by 54% and increases those of Mexico by 65%.

"The Determination of Optimal Nitrogen Application Rates With Carry-over" *Wen-yuan Huang and David Shank, USDA.*

New dynamic rules for determining the optimal fertilizer application rates, when the carry-over is significant, are developed. Application of new rules showed that farmers who use a dynamic rule have a small gain in net income but a large loss of nitrogen, as compared with the farmers who use a static rule. A profit maximizing armer could apply either a constant optimal amount of nitrogen fertilizer without the soil test or variable amounts of nitrogen fertilizer with the help of the soil test to maintain the optimal level of nitrogen in soil.

"An Analysis of Factors Relating to the Post-Contract Land Use Decision of CRP Contract Holders" *Phillip N. Johnson, Sukant K. Misra and R. Terry Ervin, Tex. Tech.*

A qualitative choice model was used to examine the effects of various factors that influence landowner's post-contract use of Conservation Reserve Program lands in the Texas High Plains Region. The data analyzed was developed from a mail survey sent to approximately 5 percent of all contract holders in each county of the 54 county area. The model correctly predicted 61.2 percent of the respondent's land use choice.

"Arresting Soil Degradation; Optimal Management of Wind-Eroded Rangelands in China" *Dayuan Hu, Richard Ready and Angelos Pagoulatos, Univ. of Ky.*

This paper presents an optimal control model to analyze the dynamic interaction of grass

growth, grazing, and wind erosion in rangelands, taking into account both intertemporal and off-site effects. An empirical study was conducted with data from the Inner Mongolia Plateau in China. By incorporating intertemporal effects, the optimal control solution provides strategies to arrest soil degradation. Also, internalizing downwind effects would be helpful for sustainable livestock production.

TITLE: Food Processing and Market Structure (Moderator: *C.W. Herndon, Jr., Miss St.*).

"Economic Implications of the Misspecification of Market Structure in Empirical Studies of Market Power" *Kellie K. Curry and H. Alan Love, Tex. A&M Univ.*

Empirical techniques used in industrial organization regularly allow flexibility of market power in one direction, assuming the other side of the market is perfectly competitive. An issue central to the study of market power in agriculture is whether econometric models can distinguish between specification errors and market power. We use Monte Carlo experiments to obtain market power parameter estimates from correctly and incorrectly specified market structures. The results indicate that correct assumptions regarding market structure may bias parameter estimates, including market power measurements. As a result, hypothesis tests conducted with these models may lead to incorrect conclusions about industry structure.

"Variability in Estimating Gross Margins in Meat Packing for Beef, Pork, and Lamb" *Eric L. Sweatt, Derrell S. Peel and Clement E. Ward, Okla. St.*

Little public data are available for monitoring performance in meat packing at times of rapid structural changes. Methodology is developed to estimate packer gross margins for beef, pork, and lamb. Some expected and some unexpected results are found. Estimated gross margins vary within and between years, between grades of meat, between data reporting locations, and between price series for outputs. Results indicate that in most cases,

public data do not allow accurately capturing the revenue component of the gross margins equation. Additional data on volume of inputs is also needed.

"The Value of Intangible Capital from Research & Development and Advertising in the Food Manufacturing Industry" *Qinrong Wu, Univ. of Okla.; Bruce Bjornson, Tim Taylor and Nicholas Kalaitzandonakes, Okla. St. Univ.*

This study evaluates the extent to which research and development and advertising have impacted intangible capital value in food manufacturing firms from 1973 to 1991. We find that (i) the market value of intangible capital in food manufacturing increased during the 1980s when the variety of new value added food products increased dramatically, (ii) advertising and low sector risk consistently positively impact the value of intangible capital in the food manufacturing industry, and (iii) though research and development and gross margins often contribute to the value of intangible capital, they did not significantly contribute during the 1980s.

"Oklahoma's Value-Added Food Industry: An Analysis of Fruit and Vegetable Processors" *Michelle Beshear and Shida R. Henneberry, Okla. St. Univ.*

Food processing is believed to be an area of potential expansion and increased revenues for Oklahoma. Fruit and vegetable processing in particular has tremendous potential for growth due to increasing consumer demand for healthy, but convenient food items. The fruit and vegetable processing sector in Oklahoma was evaluated using mail surveys and personal interviews, to determine the sector's marketing policies and to identify inefficiencies in the sector.

"Changes in Geographical Distribution and Economics of Size in the Poultry Processing Industry" *Ronald A. Schrimper, NC St. Univ.*

Increasing per capita consumption of poultry has had significant effects on the poultry processing industry. Over the last two decades, employment in this industry has doubled and become more geographically concentrated in five southern states. This expansion has occurred with

small changes in the total number of processing firms, suggesting substantial economies of size. Real wages in the industry have been declining since the late 1970s, but the quantity and/or quality of fringe benefits have increased. The decrease in real wages has not been as large as in other kinds of meat processing industries.

TITLE: Recreation and Tourism (Moderator: *Gary Wells, Clemson Univ.*).

"Demand for Recreation in the Cheaha and Sipsey Wilderness Areas in Alabama" *Ram N. Acharya, L. Upton Hatch and Howard A. Clonts, Auburn Univ.*

This study examines the factors determining the demand for wilderness using evidences from Cheaha and Sipsey wilderness. Among the five different estimators used in the study, truncated poisson and truncated negative binomial estimators are found to be superior. Factors such as visitors age, type of visits, and round trip cost are found to be important in determining the demand for wilderness. Variables such as origin, and years since an individual's first visit to the wilderness are used to measure the visitors association with rural or wilderness settings and the results support the "nostalgia theory" of wilderness.

"Economic Surplus and Lake Recreation: A Comparison of Direct and Indirect Methods" *J.M. Bowker and Donald B. K. English, USDA Forest Service, Athens, GA.*

We use contingent valuation (CVM) and travel cost methods (TCM) with censored regression models to assess the annual household economic surplus for recreation at Shasta and Trinity Lakes. We find average annual surplus to range between $50 and $300 dollars with CVM consistently lower than TCM. We test for equivalence across the techniques and reject the hypothesis that CVM and TCM are providing like economic surplus estimates.

"Understanding the Demand for Owner-Provided Services in Outdoor Recreation: The Case of Waterfowl Hunting" *Chris Gan and E. Jane Luzar, LSU*

The role of owner-provided services in fee-based recreation access is evaluated for the case of waterfowl hunting. A hedonic framework is used to analyze the estimate the implicit price of some waterfowl hunting lease attributes. A mail survey of Louisiana waterfowl hunters provides primary data for estimation of the hedonic price model specified in semi-log functional form. The willingness-to-pay functions for increased acreage per hunting club member, increased lease time, and travel distance are also empirically estimated, providing information on the implicit demand for these lease characteristics.

"Evaluating Nature-based Tourism Using the New Environmental Paradigm" *Assane Diagne, E. Jane Luzar, Chris Gan and Brenda Henning, LSU.*

Nature-based tourism [NBT], alternatively known as ecotourism, is a rapidly expanding area in the tourism travel sector. States such as Louisiana with a well established urban-based tourism industry may have expansion opportunities through development of complementary nature-based tourism. This study analyzes the decision to participate in nature-based tourism and identifies factors that appear to influence the decision to participate in NBT among Louisiana tourists. Data for the economic analysis were obtained from a 1993 mail survey of potential tourists from a six-state area. The economic analysis is based on a behavioral model which includes a modified New Environmental Paradigm scale empirically evaluated in a qualitative choice framework.

"Sensitivity of Whitewater Rafting Consumer Surplus to Pecuniary Travel Cost Specifications" *Donald B. K. English and J. M. Bowker, USDA Forest Service, Athens, GA.*

This paper empirically illustrates how different definitions of the cash costs of trips can affect consumer surplus estimates for whitewater rafting on the Chattooga River. Six price

definitions are examined across three functional forms. Three definitions are based on different costs per mile plus outfitter fees. Three others are based on different portions of actual per person trip expenditures. Results indicate that surpluses can differ by a factor of between six and ten, depending on the functional form. For all three functional forms, distance-based prices yield smaller surplus estimates than expenditure-based prices.

TITLE: Agricultural Policy (Moderator: *Michael Wetzstein, Univ. of Ga.*).

"The Effects of Farm Program Provisions on Lease Arrangements Under Uncertainty" *Peter T. Zimmel and James W. Richardson, Tex. A&M Univ.*

In the past, the main reason for share leasing farm land has been to share the price and yield risk with the landowner. Because farm programs reduce price risk, the producer's preferred lease arrangement may be different today than in prior years. A whole farm simulation model and stochastic dominance with respect to a function were used to analyze the lease arrangement decision under participation and non-participation in the current farm program. The results indicate that the share lease is still the preferred lease strategy under participation and non-participation in the current farm program.

"Farm Level Impacts of Revenue Assurance" *Allan W. Gray, James W. Richardson and Jackie McClaskey, Tex. A&M Univ.*

A simulation model was written to analyze the effects of the current farm program and two alternative revenue assurance plans on the stability and level of gross farm receipts and the level of government costs. Initial results indicated that the current program stabilizes producer returns better when the primary source of the instability is price variability. The revenue assurance plan at 90% stabilizes producer returns better when the primary source of the instability is yield variability. Other results indicated that a 70% revenue assurance guarantee would provide the lowest government cost. The current program provided the most revenue support and stability, but at the highest cost to the government. A revenue assurance guarantee at 90% indicated that some common ground between government costs and farm revenue stability and support may be obtainable.

"Impact of the 1990 Flexible Acreage and Reduced Program Acreage Base Provisions on Program Base and Net Returns to Producers" *Glenn A. Helmers, Univ. of Neb.; Joseph Atwood, Univ. of Mon.; and Kevin Bernhardt, Univ. of Neb.*

In 1990 two provisions in the commodity program were changed. One was a 15 percent normal flex provision and the second a 15 percent reduction in program acres. In this paper the impact on the program base by not participating in the program and overplanting was examined. Two farms (dryland and irrigated) were studied under midwestern conditions. A multiple period mixed integer programming model was used to study optimum base expansion strategies. The results demonstrate considerable potential for expanding program base for the dryland farm.

"Commodity Program Slippage Measurement: To Case of Upland Cotton in Georgia" *Chia-lin Chen, Christopher S. McIntosh, Michael E. Wetzstein and Fred C. White, Univ. of Ga.*

Previous research measures either acreage slippage effects or yield slippage effects independently. This partial approach ignores any interaction between yield and acreage. A methodology is presented which jointly considers yield and acreage slippage. An application of this methodology is then provided for measuring total slippage associated with Georgia cotton production.

"Economic Impacts of a Cigarette Tax Increase on the US Tobacco Industry" *Mahadev G. Bhat, Duncan M. Chembezi, Daniel G. De La Torre Ugarte and Daryll E. Ray, Univ. of Tenn.*

This study examines the implications of a 75-cent-per-pack increase in federal excise tax on cigarettes sold in the United States. The study employs a national-level simulation model of the U.S. cigarette and tobacco markets. Preliminary findings show that an increase in the excise tax on cigarettes would reduce production, farm prices and

grower returns. The tax increase also would reduce both domestic use and imports of tobacco although exports of tobacco increase, but marginally. Finally, the increase would generate substantial federal revenues.

TITLE: **Topics in Agricultural Finance** (Moderator: *Bruce L. Ahrendsen, Univ. of Ark.*).

"External Equity in Agriculture: Risk Sharing and Incentives in a Principal-Agent Relationship" *Thanapat Chaisantikulawat and David J. Leatham, Tex. A&M Univ.*

The moral hazard problem that obstructs external equity financing of farm businesses is studied using the principal-agent framework. We assume that the supplier of external equity capital (principal) cannot directly observe the farmer's (agent) effort but can observe the outcome of the effort. We solve for the optimal farm income sharing rule which includes an extra share to the agent. The extra share is dependent on the outcome and is provided to induce optimal effort from the agent. An investor must share more income when a farmer is more risk averse or a project is more risky.

"Specification of Inefficiency of Rural Banks" *Suzhen Zhu, Tex. Workers Compensation; Paul N. Ellinger, C. Richard Shumway, Tex. A&M Univ; and David L. Neff, Univ. of Ark.*

Recent changes in the regulation of U.S. financial institutions have had a major impact on bank industry structure and performance. The future ability of commercial banks to deliver credit efficiently will play a key role in determining the efficiency of U.S. agricultural production. This study evaluates and compares the cost and profit function approaches for a sample of rural banks using statistical criteria. Results indicate that the operating behavior of banks in this study satisfy exogenity assumptions of both the cost and profit specifications. Furthermore, the inefficiency rankings are very sensitive to modeling approach and function.

"The Effect of Using External Equity on Risk-Adjusted Farm Income" *David J. Leatham and Laurence Crane, Tex. A&M Univ.*

A capital-structure portfolio model was formulated to investigate the benefits of external equity to a representative farm in the Texas southern high plains. Comparisons were made for the representative farm when external equity was available and when it was not available. Results of this analysis show that the risk-adjusted real pretax rate of return on farmer's own equity would increase by 0.54 percentage points for mediumly risk averse farmers, if external equity was available under the conditions modeled. Most farmers would be better off and no farmers would be worse off if external equity was available.

"Small Greenhouse Enterprises and Investment Irreversibility" *I. Tzouramani, K. Mattas, Univ. of Thessaloniki; A. Pagoulatos, Univ. of Ky.*

Greenhouse enterprises are considered as very intensive farm productive systems and they can support substantially agricultural incomes when land constraints impede extensive production systems. Thus, greenhouse enterprises are flourishing in southern European regions producing vegetables for the whole European Union Market. Growing competition requires overhauling greenhouse investment decision process. In this study, the concepts of investment irreversibility are applied to a small tomato greenhouse enterprise in Greece. The application demonstrated that small greenhouse farmers should contemplate the timing of their decision to invest since even a year delay of the investment decision could garner farmers higher benefits.

"Typical Soybean Rental Arrangements in Arkansas: Provisions and Tenant-Landlord Returns." *Lucas D. Parsch, Diana M. Danforth and Lizabeth M. Goodman, Univ. of Ark.*

Results of a survey of crop producers show that 80% of soybeans are grown on rented acreage in eastern Arkansas. Over half of all soybean leases are straight share, followed by cash rent and cost sharing arrangements. Under average prices and yields, tenant returns are greatest under the typical

75/25 cost share lease followed by cash rent and straight share arrangements for both irrigated and non-irrigated production. Although landlord returns are greatest under straight shares, the maximum annual returns to land ranges between 3% and 7% for typical rental arrangements.

TITLE: Futures Markets (Moderator: *Sukant Misra, Tex. Tech.*).

"Using Local Crop Condition Information to Modify Futures Market Positions for Missouri Wheat Producers" *Richard K. Rudel, Kenneth D. Kephart and Francis McCamley, Univ. of Mo.*

This paper considers the possibility that soft wheat producers might be able to revise their futures market positions during the growing season as crop condition information enables them to form better yield predictions. The approach of Mathews and Holthausen is extended. Then it is applied to two southern Missouri locations to determine the effect of improved yield prediction on growing season futures market positions for soft wheat. The results are consistent with the implicit hypotheses. Limitations of the study and alternative approaches are briefly discussed.

"Connecting Technical and Fundamental Analyses of Futures Markets" *Ibrahim Yague, Jack Houston, Steven C. Turner and Lewell F. Gunter, Univ. of Ga.*

This study developed a model linking fundamental and technical approaches and their effects on price discovery for three agricultural commodities futures -- corn, wheat, and cotton. A major component of the model asserts that supply forecast error for a commodity can be modeled as a function of time to maturity and trading volume. Results indicate that the effects of changes in trading volume or of time-to-maturity on relative ratio of price ranges are interdependent and commodity specific.

"Long-term Hedging Possibilities for Corn, Soybeans and Wheat" *Dennis M. Conley, Univ. of Nebraska; Hee Seong Kim, Seoul, South Korea.*

Long-term hedging involves placing a hedge for a multi-year period, and then unwinding it as physical product is sold. This study evaluated selected possibilities for corn, soybeans and wheat under certain decision rules. In some cases the results were better than annual cash sales or annual hedges.

"Risk Shifting Efficiency of Grazing Contracts Versus Futures and Option Contracts" *Wes Harrison, LSU; Barry W. Bobst, Fred J. Benson and Lee Meyer, Univ. of Ky.*

Stochastic simulation and generalized stochastic dominance are used to compare the risk shifting efficiency of a grazing contract to integrated production of feeder cattle when futures and option contracts are used to manage price risk. The results show that a grazing contract significantly reduces the risks to the pasture owner, yet does not significantly reduce the risks to the cattle owner. The results also show that grazing contracts compare favorably to futures contracts for generally risk averse pasture owners. Moreover, they compared favorably with put option contracts for moderately and strongly risk averse pasture owners.

"Price Information in Producer Markets: An Evaluation of Futures and Spot Cotton Price Movements in the Southwest Region" *Jeff Brown, Darren Hudson and Don Ethridge, Tex. Tech.*

Relationships between futures and cash cotton were compared using three analytical techniques -- a first differences regression analysis, a causality test, and a distributed lag model. Findings indicated that cash and futures prices were not highly related in terms of daily movement, but cash prices lagged the futures price when a longer period was examined, indicating that prices are discovered in the futures market under some conditions. Under other conditions, the past producer price changes had a significant impact on the current changes, suggesting that the producer market relies more on its own past price information for price discovery.

TITLE: International Development (Moderator: *Greg Traxler, Auburn Univ.*).

"Agricultural Reform in the Newly Independent States: A Case Study of Georgia -- One Step Forward, One Leap Backward" *Glenn C. W. Ames and Claudia Davis, Univ. of Ga.*

Inconsistent agricultural reforms and macroeconomic policies are adversely impacting collective agriculture in Georgia and other republics of the former Soviet Union. Shortages of fuel, fertilizer, spare parts, and a gradual loss of land rights to farm workers are the primary reasons for a drastic fall in output. An unconvertible currency, inflation, and government policies are also contributing to agriculture's decline.

"Factors Affecting Adoption of Improved Maize Seed and Fertilizer in Northern Tanzania" *E. Nkonya, T. Schroeder and D. Norman, Kan. St. Univ.*

This study quantifies factors that affect adoption of improved maize seed and chemical fertilizer in Tanzania. Tobit model was used to analyze data obtained from a survey of 246 farmers in Northern Tanzania. Adoption of improved maize seed is positively affected by education, farm size, and level of chemical fertilizer application. Fertilizer adoption is positively influenced by area planted with improved seed and visits by extension agents. Farm size, herd size, farmer age, and off-farm activities had negative effects on fertilizer adoption. Results are important for focussing future producer educational activities.

"The Role of Women in Sub-Saharan African Agriculture: What Can Be Expected From Expanded Participation." *Enefiok P. Ekanem, Tenn. St. Univ.; and Mary Mafuyai, NC A&T Univ.*

Sub-Saharan African countries with higher rates of women participating in government and agriculturally-related programs in educational institutions may or may not witness higher agricultural productivity than countries with low female participation rates. A model explaining the impact of women on agricultural output was estimated with data from thirty-seven Sub-Saharan African countries. The existence of political and legal equality between men and women showed a positive impact on the output per agricultural worker in countries selected for the study. Results were significant at the 2% level.

"The Impact of Food Aid on Zaire's Agricultural Food Markets" *William A. Amponsah and Kabuatshika Molond, NC A&T Univ.*

Food aid has been viewed disfavorably because of its likely negative impact on prices. In this study of food aid impact on Zaire, the impact multiplier analysis reveals that food aid had disincentive effects on food availability by increasing prices, the demand for food grains, and by reducing commercial food imports.

"An Analysis of Demand for Foodgrains in Ivory Coast" *Nouhoun Coulibaly and Shida R. Henneberry, Okla. St. Univ.*

Demand elasticities for domestic rice, imported rice, and wheat Ivory Coast are estimated using the linear approximation of the Almost Ideal Demand System. Estimated price and expenditure elasticities indicate that the studied crops are net substitutes. Furthermore, domestic rice is a necessity while imported rice and wheat are luxuries.

TITLE: Rural Development (Moderator: *Tesfa G. Gebremedhin, West Va. Univ.*).

"Defining Labor Market Areas and Functional Economic Areas: An Alternative Approach" *Shuming Bao, Mark S. Henry and David L. Barkely, Clemson Univ.*

Since the construction of LMAs defined by Tolbert and Killian (1987), these classifications have been used by the Census Bureau to select public use microdata samples (PUMS) from them and many studies have been conducted using the LMA geography. In this paper, we propose alternative approaches in defining LMAs or FEAs. By using the commuting linkage index suggested here, we can differentiate the relative strength of commuting linkages more clearly. By incorporating the

topological information generated by GIS into a dynamic adjustment procedure, we can also find a more precise classification of LMAs of FEAs. Specifically, we find that our revision of Tolbert/Killian's CZ groupings meets standard statistical criteria (minimum error sum of squares). Our procedures for establishing CZs also reveal the importance of urban core counties (central Metropolitan Statistical Area counties) in establishing CZs that meet these statistical criteria. Moreover, the revised CZs are quite similar to county groupings based on the FEA concept of urban core and surrounding hinterlands. With the inclusion of the urban core counties the revised CZ procedure is likely to generate LMAs with the minimum 100,000 population needed for PUMS data with less need for arbitrary regrouping of CZs into LMAs.

"Military Facility Reductions in the U.S.: Some Generalizations About Employment Loss and Recovery" *Lonnie L. Jones and Allen J. Wyse, Tex. A&M Univ.*

Since 1961, more than 100 U.S. military facilities have been converted to civilian use, resulting in the loss of rural and metropolitan employment opportunities. Employment recovery at the former base sites has occurred at varying rates. This study estimated employment recovery response functions that may be used to project expected employment growth associated with a closed facility. Least squares regression results indicated the job response sensitivity to time since closure, size of the closed facility, proximity to metropolitan areas and end use. Further research is needed into the factors influencing the rate and extent of job recovery following a base closure.

"Equal Funds for Equal Effort: How Does the Indiana School Funding Formula Measure Up?" *David Broomhall and Marilyn Hirth, Purdue Univ.*

This paper examines the performance of the Indiana school funding formula since 1982 with regard to equity, and examines the factors that influence school funding levels. The results show that equity has increased since 1982, but that it is still far from the stated goal of equal funds for equal tax effort. Regression analysis shows that property values, tax effort, household income, and the proportion of school age students in a school district influence spending levels. In addition, rural schools were found to receive fewer funds per pupil even after accounting for these factors.

"Complexity, Diversity and Stability Debate: Evidence from California County Data" *Andrew Dabaien and George Goldman, Univ. of Cal. - Berkeley.*

This paper examines the linkage between stability and diversity for county level economies in California. We do this using different measures of county level economies as revealed by California county input-output models, derived from the national IMPLAN system. These measures are put into a regression framework, with measures of structural instability being the independent variable. Our main result indicates, contrary to popular belief, no statistical evidence for a relation between stability and diversity. These are preliminary results and work is continuing. However, if these results are borne out, it would have important implications for rural economic development policy.

"The Influence of State Attributes on the Location of Foreign Direct Investment in the United States" *Roshan S. Londhe, Stephen E. Miller, Gary J. Wells and Michael Hammig, Clemson Univ.*

This study provides a longitudinal perspective to industrial location studies by using a pooled time-series and cross-sectional regression. The objective is to evaluate the impact of selected state attributes on the location of foreign direct investment in the U.S. The cross-sectionally correlated and time-wise autoregressive model covers a time-series from 1981 to 1989 with the 48 contiguous states as cross-sections. The results show that higher manufacturing employment, greater personal income, and lower unemployment in the states are important factors in attracting FDI. Wage rate differentials are not significant while unionization has a minimal effect.

TITLE: **Production and Marketing of Alternative Enterprises** (Moderator: *P. J. van Blokland, Univ. of Fla.*).

"Marketing of Vegetables By Small Farmers: Procurement Practices and Requirements of Fresh Vegetable Wholesalers in Mississippi" *Dovi Alipoe and Sara K. Stallings, Alcorn St. Univ.*

The main objectives of this investigation were to examine the marketing practices of fresh vegetable wholesalers in Mississippi and identify market requirements and other factors to increase the participation of small producers in the wholesale trade of fresh produce. Analysis of data collected from a mail-out survey of wholesalers in the state revealed the following. Currently a large proportion of the wholesalers procure fresh produce from out-of-state shippers and distributors. Produce grading and inspection, packaging, dependability of supply source, produce uniformity, farm price and produce cleanliness were rated as important trade requirements in choosing a supply source.

"A Supply Dynamics Model Applied to Catfish Production" *Pierre-Justin Kouka, Carole R. Engle, Univ. of Ark. at Pine Bluff; and Henry W. Kinnucan, Auburn Univ.*

A multi-stage model, taking into account supply dynamics, was developed to determine the structure of U.S. catfish supply. The study highlights the importance of supply responses at various stages of production. At the processor level, price effects are shown to be stronger than would be suggested by a single-equation aggregate model. Economic adjustments are shown to be largest in the first stage of production. However, price effects are shown to be relatively weak compared to non-price effects in the first two stages of production. Results suggest an inelastic short-run supply for catfish at the processor level.

"Economic Comparisons of Alternative and Conventional Production Technologies for Eggplant in Southern Georgia" *Kathryn E. Brunson, C. Robert Stark, Jr. and Shard C. Phatak, Univ. of Ga.-Tifton.*

Environmental concerns about pesticide usage in traditional production systems are prompting vegetable producers to consider alternative systems. Research results from a multi-year study on eggplant in Southern Georgia compare two alternative production technologies to the conventional rye cover crop technology. Alternative technologies utilize beneficial insect principles as substitutes for conventional pesticide controls. Eggplant production budgets are developed, using field data, to generate net return estimates under each system. Yield and profitability results indicate that higher yields under rye are not offset by cost reductions in alternative technologies. Cash input requirements for alternative systems suggest potential for limited resource producers.

"Policy Changes in the Sheep Industry: Survival of Extensive Colorado Sheep Ranches at Various Levels of Production and Costs." *Paul H. Gutierrez, Vilma G. Carande and Steve B. LeValley, Colorado St.*

Given the uncertain effects of domestic and global policies on lamb and wool markets and new policy changes in incentive payments and grazing fees in Colorado and the U.S., sheep producers will need to identify the financial benefits from improving the biological and/or economic efficiency of their operations. Simulated analysis of a representative Colorado extensive sheep ranch suggest that survival will require a 25 to 35 lb. increase in production per ewe with a cost of production increase not greater than 12 percent to be as well off as prior to policy changes.

"Turfgrass-Sod Production: Economic Feasibility of Grass Species" *John Adrian, Patricia Duffy and Michael Lloyd, Auburn, Univ.*

Feasibility of production of bermudagrass, centipedegrass, and zoysiagrass is evaluated for a farm with 100 acres available to allocate to turfgrass-sod production. A multiperiod linear programming model is used to determine optimal mixes of grasses and net return over a seven-year planning horizon. Within current observable price ranges, variation in the prices of the different grasses has little impact on the profit-maximizing combination of grasses. Bermudagrass, with the shorter production cycle and positive influence on cash flow dominates the higher-valued, longer production cycle alternative grasses. Availability of

initial money capital does not alter the feasibility of bermudagrass.

TITLE: Quantitative and Research Methods (Moderator: *Yu Hsing, SE Louisiana Univ.*).

"Using the Analytic Hierarchy Process to Rank Order Farming Systems and Objectives" *Mwana Nanga Mawampanga and David L. Debertin, Univ. of Ky.*

This study has used the Analytic Hierarchy Process to explain how farmers blend different objectives and other decision criteria in choosing between sustainable and conventional farming systems. The priority vectors produced as a result of the AHP analysis show the rankings of both farming systems and farming objectives from the stand point of farmers and extension agents.

"An Econometric Analysis for Enhancing the External Validity of Texas Rice Research and Extension Recommendations" *Troy N. Thompson, M. Edward Rister, Tiofilo Ozuna, Jr., David A. Bessler, Tex. A&M; and James W. Stansel, Beaumont Research and Extension Center.*

This study examines Texas rice researchers' ability to predict differences in ratoon crop yields and quality. Comparison between hypothesized and statistically estimated variable signs is used to test external relevance. A bivariate probit model is used to determine reasons for statistical significance/non-significance and agreement/disagreement according to variable type, perceived knowledge base, and timeframe of underlying research. The results indicate scientists are less accurate for hypotheses pertaining to ratoon crop and quality, while they are more accurate for hypotheses pertaining to main crop and field yield. The results have implications for other disciplines involved in technology transfer.

"A Simulation Study of Nonparametric Technical Efficiency: Revisited" *Feng Xu and Tony Prato, Univ. of Mo.*

Meta-models of nonparametric firm efficiency are estimated from simulated data

envelopment method. Results show that measured firm efficiencies from data envelopment analysis are significantly affected by the number of firms, inputs and outputs used in the simulations. The fewer the number of firms and the greater the number of inputs and outputs, the higher the overall firm efficiency and the higher the percentage of firms being measured as completely efficient. Future empirical studies using data envelopment techniques should be cautious about the dimension of the problem. A researcher can check if there is any discrepancy between the calculated efficiencies and the results from the meta-models of randomly generated data presented in this paper.

"Search, Land Price and Farmland Preservation"   *Farong Li and Edmund M. Tavernier, Rutgers Univ.*

This paper uses a search-theoretic approach to examine the effects that farm income, uncertainty level, and farmers' risk attitude have on land preservation and capitalization. The study provides a theoretical foundation which explains some empirical irregularities noted by previous research. In that regard it extends the risk neutral assumption of simple asset pricing theory, thereby enhancing the framework for understanding land preservation policy.

"Validating Crop Simulators for Decision Analyses: A Response Theory Approach" *James A. Larson, Univ. of Tenn.; Harry P. Mapp, Laval M. Verhalen and J.C. Banks, Okla. St. Univ.*

Adapting a crop simulator to a specific locale and validating it present a number of conceptual and practical difficulties. Methods used to adapt COTTAM for cotton decision analyses in Oklahoma are described as well as a validation of the model using a response theory approach. Regression methods were employed to estimate production functions for simulated yield from the adapted model. General and marginal production response relationships derived from the production functions were used to evaluate the validity of the adapted model. Relationships estimated from adapted simulator output corresponded to those hypothesized from the literature and estimated from available field data.

TITLE: Topics   in   Demand   and   Trade
(Moderator: *Mary Marchant, Univ. of Ky.*).

"Household Expenditure Analysis for Food Away from Home: The National Diary Data." *Patrick J. Byrne, Univ. of Fla.; Oral Capps, Jr. and Atanu Saha, Tex. A&M Univ.*

This research represents the initial analysis effort using the National Panel Diary household data for the 1982-1989 study period.   A two-step estimation technique similar to Heien and Wessells approach was used for the analysis.   Marginal effects for the expenditure decision were corrected by untangling the respective variable impact on the inverse of mills ratio. Expenditure elasticities with respect to income were relatively constant over the entire study   period, in the 0.20 neighborhood. Expenditures were also highly inelastic with respect to household size measured in adult equivalence scale terms.   Contributions of younger household members to expenditures increased over the period.

"A Market Assessment for Alligator Meat in Louisiana and Texas" *Jianguo Hui, Patricia E. McLean-Meyinsse and Tammy Armand-Golden, Southern Univ.*

This study suggests that there is a potential market for alligator meat.   Thirty-six percent of consumers in Louisiana and Texas have eaten alligator meat and 21 percent have positive attitudes toward the meat.   The market potential is affected by the geographic area, gender, education, religion, employment status, race, and household income. To develop a ·niche market for alligator meat, the market strategies should target Louisiana residents, males, younger consumers, non-Baptists, consumers with higher education, blue collar workers, or those with higher incomes.

"Analyzing Impacts of Tariffication on the Sugar Market in Taiwan" *Rhung-Jieh Woo and Chang-choo Chiang, National Taiwan Univ.*

This paper evaluates likely impacts of tariffication upon the sugar market in Taiwan by performing dynamic simulation analysis. Simulation results show that tariffication is not so dreadful as some people expected. As long as the producer price supporting program persists, the influences of tariffication upon the domestic sugar market in Taiwan might be very slight in the short run.

"The Edible Offals Market: Effects of the North American   Free   Trade   Agreement" *Lisa Offenback, Kan. St.; and Barry Goodwin, NC St. Univ.*

An economic Investigation of the edible offal market can show the overall effects of trade barriers on economic welfare and trade patterns. This analysis predicts welfare gains and trade changes that will result from the North American Free Trade Agreement (NAFTA).   Inequality constraints are used to constrain the model to upward-sloping supply curves and downward-sloping demand curves. Depending on the potential response of other exporting countries, the United States will gain $5.51 million to $15.78 million in welfare as a result of NAFTA in the beef edible offal market. The net efficiency gain in Mexico is $23.75 million.

"Contributions of Technological Change and Terms of Trade to Welfare: An Empirical Analysis of North America" *M. Gopinath and P. Lynn Kennedy, LSU.*

Total factor productivity, terms of trade and welfare indices are computed for the NAFTA signatories in a producer theory framework. Using a translog approach, these ideal indices are derived from   aggregate   data   without   the   use   of econometrics.   Results indicate that total factor productivity and terms of trade changes have contributed significantly to welfare changes for all three countries.

TITLE: Agricultural Prices (Moderator: *Ted C. Schroeder, Kan. St.*).

"Determinants of Cow-Calf Prices" *Joseph L. Parcell, Ted C. Schroeder and Frina D. Hiner, Kansas St.*

Cow-calf   prices   are   determined   by interaction of many factors.   At any particular auction, cow-calf pair prices may vary 75% of the

mean. This variability makes price reporting difficult, suggesting that producers need to be informed regarding cow-calf price determinants. This study uses auction data during 1993 to estimate price differentials associated with cow-calf pair characteristics using a hedonic model. Cow breed, age, health, grade, horns, frame, and bred back were significant price determinants. Calf weight, health, and frame had significant price impacts. Highest prices were paid for pens containing 10-12 pairs of healthy, Angus, dehorned, cows with heavy calves.

"Feeder Cattle Price Differentials: How Much Do They Change Over Time?" *James D. Sartwelle, III, James Mintert, Ted C. Schroeder, Michael Langemeier and Frank Brazle, Kan. St.*

Results from feeder cattle price/characteristics models using data collected in Kansas and Missouri in 1986/1987 and 1993 following the same data collection and modeling procedures indicate many implicit characteristic values change as average cattle price level changes. Characteristic values often changed whether their value was measured in dollars per hundredweight or as a percentage of the mean feeder price during the data collection period. Directional impacts of characteristics on feeder cattle price were generally consistent from 1986/1987 to 1993. These results imply that when market conditions change, new price/characteristic relationships need to be estimated.

"Pricing Efficiency and Competitiveness in the U.S. Rice Market" *Eddie C. Chavez and Eric J. Wailes, Univ. of Ark.*

Pricing efficiency and competitiveness of U.S. rice is analyzed using marketing margins for the period 1978-90. Consistent with economic expectation, the level of competitiveness in the market is positively associated with improved pricing efficiency. Pricing efficiency in the U.S. rice market has changed over time, reaching its highest level during the period 1986-90, the same period when no wholesale level pricing distortion was found. Farm-to-milling and milling-to-wholesale level margin distortions existed during the 1978-85 period, the same period which was found to have relatively low efficiency.

"Pricing Efficiency: Linkages Between "Traditional" Pricing Efficiency Models and Co-Integration" *Darren Hudson and Emmett Elam, Tex. Tech Univ.*

One of the newest approaches to analyzing pricing efficiency is co-integration. This paper discusses the linkages between the more "traditional" pricing efficiency models and co-integration, and outlines the differences as well as the fundamental similarities between these approaches. The findings of the conceptual analysis is that the conclusions of the "traditional" pricing efficiency models are consistent with co-integration. However, the co-integration test appears less specific in terms of specific interpretation and testing of structural parameters. This analysis also indicates that the "level" and "first differences" regressions have different interpretations.

"Time Series Analysis of U.S. Farmland Values." *Jyantha R. Perera, Joe L. Outlaw and David Anderson, Tex. A&M Univ.*

This paper presents two models for U S farm land values. Model 1 contains net farm income, land value, and prime rate. This information set is extended by non-farm personal income in model 2. In each case we find one cointegration vector. An error-correction model is built to capture short-run and long-run relationships. Hypothesis tests on the cointegration vector indicate that a one-period lag of land value shows significant positive impact on current land value in the short run in both models, but when non-farm personal income is included in the model, it also shows significant influence on land values in the short run. In model 2 the tests for weak exogeneity reveals that nonfarm personal income is weakly exogenous to the model, while model 1 and 2 both suggest that net farm income and prime rate determine U.S. land values in the long run.

TITLE: **Trade Agreements and Policies**
(Moderator: *Mitch Renkow, NC St. Univ.*).

"Incentive for Compliance with the Domestic Content Policy for U.S. Cigarette Production."*Hasyim Zaini, John Beghin and Blake Brown, NC St. Univ.*

This paper analyzes incentives faced by manufacturers to comply with or violate domestic content requirement policies. We derive sufficient conditions for compliance with and for violation of a physical domestic content requirement. We apply our methodology to the case of the U.S. cigarette industry. We find that cigarette manufacturers have no short-term incentives to violate the U.S. tobacco content policy and we predict that manufacturers will comply with the new policy.

"Modeling the Blair House Agreement: Distributional and Market Share Effects." *David W. Skully and Stephen L. Haley, USDA.*

The Blair House Agreement mandates a reduction in subsidized agricultural exports. The agreement constrains US Export Enhancement Program [EEP] and EU Restitution Payment subsidies for wheat exports. This paper examines how these constraints are likely to influence the allocation of export subsidies by the EU and the US among wheat importing countries, and how these new allocations are likely to affect the market shares of major wheat exporting countries.

"Trade Implications of Soybean Policies." *Eleni Christina-Tsigas, Purdue; and Suchada Langley, USDA.*

A world econometric trade model that includes policy variables such as taxes and/or subsidies on soybeans, soymeal, soyoil, as well as on competing crops, meals and oils, is used to analyze trade implications of changing policies of the major soybean producing and consuming countries in the Western Hemisphere (i.e., U.S., Brazil, and Argentina) and the European Union. We have found that the change in the demand for imports/exports, following a change in the world price of the commodities in study, is not absorbed evenly among the four countries.

"Political Economy of United States and European Union Dairy Policy Choice" *Mary A. Marchant, Univ. of Ky; Steven Neff, USDA; and Mei Xiao, Univ. of Ky.*

Policy interventions in dairy markets are pervasive in industrialized countries. The goal of this research is to explain U.S. and E.U. dairy policy choices by analyzing the influence of key domestic variables. Econometric results for the U.S. price support and the E.U. intervention price show a dominant influence of the support (intervention) price in the previous year. U.S. farm income, stocks, and government costs also influenced U.S. policymakers' choice of the price support level. In the E.U., where multiple policy instruments are used, government costs influence both production and surplus disposal policies.

"Linking Transaction Costs to Trade: The Role of Standards in the EU-Meat Trade." *Lokman T. Zaibet and Maury E. Bredahl, Univ. of Mo.*

By the year 1993, all European slaughterhouses were expected to conform to common standards to ensure the quality and safety of traded products. Countries with low percentage of EU-approved plants are expected to bear higher costs as long as the lack of the EU approval reflects lower standards and quality and may impede trade. This paper developed a theoretical framework that links standards and transaction costs in a trade model. This framework is used to test the effects of the adoption of standards on trade and intra-industry trade (IIT) within the European Union. Results show that the adoption of common standards as reflected by the percentage of Eu-approved plants has significantly positive effect on exports and IIT. Firms are found to adopt the standards mainly for market access reasons.

TITLE: Issues in Pest Control and Pesticide Use (Moderator: *Feng Xu, Univ. of MO*).

"Augmenting Biological Control Inputs for Integrated Pest Management of Primary and Secondary Pests: A Case Study" *John C. Robinson and Merritt J. Taylor, Tex. A&M - Weslaco.*

The paper examines the effects of insecticide and augmentative biological control inputs in suppression of a key pest, where secondary pests and their natural biological controls are also involved. A simple graphical analysis of the biological system is presented. The implications for future modeling of biological control inputs are discussed. This framework is used to analyze data from the first successful biological control program for the boll weevil.

"New Pesticide Sales and Pesticide Toxicity in the U.S. Pesticide Industry" *Michael Ollinger, USDA; Arnold Aspelin, EPA; and Martin Shields, Univ. of Wisconsin.*

This paper examines the hypothesis that regulation negatively affects new pesticide sales and increases the sales of more harmful new pesticides. The results suggest that pesticide regulation adversely affects new pesticide sales. Results do not indicate a rise in the sales of more harmful new pesticides as a percent of new pesticide sales, however. Rather, regulation causes a decline in the sales of more harmful new pesticides.

"Using the Static and Dynamic Logistic to Model the Diffusion of IPM" *Jorge Fernandez-Cornejo and Alan Kackmeister, USDA.*

This study examines diffusion paths of Integrated Pest Management (IPM) techniques among vegetable growers in 15 states, as well as the factors influencing such paths, using static and dynamic diffusion models. The adoption of IPM techniques appears to follow the logistic model, with the 75 percent adoption of most IPM techniques being reached in the first quarter of the next century. Much of the significant differences in levels of adoption across states and crops can be accounted for by the different conditions in the regions and crops, as well as the levels of research, education, and revenues per acre.

"Pesticide Productivity Revisited from a Time-Trend Perspective" *Mark L. Teague and B. Wade Brorsen, Okla. St. Univ.*

Obtaining estimates of pesticide productivity is an economic response to the growing public concern about the steady increase of pesticide use in the United States. This type of research indicates the cost of limiting pesticide use in terms of foregone output. Previous empirical studies give a "snap-shot", or "average", look at pesticide productivity. This research effort employs a random coefficient model to determine the trend of the marginal value product of pesticides in agriculture in the United States. Results show a distinct downward trend in two states, Iowa and Texas. California, however, shows no evidence of a downward trend.

"A Principal-Agent Model for Regional Pest Control Adoption" *Michael E. Wetzstein and Nicolas B.C. Ahouissoussi, Univ. of Ga.*

A Principal-Agent model is developed to explain producers' support for the Boll Weevil Eradication Program in Alabama, Florida and Georgia. Results indicate a fundamental difference in the type of producer who will early adopt industry-specific versus firm-specific technologies.

TITLE: Irrigation and Other Water Resource Issues (Moderator: *Eduardo Segarra, Tex. Tech.*).

"The Effects of Field Characteristics on the Adoption of Water-Conserving Irrigation Technologies in the Central High Plains" *K. Bradley Watkins and Harry P. Mapp, Okla. St.*

A multinomial logit model is estimated to (1) identify factors important to the adoption of water-conserving irrigation technologies in the Central High Plains and (2) to predict the probability of adopting different irrigation methods (furrow, improved furrow, sprinkler, and low energy precision application (LEPA)) for different field characteristics in the Central High Plains. The

results indicate that field characteristics have the greatest impact on the probability of sprinkler adoption. Sprinkler adoption probabilities were greatest for sandy soils and/or fields with high slopes, in areas where pump lifts are shallow, and in locations were water availability is low.

"Optimal Variable Input Choice Criteria: An Empirical Application For Peanut Irrigation" *Marshall C. Lamb, Neil R. Martin, Jr., Krishna P. Paudel and Chieng-Feng Tai, Auburn Univ.*

An agronomic response function relating Southeast peanut yield to water during the primary peanut fruiting period was estimated. Economic theory regarding profit maximization in a one variable input, one output problem was used to determine the optimum level of total water (rainfall plus irrigation) in producing peanuts. The complexities of the two-tier price support program for peanuts and the resulting price effects on the decision criteria were addressed. Results suggested that different profit-maximizing water amounts were associated with different peanut prices. Further, profit could be increased by altering irrigation management strategies according to expected peanut production and price.

"Correcting for Simultaneity Bias in the Estimation of Water Demand Price Elasticities: Is the Cure Worse than the Problem?" *Robert D. Funk and Ronald C. Griffin, Tex. A&M Univ.*

This paper examines potential difficulties arising over selection of a price instrument when correcting for simultaneity bias, which is present when estimating price elasticities for water demand. Instruments which incorporate the price rate structure of block rate pricing systems will yield elasticity estimates that over-compensate for simultaneity bias resulting in underestimation of price elasticities. The significance of this bias is investigated by comparing a price instrument that incorporates rate structure information and one that does not. Our general finding is that the cure for the simultaneity bias introduced by commonly available data may be worse than the initial illness.

"Multiple Criteria Spatial Optimization Under Dynamic Simulation of Nonpoint Source Pollution" *Timothy O. Randhir and John G. Lee, Purdue Univ.*

A dynamic spatial optimization algorithm is developed for watershed modeling, which reduces dimensionality and considers multiple objectives. Various methodologies, including spatially linear and nonlinear formulations, are applied to an experimental watershed and tested against a full enumeration frontier. The superiority of dynamic optimization is demonstrated and used in the development of the integrated algorithm. The integrated algorithm includes bio-physical simulation and economic decision making, coupled with a geographic information system. The algorithm can be used to develop efficient policies towards environmental management of watersheds to address agricultural nonpoint source water quality issues.

"Land Application of Municipal Wastewater: An Enviro-Economic Analysis. *Mohamed Ragy Darwish, Don Ethridge and Eduardo Segarra, Tex. Tech.*

Until recently, municipal wastewater treatment facilities have been planned with little regard for potential monetary benefits to offset investment and operating costs. The land application technique provides an alternative for wastewater deposition which may be an environmentally sound and economically rewarding approach, once an appropriate cropping combination is determined. A dynamic programming model was developed to determine the cropping pattern that would remove all hazardous chemical materials from the effluent and maximize net revenue, for a study case in Lubbock, Texas. The results indicated that the optimal combination would be a mix of alfalfa, wheat, grain sorghum, and cotton.

TITLE: Management Issues for Livestock Enterprises (Moderator: *Jeff Gillespie, LSU*).

"Inter-Temporal Rangeland Decisions Under Stochastic Rainfall and Price" *Vilma G. Carande, Paul H. Gutierrez and E. T. Bartlett, Col. St.*

Stochastic dynamic programming was used to obtain optimal marketing and management

policies for rangeland stocker operations in Southeastern Colorado under light, moderate, and heavy stocking rate. The probabilities distributions of animal gain and price used in the optimization were generated with the simulation models RANGES and PRIGEN respectively. Optimal policies of early sales were important in avoiding negative returns in those cases of high stocking rate, unfavorable rainfall, and pessimistic expectations of prices. This study showed that under rainfall and price variability, flexible rules for management and marketing have a positive effect on the economic sustainability of the enterprise.

"Financial Feasibility of Multiple-Site Contract Hog Production" *David L. Neff and Scott McAdoo, Univ. of Ark.*

This analysis examines the financial feasibility of multiple-site contract hog production. A ten-year investment planning horizon is employed. Net farm income, cash flow, and net present value of multiple-site production case farms are compared with financial measures from conventional two-site and one-site hog production units.

"Quasi-Vertical Contracts in the U.S. Hog Industry: A Source of Efficiency and Productivity?" *Vern Pierce, Univ. of Maine; and Nicholas Kalaitzandonakes, Univ. of Mo.*

The structure of U.S. swine operations has evolved significantly. Recent industry trends show increased contracting activity in the U.S. hog industry. The quasi-vertical contract has been the fastest growing form of coordinating relationships in the swine industry. This type of contract is characterized by a contractor whose primary business is swine production and marketing, and who also provides a contract to another swine producer. This study determines the existence of and sources for any competitive advantage enjoyed by these type of contract growers in terms of

average productivity. The results provide an empirical explanation for the rising interest in this type of structure.

"A Comparison of Contract and Independent Operating Arrangements for Finishing Hogs" *William McBride, USDA.*

Contract hog operations are significantly larger than independent operations, but other farm structural and operator characteristics are much the same. Contract operations finish hogs with greater feed and labor efficiency and lower death losses. Despite greater feed efficiency, total feed cost is not significantly different because contract finishers spend more on processed feed while independent finishers spend more on fuel and repairs used to process feed. Total economic costs are lower on contract operations because replacement, capital, and unpaid labor costs are spread over more units of output. Per-unit returns above cash costs are highest for contractors, followed by independent operators, and lowest for contractees. However, contractees earn more per farm than independent operators because of their greater volume of production.

"Technology and Efficiency Changes on Individual Dairy Farms" *Loren W. Tauer, Cornell.*

Individual technology and efficiency changes of 49 New York dairy farms were estimated using Malmquist indices. These were calculated using nonparametric mathematical programming methods, which place no functional form restriction on the technology, but since individual farm output is subject to stochastic events, a chance-constrained specification was used. The farms increased their technical efficiency and average of 2.1 percent each year, and technical change averaged 1 percent. A comparison assuming deterministic output showed little difference in averages, but some individual estimates varied, especially for technology change.

TITLE: Health, Safety, and Other Consumer Concerns about Food (Moderator: *George Davis, Univ. of Tenn.*).

"Safer Food, Mortality Risk and Willingness to Pay" *Godfrey C. Ejimakor and Anjana Pai, NC A&T Univ.*

Responses from a survey of North Carolina residents were used to underscore the widespread public awareness of, and concern over food safety issues.   A logit regression model was used to investigate the relationship between the willingness of the respondents to pay more for food produced without using chemicals and selected socioeconomic factors. Food-related health concerns, gender, farm ownership and skepticism about the safety of the food supply were found to be significant predictors of willingness to pay more for food produced without using chemicals.   Age, education and income had little or no effect.

"Estimating the Demand for Food Away From Home from Limited Menu and Full-Menu Eating Establishments Using Time-Series Data" *Wendi L. Adams and Oral Capps, Jr., Tex. A&M Univ.*

The demand for food away from home, disaggregated into limited-menu and full-menu establishments, is estimated using monthly time series data. Using ridge regression, results indicate that limited-menu operations are more sensitive to changes in disposable personal income and the percentage of women in the labor force than are full-menu operations; and the demand for food away from home at full-menu operations is more sensitive to changes in the price of food at home than are limited-menu operations. Own-price elasticities are in the elastic range indicating that revenues will increase if prices are lowered, *ceteris paribus.*

"Consumer Characteristics Associated with Healthful Diets: The Case of Low Calorie and Low Fat/Cholesterol Foods" *Rodolfo M. Nayga, Jr., Rutgers Univ.*

This   study   examines   consumer characteristics associated with low calorie and low fat/cholesterol   diets.   Factors   affecting   the probability of being on a low fat or low cholesterol

diet include perception about one's health, sex, age, and weight. The same factors and height affect the likelihood of being on a low calorie diet. Individuals who are on a low fat or cholesterol diet tend to be healthy, elderly, heavy women. On the other hand, individuals who are on a low calorie diet tend to be lighter but taller men who have lower perceptions about their health status.

"Food   Labeling   and   Consumer   Factors Influencing Fat and Cholesterol Consumption" *Guijing Wang, Stanley M. Fletcher and Dale H. Carley, Univ. of Ga. - Griffin.*

Using the 1987-88 Nationwide Food Consumption Survey, impact of food labeling and consumer factors on fat and cholesterol consumption is analyzed. Results show that the consumption responsiveness to income and food expenditure are significant. Household size, education, and race are important determinants of consumption.   Food labeling is an effective means of reducing fat and cholesterol contents in American diet. Consumption patterns are different between label users and non-users. These results are useful in evaluating food labeling policies, initiating consumer nutritional education programs, and proposing food production and marketing strategies.

"An Analysis of Consumers' Willingness to Try New   Food   Products   and   Specialty   Meats" *Patricia E. McLean-Meyinsse and Jianguo Hui, Southern Univ.*

This study examined the willingness of Louisiana and southeast Texas residents to try new food products and specialty meats. Results from the ordered   probit   model   used   to   make   this determination indicate that willingness to try new food products is influenced by gender, age, education, religion (Baptist), race, and household income. The probabilities of trying these foods are greatest among females, those with education beyond high school, and respondents with household income between $35,000 and $74,999.   The likelihood of shopping at specialty meat stores is highest for respondents with household income of $75,000 or above, for non-white respondents, and for Baptists.

TITLE: Agricultural Demand and Demand Systems (Moderator: *Oral Capps, Jr., Tex A&M Univ.*).

"An Analysis of the Demand for Fish in Indonesia" *Tridoyo Kusumastanto and Curtis M. Jolly, Auburn Univ.*

The study was to determine the factors influencing the demand for fish in Indonesia for 1967-1988. Using Box-Cox transformation methodology, the double-log model was found to be appropriate for explaining the demand for fish. Factors influencing demand were own-price, price of eggs, and per capita income. Results of static analysis showed own-price of -0.102, cross-price elasticity for eggs of 0.271, and income elasticity of 0.506. Dynamic analysis using Houthakker-Taylor model indicated that fish consumption depended on psychological food-buying habits of consumers. Short-run and long-run elasticities, resulting from a partial adjustment model, implied that per capita consumption of fish is growing slowly.

"Household Demand For FinFish" *Steven T. Yen, Iowa St. and Chung L. Huang, Univ. of Ga.*

Household consumption of finfish in the United States is investigated using a generalized limited dependent variable model that accounts for both participation and consumption decisions and also accommodates nonnormal and heteroskedastic errors. Results suggest that demand is inelastic, and income elasticity is small. Household age composition and race are among the demographic variables that determine finfish consumption.

"Factors Affecting the Demand for U.S. Rough Rice" *John W. Miller, Edward G. Smith and Ronald D. Knutson, Tex. A&M Univ.*

Econometric modeling techniques are used to estimate rice demand to account for recent changes affecting the demand for U.S. rice. Similar to previous studies, changes in the price of rough rice have little impact on demand. Income and population are the principle determinants of food demand. The income elasticity, however, is much higher than those from studies using earlier time periods. The large affect of time on the demand by brewers suggest more beer is being consumed. A lower than expected export elasticity suggest that institutional changes abroad are having a negative impact.

"A System Demand Analysis for Food Commodities Segmented by Income" *Rodney B. Holcomb, Kellie K. Curry, John L. Park and Oral Capps, Jr., Tex A&M Univ.*

The demand for food is in part dependent upon the level and distribution of real income. Twelve food commodity groups were analyzed according to household poverty status to test Engel's Law. Parameter estimates were used to obtain subsistence expenditures, own-price elasticities, expenditure elasticities, and income elasticities. Price responsiveness was similar between the two groups, although income responsiveness differed. These results may serve as a justification for federal food assistance programs, which effectively increase income for eligible households. Also, the relatively higher income elasticities associated with the poverty status group offered empirical support for Engel's Law.

"Calculating Marginal Effects in Models for Zero Expenditures in Household Budgets Using a Heckman-Type Correction" *Atanu Saha, Oral Capps, Jr. and Patrick Byrne, Tex. A&M Univ.*

Using the Heckman approach, either in single-equation or multi-equation settings, general expressions were derived for calculating marginal effects and elasticities. In the conventional calculation of marginal effects, terms related to the change in the inverse of Mills ratio are omitted. Using data from the 1987-88 Nationwide Consumption Survey, we calculate income and household size elasticities for twelve commodities. We compare the magnitudes and signs of the elasticities using the conventional expressions of marginal effects and our derived expressions. Bottomline, sizeable differences, especially in single-equation applications, can occur in calculating marginal effects if one fails to account for changes in the inverse of Mills ratio.

TITLE: Professional Issues: Teaching, Research and Extension (Moderator: *Charlie Forrest, Miss. St. Univ.*).

"Evaluation of the Effectiveness of Role Playing Experiental Teaching and Other Teaching Methods in Teaching Managerial Skills" *James N. Trapp, Steven R. Koontz, Darrell S. Peel and Clement E. Ward, Okla. St. Univ.*

Students were asked to rate the effectiveness of lectures, case studies, laboratories and role playing simulation in teaching 41 business skills rated by experienced business school graduates as useful in their job. Role playing simulation clearly ranked as the most effective teaching method. In addition role playing simulation was found to be most effective at teaching skills that lectures taught least effectively. It is contended that evaluation of courses with respect to career skills taught, rather than more traditional evaluations which focus on generic learning quality, communication quality, etc. can be helpful in course and curriculum development and coordination.

"County Level Demand for Cooperative Extension Programming" *Notie H. lansford, Jr., Okla. St. Univ.*

Extension budgets are declining, or at best, holding steady. The local extension partner (county governments) in rural areas often face increasing budget stress as population and tax base decline. Does local demand for extension decrease? Six years of county government budgets are examined using descriptive statistics and pooled regression analysis. The Oklahoma case study suggest that support for extension is declining and asks what can be done to increase demand for extension services.

"Learning and Teaching Styles in Agricultural Economics Classrooms and Extension Audiences" *Arnold W. Oltmans, NC St. Univ.*

This study provides important information on the preferred learning styles of students and extension clientele in agricultural economics classrooms. Using Gregorc's model, empirical measures of large samples of various groups of individuals find students and extension clientele to be heavily pre-disposed toward the concrete sequential learning style. Introductory courses have a different distribution of student styles than do advance courses. Research-teaching faculty do not match up well in style to undergraduate students while extension faculty match closely to the preferences of their extension audiences.

"Use of Electronic Spreadsheet Simulation Add-Ins: An Investment Analysis Example" *Lawrence Falconer, Tex. Agri. Exten. Service, Corpus Christi; Jeff Johnson, Tex. Tech; and John R. C. Robinson, Tex. Agri. Expt. Sta. Weslaco.*

This paper shows the value of simulation add-ins for computerized spreadsheet software in Extension and farm management work. A model developed for analysis of economic feasibility of sugar cane production in the Rio Grande Valley of Texas is developed to demonstrate how the simulation add-in may be used. The model explicitly includes uncertainty involving freezing weather in the sugar cane production process. The add-ins can be used in any situation involving uncertainty in the planning and budgeting process.

"An Analysis of Presentation at Annual Meetings of the Southern Agricultural Economics Association by Southern Land Grant Institutions" *Edoe Agbodjan, S. Sureshwaran and P. Frazier, SC St. Univ.*

Presentations at the annual meetings of the Southern Agricultural Economics Association in 1982, 1987 and 1992 are used to identify the research focus at individual institutions and to compare the changes in research focus at Southern Land Grant Institutions vis-a-vis the nation (Brandt and Ahearn, 1993). Results suggest that there are significant variations in papers presented. Research at Southern Institutions is mostly focussed on regional issues, such as production, product supply, demand and prices.

TITLE: Agribusiness and Finance (Moderator: *Rodolfo Nayga, Jr., Rutgers Univ.*).

"Producer Response to a Subsidized Agricultural Water Conservation Program." *Bobby Stanaland, Sukant Misra, Eduardo Segarra, Tex. Tech; and Ronald Lacewell, Tex. A&M Univ.*

Texas voters approved the sale of bonds to finance low interest agricultural loans to purchase water efficient equipment. Results from a five million dollar pilot program indicated that the low interest loan program had been used to a limited extent. Survey data of 1,141 producers was used to identify factors that influence producer participation. Results from a qualitative choice model indicate that educating producers about water use efficiency, encouraging participation of commercial lenders by a guaranteed loan program and minimizing water district administrative procedures would enhance the low interest loan program.

"Using Value-Added to Measure the Economic Contribution by Agricultural Cooperatives" *Jerry C. Namken and John E. Jinkins, USDA.*

Using a data set developed by the USDA's Agricultural Cooperative Service, wealth creation by agricultural cooperatives was quantified by value-added measurement. Small-size cooperatives generated more value-added per member than medium-size cooperatives. Cooperative type had less influence on value-added. Value-added amounts created per member were similar for marketing and supply cooperatives. Employees received the largest portion of value-added while members received the second largest. As marketing activity increased, the percentage of value-added going to members tended to increase.

"A Comparative Static Analysis of Oklahoma's Vegetable Industry" *Shida R. Henneberry, Joe Schatzer and Yousif El Beheisi, Okla. St. Univ.*

The impact of changes that might result from the organization of Oklahoma vegetable growers is estimated using a sector programming model. A comparative static analysis is used to evaluate the impact of these changes on consumer and producer surplus and planted area. Results indicate that demand changes are most effective.

"Sources of Financial Stress in Agricultural Cooperatives" *Lynn G. Moller, Allen M. Featherstone and David G. Barton, Kan. St. Univ.*

Agricultural cooperatives experience varying levels of financial stress. Financial stress may be due to a combination of three factors: inadequate profitability, excessive debt, or high interest rates. This paper uses an analytical technique to determine the relative degree of financial stress in agricultural cooperatives attributable to each factor. The results of the analysis indicate that the greatest portion of financial stress, 54 percent, originates from low earnings. High interest rates accounted for roughly 24 percent of the financial stress while leverage accounts for the remaining 22 percent. More than half of the 226 agricultural cooperatives suffering from financial stress have significant levels of both earnings and financing problems. The remaining firms are about equally divided between either earnings or financing problems.

"A Control Theory Approach for Evaluating Optimal Farm Debt/Equity Adjustment" *David L. Watt, ND St. Univ.; and James A. Larson, Univ. of Tenn.*

This paper describes an algebraically tractable farm debt/equity adjustment control model. The model was specified from the determinants of farm debt structure. Risk was incorporated using a Poisson distributed insolvency risk discount function and EV criterion to penalize variation in the future income stream. The model was used to examine alternative risk and return influences on optimal debt/equity adjustment from an initial debt level. Changes in risk and return were found to substantially influence the intertemporal marginal value of leverage. Results also demonstrate that a simple control model approach provides meaningful implications and applications.

TITLE: Topics in Consumer Theory and Preferences (Moderator: *Robert G. Nelson, Auburn Univ.*).

"Product Differentiation and Representative Agent Import Demand Systems: A Reconsideration and Rejoinder" *George C. Davis, Univ. of Tenn.*

This paper shows that the assumption of product differentiation does not generate the import demand systems found in the literature, such as the Armington Model, unless two additional assumptions hold. A procedure is demonstrated for testing for these assumptions.

"Food Product Positioning" *Orlen Grunewald, Kan. St. Univ.; and David J. Faulds, Univ. of Louisville.*

This paper examines the agglomeration (clustering) of food products in quality space. Quality scores from consumer magazines published in Belgium, Canada, France, Germany and the United States were analyzed for 15 food product categories to determine brand positions in quality space. The results indicate that markets for food products cluster around average and high quality. The results remain consistent across countries, product categories, and different definitions of quality space.

"Identifying   Consumer   Characteristics Influencing Nut Product Consumption Using Utility Maximization Framework" *Senhui George He, Univ. of Ga.; and Wojciech J. Florkowski, Univ. of Ga. - Griffin.*

Socio-economic   and   demographic characteristics of consumers affecting nut- product consumption frequency were identified using the ordered   probit   procedure.   Six   equations representing different nut products were estimated using data from a national consumer survey. Results identified respondent age, education level, and annual household income as the primary factors influencing the nut-product consumption. Other factors influencing consumption of nut products

included place of residence affecting chocolate covered   nut   consumption,   race   affecting consumption of nut snack and ice cream with nuts, and gender affecting the consumption of nuts as a snack and in salads.

"Comparisons Between Fruit and Vegetable Preferences of Agricultural research Staff and General Public Consumers: A Case Study From Georgia" *C. Robert Stark, Craig K. Kvien and Teresa Chung Stark, Univ. of Ga. - Tifton.*

Fruit   and   vegetable   preferences   are generally not considered homogenous over the human population. This case study compared the preferences of consumers on an agricultural research staff to general public consumers.   While consumption patterns were similar for both groups, the general public was found to purchase produce more frequently and to be more responsive to pesticide issues in fruit and vegetables. General public participants indicated significant changes to pesticide practices and that availability of produce grown under less pesticide conditions would prompt them to purchase more frequently each week and willingness to pay a 1-5% premium for the reduced pesticide produce.

"Family vs. Ando-Modigliani Life-Cycle Theory: An Application to Impure Public Goods" *Andrew Seidl, Univ. of Fla.*

A probit and a tobit maximum likelihood model were estimated and used to analyze the primary determining factors of the demand for an impure public good. Traditional life-cycle analyses would predict that age and income level are the best predictors of consumer decision-making, while Family Life Cycle Theory holds that the presence and age of children in the household provides significant additional predictive power. This study evaluates the relative performance of these two theories to predict: (1) The response to a dichotomous choice WTP elicitation: (2) The magnitude of the elicited response. Results indicate more evidence in favor of Ando-Modigliani style life-cycle analysis than for Family Life Cycle analyses.

TITLE: Topics in Resources and Production
(Moderator: *Nicholas Kalaitzandonakes, Univ. of Mo.*).

"A Comparative Economic Analysis of Biodiesel for Transit Bus Systems" *Nicolas Ahouissoussi and Michael E. Wetzstein, Univ. of Ga.*

Four alternative fuels, diesel, biodiesel, methanol, and compressed natural gas are investigated in a regenerative optimal stopping model for engine rebuilds with data on mileage and rebuilt costs for municipal bus operations. The model for this bus engine optimal rebuilt problem is a nested fixed point maximum likelihood algorithm which avoids many of the limitations which depend critically on the existence of an analytic solution. Results indicate biodiesel buses at prices as high as $3.00 per gallon for biodiesel are comparative with other alternative fuels.

"Farmers and Prospect Theory"   *Wesley N. Musser, Univ. of Md.; and George F. Patrick, Purdue Univ.*

Prospect theory was developed to explain responses to problems that were contradictory with expected utility theory. This study reports farmer responses to these problems in a general and an agricultural format. Responses were similar to the general population for both formats but individual responses were not consistent in alternative formats.

"Short-Run Increasing Returns to Labor in a Dynamic Adjustment Model"   *Yir-Hueih Luh, National Tsing Hua Univ.*

Based on dynamic duality theory, it is shown that short-run increasing returns to labor (SRIRL) does not necessarily contradict intertemporal optimization behavior and labor hoarding is neither sufficient nor necessary for SRIRL. Specifically, given that labor hoarding is a rational behavior for long-run cost-minimizing firms, SRIRL may not be present. On the other hand, observing SRIRL does not require labor hoarding, but rather relying on the relationship between proportional growth in labor and other inputs. The analytic results suggest that SRIRL ought to be treated as an open question for empirically oriented research. To illustrate this point, the SRIRL phenomenon is examined using Taiwan production agriculture data for the 1950-86 period. The results indicate that while labor is quasi-fixed in nature, the empirical phenomenon of SRIRL also applies to the agriculture sector in Taiwan.

"Effects of Alternative Water Distribution Rules on Irrigation System Performance: A Simulation Analysis"   *Leslie E. Small, Rutgers Univ.; and Arbindra Rimal, Univ. of Fla.*

Based on a simulation model reflecting physical and economic conditions typically found in rice irrigation systems in Asia, the implications of four alternative water distribution strategies under varying degrees of water shortage are evaluated using several productivity and equity measures of irrigation performance. Economic efficiency and equity are found to be largely complementary strategies at the lower levels of water shortage, but with increasing shortage, clear tradeoffs develop between these objectives. An operational rule for water distribution under a goal of economic efficiency is developed, and the data requirements for its implementation are shown to be modest.

"Climate Change and Agriculture"   *Marinos E. Tsigas, George Frisvold and Betsey Kuhn, USDA.*

In this paper, we determine potential differences in partial and general equilibrium analyses of the effects of global warming on agriculture. We use an applied general equilibrium model of global trade which has eight regions and eight commodities. Our results suggest that (i) for most regions under consideration, partial equilibrium welfare impacts are substantially different to magnitude from the general equilibrium results, and (ii) it is important to consider the secondary effects of climate change on the sectors that process agricultural commodities. We also conclude that it is important to properly account for the CO_2 fertilization effect.

TITLE: Topics in Resource Development, Pollution, and Waste Management (Moderator: *James Seale, Univ. of Florida*).

"An Economic Analysis of Baitfish Culture in a Poultry Processing Waste Treatment System" *William W. Lussier, Conrado M. Gempesaw, II, J. Richard Bacon, Univ. of Delaware; and Peter Pearce, Hudson Foods.*

Using waste treatment systems for aquaculture production could be an attractive option for operators of agri-industrial processing firms who are seeking additional sources of revenue. The objective of this research was to evaluate the economic viability of producing baitfish in the waste treatment lagoon system of a poultry processing plant using a comprehensive, farm-level, stochastic, multiple year capital budgeting computer simulation model. The simulation results show that production of baitfish in a poultry processing plant waste-water treatment system has the potential to generate a high expected rate of return along a high probability of economic success.

"Can the Wild Fishery Always Benefit From Development of Aquaculture?" *Jen Feng Sun, Ohio St. Univ.*

Previous static studies show that, under competition from aquaculture, the operation of the wild fishery sector may become relatively efficient. In this paper, it is found that, with a dynamic model, it is possible for the wild fishery to experience a longer time in inefficient operation. This result implies that the impacts of aquaculture on the wild fishery might be negative. A numerical example is also provided to support the theoretical findings. This exercise is especially employed to show the impacts of salmon farming on the management of wild salmon harvesting.

"Reconciling Decision and Game Theory Conclusions Concerning the Effect of Fines on Polluters" *Chia-Chuen Chang, James W. Mjelde and Teofilo Ozuna, Jr., Tex. A&M Univ.*

Conclusions of regulatory studies addressing the effect of fines on firm behavior are contradictory. A simple game theoretic model is developed to reconcile these contradictory conclusions. The model developed uses continuous payoff functions to reconcile the differences. The game suggest that the fine shifts the reaction functions of both the regulatory agency and the firm. The nature of such shifts leads to the contradictory results found in previous studies.

"Determining The Optimal Landfill Size: Is Bigger Always Better?" *Mitch Renkow, NC St. Univ.; and Andrew G. Keeler, Univ. of Ga.*

A model of landfill costs is developed that accounts for construction, operating, externality, and political costs. Simulations based on the model suggest a few provisos to the conventional wisdom that disposing of larger volumes of waste in regional landfills is desirable on cost minimization grounds. In particular, transport costs, increased political costs of siting regional facilities, and difficulties for potential host communities to recover political externality costs from regional partners may reverse cost advantages stemming from increasing the size of the waste stream.

"Waste Management: An Application to Texas Cattle Feedlots" *Teresa P. Glover, Eduardo Segarra and Phillip Johnson, Tex. Tech.*

Since the 1960's, the number of Texas feedlots and the average number of cattle per feedlot has increased rapidly. Due to these increases as well as incidents of acute water and air quality problems, interest in livestock waste management has developed. The purpose of this study was to examine efficient waste management strategies which would be environmentally benign while benefiting agricultural producers. Linear programming models were developed to derive crop supply and factor demand functions. Land application of manure was determined to be an optimal approach to waste management in the Texas High Plains.

TITLE: Issues in Trade and Development
(Moderator: *Lewell F. Gunter, Univ. of Ga.*).

"Effect of NAFTA on U.S./Mexico Dry Onion Trade"   *Melanie Gillis, Stephen Fuller and Houshmand Ziari, Tex. A&M Univ.*

A spatial, multiperiod equilibrium model of the North American dry onion economy is constructed to analyze the impact of liberalized U.S.-Mexico trade. In a free trade environment, exports of Mexican onions to the U.S. increase 46 percent while Mexico's share of the U.S. market increases from 8.5 to 12.2 percent. Farm-level prices in the U.S. are projected to decline 7.3 percent while production declines 4.4 percent. The effect of free trade on U.S. producers is disproportional across regions: northwest producers experience the greatest decline in production. In spite of the unfavorable impact of free trade on U.S. dry onion producers, the industry is not economically devastated.

"Economic Welfare Analysis of Policy-Induced Structural Change in the Indonesian Poultry Industry"   *Endang Suwartini, H. Garth Coffin and Kisan Gunjal, McGill Univ.*

The performances of the poultry industry in Indonesia is analyzed in terms of changes in producer and consumer welfare as a results of public policy intended to limit the size of production units in order to distribute growth opportunities to smaller farms. Elasticities of supply and demand are estimated using the Seemingly Unrelated System of Equations. The hypothesized policy-induced structural change, estimated through a dummy variable accounting for a shift in supply associated with implementation of the policy, shows a negative impact on the output supplied and the welfare of producers and consumers to the tune of Rp 94 billions or roughly about 0.1 percent of national income as of 1983.

"Identifying Export Market Structure and Competitiveness: The Case of Mauritanian Octopus"   *Richard F. Kazmierczak, Hector O. Zapata and Hamady Diop, LSU.*

Octopus exports to Japan and Europe are an important source of foreign exchange earnings

for Mauritania and a critical component of the nation's economy. Issues concerning competitiveness and price discrimination in the Mauritanian octopus export market were empirically examined in this study using a seemingly unrelated regression model corrected for contemporaneous and serial correlation. Results indicate a significant amount of price discrimination across destination markets, market share enhancement through local currency price stabilization, and increases in marginal costs of production following nationalization of the Mauritanian trawler fleet.

"Price Response and the Effects of Exchange Rate Distortions on Cotton Production in Uganda"   *Godfrey B. Bahiigwa, Univ. of Mo.*

Cotton contributed about 23% of Uganda's total agricultural export earnings in 1971, but by 1988 it accounted for less than 2%. This study analyses several significant factors for this dramatic decline, including changes in government policies, and more specifically the indirect effect of the exchange rate distortion, through the prices received by cotton producers. A regional analysis was done based on the type of cotton variety grown in each region. Results indicate that actual area planted, on average, was 37% and 116% lower in SATU and BPA regions respectively, than the simulated values with a more flexible exchange rate in the period of study.

"Quality and Production Cost Oriented Measurement of International Competitiveness -- Is U.S. Rice Feasible in the Japanese Market?"   *Shoichi Ito, Mark W. Rosegrant and Mercedita C. Agcaoili-Sombilla. International Food Policy Research Institute.*

In this research, quality of foreign japonica rices were evaluated in terms of prices relative to Japanese domestic retail prices. Then, retail prices, consumer surplus and competitiveness among the foreign rices in the Japanese market were estimated assuming those rices were imported at prices based on their production costs. According to the results, rices produced in China are quite superior to other rices grown in the United States. Further, a 700 percent of tariff which was discussed in the GATT negotiation appears to be too low and too high for Chinese and American rices, respectively.