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Abstracts

Contributed Papers

FARM FIRM OBJECTIVES

"Legal and Ethical Implications of the U.S. Agricultural Structure Controversy." James R. Simpson and James S. Wershow, University of Florida.

This paper's purpose is assisting in explaining the ethical and legal framework as one tool by which two national farm structure questions can be analyzed. The issues are (a) explicit recognition in the Food and Agriculture Act of 1977 of the ideal that it is "good" and "right" that farmland be held and worked by family farmers and (b) whether the 160 acre limitation on federally subsidized irrigation water should be enforced and its impact on agricultural structure, especially in the Southeastern United States. It is concluded that the issues will be mainly evaluated in a legal, ethical and political context rather than on the basis of efficiency, and thus agricultural economists concerned with land tenure problems need to better acquaint themselves with the disciplines of law and moral philosophy.

"A Discriminant Analysis of Benefits Farmers Receive From Farming." James B. Kliebenstein, William D. Hefferman, Donald A. Barrett and Carrol L. Kirtley, University of Missouri-Columbia.

In farm decision making model development, it is important to have insight into benefits farmers receive from farming as these benefits ultimately affect decisions that are made. In this study, farmers' relative importance of benefit values, obtained through a telephone survey, are tested through use of a discriminant analysis to see if the response values are effective in categorizing farmers. If the relative importance values effectively categorize farmers then farm decision making models should be structured to account for those discriminating differences.

An important discriminating variable is "sense of security" while "increase in security" is not a discriminating variable. Therefore, in model development, one modeling framework for increasing security would be adequate, as similar values are placed on this factor by all respondents. However, decision models should have the capability of handling different security levels as sense of security is found to be a discriminating variable. Models appear to need threshold security levels. Other important discriminating factors are recogni-

tion as being successful, increasing income and allowing expression of yourself.

"Farmer's Goals: Modelling and Measurement." George F. Patrick and Brian F. Blake, Purdue University.

Various techniques of modelling farmers' multiple goals, their conceptualization of decision-making and data requirements are discussed. Previous attempts to conceptualize and measure goals are reviewed. Techniques which can be used to measure goal weights and target levels in ways useful for modelling are suggested.

"Evaluating Differences in Goals and Preferences Between Large and Small Field Corn Producers." W. Arden Colette and Steven P. Hubbard, University of Florida.

The wide economic gap between large and small farms has been largely attributed to the differential adoption of technology by the two groups. This differential is traced to differences in attitudes and values between the groups. An Expected Return-Variance of Return analysis is conducted on net returns generated in an effort to compare the attitudes and values of the two groups as revealed through their selection of production practices. Results indicate that large farmers optimize in their selection of practices while small farmers do not optimize at the production practice decision level.

LAND VALUATION AND PRICING

"Alternative Measures of Locational and Economic Development Factors Affecting Inter-Tract Variation of Agricultural Land Prices." Lonnie R. Vandever and Darrel D. Kletke, Louisiana State University and Oklahoma State University, respectively.

With increasing complexities in agricultural land markets caused by the growing demand for nonagricultural land and the increasing importance of transportation costs, it seems imperative that agricultural economists develop accurate methods for measuring the impacts of location and economic development in agricultural land markets. This study tests several alternative methods for measuring these impacts in agricultural land markets.

Market potential and interaction relations frequently discussed in geography literature are tested in agricultural land value models. The empirical results show these variables to better measure the impacts of location and economic development on land values than traditional raw distance and population measures.

"The Impact of Locational Characteristics on Rural Land Prices." John E. Reynolds and Devin L. Tower, University of Florida.

The results of this study support the hypothesis that locational characteristics are important determinants of rural land prices in an area where the nonagricultural demand for land has provided strong competition for the agricultural uses of the land. The distance to the dominant city in the area, distance to intermediate size cities, distance to a four land highway, size of tract, land use variables and value of buildings were important variables in explaining the variation in rural land prices. The locational variables and size of tract exhibited a strong nonlinear relationship with rural land prices.

"Farmland Values and The Role of Expectations." Richard W. Dunford, Washington State University.

Fluctuating returns to farmland, land appreciation, and general price inflation in the 1970s have made it difficult for farmers to accurately determine their maximum bid price for farmland. In this paper, a discounted cash-flow model for determining the present value of farmland is specified which explicitly incorporates expected changes in returns to farmland, aggregate farmland values, and general price levels. The sensitivity of farmland prices to these expectations is examined for various planning horizons. The expected rate of increase in aggregate farmland values relative to the expected rate of inflation is shown to have the dominant influence on the value of farmland parcels.

"Land and Easement Values for Small Watershed Structure Sites." James Kasal, United States Department of Agriculture.

Data from small watershed flood control development sites in Oklahoma and Nebraska indicate land value changes range from a negative 27.5 percent to a positive 24.2 percent, depending on deflating procedures. Data also indicate that easement expenditures usually exceed the compensation necessary to leave landowners in the same financial position before and after the transfer of land rights.

COMMUNITY SERVICES

"LIML3SLS — A New Econometric Technique for Estimating the Demand for Public Services." David L. Debertin and Angelos Pagoulatos, University of Kentucky.

"Estimating Community Government Costs Associated with Economic Development and Growth." H. L. Goodwin, Jr., Oklahoma State University.

The objective is to develop guidelines for evaluating the potential effects on community expenditures of industrial development and growth. Econometric models are used to examine relationships of Oklahoma municipal governments costs to population, income and industrial development. Results should be useful to community leaders as well as to persons from extension and other agencies who work with such leaders.

"A Practical Methodology for Determining Economic Feasibilities of Planned Rural Water Systems." James R. Nelson, Harold Lloyd Goodwin, Jr. and Gerald A. Doeksen, Oklahoma State University.

The objective is to develop a methodology which can be used by extension personnel and others as they work with rural decisionmakers to analyze economic feasibilities of water systems for rural areas. Data on 82 Oklahoma water system projects financed by Farmers Home Administration are used to develop models to estimate water needs and system costs for potential rural water systems.

A simple econometric model to estimate water needs as a function of residential, commercial, and industrial users is presented. Then procedures to estimate costs and evaluate economic feasibilities for water systems to meet estimated needs are discussed and demonstrated.

For analysis purposes rural water system costs are disaggregated into capital costs and operating costs. Average costs for frequently used rural water systems construction items are presented (capital costs). Operating costs are reported for different types of rural water systems on a per user basis.

Forms are presented, which can be used in the field to apply this information to estimated annualized total costs for specific systems and to analyze their economic feasibilities.

"Provision of Police Services: Demographic, Social, and Economic Determinants." Vada Agnes Davidson, Joseph Havlicek, Jr., Virginia Polytechnic Institute and State University.

A recursive system of equations with lags is employed to analyze the interaction of crime levels, police service expenditures, and the productivity of police agencies. A cross-sectional analysis involving multiple regression equations was performed on data for 136 cities and counties in Virginia.

The analysis suggests that the effectiveness of police service expenditures in decreasing FBI index crimes depends on the ability of police departments to employ the expenditures in increasing output as measured by arrests. Protection efforts tend to be impeded by the community's proximity to an urban center and degree of population growth, size, and density.

LIVESTOCK PRICE ANALYSIS

"A Study of Composite Forecasting with an Application to U.S. Hog Prices." Jon A. Brandt and David A. Bessler, Purdue University.

This paper considers alternative methods for combining multiple forecasts of time dependent random variables. Three composite weighting schemes are applied to econometric and ARIMA model forecasts of 1976-1979 quarterly U.S. hog prices. Performance measures for all forecast methods are presented and suggestions for further use of composite forecasting are made.

"Lead-Lag Relationships Between Pork Prices at the Retail, Wholesale and Farm Levels." Steve E. Miller, Clemson University.

This paper presents an empirical assessment of the lead-lag relationships of pork prices between the retail, wholesale and farm levels. Both a more recent sampling interval and an improved methodology differentiate the present study from an earlier investigation of the same topic by the National Commission on Food Marketing. Empirical results from univariate residual cross correlation analysis indicate that farm level pork prices lead wholesale prices by about 2-3 weeks, and in turn, wholesale prices lead retail prices by 2-3 weeks. These results should be useful both in the specification of econometric models of the pork sector and in the evaluation of marketing margins for pork.

"Impact of Rising Energy Prices on Livestock Prices and Production." John F. Yanagida and Roger K. Conway.

The U.S. energy situation has changed dramatically in the 1970's. Although agricultural production alone accounts only for 3-4% of the total U.S. consumption of direct energy, the production, processing, and distribution of agricultural products accounts for nearly 20%. This study assesses the effect of increasing energy prices on major livestock prices and production in the U.S. An econometric livestock model is used to determine the impact of rising energy prices on the beef, pork, poultry, eggs, and dairy industries. The impact of

energy prices is incorporated in three sections of the model. At the farm level, higher energy prices will increase feed grain costs and prices of fuels and utilities. For the wholesale and retail levels, transportation and processing costs of livestock commodities will rise. Energy price increases of 50%, 100% and 200% are evaluated and the results indicate significant effects on the livestock sector. These results are then compared with cost of production studies at the farm and processing levels.

"Seasonal Variations in Prices Paid by Farmers for Production Items." Gene K. Lee, United States Department of Agriculture.

Seasonal variations in prices paid by farmers for production items are examined through the *X11 Variant of the Census Method II Seasonal Adjustment Program*. The result indicates that among the eleven production items examined, seasonal variations are apparent in six items—feed, feeder livestock, seed, fertilizer, agricultural chemicals, and autos and trucks. Since many of the underlying factors affecting seasonal movements in price remain approximately stable or change slowly over time, the result of this paper can serve as a guide for future decisions of input purchases.

THE SMALL FARM

"Determinants of Farm Size in Kentucky: Implications for the South." Roslan A. Ghaffar, Angelos Pagoulatos and David Debertin, University of Kentucky.

The factors affecting farm size in each of the 120 Kentucky counties are investigated and a cross-sectional model of the demand for farm size is estimated for 1974. Results obtained indicate that land price was consistently significant in all regional models and that the size of mechanized grain production farms is closely linked to high energy use.

"Typology and Policy for Small Farms." Luther Tweeten and Isaac Popoola, Oklahoma State University.

Based on census data, small farms are divided into three categories according to operators' characteristics: (1) aged and disabled, (2) part-time and (3) bona-fide, able-bodied depending on the farm for their livelihood. Appropriate public policy differs for each of these classes. The following hypotheses are advanced:

(1) Incomes of the small farm households with aged and disabled breadwinners can be raised most cost-effectively by public assistance transfer payments.

(2) Incomes of part-time farmers are for the most part above the poverty threshold and they are not of high priority for public policy.

(3) Incomes of the bona-fide, able-bodied small farm operators depending on the farm for their livelihood can be raised with agricultural research-extension programs within current fencelines, but scope for increased income with favorable benefit-cost ratios under such programs is very limited. Significant gains are possible only by expanding the size of farming operations obtaining off-farm employment.

"Are Small Farms Really Different? An Example From Illinois." Lyle Solverson and John E. Ellerman, Southern Illinois University at Carbondale.

The major objective of this paper is to determine if there were differences between small and large farmers and to discuss the usefulness of these for forecasting changes in the structure of agriculture.

The paper originates from an integrated assessment of the farming systems in southern Illinois, a study which was conducted in a five-county area during the summer of 1979.

The paper presents differences between small and large farmers using the following criteria: farm inputs, production practices, marketing procedures and the socioeconomic aspects of farm life. It concludes that the factors influencing levels of production for small farmers could be serviced through assistance programs, but the socioeconomic aspects of small farms may bring about changes in the structure of farming which could be irreversible.

"Small Farm Polyperiod Planning Model for Developing Economies." John R. Allison and James E. Epperson, University of Georgia and Georgia Experiment Station, respectively.

A polyperiod small farm planning model was designed for developing economies. The model, a LP model with a 20-year horizon, has the capabilities of variable discount rates and non-year specific perennial crop and livestock enterprise establishment. The capital section of the model permits evaluation of annual and investment capital subsidy policies.

SOIL TREATMENTS: IRRIGATION AND FERTILIZER

"A Control Theory Approach to Optimal Irrigation Scheduling in the Oklahoma Panhandle." Thomas R. Harris and Harry P. Mapp, Jr., Oklahoma State University.

Rapid development in irrigated production of food and fiber in the Oklahoma Panhandle has occurred during the past three decades. The source of irrigation water in the area is finite. With continued overdraft of the aquifer and rising fuel costs, the economic life of the aquifer is being reduced. Optimal control theory was used to derive irrigation strategies which reduce water and energy use while maintaining producer net returns. A comparison of the results of the optimal control procedure with contemporary irrigation practices, reveals that less water can be applied than currently practiced without reducing crop yields. Net returns to the producer are higher under the optimal control irrigation strategies.

"A Comparison of Alternative Techniques for Measuring Soil Moisture in Relation to Economic Crop-Response Analysis in Irrigation Decision Making in Virginia." Kenneth Baum, Carl Mabbs-Zeno and William Park, Virginia Polytechnic Institute and State University.

Many techniques for measurement of soil moisture have been developed. The techniques offer different performance with respect to (1) accuracy, (2) range of moisture within which consistent results are possible, and (3) range of soil types within which consistent results are possible. The requirements of measurement techniques differ in (1) variable costs, (2) fixed costs, (3) equipment needs, and (4) skill of the observer.

Data from a study of irrigated and dryland corn production on one soil type in Virginia indicates that either a simple computer-generated water budget or measuring resistance through gypsum blocks performs best for research purposes. Theoretical expectations of accurate performance by oven-drying soil samples and by tensionmeters were not confirmed by field data. Additional data acquired through repetitions of each soil measurement technique or more careful use of the techniques could have yielded more explicit comparisons among their results.

"Returns to Irrigating Corn in Virginia." Denise Gould Daniels and David Kenyon, Virginia Polytechnic Institute and State University.

Field corn yield data from a 6-year experiment under irrigated and non-irrigated conditions were used to estimate a yield response function to moisture levels. Using 26 years of historical rainfall data, irrigated and non-irrigated yields were simulated to determine the profitability of irrigating corn.

"Fertilizer Demand Functions for Five Individual Crops in the United States." Kisan Gunjal, Roland K. Roberts and Earl O. Heady, Iowa State University.

Fertilizer demand functions are estimated for each of five crops, including: feed grains, wheat, soybeans, cotton and tobacco. Crop-specific plant nutrient data were developed at the Center for Agricultural and Rural Development and aggregated for each crop using nutrient prices as weights. The results of estimation suggest that feed grain and wheat farmers are most responsive to changes in the real price of fertilizer, while cotton and tobacco farmers are the least responsive. Results suggest that farmers respond to different economic variables, depending upon the crop being fertilized.

LOCAL GOVERNMENT

"The Importance of Government in U.S. and Southern Nonmetropolitan Economies." Leon E. Perkinson, EDDSCS, United States Department of Agriculture.

State and local government employment more than doubled between 1957 and 1977, but local initiatives such as Proposition 13 may reduce public employment. With over 2.5 million local government employees and additional State government employees located outside SMSAs in 1977, changes in State and local public employment could adversely effect non-metropolitan areas if the public sector provides an important source of work and earnings opportunities.

Government employment exceeded the employment in each of the private sectors examined in over one-half of the U.S. counties, except for farming, for 1976. Government employment exceeded specific sector employment in more than 55 percent of nonmetro counties but in less than 45 percent of metro counties. The pattern for the South was similar but the differences between metro and nonmetro counties were smaller. Ranking employment, State and local governments were the first or second most important source of employment in 46 percent of U.S. counties compared with 36 percent of counties in the South. Government was the main or second most important source of employment in 38-39 percent of metro U.S. and southern counties compared with 49 percent and 35 percent of nonmetro counties, respectively. Governments were more important as a source of employment than as a source of earnings.

"To Improve the Productivity of Local Governments." John Sjo and Arlo Biere, Kansas State University.

The thesis that governmental X-inefficiency is due to the lack of internal production controls is proposed. That thesis differs from the theory of bureaucracy and Stockfish's thesis of X-inefficiency of government because those two are based on the notion that bureaucrats deliberately manage the information about their agency's production. The Ellis County Financial Management system was designed to provide better financial controls consistent with the economic principles of production.

"The Impact of New Industry on County Government Property Tax Revenues." Mark Henry and Kathy Lambert, Clemson University and VPI & SU, respectively.

A behavioral model of local government fiscal actions is developed along the lines of Gramlich [1]. Tax and expenditure decisions are made in an attempt to maximize community welfare subject to a local government budget constraint. Structural equations for tax and expenditure policy are derived and found to form a simultaneous system. A local tax rate equation is derived from the tax revenue identity and the exogenous variables of the structural equations. South Carolina county government data are used to statistically estimate the reduced form parameters. The model reveals the interaction between local tax rate decisions, the tax base and inter-governmental revenues.

[1] Gramlich, E. "State and Local Governments and Their Budget Constraints." *International Economic Review*. 10:2, June 1969, pp. 163-181.

"The Determination of Tax Revenue A Simultaneous Equation Approach." E. Jane Luzar, David L. Debertin and Angelos Pagoulatos, University of Kentucky.

The state legislative decision-making process with regard to the use of the major forms of tax revenue yields a set of interdependent decisions with regard to the levels of taxes. This paper uses a simultaneous equation approach to model this interdependency. The model identifies taxes which compete with each other as sources of revenue, as well as taxes which supplement revenue to expand public services.

LIVESTOCK MARKETING

"A Systems Approach to Initiating an Electronic Marketing System." Jim Russell and Wayne Purcell, University of Georgia.

Electronic marketing has been identified as a possible mechanism to reduce or eliminate spatial imperfections and pricing problems in

"thin" markets. For an electronic marketing system to be workable, either both participants must see economic advantage or one party must see advantage and have sufficient bargaining strength (either natural or legislated) to enforce his views. This paper proposes a systems oriented survey procedure as a means of identifying the concerns, biases, and expectations of potential participants in an electronic marketing system.

To illustrate the procedure a "mirror image" survey which was administered to a sample of Virginia slaughter cattle producers and eastern packers, is examined. The four broad areas of interest covered in the surveys were: (1) the current situation and present attitudes, (2) product description, (3) performance guarantees, and (4) organization and operation. Implications are drawn from the survey results to the development and operation of an electronic marketing system for Virginia slaughter cattle.

"Toward a Performance Evaluation of the Carcass Beef Market." Clement E. Ward, Oklahoma State University.

Reported carcass beef prices serve as a basis for pricing carcass sales and as a starting point in determining a pricing policy for purchasing live cattle. Weak form tests of the efficient markets model were applied to the first differences of the logarithms of reported daily closing prices for 11 carcass beef classes. Results of two tests for kurtosis, a direct test and range to standard deviation test, indicated daily price changes between July 1976 and January 1979 were leptokurtic, and thus, non-normally distributed. Results of turning point and phase length tests indicated daily price changes were serially dependent. Therefore, weak form tests reject the hypothesis that daily price changes are distributed normally and independently. While rejection of the independence assumption of the efficient markets model is not sufficient to conclude the market is inefficient, results suggest market inefficiencies exist. Prices do not seem to adjust efficiently to the influx of new information into the market; however, further research is necessary to fully evaluate performance of the carcass beef market.

"Investment and Operating Costs for Two Types and Three Sizes of Florida Feedlots." James R. Simpson, L. B. Baldwin and F. S. Baker, Jr., University of Florida.

Investment and operating costs for the traditional dirt, open-lot system were compared with those for a total confinement, all concrete, flume floor cattle feeding facility. Three differ-

ent sizes of operation were also evaluated. They are, on a one time capacity basis, 500 head, 5,000 head and 10,000 head. Considerable economies of scale are apparent when moving from 500 to 5,000 head, but little unit cost reduction was noted by increasing lot size to 10,000 head. A final evaluation by using standard project analysis procedures indicated that the flume floor system is the lower cost alternative.

"Optimum Location of Manufacturing Milk Plants to Minimize Marketing Costs." Robert L. Beck and J. Don Goodin, University of Kentucky.

The primary objective of the study was to determine the optimum number and location of manufacturing milk plants in the state that would minimize the total cost of assembling and processing current and future supplies of milk available for manufactured products.

The Granges Method, a modification of the linear programming transportation model, was used to identify the optimum solutions—up to the number of plants needed to process the supply of raw milk. Existing plant locations were identified as processing centers. Actual plant capacities were included as restraints. The use of existing locations and plant capacities adds a dimension of "real world" acceptability to the results.

Results indicate a savings of several million dollars in the assembly and processing of manufacturing milk by operating fewer plants, thus eliminating a great deal of excess capacity in the industry.

AUXILIARY INDUSTRIES: FINANCE AND TRANSPORTATION

"The Distributive Impacts of Inflation." Lindon J. Robison, Michigan State University.

Inflation or rising prices has affected both current and prospective long-term asset owners in significant and different ways. This paper demonstrates how increases in inflation have increased the difficulty of acquiring control of long-term assets, how asset owners may gain from inflation, and why depreciable rather than nondepreciable assets may be more attractive as investments during inflation.

Finally, this paper concludes with recommendations for lenders that may mitigate some of the unequal distributive impacts of inflation.

"Evidence on the Relationship Between Loan Insurance & the Supply of Agricultural Credit." L. Upton Hatch and Wesley N. Musser, University of Minnesota.

Insured farm loans have evolved to be an

important component of the federal role in the agricultural credit subsector. An important possible issue concerns the impact of these programs on the aggregate supply of agricultural credit. It is conceivable that these programs simply transfer credit from farm borrowers eligible for conventional credit to farm borrowers only eligible for federally insured loans. Evidence on this issue would clarify the public objectives served by these programs. The Georgia Development Authority is a unique public, non-profit institution that provides an insured agricultural loan program in Georgia. This paper presents some research on this institution which provides evidence on this policy issue. A simultaneous econometric model of banks in Georgia is developed and estimated with cross section data. The model focuses on the interaction between total agricultural bank loans and loans by the Georgia Development Authority. A number of other hypotheses concerning the banking sector are also incorporated in the model and tested. In general, the results indicate that insured loans increase the supply of agricultural credit. Specifically, the regression estimates support the hypothesis that no redistribution from other farm loans occurs.

"An Analysis of Factors Influencing Use of the Seasonal Borrowing Privilege Among Eligible Member Banks of the Federal Reserve System." Donald D. Osburn and Woodrow F. Dick, University of Missouri - Columbia.

The seasonal borrowing privilege afforded qualified member banks from Federal Reserve banks has not been utilized to the extent that many policy makers hypothesized. This study investigates factors influencing uses of the borrowing privilege of qualified banks in the 8th, 9th, and 10th Federal Reserve Districts. Multi-variate statistical analysis was used to isolate the net effect that selected institutional, business environment, and bank management characteristics had on usage.

"Inland/Ocean Waterborne Transportation Innovations and Port Charges." Gary L. Belcher, James R. Jones and Karl H. Lindeborg, University of Idaho.

Recent innovations in the area of agricultural commodity transportation have greatly affected the impact of port charges upon the total transportation bill. Container-on-barge and barge-carrying vessel technologies are new applications of intermodal transportation to agricultural commodity transportation which lessen or eliminate the rehandling of goods at the ocean port of embarkation. This study had two objectives: (1) to identify transportation

modes and analyze the economics of transportation of bagged farm exports, and (2) to present a comparative analysis of port charges for different modal interfaces at river and seaports. Although a specific commodity and region were dealt with here, the analysis should have applications to similarly shipped commodities in similar shipping environments. The findings indicate that the container-on-barge concept should work well for bagged farm commodity shipping within regions with inland waterways. The barge-carrying vessel concept is less competitive for bagged shipments given the high loading costs at the inland port and limited service and schedules.

PRODUCTION AND FARM MANAGEMENT

"A Portfolio Analysis of the Beef Calf Backgrounding Enterprise in Georgia." Wesley N. Musser, W. D. Shurley and F. W. Williams, University of Georgia, Purdue University and University of Georgia, respectively.

Portfolio analysis has become a popular framework for normative analysis of agricultural firm problems. However, most applications emphasize either production or marketing decisions. This paper presents a portfolio analysis of the beef backgrounding enterprise in Georgia which considers interaction between production and marketing. A quadratic programming model of selected production-marketing alternatives is developed for the beef backgrounding subsector of a diversified farm firm. Optimal parametric solutions are then derived for three general marketing situations, emphasizing herd composition constraints related to grade and sex of calves. The solutions indicate that risk-returns tradeoffs exist for this enterprise. However, these tradeoffs do not arise from different combinations of activities as much as from different activities and/or activity levels in the various solutions. Comparison of solutions for the different herd composition constraints also indicates that considerable efficient risk-reduction can arise from the opportunity to purchase graded lots of calves. A general conclusion of the study is that portfolio analysis of a production subsector allows more attention to various marketing alternatives than is possible in broader production analysis.

"Culling and Replacement Strategies for Optimal Herd Size Maintenance." James N. Trapp, Oklahoma State University.

Results of this study indicate that given cyclical feeder cattle prices the optimal cow herd size varies cyclically in a cycle which

"peaks" and "bottoms" three years ahead of the feeder calf price cycle. Culling ages should vary from 6 to 13 years of age depending upon the phase of the cattle price cycle. Culling and replacement rates should both be two to three times more rapid in the up phase of the cattle price cycle than in the down phase. An average culling and replacement rate of 18.9 percent was found.

"Use of Recursive Linear Programming to Simulate an Energy Conservation System in Dairies." Bill Miller and Randal C. Copeland, University of Georgia.

Changes in energy price levels are expected to cause a change in the input mix used to produce energy. An increasing number of energy conservation devices are expected to become economically feasible. In the absence of empirical or first hand information, it will be important to develop simulation models. A linear programming example is presented that forecasts 40 to 60 internal rates of return for dairymen. If generally adopted throughout the U.S., the forecast in savings is 58 million dollars per year, or the equivalent of three million barrels of crude oil.

"Using a Microcomputer in Teaching Farm Management." Mark Wilsdorf and Ken Schneeberger, University of Missouri.

LAND USE INSTITUTIONS

"Factors Affecting Agricultural Differential Assessment Legislation." Rod F. Ziemer, Fred C. White and Ivery D. Clifton, University of Georgia.

In response to an increased urban demand for rural land many states have elected to enact differential assessment legislation in an attempt to preserve open space and agricultural land. Such laws allow farmland and other types of rural land to be assessed on the basis of value in current use rather than market value. The purpose of this study is: (1) to identify factors affecting adoption of state agricultural differential assessment laws, (2) to determine the effect these factors have on the type of differential assessment legislation adopted, and (3) to predict what type of differential assessment legislation may be adopted by states which presently have no such laws.

"The Model Land Development Code: Florida's Experience." Clyde Kiker and Gary D. Lynne, University of Florida.

"The Incorporation of Efficiency Analysis in Environmental Management: A Case Study of Virginia Wetlands Law." Carl C. Mabbs-Zeno and Sandra S. Batie, Virginia Polytechnic Institute and State University.

Coastal wetlands in Virginia are managed through local boards of volunteers who perform informal cost-benefit analyses for each proposed modification of wetlands. Their ability to generate and utilize information appropriate to this analysis is investigated through records, interviews, public meetings, and several questionnaires. Their efforts were found to incorporate many subtle insights into the value of proposals, but their overall economic analysis lacks the sophistication necessary for conceptually valid use of available information. Local boards, however, were found to possess important information and abilities which is generally unavailable at other administrative levels with the result that wetlands management in Virginia performs well in relation to many alternative management strategies for the purpose of offsetting environmental externalities.

"Landownership in the Southeast." Douglas G. Lewis, NRED, United States Department of Agriculture.

This paper is intended to make the profession aware of a new landownership data base and to present some findings and contrasts with an earlier landownership study. The Economics, Statistics, and Cooperatives Service of the U.S. Department of Agriculture has recently completed a nationwide landownership survey. It focuses on owner characteristics, but can be joined with related information on land capability and use and investment behavior. The data are available to interested researchers.

Over 60 percent of the estimated 168.1 million acres in private ownership in the Southeast is held by sole proprietors and husband-wife ownership units. Farmers are the occupational group with the largest holdings, almost 29 percent. Little land is owned by people under 35 years of age. Over 60 percent is owned by people 55 and over. Individuals with high incomes tend to own a disproportionate amount of land. Owners with 180 acres or more make up only 1.3 percent of the owners but hold almost 60 percent of the land. Research is underway exploring the links between ownership and use of land.

FIELD CROP PRICE ANALYSIS

"The Demand Structure of Field Crops and Policy Implications." Harry S. Baumes, Jr., Abner W. Womack, Virginia Polytechnic Insti-

tute and State University.

The objectives of this paper were to examine the demand structure of agricultural field crops and to assess the impact of government actions in each of the structures. A stock adjustment and price adjustment demand structure was estimated for both corn and wheat using the ordinary least squares procedure. A comparison of the models' predictive capabilities was made over the 1964-75 historical period and the 1976-78 forecast period. The results indicate that the price adjustment model tends to yield biased predictions, when estimated lagged endogenous variables are used for a complete model solution, for both corn and wheat over the historical period. However, the stock adjustment model was not supported over the forecast period.

An overall direct price elasticity for corn of $-.33$ and $-.44$ and for wheat of $-.43$ and $-.59$ for the stock adjustment model and price adjustment model, respectively, was estimated. This infers that the price adjustment model is approximately 37 percent more price responsive than the stock adjustment model. This leads to different market impacts when considering demand oriented policy alternatives. Policy instruments included in the study were production, government ending stock levels, and government controlled exports.

"An Analysis of the Chicago Corn Basis, 1960-1978." Kandice H. Kahl, United States Department of Agriculture.

The Chicago corn basis increased in harvest months of 1970-1978 from its 1960-1969 level. It decreased in summer months of 1973-1975. Evidence supports the hypothesis that increased demand for available storage space contributed to the harvest increase. Increased convenience yield because of less stocks contributed to the decreased summer basis.

"Forecasting South Carolina Tomato Prices Prior to Planting." Gary J. Wells, Clemson University.

Attempts at forecasting South Carolina's spring tomato prices as early as January are aided by the dominant position that Florida plays in the East coast tomato industry. This paper constructs a forecasting model based on this dominant position. South Carolina tomato prices are presented as a function of acres of tomatoes planted in Florida for harvest in the fall of the previous year and the winter and spring of the current year as well as seasonally adjusted real expenditures on food for the fourth quarter of the previous year. These variables were chosen because of the ability to find estimates in time to make a prediction in January and the contribution that the measure

makes to the objective of forecasting.

The model accepted has desirable statistical properties and its forecasting ability for the years 1970-1979 is encouraging. In contrast to a model assuming no change the model presented has 41 percent of the forecast error.

Evidence is also presented that a structural change occurred in the relationship that Florida plantings and food expenditures have on South Carolina's price. Adjustment for this change is encouraging but until verification is possible the non-adjusted model is suggested for producer-extension contract.

"A Model of Price Discovery for Florida Celery." J. Scott Shonkwiler and Emilio Pagoulatos, University of Florida.

RESOURCE USE

"Two-User Fishery Conflicts. An Economic Analysis of the Texas Brown Shrimp Fishery." W. L. Griffin, J. P. Nichols, G. C. Tydlacka and W. E. Grant, Texas A&M University.

A proposal to close the spring open season in the Texas brown shrimp fishery is evaluated in terms of the different impacts on two groups of commercial users. Production functions are estimated including relationships between inshore fishing effort and subsequent offshore catch. Results indicate that a reduction of one pound of catch in inshore waters is associated with an increase in 2.6612 pounds caught offshore in later months. The aggregate gain to the fishery may be as high as \$10.3 million but inshore boat owners and crewmen will lose as much as \$1.16 million. Offshore vessel owners and crews are the gainers.

"Estimation of Sustained Yield Functions, Harvest Levels and Hunting Success Rates for Deer by Use of a Predictive Time Series Model." Roger Mann, Virginia Polytechnic Institute and State University.

An economic estimation of sustainable deer yields, harvest levels and success rates can be of great value for Fish and Game managers. These government officials must often consider long run impacts of regulatory actions on quality and quantity of hunting services. An economic model is developed demonstrating that current harvest and success rates are dependent on past numbers of hunters allowed to harvest the deer herd. A general methodology of deriving sustained yield functions from a predictive model is developed and explored. Finally, estimated sustained yield functions for deer herds in Nevada are given.

"An Analytical Framework for the Efficient Allocation of Agricultural Research Expenditures by States." Nathan M. Garren and Fred C. White, University of Georgia.

The allocation of agricultural research expenditures among research areas traditionally has been an informal, often subjective, process within the various states. Attempts to introduce objectivity into the decision making process have taken many forms. One of which is an analytical framework designed to allocate limited research funds efficiently by equating the value of marginal product of research for all commodities for the state. This paper extends the basic analytical framework by including externalities, both spillins and spillouts, in the calculation of the VMPP's. Such an extension allows one to identify both an efficient allocation for the state and socially optimum allocation for the nation in light of externalities. The application of the developed framework to a hypothetical situation indicates allocation strategies for the state acting in its own best interest different from allocation strategies for the state acting in the best interest of the nation. For there to be efficient and socially optimal allocation of research expenditures both spillins and spillouts must be considered.

"A Statistical Approach for Identifying Socioeconomic Structure in Rural Communities." Don Blayney and Gerald Marousek, University of Idaho.

Rural communities undergoing change, be it growth or decline, are confronted with adjustment problems. Both public and private sector officials need information to determine development potential and strategies. Factor analysis is a statistical technique based on identification of structural relationships in data. It serves two purposes: 1) indication of potential policy targets through factor identification and 2) a ranking of the factors. Data describing socioeconomic characteristics of Idaho counties were factor analyzed. Six significant factors, 1) FOREST, 2) FISCAL STATUS, 3) STATE-FEDERAL, 4) EDUCATION-EMPLOYMENT, 5) AGRICULTURE, and 6) WELFARE were identified. The ordered rankings suggested that natural resources receive first consideration in choosing among community development activities, followed by fiscal policy, state and federal government action, and educational and employment policies. Change in economic structure is a basic phenomenon of development. In rural areas, the structure of the economy and the relative importance of elements within the structure are useful in determining development potential and selecting strategies for development. Natural resource-based activities, education, and employment opportunities are

generally associated with rural economic development; impacts of government actions also have become recognized as important. This study confirms the prominence of these elements in the structure of rural Idaho communities.

QUANTITATIVE METHODS

"Solving Quadratic Programming Problems via Separable Programming." William G. Boggess and V. A. Sposito, University of Florida and Iowa State University, respectively.

This paper displays how an eigenvalue diagonalization procedure can be used to transform a quadratic programming model to a separable programming model, demonstrates how to set up the transformed problem, and briefly discusses the advantages and disadvantages of the approach. The approach allows the research to efficiently handle large scale problems and to take advantage of the greater accessibility and flexibility of linear programming algorithms. The technique is particularly well suited to problems with a large number of linear constraints and a relatively small number of quadratic variables such as competitive equilibrium models and detailed farm programming models incorporating risk considerations.

"Forecasting Aggregates of Dependent ARIMA Processes with Applications to Some Agricultural Series." D. A. Bessler, Purdue University.

Results on forecasting aggregate ARIMA processes are extended to cover dependent micro series. Two empirical series are analyzed using these results.

"Developing Regional Input-Output Models from U.N. Format Adopted by the U.S. in the New 1972 Input-Output Tables." Dennis DiPietre and Rodney L. Walker, University of Arkansas.

Newly adopted changes in the treatment of secondary products are reflected in the 1972 Input-Output tables of the U.S. economy released to the public in 1979. These changes alter the solution methodology and the procedures commonly used to develop regional Input-Output models. This paper contains a description of this new methodology and associated changes in developing and solving regional models.

HOUSEHOLD CONSUMPTION

"Household Expenditure of Meat vs. Non-meat Sources of Protein in the United States."

Barbara J. Redman, University of Georgia.

Vegetarianism has recently become more prevalent in the U.S., and other households have considered decreasing their meat consumption. This has been due to economic factors such as income and relative prices, and to social consciousness, which is manifest in increased concern about both health hazards associated with overconsumption of meat and the need to feed an increasing world population. This study examines factors affecting expenditure on non-meat protein relative to meat protein, using the Bureau of Labor Statistics 1972-74 Consumer Expenditure Surveys. The woman's college education, as an indicator of social consciousness, had a positive effect on relative non-meat protein expenditure. Negative influences included income, the presence of older children in the household, black racial identity, and residence in all regions of the U.S. except the Pacific region. These correspond to the determinants of meat, non-meat, and total protein expenditures when estimated separately. Still, only a small percentage of variance was explained; available data did not provide good measures of consumer tastes or personality variables which have more importance in explanations of socially conscious behavior.

"Analysis of Food Nutrients Purchasing Behavior of Low Income Households in the Southern Region of the U.S." Chung-Liang Huang and W. Keith Scarce, University of Georgia and Oklahoma State University, respectively.

The objective of this study was to test the hypotheses that the Food Stamp Program (FSP) improves the nutritional status of the low income households in the southern region of the United States. The study utilizes data developed from the Bureau of Labor Statistics 1972-73 Consumer Expenditure Survey. The study also applies the Box-Cox transformation technique to sample data to test and determine the appropriate mathematical form of the statistical model.

The results of this analysis indicate that stamp recipients behave somewhat different from those of nonparticipants. Implication of the differing food patterns as reflected in the estimated elasticities suggests that the participant households generally purchase more nutrients than their counterpart of eligible nonparticipants. The results also suggest that the FSP participants tend to use an increasing portion of their income freed by the FSP to expand purchasing of nonfood items. The negative household size elasticities and positive expenditure elasticities of greater than unity for nutrients vitamin A and vitamin C seem to imply that certain food items such as fruits

and vegetables may be considered as luxuries by the FSP participant households.

"Impacts of Selected Nonfoods, Foods and Socioeconomic and Demographic Characteristics on the Decision to Purchase Various Meats and Seafoods in the U.S. and the South." Oral Capps, Jr. and Joseph Havlicek, Jr., Virginia Polytechnic Institute and State University.

A complete systems framework is used to identify and assess the factors that affect the choices among various meats and seafoods for home consumption as well as other commodities. Employing a constant elasticity of demand system, traditional factors such as own prices, prices of substitute and complementary commodities, and income are significant factors affecting the demand for meat and seafood products. In addition, the nontraditional factors of food away from home, fuels for home heating, gasoline, family size, and location of place of residence influence consumer purchases of various types of meat and seafood products.

"A Cross-Sectional Survey of Indoor Foliage Plants in Florida Households." Ella Carl and J. Robert Strain, University of Florida.

Consumer surveys for information on commodities which are produced locally can provide useful and unique information for Extension programs with growers and retailers. These surveys are particularly valuable for evaluating current attitudes toward and future demand for the product. Research conducted at the University of Florida concerning consumer purchasing patterns for house plants provides an example of this type of work. Responses were tabulated and subjected to various statistical tests. It is suggested that this technique can be a valuable tool for other economists working with other products of local economic importance.

INTERNATIONAL TRADE

"The Effect of Market Forces on Trade Barriers." Michael R. Reed, University of Kentucky.

This study examines the effects of various factors, including trade barriers and exchange rates, on the import demand for feed grains by Japan, Spain, and the United Kingdom. The level of trade barriers for a particular country is endogenously determined via a governmental utility function which incorporates the arguments for protection. The results support the hypotheses that trade restrictions are changed by governments when market forces inside the country change.

"The Variable Levy: A Barrier to Grain Imports in France, Netherlands, Federal Republic of Germany and United Kingdom." Cathy L. Jabara and Alan S. Brigida, United States Department of Agriculture.

This paper describes the European Community's variable levy as a barrier to grain imports and shows the effect of Monetary Compensatory Amounts in determining protection levels in member countries. Nominal protection from levies is estimated for France, Netherlands, Federal Republic of Germany and United Kingdom. Effective protections is estimated for France and Federal Republic of Germany.

"The Influence of the Foreign Sector on the U.S. Market for Unmanufactured Burley Tobacco." Jeffrey Aplan and Michael R. Reed, University of Kentucky.

The concern burley tobacco producers have voiced recently concerning the U.S. burley price versus foreign burley prices is examined in this paper. The relationship between U.S. burley exports and foreign burley prices is investigated. A simultaneous system of the U.S.

market for unmanufactured burley tobacco, which includes three behavioral equations and one identity, is estimated.

The results indicate that U.S. burley exports have been affected by market conditions in foreign countries. Specifically, the price of Greek burley, world population, and world income were found to have a substantial impact on the volume of U.S. burley exports.

"The Benefit of Free Entry of Soybean Meal into the European Community." Philip L. Paarlberg, United States Department of Agriculture.

Analysis demonstrates that the zero binding on soybean meal imports into the European Community benefited soybean crushers in exporting nations, mainly the United States. A hypothetical import tariff on soymeal imports results in declining crushing margins for non-E.C. Processors, and soybean processing shifts to the community.

"Market-share Analysis of U.S. Peanuts Exports." Glen C. W. Ames, University of Georgia.