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Session 7-A: Transportation Processing Systems: Two Case Studies in Agriculture
Session chair: Walter J. Armbruster, Farm Foundation

Summary by Session Chair:
This session took a bit different cut at transportation than most, examining two industries in Pennsylvania in a systems context.

The Madison and Beierlein paper presented an optimizing analysis for the shell egg industry. Results have implications for managers seeking profitability of shell egg operations in an industry with excess capacity. The importance of transportation as well as processing efficiencies must be considered since eggs can be economically shipped a considerable distance before offsetting efficiencies gained in processing at larger facilities.

The discussion centered around the implications of this result for a number of small plants in Pennsylvania. Transportation costs are a major factor in the flow of shell eggs. Clearly, a small number of large plants could process all Pennsylvania eggs. Since there is a near even trade-off between transportation and processing costs, management must pay attention to the transportation as well as the processing system.

The Dunn, et. al. paper reported an interdisciplinary research effort with important implications for potato chippers, potato growers and the transportation system. The results may be applicable in a number of states, given Pennsylvania's location close to large population concentrations. Even though the state produces only about 1.5 percent of the U.S. potato production, it accounts for about 18 percent of the potatoes used for chips.

Discussion centered around the fact that it is possible to make good returns on investment in potato storage facilities if storage is used to hold potatoes for the February-April processing period to replace those currently shipped in from North Dakota. It was also suggested that it may be possible to adopt alternative ways of extending storage life. Radiation technology is one alternative, although discussion indicated that it probably is not a feasible technology because
of cost relative to the economics of shipping potatoes.

Optimizing the Transportation-Processing System: The Case of Shell Eggs, by Milton E. Madison and James G. Beierlein.

Milton E. Madison is with the Pennsylvania State University, University Park, Pennsylvania.

James G. Beierlein is Associate Professor, Agricultural Economics, Pennsylvania State University, University Park, Pennsylvania.

A system approach to the assembly, processing, and distribution of shell eggs in Pennsylvania was evaluated using a network analysis algorithm that minimizes the total cost of moving shell eggs from the farm to consumers. The use of the network algorithm permits the examination of the trade offs that arise from seeking greater efficiencies in either transportation or processing, and their impact on total system cost.

The total system was first optimized and then various parametrics were performed. These included: changes in plant capacities, consumer demand for shell eggs, processing cost differentials per dozen for various sized plants, and changes in transportation rates.

Optimization of the current system showed that a few plants (< 15) could perform the processing now done by 108 plants. The presence of excess processing capacity and the low density of eggs combine to make it possible to be profitably transported long distances. Performance of the various parametrics listed above did little to change the optimal solution reached above. Thus, Pennsylvania's shell egg industry has the

potential for a radical transformation from one made up heavily of many small local processing facilities to one that is dominated by just a few large processors.

Spatial and Temporal Aspects of Potatoes for Chipping: Current Practices and Future Directions, by James W. Dunn.

James W. Dunn is with the Pennsylvania State University, State College, Pennsylvania.

Sixteen Pennsylvania potato chip makers are surveyed about their potato acquisition and storage practices. The feasibility of storing potatoes for chipping at the plant is examined. Storage of potatoes by the firms appears to be economically attractive, especially for periods from four to six months. Under current practices, Pennsylvania chippers buy local potatoes from August through April, although purchases from nearby sources decline and are replaced by purchases of North Dakota potatoes as this period progresses. Regardless of the source, purchases from November through April must come from storage. For May through early August, newly harvested potatoes are purchased from the southern state that is harvesting in that month. Although all chippers store some potatoes, few store enough for their storage period needs. Most buy potatoes as they need them.

If more potatoes are stored at the factory, potato purchases, and therefore shipments, will be concentrated into September and October rather than spread over the storage period. This will increase the demand for transportation in September and October and decrease demand in November through April. This would aggravate the existing seasonality problem in agricultural transportation, particularly if the incentives for at-plant storage in Pennsylvania also exist in other states.

Session 7-B: Analysis of Commuting Alternatives
Session chair: Anthony M. Pagano,
University of Illinois-Chicago

The Determinants of Mass Bicycle Community Revisited, by Michael D. Everett.

Michael D. Everett is Associate Professor, East Tennessee State University, Department of Economics and Finance, Johnson City, Tennesse.

Considerable agreement exists that mass bicycle commuting could generate substantial economic, environmental, and health benefits for short trips to congested areas (Everett, 1977) such as to schools, business districts, and mass transit terminals. Theoretically the determinants of mass bicycle commuting include: Perceived safe access which generally means separation from high to even moderate speed-volume (SV) traffic, trip distances of around 1 to 3 miles, and bicycles providing relatively fast transportation because of congestion or restrictions on driving.

The major controversy over this paradigm involves the role of bikeways (paths and lanes). Some major recreational bicycling organizations have opposed separated bicycle paths and lanes vigorously because they may lead to a dejure or defacto restriction of cyclists from the road. On the other hand, numerous surveys have found that the overwhelming majority of actual and potential cyclists desire separation from high and even moderate SV traffic (Everett, 1982).

This paper refines an earlier empirical study on where and under what condition mass bicycle commuting occurs in the U.S. (Everett and Spencer, 1983). The paper finds mass cycling only to public schools and universities. Regression models find the major determinants of this mass cycling