

Cotton and Field Crop Costs and Returns

Identifying risks and opportunities for the Central Arizona region

No one can predict the future exactly, but agricultural economic analysis can assist farmers by identifying trends that might continue. A study of cotton and field crop prices, yields, and costs of production, completed in 1996 by UA agricultural economists Bruce Beattie and Jeff LaFrance, with Brett Franklin, an M.S. graduate student, indicates declining net returns per acre for cotton, wheat and barley, and stable figures for alfalfa.

"The main problem is the downward trend on real prices of crops — it's been down since 1945 and it's not going to go away," Beattie says. "The message is that producers have to continue to fight hard to increase productivity by increasing yield and reducing costs per unit of output."

The researchers conducted the study using historical field crop figures (cotton, alfalfa, wheat and barley) for three counties: Maricopa, Pinal and Pima. The study was part of a larger economic analysis of Central Arizona Project Canal water prices and their implications for growers. A report was presented to CalCot, and was also distributed to Cotton Incorporated.

"This three-county area accounted for 74, 43, 65, and 85 percent, respectively, of Arizona's harvested acres of cotton, alfalfa, wheat and barley in 1994," Beattie says. The analysis involved a time-path "forecast" framework, which is really a set of trend extrapolations, to address agricultural profitability. It focused on three key areas:

1. real product prices received by producers
2. crop yields per acre
3. real costs of production per acre.

Based on these forecasts, the researchers were able to estimate a time-path of future real net returns per acre. They drew figures, starting from the middle of the 20th century, and made projections into the next century using annual crop price data, yield data and cost of production data in their calculations. "Real" costs and prices are those that have been adjusted for inflation.

In the study, the "bottom-line" calculation involved multiplying the "forecasted" future price per unit times "forecasted" yield per acre and

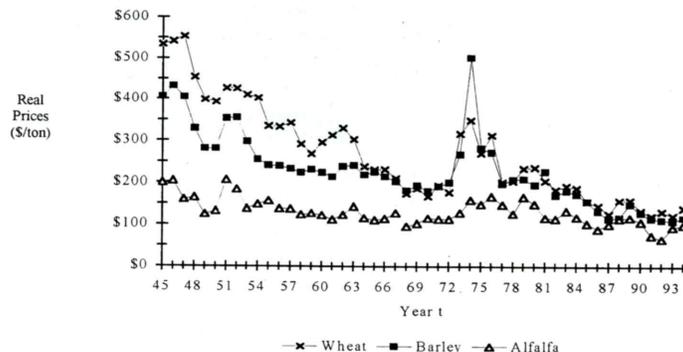
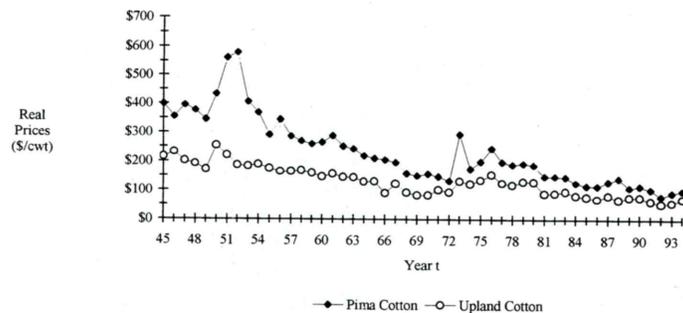
subtracting "forecasted" variable costs of production per acre for selected future time periods to get at "forecasted" net returns (profitability).

For product prices, the team used time-series data from 1945 to 1994 for Pima cotton, upland cotton, cottonseed, wheat, barley and alfalfa, published by the Arizona Office of the National Agricultural Statistics Service (NASS). The figures showed a long historical decline of inflation-adjusted prices for all of these crops.

The same source provided yield data for each crop: 1950–1994 for cotton, all three counties; 1957–1994 for wheat, Maricopa and Pinal counties, and 1968–1994 for Pima County; 1956–1994 for barley, Maricopa and Pinal Counties, no data for Pima County; and 1959–1994 for alfalfa, all three counties. The simple linear time-trend model, with a one-year yield lag variable, showed a positive yet modest trend for all three commodities for all three counties.

As for cost of production, they used data from 1975 through 1992 that are collected and published by the Arizona Cooperative Extension at The University of Arizona.

"These simplified forecasts indicate that net returns per acre decline in each forecast year for upland and Pima cotton and wheat in all three counties and for barley in Pinal county," Beattie says. "A similar pattern is exhibited for barley in Maricopa County beginning in 2000. Out of net returns the producer must cover water cost and payments for capital investment (durable inputs) over the long run." As for alfalfa, he believes that net returns per acre do not decline for that crop because it is produced mainly for local markets. Because of high transport costs, Central Arizona probably won't become either a major exporter or importer of alfalfa.



"If we were to have done this study nationwide we'd have gotten similar results," Beattie says. "Arizona is not unique. The long-term trend in prices is flattening and it isn't going to rise any time soon. The worldwide level of competition is going up, not down, as trade barriers are reduced." Other factors that will influence field crop profitability in the future include water costs, the public's attitude about open space and agriculture's place in preserving it, and keeping up research conducted locally to improve production in different microclimates across the state.

Beattie says that consumers also benefit from agricultural production research. "The winners from that are not mainly agriculturalists but rather consumers. If you have declining real prices for food, as has been the case in the U.S., that obviously helps the consumer."

Despite the bleak figures, Beattie does believe that continued agricultural productivity improvements will offset some of the negative effects of declining product prices on profitability. "It's naive to think we're not going to continue to make progress on yield in all areas," he says. "Small improvements are definitely in the future, and they will have a large impact on our cost of production per unit of output."

— Susan McGinley