

Reducing the Cost of Cotton Production

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Introduction

The goal of every cotton producer is to maximize profitability in his or her business. The current political and economic environment in which producers operate makes this goal particularly challenging. Increasing global competition and scrutiny of agriculture policy are of specific concern. With the future of government support payments in jeopardy, it becomes increasingly apparent that cotton price and yield alone must be sufficient to cover all production costs and provide an acceptable return on investment.

This fact sheet lists some suggestions Arkansas farmers may consider to lower production costs and increase profitability. These suggestions include developing a marketing plan, identifying high-cost fields, good machinery management, performing cultural practices on time, improving irrigation timing, reducing late-season insecticide sprays and precision agricultural applications.

Developing a Marketing Plan

A marketing plan is an essential step in effectively managing price risk. A plan includes evaluation of the financial position of your business, risk-taking philosophy, timing of cash flow, estimated breakeven cost and a realistic profit margin based on selected pricing strategies (Anderson, 2000).

A marketing plan is a written strategy of when and how the crop will be sold. A crucial element in the

marketing plan is the objectives. If the objectives include covering the cost of production and family living expenses, then the cost of production for each commodity must be determined (Smith, 1997). These costs need to be expressed on a per pound of lint basis so they can be compared to prices being offered in the market. When market price reaches a level that will allow the farm to accomplish some or all of its objectives, action should be taken to "lock in" at least a portion of the crop at that price.

While a good marketing plan may reduce costs, it can also help stabilize net income. As a final comment, markets will not give you anything if you do not take action to implement your marketing plan.

A marketing plan built into an Excel® spreadsheet is available through the Cooperative Extension Service. It will help the user develop a plan for cotton, rice, soybeans, corn or wheat. Using excerpts from Extension's online production budgets, the user is guided through the budgeting process, estimating yields and market prices, breakeven prices and yields and marketing methods and timetables. The spreadsheet is named **MarketingPlanSar.xls** and is available at no cost by contacting the authors of this fact sheet.

Identifying High-Cost Fields

The cost of producing cotton varies by region and from field to field. Field characteristics such as soil type, topography, irrigation capabilities and pest pressures make some

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fields better suited for cotton production than other fields. Of the six fields enrolled in the Cotton Research Verification Trials in 2004, cost of production ranged from \$0.37 per pound to \$0.50 per pound (Groves, Robertson and Bryant, 2004). Cost of production includes annual direct costs – for example, seed, fertilizer, chemicals, etc; the annual portion of fixed costs – for example, depreciation on machinery and irrigation equipment, etc.; and annual rent, either cash or crop share. Taking the high-cost fields out of cotton production and using them to produce some other crop will reduce the overall cost of producing cotton for that farm. Identifying the cost of production on each field requires a rather extensive, though not prohibitive, record-keeping system. However, fields that typically have low yields and high pest pressures are the most likely candidates for a high cost of production.

Good Machinery Management

The manager must control the size of this investment and the related operating costs (Kay and Edwards, 1994). Machinery and motor vehicles represent a large investment on commercial farms, as much as \$500 to \$700 per acre on small- to medium-size cotton farms. This represents a total investment per acre for machinery and equipment and is not an annual expense. Iowa State University calculated the machinery investment per crop acre in 2001. Their high-profit grain farmers averaged \$228 per acre in machinery investment while their low-profit grain farmers averaged \$245 per acre (Bryant et al., 2005).

Maintaining flexibility in equipment purchases is another way to manage machinery and equipment costs. Purchasing equipment to use for more than one crop helps spread the cost of that machine over more acres. Short-term leasing and custom hire are very economical ways to secure needed machinery services when extra capacity will only be needed for a short time. Conservation tillage or no-till farming can permit a reduction in machinery and labor needs if adopted on a large scale.

Performing Cultural Practices on Time

Management of cotton to achieve timeliness is critical if cotton is to be a profitable enterprise. Growers can significantly influence crop timeliness through many of their management decisions and actions (Bonner, 1993).

Cotton can better compete with pests if it is healthy and actively growing. Rapid emergence of a healthy, uniform stand is the foundation for maximum early season growth. Cotton flowering will be delayed when physiological, chemical or insect-related stress retards square formation or causes square abscission or shed (Mauney and Stewart, 1986).

The effectiveness of cotton pesticides is entirely dependent on timely application. Once fields are in a salvage situation, their potential for low cost is at risk. Growers should always follow label recommendations to avoid delays in maturity, especially when considering over-the-top treatments of conventional herbicides. Even in glyphosate-tolerant cotton varieties, mis-applications of glyphosate can cause early fruit loss and delay maturity. Return to any treatment, whether herbicide or insecticide, is greatest when the treatment is applied on time.

A timely harvest will increase or maintain the value of an investment in cotton. Each day mature cotton is left unharvested, the potential exists for reduced quality and yield. In addition, the number of days and hours suitable for harvest progressively decline through the fall. Proper management and timing of operations throughout the entire growing season will commonly translate into an earlier harvest.

While weather can have a significant impact on the ability to perform cultural practices on time, growers who are able to do so are often rewarded with lower costs and higher yields.

Improving Irrigation Timing

Improved irrigation timing can be accomplished using the Arkansas Irrigation Scheduling Program developed by the University of Arkansas (Ferguson et al., 1996). This program is a computer-based “check-book” system. It uses average daily high temperature, rainfall and irrigation amounts and crop development stage to predict the need for future irrigations (Bonner, 1995).

“Watering a week or a few days earlier than actually required seldom causes a problem. However, when irrigation is delayed a few days beyond the actual need, the impact can often be adverse to both yield and earliness” (Bonner, 1993). Cotton plants generally need water before visual signs of water stress appear (Tacker, 1998). The Arkansas Irrigation Scheduling Program has shown to be a practical decision aid for helping the grower to irrigate timely enough to satisfy the crop’s water needs during the season while better managing his irrigation water and labor (Tacker et al., 2004). There is currently research underway (but not completed at this time) which suggests delaying irrigation by two weeks from a timely start will result in economic loss of approximately \$8 per acre minimum (basis cash rent) or \$6 per acre (basis share rent). Delaying irrigation by four weeks results in an approximate loss of \$50 to \$90 per acre maximum (basis cash rent) or \$40 to \$60 per acre (basis share rent).

Using the Arkansas Irrigation Scheduling Program may increase the number of irrigations per field and thus increase the cost of production per acre. However, improved irrigation timing is expected

to increase cotton yield and promote earliness, thereby reducing the cost of production per pound and enhancing economic returns.

Reducing Late-Season Insecticide Sprays

Reducing late-season insecticide sprays can be accomplished by using the BOLLMAN program. COTMAN is a computer-based expert system that contains BOLLMAN as one of its components. BOLLMAN helps with the timing of insecticide termination (Bourland et al., 1997). It identifies the flowering date of the last population of bolls expected to make a profitable contribution to yield. After 350 heat units have accumulated beyond this date, the last population of bolls is considered safe from pest damage and insecticide sprays can be terminated. Pests may still be present in the field but will be feeding on bolls that would not contribute to profits. Terminating insecticide sprays as recommended by BOLLMAN is expected to reduce insecticide control costs by \$18 per acre without reducing cotton yields (Hogan and Robertson, 2004).

A non-computerized version of BOLLMAN is available for individuals who are not prepared to invest in the computer-based COTMAN system. For information on obtaining a copy of BOLLMAN or COTMAN (either computerized or non-computerized), contact your county extension agriculture agent or the Arkansas Agricultural Experiment Station.

Precision Agriculture

Precision agriculture (PA) is the application of spatial information technology to a cropping production enterprise. Current precision agriculture technologies include Global Positioning Systems (GPS), Geographic Information Systems (GIS), yield monitors, variable rate technologies (VRT) and other technologies. These have now been commercially available for approximately 15 years and are currently in use by producers.

Yield monitor adoption is often the yardstick by which PA is measured. Around the world, yield monitors are the single most common precision agriculture technology. However, recent studies have shown only approximately 1% of the acres planted to cotton was being harvested with pickers using yield monitors by the end of 2000 (Griffin et al., 2004). It should be noted that the cotton yield monitor became available in 1998. Industry claims benefits of precision agriculture include 1) reduction in equipment overlap, 2) increased speed of field operations, 3) longer workdays, 4) greater flexibility in hiring labor and 5) more appropriate placement of production inputs.

The use of soil mapping (another component of PA) is increasing in cotton. Cotton acres that are soil

mapped have doubled, beginning at 3.1% in 1998 and increasing to 14.2% by 2000. The use of remote sensing data also appears to have great potential in commercial cotton production. It is expected that remote sensing in cotton (using NDVI images obtained from aerial sources) has increased and perhaps exceeds that of corn and soybeans substantially (OSU, 2003; Larson et al., 2004).

Results of previous studies into the economics of precision agriculture, site specific or variable rate techniques are mixed. Some studies have reported positive returns to this emerging technology such as VR seeding for cotton (Larson et al., 2004). Other studies show costs that are higher than returns or no statistically significant difference in returns such as auto-guidance (AG) technology. A recent AG technology study indicated this technology is profitable only when farm size can be increased (Griffin, Lambert and Lowenberg-DeBoer, 2005). It appears the economics of its use may depend on the individual situation, and managers must determine whether or not this technology is right for their enterprise. However, some generalizations can be made. Precision ag is more likely to be economically feasible if used on:

1. Larger operations, where ownership costs can be spread across more acres if the operator will need to acquire variable rate equipment, skills or durable information. However, if the operator uses a crop consultant for soil testing, recommendations development and uses custom application, then ownership cost may not be significant.
2. High-valued crops compared to lower-valued commodities. Examples of high-valued crops are vegetables, production of certified seed or potatoes, while examples of commodities are commercial corn, soybeans or wheat.
3. Intensively managed operations with a high degree of planning, monitoring and control already in place.

Some aspects of precision farming have become standard practice for North American agriculture. However, the most durable investment that farmers and agribusiness can make in this area is the development of management skill and databases.

Summary

This fact sheet has presented some suggestions Arkansas farmers may consider to lower production costs and increase profitability. The current farm legislation provides farmers with more freedom to choose what they produce and how they produce it. This flexibility, however, demands a higher level of management from the producer, especially during this era of ever increasing global competition and market volatility.

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