

ECONOMIC AND ENVIRONMENTAL ANALYSIS OF THE BOLL WEEVIL ERADICATION PROGRAM IN MISSISSIPPI

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Abstract

The Boll Weevil Eradication Program in Mississippi is examined from the economic and environmental perspective. Both disadvantages and advantages are discussed in this paper. The advantages of the Boll Weevil Eradication Program outweigh the disadvantages.

Introduction

Background

The boll weevil entered the United States in the late 1800's from Mexico. It was first detected in Texas. Throughout the early 1900's the boll weevil spread across Texas. The boll weevil continued to spread across the Midsouth and Southeast. By 1950, the pest had entered into the Carolinas and Virginia. By this time, the boll weevil, which had become the cotton industry's number one pest, cost the industry in excess of \$13 billion(National Cotton Council of America, 1994).

In 1973 a pilot program, in southern Mississippi, showed that the boll weevil could be eradicated as an economic pest. After another successful trial in Virginia and North Carolina the eradication program was established in a few counties of northern North Carolina and southern Virginia. Later, the program expanded into the balance of North and South Carolina. In 1987 the boll weevil eradication program expanded into Georgia, Florida, and Alabama. Today, the cotton fields of the Virginia, North Carolina, South Carolina, Florida, Georgia and much of Alabama are basically weevil free(National Cotton Council of America, 1994). The eradication of the boll weevil is essential for Mississippi producers to enter the modern era of cotton production.

Purpose

In 1994 growers in twenty-nine counties of Northeast Mississippi voted to implement the boll weevil eradication program. The program started in the fall of 1994(Layton, 1996). This program was on schedule when growers in this region petitioned for a vote to stop the program. On March 26, 1996 the growers voted to stop the eradication program. The purpose of this paper is to investigate if this was a major set back for Mississippi cotton producers.

Disadvantages

Cost of eradication

Initially, the cotton growers of Mississippi were to pay 70% of the cost of eradication with APHIS(Animal and Plant Health Inspection Service) paying the other 30%. The total cost of the eradication program was estimated at \$142.70 per acre, but the grower was to pay only \$101.70 per acre. These costs were to be spread over a five year period. The amounts per year were: 1994..\$10.00, 1995..\$16.00, 1996..\$16.00, 1997..\$29.00, and 1998..\$30.70. If the program cost more than \$142.70 per acre the grower would not be required to pay more. However, if the program cost less, the yearly fees could be adjusted down. Estimated fees were reduced in South Carolina, Georgia, Alabama, and Florida(Layton, 1994).

During the eradication program, growers will not spray to control the weevil. The eradication program will control the boll weevil. In 1992, growers in Northeast Mississippi spent an average of \$27.57 per acre controlling boll weevils(Layton, 1994). On average, the cost of the eradication program will be less expensive to the grower and long run grower benefits will be large.

Secondary Pest

The tobacco budworm is known as a secondary pest which is often controlled by beneficial insects. These beneficial insects are typically killed by early season spraying for boll weevils. Some individuals contend that the eradication program was the main reason for the tobacco budworm outbreak in 1995 in Northeast Mississippi. However, research has shown that there was large budworm damage in other parts of Mississippi(Layton, 1996).

Currently, growers consider the cost of the program and "flared" secondary pests as the major disadvantages of the program. Why are secondary pests, especially the worm complex, a problem today and not earlier in the program when eradication activities were moving through NC, SC, and GA?

Early season Boll Weevil spraying by growers or APHIS destroys beneficial insects. Where APHIS was spraying heavily in NC, SC, and GA, grower had newly available worms materials or insecticide like Pydrin, Ambush etc. They were **very** effective (low level of resistance). When APHIS or growers flared worms, growers controlled them effectively. Currently, when worms are flared, available insecticides are **not** effective(high level of resistance) and pest populations increase to unacceptable levels. The author notes that **all** early season spraying(APHIS or grower) does not flare secondary pests -- but some do. During year one and two of eradication when APHIS is spraying at high levels, the probability of enhanced or flared secondary pests are increased.

Advantages

Economic Benefit

There are many direct economic benefits of eradicating the boll weevil(Ahouissoussi, Carlson, Haney, Layton 1996, Robinson 92, 94). The decreased cost of insect control, increased yields, and increased acreage are simply a few of these benefits. The estimated direct economic benefit to other eradicated states are, on average, in excess of \$60 per acre(Layton, 1996). Approximately, \$30 per acre in reduced insecticide cost and \$30 per acre in yield increase. In addition, land values have increased (Carlson, 1989).

Indirect benefits are related to increased buying power from growers and to expanded acreage which generates additional gins, oil mills, etc. Increased equipment and other input sales are also indirect benefits(Smith, 1996).

Decreased Insect Control Costs

In 1995, it was estimated that the cost of insect control in Mississippi was \$90 per acre, compared to \$36, \$42, and \$16 for Georgia, South Carolina and North Carolina, respectively(Layton, 1996). Many Mississippi cotton producers cannot continue to compete with these insect control cost relationship. Mississippi cotton acreage fell from over 1.4 million in 1995 to about 1.0 million in 1996.

The low insect control cost in the Southeast is directly related to the completion of the boll weevil eradication program. The reduction of weevil insecticide is a large percentage of the decrease in insect control cost. However, there is also a relationship with the control of other cotton pests. Early spraying to control weevils kills many beneficial insects which control secondary pests, especially the worm complex. Boll weevil treatments are not necessary in eradicated states. Thus, beneficial insects are not killed and fewer treatments are necessary to control harmful pests(Layton, 1996).

Increased Yields

The increase in yield or reduction in crop loss will also be beneficial. Some eradicated states have reported an increase as large as 100 pounds per acre(Ahouissoussi, 1993). An increase of this size for Mississippi growers would mean a \$60-70 increase per acre at present prices(more than doubling net returns for most growers). In Figure 1, the yields of the eradicated states(series 1) have increased greatly compared to Mississippi(series 2)(ERS Homepage).

Increased Acres Harvested

Producing cotton in a boll weevil free environment has become more profitable. Because of this enhanced profitability, many farmers in eradicated states have switched from less profitable crops to cotton. There has been a large increase in acres harvested in the eradicated states. In 1989, Mississippi was third in production behind California and Texas(USDA, 1992). As seen in figure 2,

Mississippi is no longer the dominant cotton producer in the Southeast(ERS Homepage).

Parvin reported Boll Weevil Eradication could increase Mississippi cotton acreage by 326,000. The current trend in Mississippi cotton acreage has been negative. In 1995, Mississippi acreage was 1.42 million. In 1996, it fell to 1.03 million and is expected to be about 975 thousand or less in 1997. Table 1 reports total revenue or gross sales per acre for cotton and corn in Mississippi. The acreage reduction from 1995 to 1997 is expected to be approximately 500 thousand. The difference in total revenue per acre for cotton and corn (most of the cotton acreage reduction has been to corn) is estimated to be 692-277 or \$415 per acre. On 500 thousand acres this implies that 500,000 times \$415 or 208 million dollars will **not** be in circulation in the Mississippi economy.

Additionally, if Boll Weevil Eradication is **not** completed in Mississippi the added 326,000 acres of cotton can not be realized. Hence, an estimated 326,000 times \$692 per acre of 226 million dollars will be lost. A total loss in excess of 430 million dollars(Parvin 1996).

Impact on Price

The increase in acres and production has not driven price down. Because of simple "supply and demand" price has stayed relatively constant during this period. As seen in Figure 3 and Figure 4 demand has increased and price has stayed relatively constant, actually increased during the acreage expansion in the Southeast(ERS).

Environmental Benefit

In general, during the first two years of eradication, total insecticide usage does increase slightly. However, after year 2, it decreases. Also, eradicating the boll weevil will allow less insecticide to be used to control other pests. The total insecticide used on US cotton, has decreased by 20 million pounds since the start of the eradication program. A reduction in number of treatments and a reduction in the total pounds of insecticides applied will improve the environment(Haney, 1995).

Summary

The Boll Weevil Eradication Program has proven itself in other states. The advantages outweigh the disadvantages. The program has decreased the variable cost of producing cotton and increased yields, allowing producers in the boll weevil free area to receive higher profits per acre. The program has improved the environment. The loss in direct benefit estimated in excess of 430 million dollars for Mississippi is large enough to have a major impact on the state tax revenue.

Growers that shift from cotton to less valuable crops do so with the expectation that their net return will increase. If

they are correct, they will be better off. Even if they are correct, the region will likely to be worse off.

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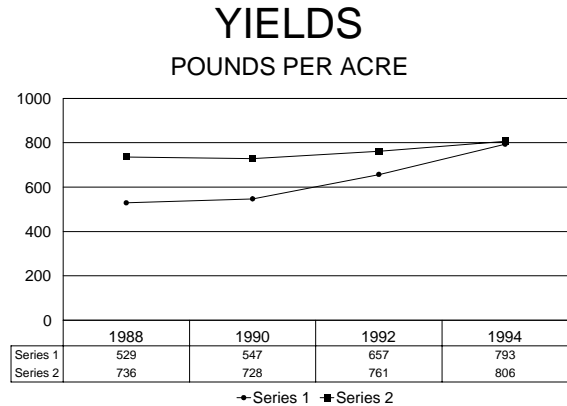


Figure 1.

ACRES HARVESTED

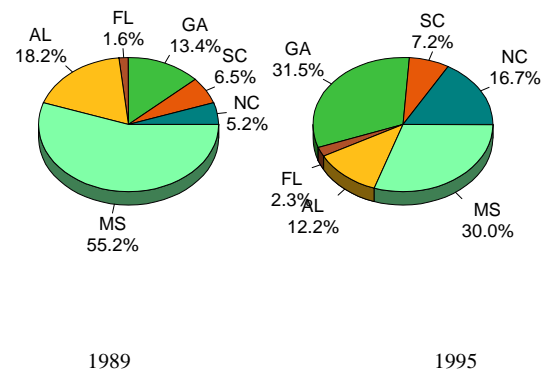


Figure 2.

DOMESTIC DEMAND COTTON

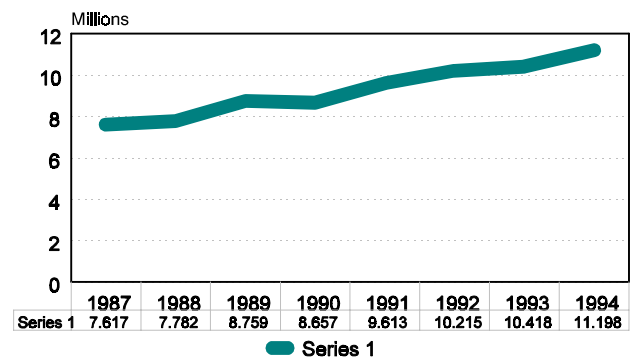


Figure 3.

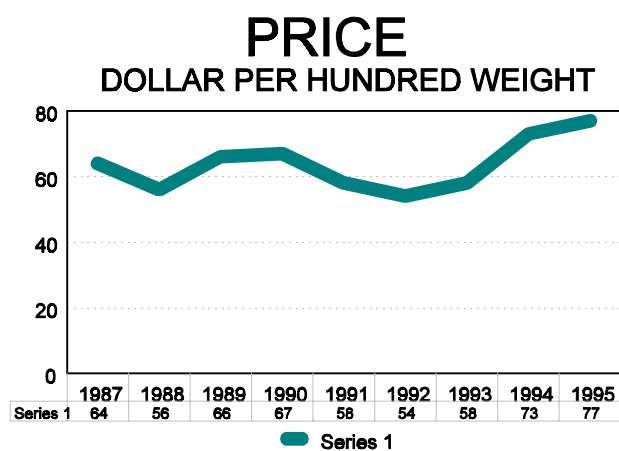


Figure 4.

Table 1. Yield and revenue per acre.

	YIELD	TOTAL REVENUE
COTTON	825lb. Lint	\$692
CORN	100 bu.	\$277