United States General Accounting Office

GAO

Report to the Honorable Richard K. Armey, House of Representatives

June 1995

COTTON PROGRAM

Costly and Complex Government Program Needs To Be Reassessed

GAO/RCED-95-107

GAO

United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

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June 20, 1995

The Honorable Richard K. Armey
House of Representatives

Dear Mr. Armey:

This report responds to your request that we review the U.S. Department of Agriculture's cotton program. The report describes the program's cost and complexity, distribution of payments, effects on producers' costs and returns, and effectiveness in enhancing U.S. cotton exports. The report suggests alternatives that the Congress may wish to consider to streamline the program and reduce its cost.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days after the date of this letter. At that time, we will send copies to appropriate House and Senate committees and subcommittees; interested Members of Congress; the Secretary of Agriculture; and the Director, Office of Management and Budget. Copies will also be made available to others upon request.

This work was performed under the direction of John W. Harman, Director, Food and Agriculture Issues, who may be reached at (202) 512-5138 if you or your staff have any questions. Other major contributors to this report are listed in appendix V.

Sincerely yours,

Keith O. Fultz
Assistant Comptroller General

Executive Summary

Purpose

The cotton program, a U.S. Department of Agriculture (USDA) program to support cotton farmers and cotton exports, cost an average of $1.5 billion annually for crop years 1986 through 1993. Concerned about the cost, Representative Richard K. Armey asked GAO to conduct a comprehensive evaluation of the cotton program. Specifically, GAO was asked to evaluate the program's cost and complexity, distribution of payments, effects on producers' costs and returns, and effectiveness in enhancing U.S. cotton exports.

Background

Since the turn of the century, U.S. cotton producers have frequently experienced excess production capacity, high stocks, and low product prices. These problems were intensified during the Great Depression, when U.S. farm families saw their income decline significantly as farm commodity prices dropped by 50 percent. In response, the Congress established a comprehensive program in 1933 aimed at controlling the production of designated basic commodities, including cotton, and supporting farm income and prices. This program was intended to be temporary.

Since then, the cotton program has been modified many times. The most recent reforms in 1985 and 1990 were designed to reduce government costs and to enhance exports by making U.S. cotton more competitively priced in world markets.

While the cotton program is voluntary, about 90 percent of all acreage devoted to cotton is enrolled. Producers must agree to abide by any USDA-imposed limits, under the acreage reduction program, on the number of acres farmed for cotton. Under other programs that deal with the cotton supply, producers may voluntarily idle additional acreage. Early in the calendar year, participating producers must register (sign up) how much of their cotton acreage they intend to plant.

The program has two basic components to support producers' income. The first component—known as the deficiency payment—guarantees producers a given level of revenue by paying them the difference between a set target price, established by the Congress, and either the domestic market price or the USDA-determined loan rate, whichever is higher. When producers sign up, they may receive a portion of their projected deficiency payment to provide funds for planting. The second component—the nonrecourse loan—provides government money to producers, using their cotton as collateral, and allows them to repay the loan or forfeit the cotton

as full payment of the loan. This loan provides funds to producers at harvest, when prices are low, and producers may want to store cotton until prices rise. A concept introduced in 1985—the marketing loan—changed the nonrecourse loan repayment process. This loan permits producers to repay their loan at the USDA-determined loan rate or at the USDA-adjusted world price, whichever is lower. If the loan is repaid at the adjusted world price, producers keep the difference and thus receive a gain referred to as a marketing loan gain. This loan is attractive to producers during periods of low prices. It allows producers to wait for prices to rise but lessen their market risk because the government pays producers' storage costs for up to 10 months.

Producers can decide not to put their cotton under government loan and instead receive a so-called loan deficiency payment. This payment, available when the adjusted world price is less than the loan rate, is calculated to represent the difference between the loan rate and the adjusted world price. During any crop year, producers can place a portion of their cotton under nonrecourse loan and receive a loan deficiency payment on the remainder.

The price of U.S. cotton from 1986 through 1993 was higher than the world price for cotton. The world price for cotton is determined by a pricing mechanism anchored in northern Europe. This higher domestic price tends to make U.S. cotton noncompetitive on the world market. U.S. cotton is priced higher because the cotton program's import restrictions effectively prevent any cotton imports. To address this problem, the cotton program provides for subsidies—called step 2 payments—to exporters and domestic mills to help keep domestically grown cotton competitively priced in world markets. Competitive U.S. prices are important because about 40 percent of U.S. cotton is exported.

Results in Brief

The cotton program has evolved over the past 60 years into a costly, complex maze of domestic and international price supports that benefit producers at great cost to the government and society. From 1986 through 1993, the cotton program's costs totaled $12 billion, an average of $1.5 billion a year. Moreover, the program is very complex, with dozens of key factors that interact and counteract to determine price, acreage, and payments and to restrict imports.

The severe economic conditions and many of the motivations that led to the cotton program in the 1930s no longer exist. Cotton farming has

become a concentrated business, with only 20 percent of the producers growing most of the cotton. Consequently, most of the program's payments also go to those producers. For most producers, domestic prices together with government payments provide revenues above the amount needed to cover their total production costs, including a return on assets.

USDA's marketing loan and step 2 payments are intended to maintain cotton exports by bringing the price of U.S. cotton in line with the lower world price. These provisions have not succeeded despite government payments of about $3 billion from 1986 through 1993: In 1988, 1991, and 1992, U.S. cotton exports and market share actually declined despite heavy government expenditures. In addition, because of production costs and government payments, exports of U.S. cotton occur at a loss to the nation. In 1993, the adjusted world price was 56 cents per pound; however, from a national standpoint, U.S. cotton cost 90 cents per pound—66 cents to produce and 24 cents in federal payments. Despite this loss, the government continues to fund programs that promote cotton exports. Furthermore, certain objectives of the North American Free Trade Agreement (NAFTA) and the General Agreement on Tariffs and Trade (GATT)—to encourage less government support for agriculture and a more open world market—may make it more costly in the long term to maintain price supports and other aspects of the current U.S. cotton program.

Principal Findings

Program Is Costly and Complex

The cotton program's costs are incurred primarily through a variety of government payments to producers. In crop year 1993, the government paid producers $1 billion in deficiency payments, $238 million in marketing loan gains, and $305 million in loan deficiency payments.

Reforms over the years have made the program more complex. Because of this, a labyrinth of factors must interact for the program to function. The interactions are frequently at cross-purposes to one another, such as when the program supports the price the producer gets, then subsidizes buyers to reduce their costs.

Relatively Few Producers Receive Most Benefits, Often in Excess of Production Costs

In 1993, 20 percent of cotton farmers produced an estimated 79 percent of the cotton under the program and received a like percentage of program payments. Legislation limits the amount of certain farm programs' payments a person can receive, generally to $250,000. However, as part of the concentration of cotton production, producers have in some cases organized their operations into entities, such as joint ventures or partnerships composed of multiple "persons," each eligible to receive payments up to the applicable limit. In 1993, for example, 295 producers each received more than $250,000—4 of these received more than $1 million—in payments from USDA for their cotton operations.

Furthermore, revenues from domestic market prices were sufficient to more than cover producers' short-run production costs and most of the average producer's total (long-run) costs of production over the 8-year period 1986-93. When government payments were added, producers' revenue averaged 17 percent higher than the total costs of production. If the cotton program were not in place and the 1986-93 average costs of production and market prices were in effect, some producers would not be able to cover their production costs and would have to either reduce costs or go out of business.

While the cotton program has worked well to ensure producers' income, it has not been economically sound. On the basis of its economic model, GAO estimates that the program's means of supporting prices resulted in losses to society of $738 million, on average, from crop years 1986 to 1993 (August 1 to July 30). GAO's economic model is designed to evaluate the impact of a commodity program on the economic welfare of society as a whole by measuring the inefficiencies resulting from aspects of that program that keep land from being used productively. With land taken out of production, society is prevented from benefiting economically from additional crops. At the same time, reduced supplies raise prices. In addition, through the program's benefits, the government pays producers not to produce on the idled acres.

Federal Efforts to Enhance Cotton Exports Are Costly

USDA's efforts to maintain and enhance exports when world prices are low have not been effective despite marketing loan and step 2 payments of $3 billion since 1986 to producers, exporters, and domestic mills. Cotton exports fell significantly in 1988, 1991, and 1992—by 222 million pounds, or 7 percent, in 1988; by 500 million pounds, or 14 percent, in 1991; and by 700 million pounds, or 23 percent, in 1992.

The marketing loans and step 2 payments were designed to bring the U.S. price more in line with the lower adjusted world price in order to maintain exports. However, these provisions did not prevent a continuing divergence of the adjusted world price and the U.S. price or a significant decline in exports and market share. This situation occurred because the marketing loans and step 2 payments cannot counteract the effect of the cotton program's other provisions, such as import restrictions, that tend to keep the U.S. price of cotton higher than the adjusted world price, thereby limiting exports. Furthermore, because USDA's loan program enables producers to keep cotton in storage without charge for up to 10 months, producers can keep their cotton off the market at no cost and speculate on receiving higher prices.

Although exports are usually considered to be beneficial, this is not true for cotton. While the cotton industry benefits from exports, during the period covered by our review, production costs and government payments, taken together, were consistently higher than the adjusted world price. As a result, the United States sold cotton on the world market for less than its cost. Despite these losses, the United States spent $428 million from fiscal year 1986 through fiscal year 1994 to promote and market cotton exports. Certain objectives of NAFTA and GATT—encouraging less government support for agriculture and a more open world market for raw cotton and cotton textiles—may make it increasingly difficult in the long term for the United States to subsidize cotton exports while also supporting prices under the loan program.

Matters for Congressional Consideration

The cotton program has become very costly and complicated as it has tried to accomplish conflicting objectives, such as supporting farm prices through direct subsidies and import restrictions while subsidizing domestic mills and exporters to purchase higher-priced U.S. cotton. While the cotton program does fulfill its objectives of protecting farmers' income and managing the cotton supply, a small percentage of producers receive most of the program's benefits. Furthermore, the program's provisions to enhance exports have not prevented declines in exports when world prices are low.

The Congress may wish to consider whether benefits from the cotton program are worth its costs and whether the program should be continued. However, any reductions or changes should be made cautiously. We recognize that if government support is reduced or eliminated, some producers could not profitably remain in cotton farming.

In addition, because lower government support would cause declines in land values, some producers and rural economies would be negatively affected. Among the producers most adversely affected would be those who are heavily in debt for land or machinery. Thus, if significant changes are made to the program, the Congress may want to consider options to give producers and other affected parties time to make adjustments in their investment decisions. The Congress could, for example, reduce or phase out payments over a number of years, perhaps over the life of the next farm bill.

The implementation of GATT's and NAFTA's requirements over a period of years will give the cotton industry time to make adjustments during the transition from a government program to greater reliance on the market. The elimination of trade barriers for both raw cotton and cotton textiles will push the U.S. cotton industry and program toward greater market orientation and reliance on market prices. However, because the economic changes imposed by GATT and NAFTA will be phased in gradually, the U.S. cotton industry will have some time to adjust to an environment of a more competitive world market.

Agency Comments and Our Evaluation

In commenting on a draft of this report, USDA stated that it is in fundamental disagreement with certain conclusions reached by GAO. In particular, USDA took exception to GAO's statement that the economic situation that led to the cotton program no longer exists—that the economic emergency and related problems that generated a cotton program in the 1930s have ended. USDA indicated that such a statement questions the need for a cotton program. USDA noted that some problems have not gone away, especially the continuing problem of trade protectionism and subsidization by other cotton-producing countries.

GAO believes that the economic conditions affecting farming have changed significantly since the 1930s. For example, the average recipient of farm payments is no longer poor; the number of farms has declined dramatically, while the size of the average farm is much larger; and farmers can now insure themselves against price declines. Regarding the trade issue raised by USDA, GAO recognizes that certain of our foreign competitors intervene in various ways in the world cotton market. Some of these actions may put our cotton at a price disadvantage. GAO believes that, ultimately, it is up to the Congress to determine whether it is in the nation's best interest to respond to these countries in-kind by continuing to subsidize our cotton industry. Subsidizing the U.S. cotton industry to

make it more competitive in the world market has been very costly—about $3 billion between 1986 and 1993 for marketing loan and step 2 payments.

USDA also disagreed with the methodology used by GAO to measure producers' revenues and costs, the losses to society resulting from land taken out of production, and the losses to the nation from export sales.

First, USDA believes that the use of 8-year average revenue and cost figures are of limited value in explaining a real profit/loss result in a given year because each cost estimate is based on a yield for a specific year and each revenue estimate is based on an assumed price for a given year. GAO believes that its use of averages to summarize cotton producers' costs and revenues is an acceptable methodology that has explanatory value. Averaging is particularly relevant in this case, since GAO is trying to assess the economic condition of cotton producers in both the long and short terms. For example, GAO's analysis for each year between 1986 and 1993 showed that in the short run, revenues from market prices alone as a percent of cost ranged from 107 to 176 percent. In the long run, revenues from market prices alone as a percent of cost ranged from 66 to 103 percent. Thus, while producers may sustain variations in returns from year to year, their long-term condition is determined by the average across years.

Second, USDA notes that GAO's estimate of the loss to society from the cotton program, as measured by an economic model, results primarily from program participants' idling some of their land either voluntarily or in compliance with the program's requirements. USDA disagrees with the model's use of acres idled voluntarily. USDA suggests that program participants decide to idle land in response to the market price of competing crops and not in response to program requirements. However, GAO believes that its analysis appropriately considers idled acres. The model is designed to evaluate the impact of a commodity program on the economic welfare of society as a whole—not any particular group—by measuring the inefficiencies that result from aspects of the program that keep land from being used productively. The idled acres used in GAO's model, whether idled because of the program's requirements or voluntarily, were idled under provisions of the cotton program. From the standpoint of society, the reasons for cotton producers' deciding to idle acres are not relevant to whether economic inefficiency results. The key point is that, as a result of the cotton program, productive land of potential benefit to society is idled.

Third, USDA questioned GAO's use of total (long-run) costs to show that the United States loses money when exporting cotton. USDA believes that, rather than total production costs, short-run costs would be more appropriate. GAO agrees that short-run costs are appropriate to use if the question is whether exporting cotton is profitable in the short term, that is, annually or for a few years. In other words, the United States might be willing to take losses on cotton exports in one year if it expected that exports would be profitable the next year. However, under the cotton program, these losses have continued over the longer term. GAO's analysis found that the nation sustained losses from 1986 through 1993.

USDA's specific comments and GAO's evaluation of them are discussed in chapters 2 through 6. GAO made changes to the report in response to these comments where appropriate. USDA's comments appear in their entirety in appendix IV.

Contents

Figures

Abbreviations

ACR	acreage conservation reserve
AMS	Agricultural Marketing Service
ARP	Acreage Reduction Program
ASCS	Agricultural Stabilization and Conservation Service
AWP	adjusted world price
CCA	coarse count adjustment
CCC	Commodity Credit Corporation
CIF	cost, insurance, and freight
CRP	Conservation Reserve Program
ERS	Economic Research Service
GATT	General Agreement on Tariffs and Trade
LDP	loan deficiency payment
MPA	maximum payment acres
NAFTA	North American Free Trade Agreement
NE	Northern European
NFA	normal flex acres
OFA	optional flex acres
PIP	producer incentive price
SCS	Soil Conservation Service
USDA	U.S. Department of Agriculture
USNE	United States Northern European

Introduction

Cotton is the single most important textile fiber in the world, accounting for 47 percent of all fibers produced. Cotton is produced in about 80 countries and generates international trade, not only in raw cotton but also in value-added products such as yarn, cloth, and finished textile goods. The United States produces about 18 percent of the world cotton supply and is generally the largest cotton exporter.

Like other commodities, cotton farming has become more concentrated in fewer, larger farms with fewer producers and farm workers. In 1949, the United States had more than 1.1 million cotton farms that grew an average of 24 acres of cotton per farm. On more than half of these farms, the family provided almost all of the labor. Less than one-third of these farms had a tractor. The mechanical harvester had been developed, but most farms were too small to support one. Mechanization of cotton farms increased rapidly in the 1950s and 1960s. By 1970, virtually all of the U.S. cotton crop was mechanically harvested. Technology has increased yields per acre and nearly eradicated the perennial cotton pest, the boll weevil. The number of cotton farms declined from over one million in the 1940s to about 147,000 in 1993.

World Cotton Production and Trade

Two major types of cotton are produced in the world: upland and extra-long staple.[1] Upland cotton, the type most commonly grown throughout the world, accounts for about 98 percent of the U.S. crop. In 1993, extra-long staple cotton accounted for almost 5 percent of total world production. This report deals with upland cotton.

The United States produces more upland cotton than any country in the world except China. China, the United States, and India account for 54 percent of world cotton production. From 1986 through 1993, world production averaged 36.5 billion pounds (76 million bales) per year.[2] Table 1.1 shows the world's major cotton-producing countries and their average upland cotton production over this 8-year period.

[1]Besides the United States, extra-long staple cotton is grown primarily in India, Egypt, and the former Soviet Union countries. Extra-long staple cotton is characterized by fineness and high fiber strength, contributing to finer and stronger yarns and is more expensive than upland cotton. Textile products made from extra-long staple cotton are considered to be of higher quality and more luxurious and are also higher priced than similar products made from upland cotton.

[2]Cotton is processed at gins into standard 480-pound bales.

Table 1.1: World Cotton Producers by Rank and Average Production, Crop Years 1986-93

Rank	Country	Average annual amount produced (billions of pounds)	Percent of world total
1	China	9.2	25.2
2	United States	6.7	18.4
3	India	3.9	10.7
4	Pakistan	3.3	9.0
5	Uzbekistan	2.9[a]	7.9
	Rest of the world	10.9	29.9
	World total	36.5	100.0

Note: Totals may not add because of rounding and because data for Uzbekistan were not available for all years.

[a]The average for Uzbekistan is based on 7 years because data for 1986 were not available.

Source: GAO analysis of USDA data.

Cotton exports in recent years have averaged about 40 percent of U.S. cotton production. The United States usually exports the largest quantity of cotton. However, the U.S. share of world exports fluctuates from year to year. For example, in 1988, the U.S. share of exports was 18 percent, and in 1993, it was 26 percent. Uzbekistan, Australia, India, Pakistan, China, and a consortium of African nations are the major competitors of U.S. cotton exports. Most U.S. cotton exports go to Pacific Rim countries with large textile and apparel industries. During the 1992 crop year, the largest importers of U.S. cotton were Korea, Japan, Mexico, and Indonesia.

Although the United States is a major exporter of raw cotton, it is a net importer of processed and finished cotton goods. To illustrate, in 1992 and 1993, the United States exported an average of about 3 billion pounds of raw cotton annually and in return had net imports of textile and apparel products containing the equivalent of about 2.5 billion pounds of raw cotton.[3] The value of cotton textile and apparel products is several times greater than the value of raw cotton alone.

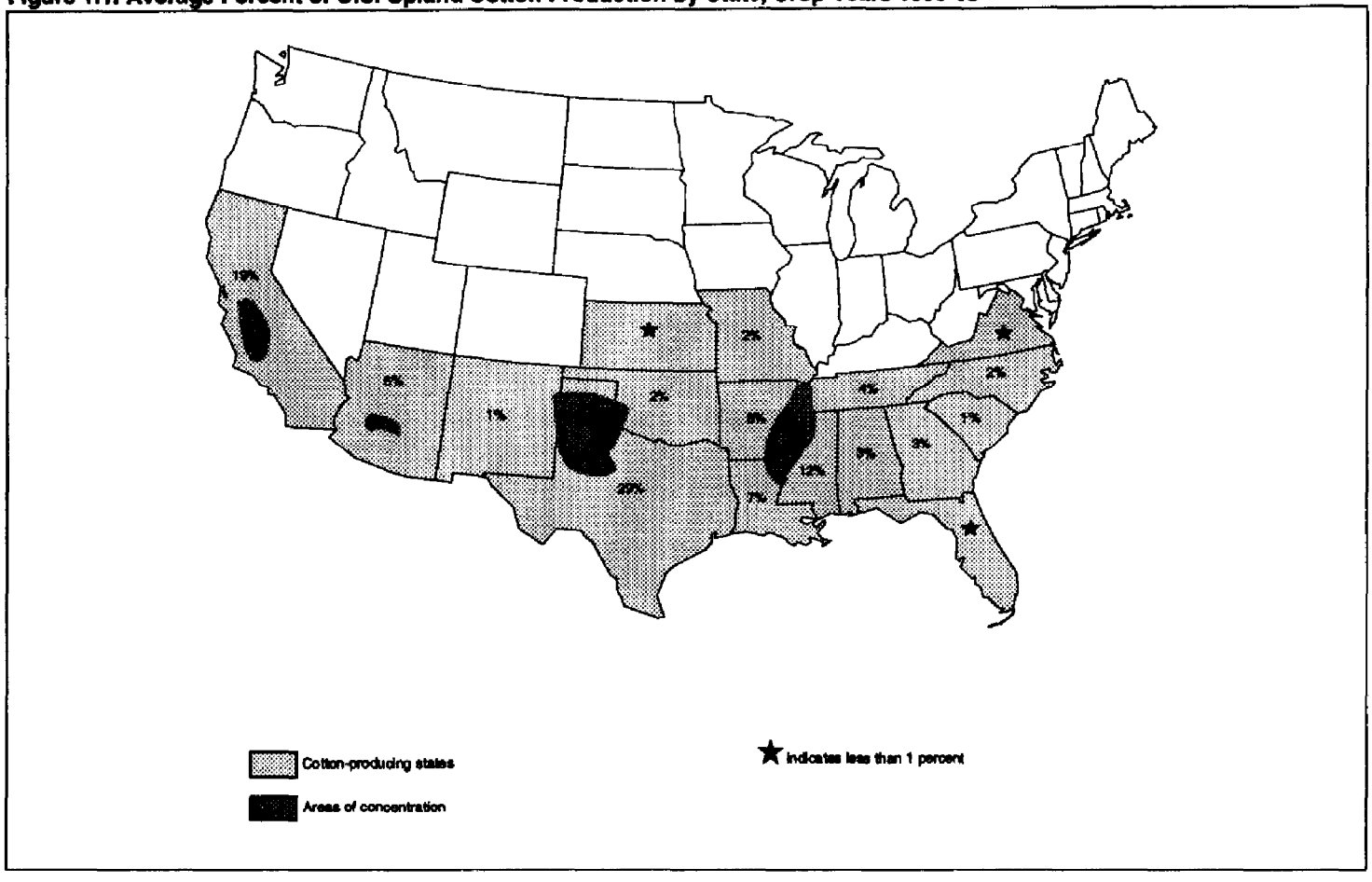
U.S. Cotton Production and Domestic Use

Cotton is grown in 17 states from Virginia to California, with the greatest concentrations in four distinct regions, as shown in figure 1.1. Cotton production from 1986 to 1993 averaged 6.7 billion pounds per year, ranging from 4.6 billion pounds in 1986 to a high of 8.3 billion pounds in 1991. The

[3]Imports for 1992 and 1993 averaged 3.4 billion pounds, while exports averaged .9 billion pounds, for a net import of 2.5 billion pounds.

U.S. Department of Agriculture (USDA) projects 1994 cotton production at 9.3 billion pounds, which if realized, would be the largest crop on record.

Figure 1.1: Average Percent of U.S. Upland Cotton Production by State, Crop Years 1986-93



Note: Numbers do not add to 100 percent due to rounding.

Source: USDA's Cotton and Wool Situation and Outlook Report.

Yields per harvested acre vary widely from year to year and from state to state. Production depends on many factors, including soil productivity, climate, producer management skills, cost of production, market conditions, and government programs.

About 60 percent of the cotton grown in the United States is used domestically. In 1993, mill use of upland cotton was about 5 billion pounds, almost all of which was domestically grown. Cotton is typically used to make yarn, thread, cords, and rope and is woven into fabrics that are then used to make apparel, house furnishings, and floor coverings.

U.S. Cotton Policy

The federal government intervened in agricultural markets in the 1930s because the Great Depression had severely disrupted the domestic economy and resulted in low prices for goods sold. U.S. farm families, whose income at that time was only about one-half that of nonfarm families, saw their income decline further as farm commodity prices dropped by 50 percent. This income reduction was felt throughout the nation because over 31 million people—or one-fourth of the U.S. population—then lived on farms.

To correct the income imbalance between farm and nonfarm families and stabilize the agricultural market, the Congress enacted the Agricultural Adjustment Act of 1933. The 1933 act established a comprehensive program aimed at controlling production of designated "basic" commodities, including cotton. The programs mandated by the 1933 act and its amendments were intended to be temporary; they were to be terminated as soon as the President declared an end to the national emergency.

The goals and provisions of current cotton legislation trace back to this act and the Agricultural Adjustment Act of 1938. After World War II, support provisions were recodified in the Agricultural Act of 1949, which still serves as the main U.S. farm law. At intervals, a new farm act is passed that amends the 1949 act and supersedes the previous farm act. Each of these acts added to the complexity of the program—new features were incorporated or existing features were deleted or revised. The most recent of these acts was the Food, Agriculture, Conservation, and Trade Act of 1990 (known as the 1990 Farm Bill).

The major objectives of USDA's cotton program are to protect U.S. farm income, manage cotton supply levels for domestic mill use and export, and maintain competitive U.S. cotton prices in world markets. Under the current U.S. farm policy, USDA tries to accomplish these objectives through deficiency payments, nonrecourse loans, acreage reduction, and various import and export provisions. Each of these program components is discussed below.

About 103,000 of the existing 147,000 U.S. cotton-producing farms participated in the cotton program in 1993. From 1986 through 1993, between 84 to 92 percent of cotton acreage was enrolled in the cotton program.

Deficiency Payments

One element of the cotton program as authorized in the 1990 Farm Bill provides direct government payments to cotton producers when market prices are low. These payments are known as deficiency payments. Under this program component, a minimum target price is legislatively set for each year in a 5-year period, and deficiency payments are made to support producers' incomes when the calendar year national average price producers receive for their cotton falls below the target price.[4] For 1986 to 1993, cotton deficiency payments averaged almost $1 billion annually. The Food Security Act of 1985 reduced target prices from 81 cents per pound to 72.9 cents per pound from 1986 to 1990. The 1990 Farm Bill set target prices at 72.9 cents per pound for each of the 5 years covered by the act.

Nonrecourse Loans

In conjunction with target prices and deficiency payments, the 1990 Farm Bill also continued the use of nonrecourse loans to cotton producers. USDA's Commodity Credit Corporation (CCC)[5] makes these loans at an established loan rate, and producers, in turn, pledge their stored cotton as collateral. The nonrecourse loan rate is calculated by USDA following a statutory formula that is based on historical market prices. This rate is expressed in cents per pound of cotton and, for 1993, it was 52.35 cents. For 1994, the rate was 50 cents per pound, the lowest rate allowed under the 1990 Farm Bill for any crop year.

Essentially, these loans support the prices farmers receive by establishing a minimum price for cotton. The loans are nonrecourse because producers may forfeit their stored cotton to CCC as payment of their loan in full, regardless of the market value of cotton at that time. In this situation, producers keep the loan proceeds, and the government bears the costs of

[4]The deficiency payment rate is the difference between the target price and either the national average market price or the loan rate, whichever is higher.

[5]CCC is a wholly owned, government corporation created in 1933 to (1) stabilize, support, and protect farmers' incomes and prices; (2) maintain balanced and adequate supplies of agricultural commodities; and (3) assist in the orderly distribution of those commodities. CCC finances its operations by borrowing from the U.S. Treasury. However, the agency is reimbursed for losses resulting from its operations by annual appropriations. CCC has no staff itself but administers its programs through a separate USDA agency, the Consolidated Farm Service Agency, that includes the former Agricultural Stabilization and Conservation Service, which deals with farmers through a network of county offices.

storing, transporting, and disposing of the forfeited cotton. These costs become a loan loss to USDA.

Nonrecourse loans for cotton mature 10 months from the first day of the month in which they were made. At the end of the 10-month loan period, producers can elect to (1) repay the loan, (2) forfeit their pledged cotton as full loan repayment, or (3) depending upon average market prices,[6] request that the loan maturity date be extended for 8 months. Thus, producers may have 18 months in which to keep their cotton under loan and off the market.

The Food Security Act of 1985 introduced a new concept, the marketing loan provision, that allows producers to redeem nonrecourse loans at a discount, referred to as a marketing loan gain. As an alternative, producers may receive an equivalent amount, referred to as a loan deficiency payment, by agreeing to forego nonrecourse loans. The marketing loan was devised to help keep U.S. cotton prices competitive in world markets, thus encouraging producers to sell their cotton instead of keeping it under loan and off the market. The marketing loan changes the nonrecourse loan repayment process by permitting producers to repay their loans at the lower of the loan rate or the USDA-calculated adjusted world price.[7] When the adjusted world price is below the loan rate, producers have an opportunity to sell their cotton at any price they can obtain from the market and receive the marketing loan gain from USDA for the difference between the loan rate and the USDA-calculated adjusted world price. In addition, when producers receive a marketing loan gain, they also benefit because USDA pays for storage. Cotton is the only USDA commodity program in which USDA pays these storage costs.

Limitations on Payments

In response to concerns about large payments to farm operations and the overall cost of federal farm programs, beginning with the 1971 crop, the Congress limited the annual amount of certain program payments a person could receive. Today, a "person" may receive up to $50,000 in deficiency payments and up to $75,000 in marketing loan gains and loan deficiency payments annually. Both of these limits are included within an overall limit of $250,000 that also includes disaster payments and other

[6]Loans may be extended, provided the spot market average price for average (base) quality cotton does not exceed 130 percent of its price for the preceding 36 months.

[7]The adjusted world price is an estimate of the prevailing world price—the average of the five lowest quoted prices for cotton from various countries in the northern European market—as calculated weekly and adjusted to U.S. quality and location by the Secretary of Agriculture.

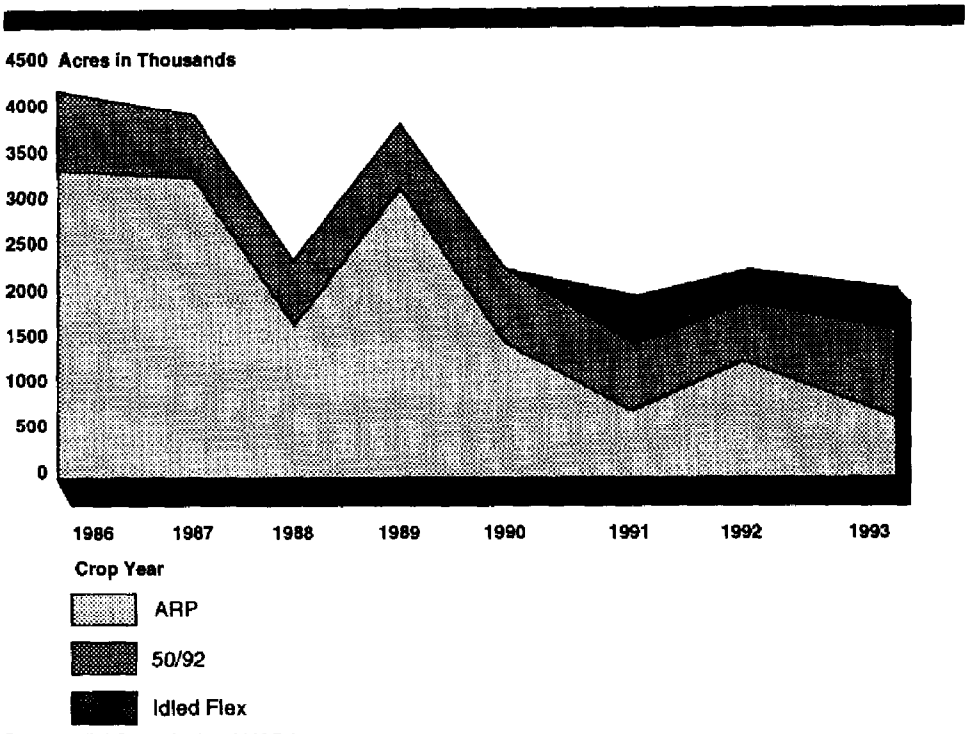
adjustments. "Persons" may be not only individuals—including those participating in general partnerships or joint ventures—but also entities such as corporations. Each individual or entity who qualifies as a separate "person" and meets additional "actively engaged in farming" requirements is eligible to receive payments up to the applicable limits. Some cotton farming operations are so organized as to have numerous "persons" associated with them. This effectively increases the amount of payments that the operation receives beyond the amount normally available to an individual.

Acreage Reduction

USDA attempts to manage the domestic supply of cotton through several program provisions to support prices and limit deficiency payments. Each of these provisions results in land being idled. The provisions are an acreage reduction program; flexibility provisions, also called "flex acres;" and the 50/92 program.[8] Producers who participate in the cotton program must follow the requirements of the acreage reduction program but may voluntarily idle additional acres through the flex acres and 50/92 programs. Figure 1.2 shows the extent to which these programs have been used to take land out of production since crop year 1986, including those flex acres that remain idle.

[8]The Omnibus Budget Reconciliation Act of 1993 changed this program to a 50/85 program for crop year 1994. However, during the period covered by our evaluation, it was the 50/92 program, and for this report we will refer to it as the 50/92 program.

Figure 1.2: Use of Acreage Reduction Program, Idled Flex Acres, and the 50/92 Program, Crop Years 1986-93



Source: GAO analysis of USDA data.

Acreage Reduction Program

Under this program, producers are required to remove acreage from production as a condition for participating in USDA's cotton program. The 1990 Farm Bill provides for the Secretary to use the acreage reduction program to ensure that U.S. stocks at the end of the crop year are at about 30 percent of domestic consumption. For 1993, the Secretary set the acreage reduction program rate at 7.5 percent of producers' base acreage;[9] for 1994, the acreage reduction program rate was 11 percent. (Base acreage is used by USDA to determine deficiency payments for the cotton program.) In December 1994, the Secretary announced that because of significant increases in export sales of cotton, farmers would not have to idle any of their cotton acreage to qualify for program benefits in 1995.

Flex Acres

The Omnibus Budget Reconciliation Act of 1990, together with the 1990 Farm Bill, authorized a two-part flex-acre provision. Under the first provision—called "normal" flex acres—producers do not receive deficiency payments on 15 percent of their enrolled base acreage. In lieu

[9]The cotton base equals a farm's 3-year average acreage of cotton planted for harvest, plus land not planted because of acreage reduction programs during a period specified by law.

of these payments, producers are permitted to plant other crops (except fruits or vegetables) and maintain their cotton base. They can also continue to plant cotton on the flex acres, in which case they remain eligible to receive marketing loans with any associated marketing loan gains.

In addition to the normal flex acres, producers can plant crops other than cotton on another 10 percent of their land—known as optional flex acres—without a reduction in their cotton base acreage. As is the case with normal flex acres, however, deficiency payments will not be paid for those acres used to grow crops other than cotton. Both the normal and optional flex acres allow producers to plant alternative crops on the basis of market signals without losing any of their cotton base acres, on which future government payments will be determined.

50/92 Program

Cotton producers who plant at least 50 percent of their maximum payment acres (acres enrolled in the program less acreage reduction program acres and other program requirements) and devote the rest to conserving uses or approved nonprogram crops, are allowed to receive deficiency payments on 92 percent of their maximum payment acreage.[10] The purpose of this provision is to reduce cotton stocks while allowing producers to retain most of their deficiency payments and protect their cotton base. In crop year 1993, farmers received almost $34 million in deficiency payments under this program.

Import and Export Provisions

The 1990 Farm Bill included three provisions (referred to as steps) to help ensure that U.S. cotton would be competitive in world markets. Step 1 permits the Secretary to lower the adjusted world price under certain price conditions; however, this step has not been used since April 1992. Step 2 provides for USDA payments to exporters and to domestic mills when U.S. prices have been higher than world prices for 4 consecutive weeks—this step has cost about $553 million since 1991. Step 3 is an import quota that must be implemented when U.S. prices exceed world prices for 10 consecutive weeks and the spot market quota, described below, is not in effect. On two occasions, the price conditions met the 10-week requirement, but the quota was not implemented because the spot market quota was already in effect.

[10]The 50-percent minimum is disregarded if the Secretary of Agriculture determines that producers are prevented from planting because of drought, flood, or other natural disasters.

Import quotas have been a part of the cotton program since the 1930s. Since then, farmers' incomes have been supported by an annual cotton import quota of about 125,000 bales (60 million pounds) imposed pursuant to section 22 of the Agricultural Adjustment Act of 1933, as amended (so-called section 22 quota restrictions). This quota was imposed to prevent U.S. textile mills from purchasing unlimited supplies of cotton from foreign sources. However, this provision was superseded by passage of the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) in late 1994. In addition, the Food Security Act of 1985 provides for a temporary import quota based on spot market prices. This spot market quota permits entry into the United States of a quantity of cotton equal to 21 days of cotton use by U.S. textile mills. It is to be implemented during 90-day periods when the current U.S. spot market price for cotton exceeds historical price averages by specific amounts. The U.S. spot price represents the average of quoted prices for cotton in seven U.S. geographical areas, as designated by the Secretary of Agriculture.

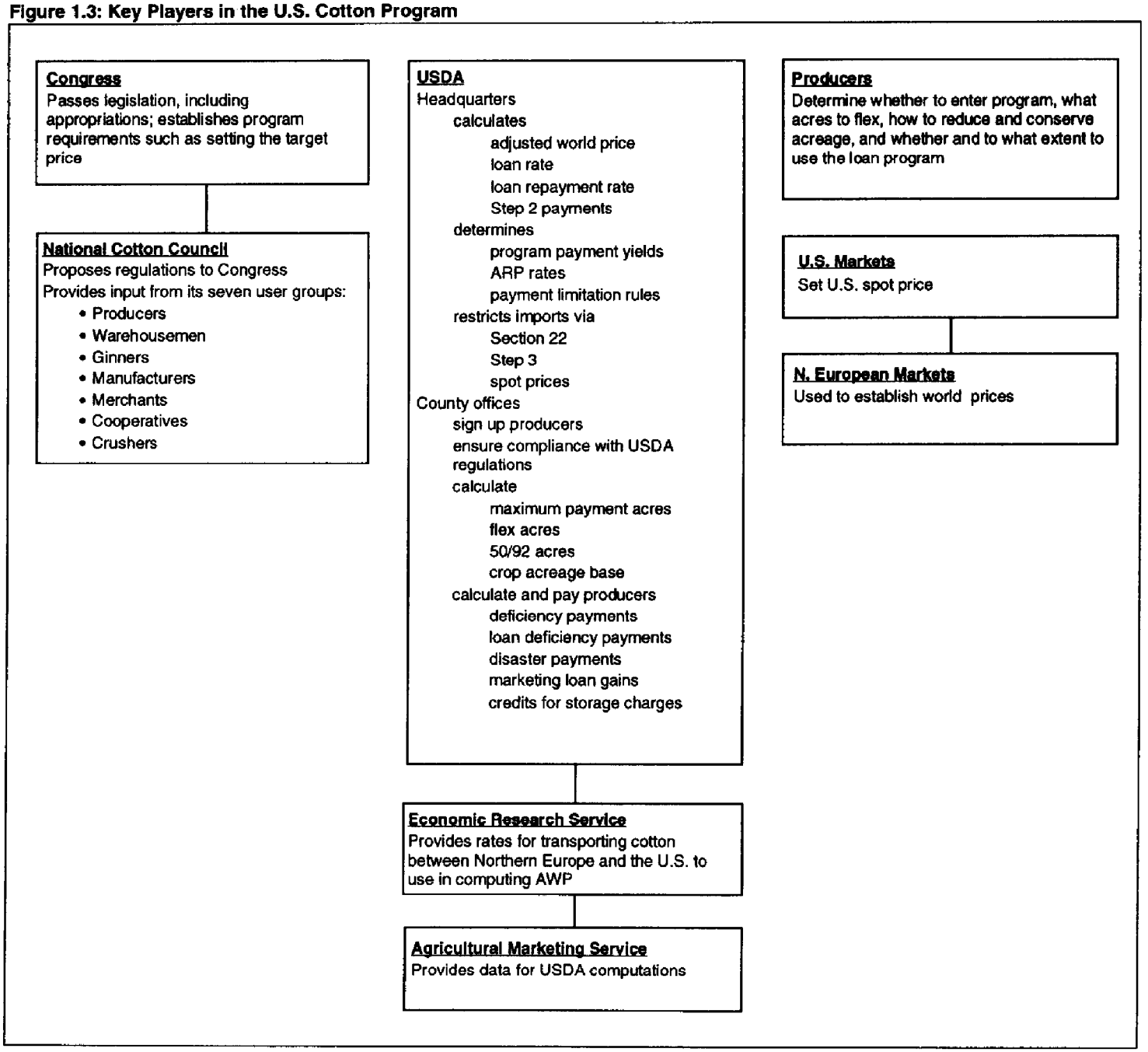
Export Promotion and International Trade Agreements

In addition to supporting import and export provisions for cotton, the United States supports promotion programs for agricultural exports and an open commercial trading system. USDA promotes cotton exports through a series of initiatives, administered by its Foreign Agricultural Service, to develop foreign markets. Also, the United States is a party to GATT and the North American Free Trade Agreement (NAFTA). GATT will allow increasing levels of cotton imports and replace section 22 quota restrictions with tariffs. NAFTA, implemented on January 1, 1994, will also result in import quotas being replaced with tariffs. Both of these agreements will push the industry toward a greater reliance on the market.

Players in the Cotton Program

Many participants have to interact to make the cotton program function. Figure 1.3 lists the key players and briefly describes their roles.

Figure 1.3: Key Players in the U.S. Cotton Program



Objectives, Scope, and Methodology

In response to a request from Representative Richard K. Armey, we evaluated the cotton program's cost and complexity, distribution of payments and benefits, effects on producers' costs and returns, and effectiveness in enhancing U.S. cotton exports. We interviewed USDA officials, industry representatives, and producers. We analyzed USDA data on cotton production, prices, payments, costs of production, and exports for 1986 through 1993. We selected this period for our review of the cotton program to focus on recent program changes made by the 1985 and 1990 Farm Bills, including the marketing loan provision and the three step provisions to address competitiveness. Also, we used an economic model developed by Bruce L. Gardner, University of Maryland, to assess the economic impact of the program on cotton buyers' costs and producers' benefits. (App. I provides a detailed explanation of the economic model.) In addition, we evaluated the potential effects on the cotton program of NAFTA and GATT. As necessary, we adjusted figures in this report to 1993 dollars to more accurately compare prices and costs over time. For this adjustment, we used the gross domestic product implicit price deflator, with 1993 being equal to 1.00. Further details on our objectives, scope, and methodology are provided in appendix II.

We conducted our review from February 1994 through March 1995 in accordance with generally accepted government auditing standards. However, we did not independently verify data provided to us by USDA. USDA's comments on a draft of this report and our responses to them are included in chapters two through six and appendix IV.

The Cotton Program Is Costly and Complex

The cotton program contains a complex series of provisions that cost the government hundreds of millions of dollars each year. For crop years 1986 through 1993, the program cost the government about $1.5 billion (1993 dollars) annually. These costs do not include the cost of other government programs that also support cotton producers. These other programs, which include farm credit, disaster assistance, export assistance, and water subsidies, substantially increase the cost of the government's involvement in cotton production. In addition, federal budgetary costs were slightly offset because U.S. cotton buyers gained an estimated average annual savings of $16 million as a result of lower cotton prices.

Modifications to the program since 1985 have added new features, such as the marketing loan, flex acres provisions, and export subsidies, that have added to the cost of the program and made it more complicated.

Cotton Program Is Costly

As shown in table 2.1, during crop years 1986-93, government costs averaged about $1.5 billion annually in support of cotton crops that were valued at an average of about $4.5 billion annually. Thus, for every dollar producers realized from the sale of cotton, the government spent 33 cents in support of the program.

Deficiency payments accounted for the largest single government cost category, averaging $995 million annually. Other major government cost categories included marketing loan gains, step 2 payments, and loan deficiency payments that together averaged $497 million annually. These costs were slightly offset by cotton buyers' gains. Cotton buyers paid less for cotton in 1986, 1992, and 1993 than they would have without a cotton program. These gains averaged an estimated $16 million annually from 1986 through 1993.

Table 2.1: Annual Cotton Program Costs, Crop Years 1986-93

1993 dollars in millions

Cost category	Total	Average
Deficiency payments[a]	$7,958	$ 995
Loan deficiency payments	942	118
Marketing loan gains	1,558	195
Step 2 payments[b]	553	184
Loan losses	915	114
Storage costs[c]	149	19
Total government costs	**$12,075**	**$1,509**
Cotton buyers' gain	(131)	(16)
Total program cost	**$11,944**	**$1,493**
Market value of production	$35,908	$4,488

[a]Deficiency payments include the costs of the 50/92 program, which averaged $47.4 million for the 8 crop years covered by our analysis.

[b]Step 2 payments were authorized in the 1990 Farm Bill and were made only during crop years 1991 through 1993.

[c]These amounts are for storage costs paid for cotton owned by CCC. Dollars were provided by USDA on a fiscal year basis but have been presented here by crop year. For example, fiscal year 1987 corresponds to crop year 1986. For the 8 years in our analysis, USDA also paid an estimated $448 million (1993 dollars) for storage costs for cotton under the loan program. These costs were included in the marketing loan category for 1991-93, but for earlier years, USDA personnel were unsure about what category absorbed these costs.

Source: GAO calculations based on USDA data.

Over the 8-year period, 1986-93, government costs varied considerably. For example, government costs ranged from $439 million in 1990 to $2.8 billion in 1986. In general, government costs were low when cotton prices were high and program features, such as the marketing loan, were not in effect. For example, in the current crop year, 1994, government costs are expected to be reduced because of high market prices, low deficiency payments, and minimal marketing loan gains.

Costs for administering the cotton program are not included in table 2.1 because USDA does not normally accumulate such costs by program. USDA budget officials estimated that for fiscal year 1993, administrative costs amounted to about $14.4 million.

On average, cotton buyers gained an estimated $16 million annually by paying lower prices for cotton than they would have without the program in 1986, 1992, and 1993. Cotton buyers' gains in 1992 and 1993 derived

from step 2 payments made to domestic mills, which contributed to lower prices. From 1987 to 1991, however, cotton buyers incurred costs ranging from $28 million to $233 million by paying higher prices for cotton than they would have without the program. Cotton buyers' costs are incurred through several mechanisms that the government uses to limit cotton acreage and production. The primary mechanisms include the acreage reduction program, the 50/92 program, and idled flex acres. To the extent that these mechanisms result in lower production and less supply, cotton buyers pay higher prices with the program than they would without it. Appendix I describes cotton buyers' costs and gains in more detail.

Numerous Other Government Programs Support Cotton Producers at Added Costs

Multiple USDA agencies administer other agriculture programs that support cotton and other crops and are intended to, among other things, minimize adverse impacts on the environment, promote cotton exports, provide disaster assistance, control pests, and provide credit assistance. In addition, the Department of the Interior administers a program that provides subsidized irrigation water to producers in western states. A brief description of these programs and estimates of their benefits to cotton farmers, based on available data, are provided below. Amounts for these programs are given in 1993 dollars, except where noted otherwise.

Conservation Reserve Program. This program authorizes USDA to contract with farmers to take highly erodible and other environmentally sensitive cropland out of production. Cotton producers received an estimated $80 million to $100 million from this program in fiscal year 1993.

Export Promotion. The Foreign Agricultural Service administers several programs to help the U.S. agriculture sector sell products, including cotton, abroad. These programs, collectively referred to as "export promotion," are intended to help maintain existing markets and develop new markets. Export promotion costs for cotton totaled $428 million from fiscal years 1986 to 1994, an average of $48 million per year.

Disaster Payments and Crop Insurance. Since 1980, USDA has provided disaster assistance to farmers through direct cash payments and subsidized insurance. From crop years 1988 through 1993, disaster payments for cotton losses totaled $804 million, an average of $134 million per year. In addition, costs associated with crop insurance, including subsidized premiums, insurance commissions, administration, and excess losses, totaled about $896 million during crop years 1986-94, an average of $100 million per year.

Pest Management. The Animal and Plant Health Inspection Service conducts cooperative programs with state and local agencies to control and eradicate the boll weevil and the pink bollworm. From fiscal years 1986 through 1994, funding for these two programs totaled about $126 million, an average of about $14 million annually.

Market News Service. The Agricultural Marketing Service collects, analyzes, and disseminates market information for numerous agricultural commodities, including cotton. Federal outlays for the Cotton Market News Service have averaged about $2 million annually since 1986.

Farm Credit. The Farmers Home Administration,[1] a lending agency within USDA, provides assistance to financially troubled farmers through direct government-funded loans and federal guarantees on loans made by other agricultural lenders. Because of loan defaults, the agency lost about $6.3 billion on its farm loan programs during fiscal years 1991-94, some of which was attributable to cotton farmers. However, the Farmers Home Administration does not maintain accounting records that show losses by type of crop.

Agricultural Research. Two USDA agencies—the Agricultural Research Service and the Cooperative State Research Service—conduct agricultural research, some of which benefits cotton farmers. The Agricultural Research Service estimates that it spent about $38 million for cotton-related research in fiscal year 1994. The Cooperative State Research Service's funding for cotton research totaled $3.7 million in fiscal year 1994.

Water Subsidies. The Department of the Interior's Bureau of Reclamation plans, constructs, and operates water resource projects to provide irrigation water to arid and semiarid lands in the 17 western states. Generally, interest on the federal government's costs incurred in constructing the irrigation component of the project facilities is not included in water irrigation rates. Cotton farmers, particularly in California, benefit from these irrigation subsidies. However, the Bureau does not maintain information by crop on federal irrigation subsidies. Although recent studies are not available, Interior estimated that the subsidy in 1986 was $534 million, and cotton production accounted for about 7 percent of the irrigated acres.

[1]In 1994, the responsibility for administering farmer program loans was transferred from the Farmers Home Administration to the newly created Consolidated Farm Service Agency.

Cotton Program Has Become Increasingly Complex in an Effort to Achieve Multiple Objectives

The cotton program has become increasingly complex because of new features and changes to existing ones, especially since 1985. As with many pieces of agricultural legislation, the government has attempted to manage cotton production and marketing through a combination of policies affecting prices, payments, acreage, and import restrictions. Making the program work requires the interplay of a wide variety of factors throughout the year. The magnitude of the program's complexity is indicated in the nine figures presented in appendix III.

In administering the cotton program and determining the payments to be made to the various participants, USDA must deal concurrently with at least six levels of domestic and international prices, eight acreage reduction and yield mechanisms, and three different types of import restrictions—plus the effects of GATT and NAFTA. The outcome of this interplay of prices and supply control mechanisms results in USDA's making at least seven types of payments to cotton producers, exporters, millers, and other buyers. USDA headquarters personnel generally perform the price calculations, sending the results on to its county offices, which calculate acreage determinations and payments to producers.

The interactions required by the cotton program are often at cross-purposes. For example, the program provides a target price that serves as a guaranteed price for producers, who respond by increasing production. This response would have the effect of lowering market prices for cotton. To counteract this effect, the program then imposes supply-control features, such as the acreage reduction program, to reduce production. These features tend to increase prices. Also, when prices are low, the program supports the price the producers get, then subsidizes buyers to reduce their costs. In addition, the program attempts to make cotton prices competitive, in order to move cotton quickly to market. However, it also allows producers to put their cotton under the loan program and hold it off the market for up to 18 months (free of storage costs for 10 of those months) and to ultimately forfeit their cotton if prices do not rise sufficiently.

Two of the cotton program's many complex processes are discussed below. These two processes are the calculation of the adjusted world price and the step 2 payment rate.

Calculation of Adjusted World Price

USDA, both daily and weekly, analyzes domestic and international cotton price quotations to calculate the prices used to determine program

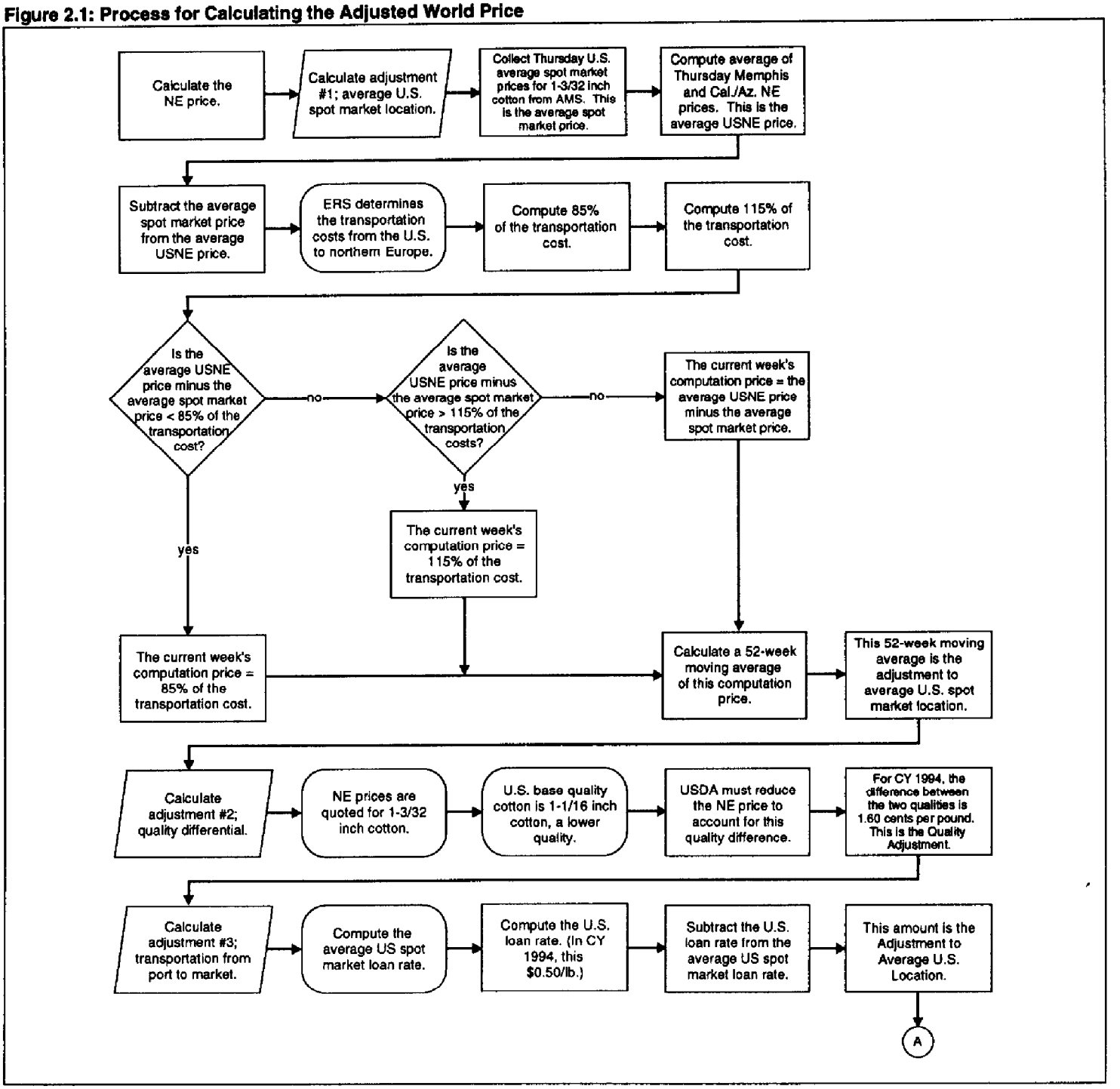
payments. The adjusted world price is an important component in establishing rates for marketing loan payments, loan deficiency payments, and step 2 payments. The method for calculating the adjusted world price, as described in USDA publications, is inherently difficult:

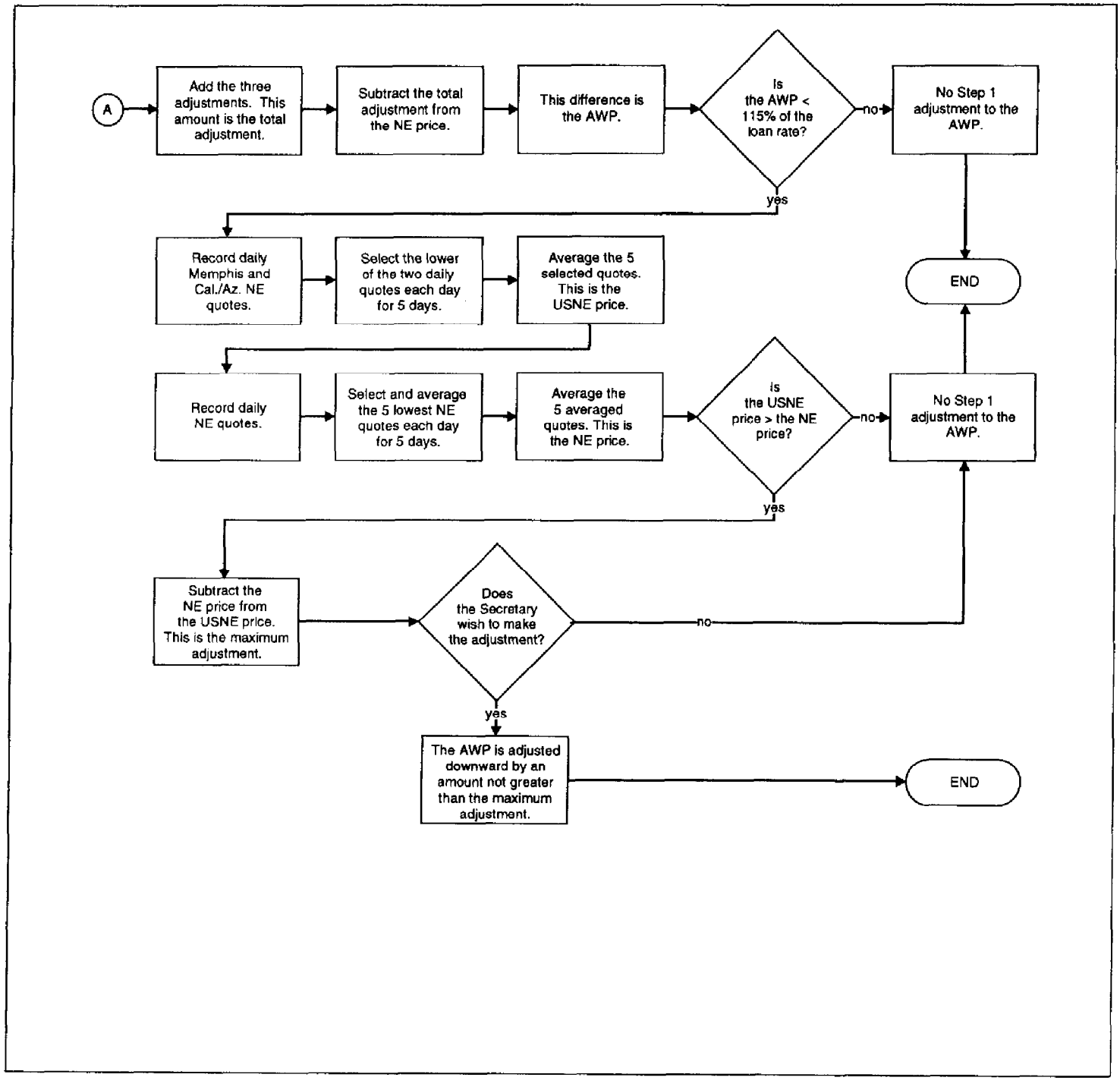
"The adjusted world price (AWP) is equal to the Northern Europe price, 'NE Price,' (an average of the 5 lowest-priced growths for Middling (M) 1-3/32 inch cotton, CIF [cost, insurance, and freight] northern Europe), adjusted to average U.S. quality and location. The AWP for individual qualities is determined by applying the 1994 schedule of loan premiums and discounts, and location differentials. An additional 'coarse count adjustment' (CCA) may be applicable for cotton with a staple length of 1-1/32 inches or shorter and for certain specific lower grades with a staple length of 1-1/16 inches and longer. The AWP and CCA for the subsequent week are announced each Thursday.

"Under certain conditions, the AWP may be adjusted downward. These conditions are when 'the lowest U.S. growth quote for M 1-3/32 inch cotton, CIF northern Europe' (USNE price) exceeds the NE price and the AWP is within 115 percent of the 1993-crop loan level. This is known as the Step 1 competitiveness provision. When these conditions are triggered the Secretary has the discretion to lower the AWP by up to the difference of USNE price minus NE price."

Figure 2.1 depicts this process.

Figure 2.1: Process for Calculating the Adjusted World Price




A
Add the three adjustments. This amount is the total adjustment.
Subtract the total adjustment from the NE price.
This difference is the AWP.
Is the AWP < 115% of the loan rate?
no
No Step 1 adjustment to the AWP.
yes
Record daily Memphis and Cal./Az. NE quotes.
Select the lower of the two daily quotes each day for 5 days.
Average the 5 selected quotes. This is the USNE price.
END
Record daily NE quotes.
Select and average the 5 lowest NE quotes each day for 5 days.
Average the 5 averaged quotes. This is the NE price.
Is the USNE price > the NE price?
no
No Step 1 adjustment to the AWP.
yes
Subtract the NE price from the USNE price. This is the maximum adjustment.
Does the Secretary wish to make the adjustment?
no
yes
The AWP is adjusted downward by an amount not greater than the maximum adjustment.
END

Calculation of Step 2 Payment Rate

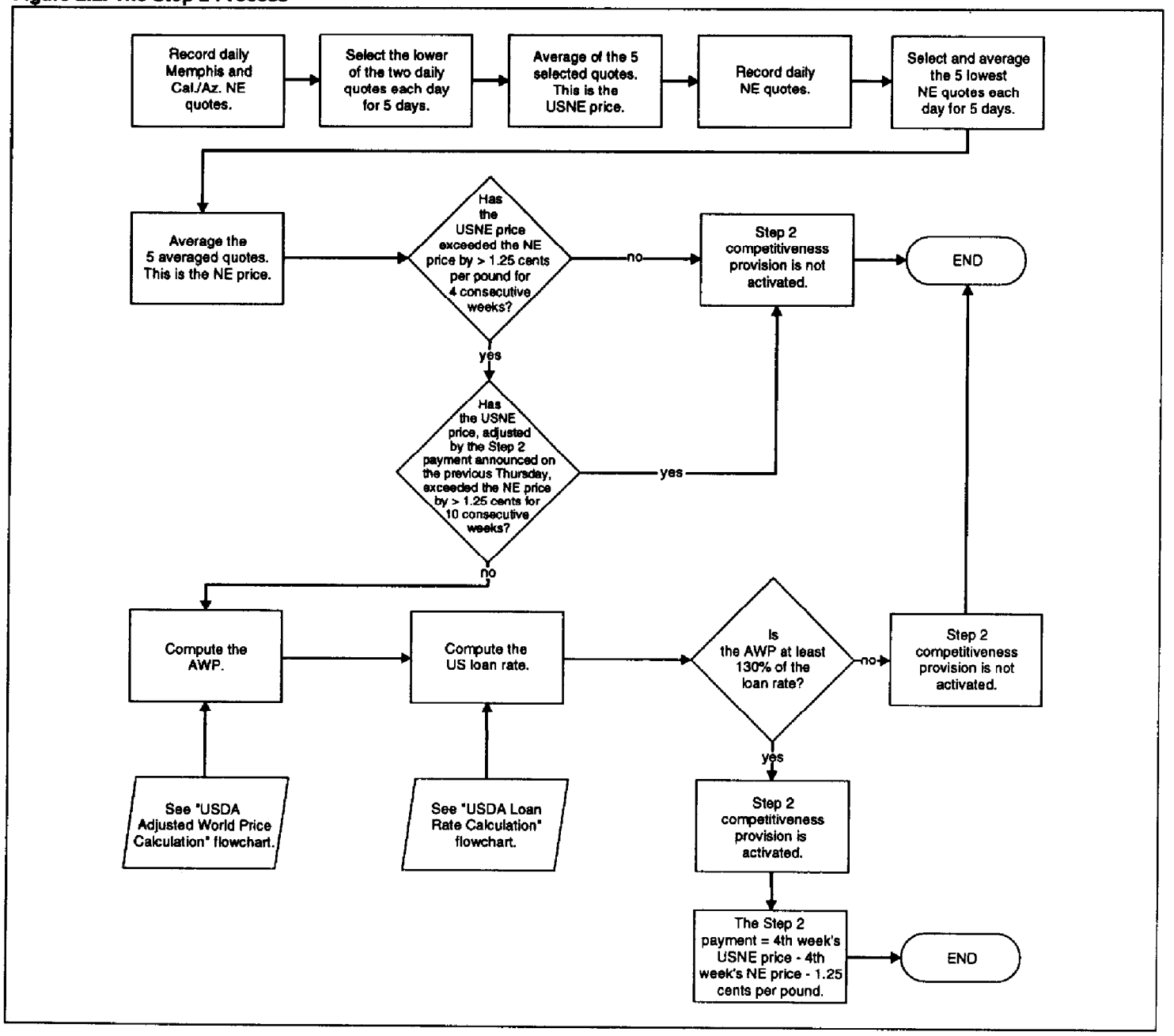
Computations used to determine whether step 2 payments should be triggered and at what rate are similarly complex. USDA publications describe the procedures as follows:

"Whenever, for 4 consecutive weeks, the USNE [U.S. northern European] price exceeds the NE price by more than 1.25 cents per pound and the AWP is within 130 percent of the base loan rate for the 1994-crop upland cotton, marketing certificates will be issued to eligible domestic users and exporters on eligible cotton designated during the week following the consecutive 4-week period. For domestic users, eligible cotton is any bale 'opened' at the mill during the subsequent week. For exporters, eligible cotton is any 'contracted' for shipment by specified dates. The payment rate is equal to the fourth week's USNE price minus NE price minus 1.25 cents/pound."

Step 2 payments will continue only if the USNE price, adjusted by any step 2 payment announced on the previous Thursday, has not exceeded the NE price by at least 1.25 cents per pound for 10 consecutive weeks, according to USDA staff.

Figure 2.2 depicts this process.

Figure 2.2: The Step 2 Process



Agency Comments and Our Evaluation

USDA agreed with the data in our report showing that program costs averaged $1.5 billion annually for crop years 1986-93 and that for every dollar producers realized from the sale of cotton, the government spent 33 cents in support of the program. USDA explained that these costs were lower than for many other program crops and that costs were high in several years because of atypical circumstances. Specifically, USDA explained that costs were high because (1) in 1986 and 1987, USDA had to dispose of stocks that had accumulated under the previous program before marketing loans were in effect and (2) in 1991 and 1992, a worldwide recession and the breakup of the Soviet Union drove world cotton prices down, which added to the cost of the cotton marketing loan program. In addition, USDA noted that projected program costs for 1995-2000 will average a little more than half of what they were for crop years 1986-93. Finally, USDA agreed that the cotton program is undeniably complex. USDA provided various explanations for the program's complexity, including requirements in the legislation. In addition, USDA noted that some aspects of the program were developed after "exhaustive consultations with the cotton industry concerning the appropriate variables to include."

We have not reviewed projections of future cotton program costs. However, we would point out that international commodity markets are inherently volatile because of weather, domestic and international political events, disease and pest outbreaks, and major economic forces in individual countries and regions. As a result, any such projections are subject to much uncertainty. We would also point out that USDA's projections of cotton program expenditures for 1991-95 proved to be well below the actual experience. For example, in its Commodity Credit Corporation Commmodity Estimates Book, USDA projected expenditures of $3 billion, or about $600 million annually over that period. However, actual costs through 1994—$5.7 billion—about $1.4 billion annually, have nearly doubled the total projected costs for the period. In addition, although prices are expected to be high and program costs low in 1995, it is likely that producers, both in the United States and elsewhere, will respond to these prices with increased production, which will probably result in low prices and high program costs in subsequent years.

Most Program Payments Go to a Relatively Few Large Producers

Since the 1940s, the number of cotton farms in the United States has declined, and cotton production has become concentrated among a relatively few large producers. A producer can be an individual or a farm operation organized as a joint venture, partnership, or corporation. One producer can operate several farms. Cotton production in the United States is dominated by the largest producers, who control most of the cotton acreage and receive most of the cotton program payments. Legislation generally limits the amount of payments a producer can receive, but producers may organize their operations in ways that result in their receiving more than the $250,000 limit applicable to a single "person."

Cotton Payments and Production Have Become Concentrated

The number of cotton farms has decreased, from more than one million in 1949 to about 147,000 in 1993. With this decrease, control of cotton production has become concentrated among a relatively few producers. USDA's data bases for crop year 1993 showed that 95,479 producers controlled the 103,000 farms participating in the program. During that year, the top 20 percent of producers grew an estimated 5.7 billion pounds of cotton, which was 79 percent of production, and received 79 percent of the government payments, as shown in table 3.1.

Table 3.1: Concentration of Cotton Farms, Acres, Production, and Government Payments Among U.S. Producers, Crop Year 1993 (Cumulative)

Producers		Percent of total controlled			
Percent	Number	Farms	Acres	Estimated production	Government payments[a]
1	955	4.0	11.4	16.2	16.1
10	9,548	32.1	50.0	57.4	57.1
20	19,096	56.6	74.3	79.1	78.6
50	47,740	88.4	95.6	96.7	96.7
100	95,479	100.0	100.0	100.0	100.0

[a]Amount of payments does not include about $262 million in loan deficiency payments and marketing loan gains paid through cooperatives to producers. We did not have the data available to allocate these payments to producers.

Source: GAO analysis of USDA cotton farm and producer data bases.

Some Producers Received More Than $250,000

For the 1993 crop year, 295 cotton producers received thousands of dollars more than the overall limit of $250,000, including 4 producers who received more than $1 million. Such payments occur because the legislation that defines limits also allows producers to organize their

operations in ways that enable them to receive payments of more than $250,000.

USDA's 1993 data bases disclosed that of the 95,479 producers, 295 received over $250,000 in cotton payments. Table 3.2 shows the distribution of payments for crop year 1993.

Table 3.2: Distribution of Cotton Payments, Crop Year 1993 (Cumulative)

Payment ranges	Producers[a]	Percent	Total Payments[b]	Percent
> $1,000,000	4	.004	$7,647,785	.5
> 250,000	295	.31	$119,107,558	7.9
> 100,000	2,099	2.20	$381,061,563	25.3
> 50,000	8,045	8.43	$788,336,778	52.2
> 10,000	29,860	31.27	$1,357,703,468	90.0
> 1	95,479	100.00	$1,508,884,835	100.0

[a]A producer can be an individual or a farm operation organized as a joint venture, partnership, or corporation. One producer can operate several farms.

[b]Amount of payments does not include about $262 million in loan deficiency payments and marketing loan gains paid through cooperatives to producers. We did not have the data available to allocate these payments to producers.

Source: GAO analysis of USDA data.

All of the 295 producers who received in excess of $250,000 were entities organized as joint ventures, partnerships, and corporations. For example, the operation that received the most in cotton program payments ($4.4 million) for 1993 was a general partnership with 39 members who formed 66 corporations, covering more than 20 farms that produced an estimated 16 million pounds of cotton in three counties within two states.

Agency Comments and Our Evaluation

In its comments on a draft of this report, USDA referred to table 3.1, which shows that about 79 percent of government cotton payments were made to producers who controlled about 79 percent of cotton production. USDA stated that it is clear from table 3.1 that government payments are directly related to the amount of production, not to the number of producers. USDA also commented that other than the rules concerning payment limitations, government payments are designed to be based on production or on base acreage on the farm.

We recognize that government payments are related to production. At the same time, the data also show that the majority of government payments

go to a small number of producers. Both production and the number of producers are related to government payments because control of cotton production has become concentrated among a relatively few producers. (As we stated, "A producer can be an individual or a farm operation organized as a joint venture, partnership, or corporation.") As we said earlier in this chapter, cotton production in the United States is dominated by the largest producers who control most of the cotton acreage and receive most of the cotton program payments.

Cotton Program Has Provided High Returns to Producers and Created Troubling Economic Consequences

Cotton farming under the U.S. cotton program is a profitable venture. Revenues from the domestic market alone are substantially higher than producers' average annual short-run fixed and variable production costs and are nearly sufficient to cover total (long-run) costs of operation, including a return on assets. When government payments are added to producers' revenue, total revenues are well above all costs of production.

In addition to providing substantial returns, the program has produced two troubling economic consequences. First, it has reversed producers' relationship to the market: Producers receive higher returns when market prices are low. Second, program features, such as the acreage reduction program, require land to be taken out of production, creating economic inefficiencies. This results in a net economic loss to society, sometimes called a social welfare loss.

Domestic Market Returns Plus Government Payments Exceed Production Costs

Domestic prices alone have exceeded the short-run production costs of the average producer by 38 percent from 1986 through 1993. Over the same period, domestic prices, on average, have provided sufficient revenue to cover 85 percent of USDA's estimate of the average producer's existing total production costs. This market-revenue-to-costs comparison is conservative—if the cotton program did not exist, production costs would be lower. When the cotton program's deficiency and marketing loan payments are added to revenues from the market, the average producer's revenues exceed total production costs by 17 percent. Table 4.1 summarizes these costs and revenues over the 8-year period, 1986-93.

Table 4:1: Average U.S. Cotton Production Costs and Revenues, 1986-93

In 1993 dollars per pound

	Production costs	Revenues			Revenue as percent of costs	
		Market	Government	Total	Market	Total
Short-run	$.48	$.66	$.25	$.91	138%	190%
Total (Long-run)	$.78	$.66	$.25	$.91	85%	117%

Source: GAO analysis of USDA data.

Short-run production costs, both variable and fixed, represent money paid out by producers each crop year to grow, harvest, and market cotton. Variable costs—seed, fertilizer, fuel, irrigation, hired labor, chemicals, and other inputs—depend upon farm operation management and practices,

operation size, and input quantities and prices. Fixed production costs, including general farm overhead, taxes, and insurance, are allocated to each crop on the basis of its relative share of total production value and also must be paid in the short-run, or each year, if a producer is to stay in business.

To estimate the amount of revenue average producers must receive to stay in business over the long run, USDA's Economic Research Service combines short-run production costs with its estimates of the amount of profit or returns average producers should earn on each cotton production asset, such as capital, land, equipment, and unpaid labor. This total estimate is also known as the long-run cost.

The cotton program benefits producers significantly and has allowed some to depend on government payments. This is not to say that all producers would be similarly affected in the absence of a cotton program. Producers told us that some would not survive as cotton farmers without the program. They suggested that producers who are heavily financed by debt loans for land and machinery, have consistently low yields and high cost, and/or who refuse to modernize will not survive without the program. However, the number of producers who would cease cotton farming is difficult to measure without looking at individual producers' financial records and assessing their operational efficiency.

Estimated Percentage of Producers Covering Production Costs From Market Prices Alone During 1993

The estimated percentage of producers who were able to cover short-run and long-run production costs from market prices alone are shown in tables 4.2 and 4.3. For example, table 4.2 shows that 77 percent of producers, who grew 90 percent of the cotton, had a short-run production cost of 58 cents per pound, the average market price for cotton in 1993.

Table 4.2: Range of the Estimated Short-Run Production Cost Under the Cotton Program and Producers at or Below That Cost, 1993

Short-run production cost per pound	Percent of producers at or below that cost	Percent of total production at or below that cost
$.40	29	42
.47	50[a]	67
.50	58	75
.58[b]	77	90
.60	81	93
.70	93	98
.80	97	99
.90 and higher	100	100

[a]Median.

[b]Average domestic price for 1993 was $.58 per pound.

Source: GAO analysis of USDA data. Estimates are based on each producer's 1981-85 historical average yield and the applicable regional average production cost.

Table 4.3 shows, for 1993, a range of total production costs with corresponding percentages of producers and production at or below those costs. For example, 27 percent of producers, who grew about 39 percent of the cotton, had a total production cost of 58 cents per pound, the average price for cotton in 1993.

Table 4.3: Range of the Estimated Total Production Cost Under the Cotton Program and Producers at or Below That Cost, 1993

Total production cost per pound	Percent of producers at or below that cost	Percent of total production at or below that cost
$.40	3	4
.50	14	19
.58[a]	27	39
.60	31	44
.70	50[b]	67
.78	64	80
.80	67	83
.90 and higher	100	100

[a]Average domestic market price for 1993 was $.58 per pound.

[b]Median.

Source: GAO analysis of USDA data. Estimates are based on each producer's 1981-85 historical average yield and the applicable regional average production cost.

In 1990, USDA last estimated the percentage distribution of cotton farms and production by per pound variable cash cost and total long-run economic cost. USDA's estimate was based on its 1987 national production costs and returns survey data. We found our percentage distribution of cotton producers and production data and returns to be similar to USDA's estimates. For example, USDA reported that about two-thirds of the 1987 cotton crop was grown at long-run economic production costs below the then target price of 79 cents a pound. In our analysis, we estimated that about 50 percent of the producers had the potential to grow over two-thirds of the 1993 cotton crop at a long-run economic cost of 70 cents a pound, or about 2 cents less than the current legislated target price. USDA officials said that they had not officially updated their distribution estimates for unit costs since they first reported them in 1990.

Our estimates of production costs in tables 4.2 and 4.3 are conservative because we were required to use USDA's 10-year-old yield data, called "program yields," to estimate costs for each farm. Had we been able to use current actual yields, which are higher, costs per pound would have been lower. Since 1985, yields have increased considerably because of increased irrigation, USDA's program to eradicate the boll weevil, technology, and other improvements.

Because the program increases producers' revenues, it also raises the total costs of production. Total costs include a value for the earning capacity of land. The value of the land is determined not only by what it earned in the previous year but also by what it is expected to earn in the future. Since the cotton program significantly raises the returns to farmers, the program increases the value of the land, as well as other costs of operation.

Program Has Generated Troubling Economic Consequences

As currently designed, the cotton program results in two troubling economic consequences for producers and society. First, between 1986 and 1993, the program created a situation in which cotton producers were better off when prices were low. This occurred primarily because at low price levels during this period, farmers were eligible for an array of government payments, including deficiency payments, marketing loan gains, and loan deficiency payments, that more than made up for the revenues lost due to the low price. As prices rose, producers were no longer eligible to receive these payments.

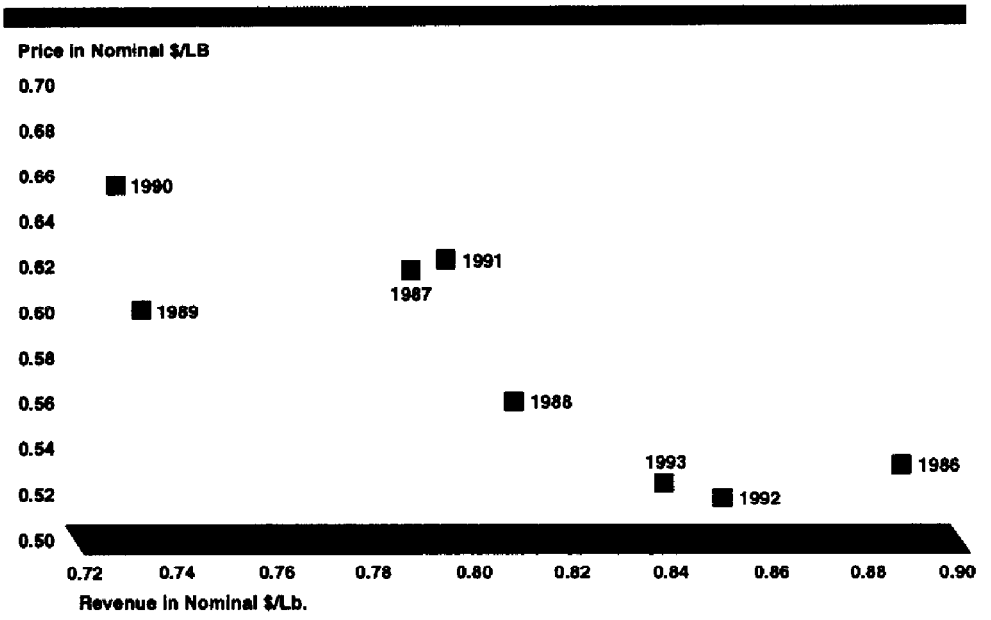
As a second consequence, program features such as acreage control resulted in economic inefficiencies as land was withdrawn from

production. These net economic losses to society, sometimes called social welfare losses, averaged an estimated $738 million a year from crop year 1986 through 1993.

Producers Gain More When Prices Are Low

The cotton program is meant to protect farmers' income during periods of low prices. However, program benefits from 1986 through 1993 were so generous that they more than offset lower prices. As shown in figure 4.1, in years when prices were low, farmers received higher total revenue per pound on their payment acres.

Figure 4.1: Relationship Between Producer Revenues and Price, 1986-93

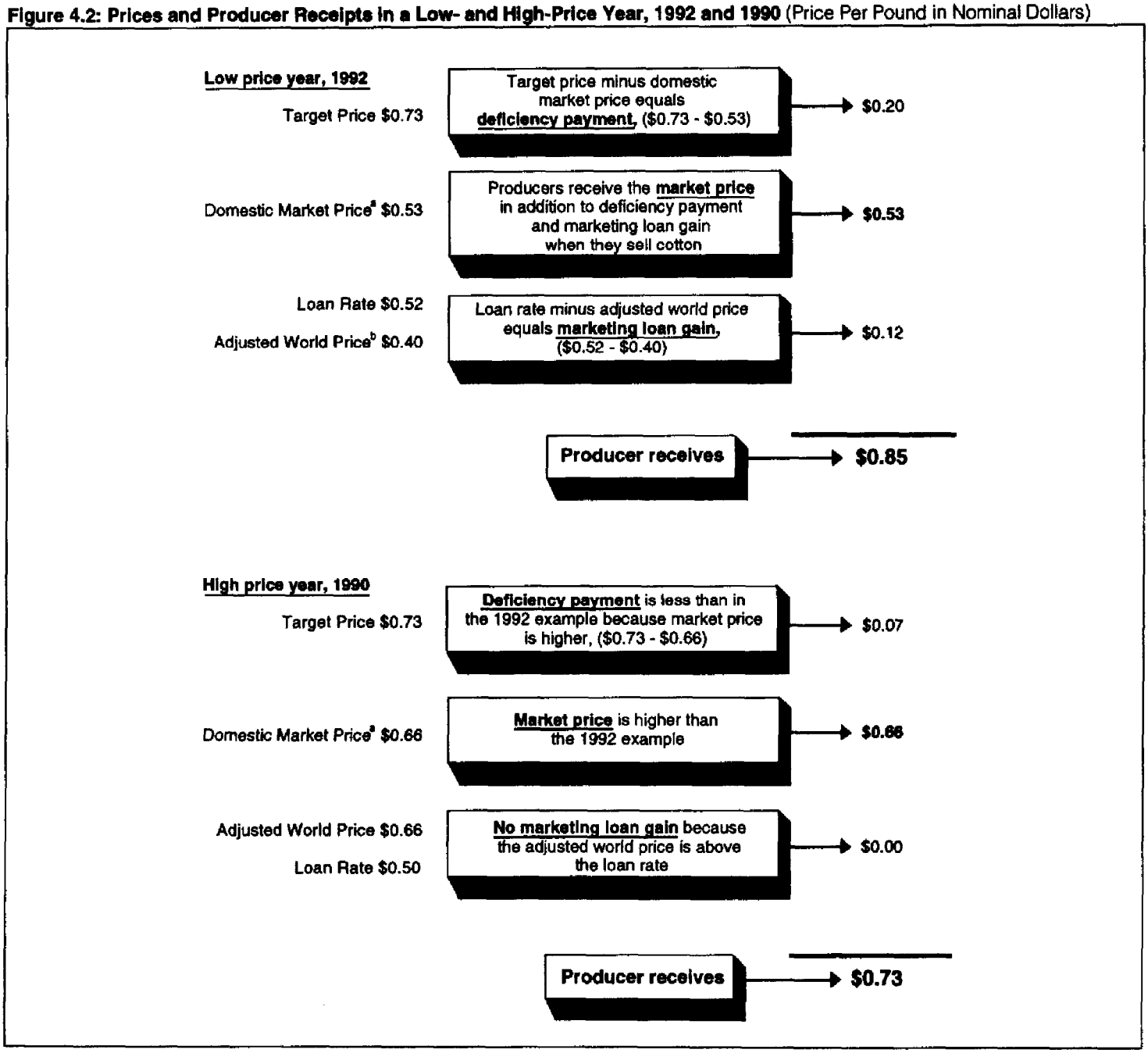


Source: GAO analysis of USDA data.

This condition occurs when domestic and world prices are such that producers receive both marketing loan gains and deficiency payments. When these amounts are added to the market price, the total is more than the legislatively set target price. Under current program requirements, the marketing loan gain is not incorporated into the deficiency payment calculations. Figure 4.2 illustrates how farmers' revenues were affected in

1992 when market prices were low and compares this situation with 1990 when market prices were high.

Figure 4.2: Prices and Producer Receipts in a Low- and High-Price Year, 1992 and 1990 (Price Per Pound in Nominal Dollars)



[a]Calendar year market price.

[b]*The adjusted world price weighted by the quantity of loans redeemed.*

Program Causes Economic Inefficiencies

Although the cost of the cotton program to the federal government averaged about $1.5 billion for crop years 1986 through 1993, we estimate that cotton producers' annual economic benefits were only about $754 million, or 51 percent of these costs. The $738 million per year, or 49 percent, difference between the program's cost and the producers' benefits represents a net loss to society (sometimes called "social welfare loss"), as shown in table 4.4.

Table 4.4: Economic Impact of the Cotton Program, Crop Years 1986-93

In millions of 1993 dollars

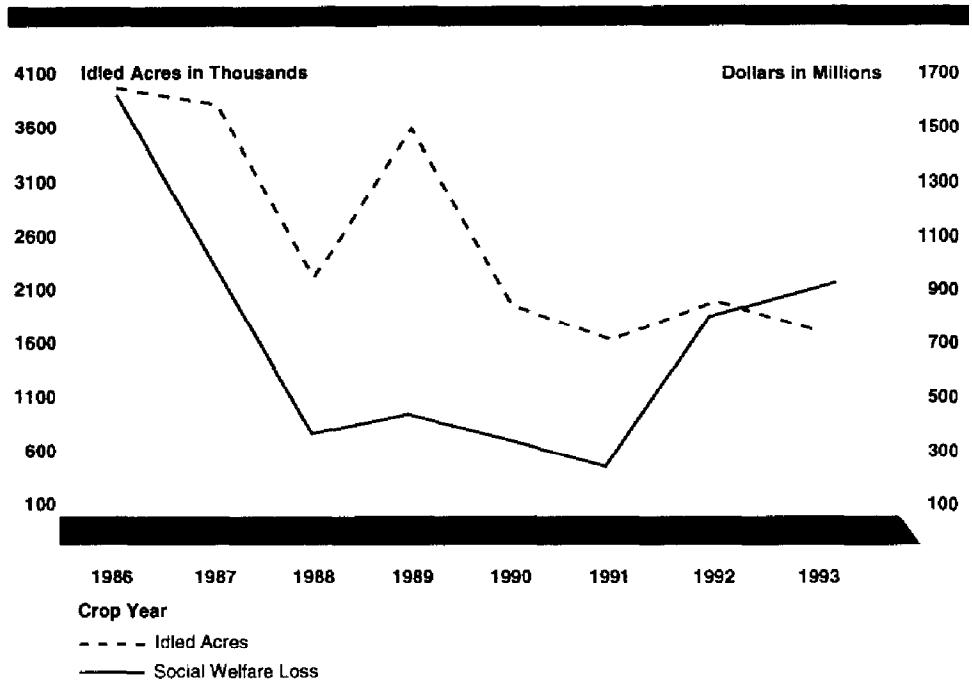
Crop year	Total government and net cotton buyer costs	Producers' net economic gain	Producers' gain as percent of total cost	Social welfare loss	Social welfare loss as percent of total costs
1986	$2,364	$ 688	29%	$1,676	71%
1987	1,680	625	37	1,055	63
1988	1,741	1,405	81	336	19
1989	981	522	53	460	47
1990	489	162	33	327	67
1991	1,251	982	79	269	21
1992	1,761	887	50	875	50
1993	1,676	766	46	910	54
Average	$1,493	$ 754	51%	$ 738	49%

Note: Totals and averages may not add due to rounding.

Source: GAO analysis of USDA data.

This social welfare loss measures the inefficiencies that result primarily from aspects of the program that keep land from being used productively—such as the acreage reduction program, 50/92, and the portion of flex acres that remain idle. (Although land has been left idle under 50/92 and flex acres, producers are not required to leave this land idle to receive program benefits as they are in the case of the acreage reduction program.) Because of these inefficiencies, producers receive economic benefits worth less than a dollar for every dollar given up by the nation. Figure 4.3 shows the relationship between the social welfare loss and idled land.

Figure 4.3: Social Welfare Losses and Idled Land (in 1993 Dollars)



Source: GAO analysis of USDA data.

Idled acreage reduces producers' opportunities to earn additional revenue and in some years increases cotton buyers' costs because reduced supplies lead to higher prices. In addition, by providing program benefits, the government is using resources to pay producers not to produce on the idled acres. The magnitude of the social welfare loss derives from (1) the number of idled acres and (2) government costs, in terms of program benefits, that the government incurs to induce producers to leave those acres idle. Additional losses accrue through government stock-holding activities—particularly the release of large stocks at prices less than the government paid for them, as occurred in 1986.

The largest social welfare losses occurred in 1986 because of two factors. First, the number of idled acres peaked that year. Second, the social welfare loss increased because the government released stocks, which had

been accumulated in previous years as a result of the program, for prices less than it paid for them.[1]

The number of idled acres and social welfare loss has generally declined since 1986. In 1992 and 1993, however, social welfare loss increased because of increases in program benefits, particularly through the marketing loan provision and step 2 payments.

Agency Comments and Our Evaluation

In its comments on a draft of this report, USDA questioned (1) our use of averages in table 4.1 to analyze cost and revenue data over the period 1986-93, (2) our finding that producers can receive higher returns when market prices are low, and (3) our application of an economic model used to determine the social welfare effects—economic gains and losses—of the cotton program.

First, USDA believes that the use of 8-year average revenue and cost figures are of limited value in explaining a real profit/loss result in a given year because each cost estimate is based on a yield for a specific year and each revenue estimate is based on an assumed price for a given year.

We believe our use of averages to summarize cotton producers' costs and revenues is a reasonable methodology that has explanatory value. Averaging is particularly relevant in this case, since we are trying to assess the economic condition of cotton producers in both the long and short term. For example, our analysis for each year during 1986-93 showed that in the short run, revenue from market prices alone as a percent of cost ranged from 107 to 176 percent. In the long run, revenue from market prices alone as a percent of cost ranged from 66 to 103 percent. Thus, while producers may sustain variations in returns from year to year, their long-term condition is determined by the average across years.

Second, USDA states that while some farmers may be better off as prices decline, there are many farmers who, by employing futures and options markets, would be able to earn nearly as much income from a higher market through timely trading as they would in a lower market through government payments. Nevertheless, USDA does agree that there is a potential for a producer to realize a higher return in a year with lower prices.

[1]Social welfare losses from the sale of CCC stocks would have been even greater had they not been partially offset by the gains that domestic cotton buyers received through the purchase of cotton at the reduced price.

We believe that USDA's comments on producers' use of futures markets are not relevant to whether the cotton program, as currently designed, allows producers to receive higher returns from the government when market prices are low. The fact that some farmers may take actions on their own by using private market mechanisms, such as futures markets, is not relevant in evaluating whether the cotton program creates unreasonable economic incentives.

Finally, USDA notes that the social welfare loss measured by our model is determined, in part, by program participants' idling part of their land. USDA does not appear to object to our use of acres idled as a result of the acreage reduction program. However, USDA disagrees with our model's use of idled acres voluntarily idled under flex acres and 50/85. (The 50/85 program was a revision to the 50/92 program, which was in place during the period of our review.) USDA's comments also include a discussion of possible impacts of eliminating the cotton program on the basis of cost data contained in tables 4.2 and 4.3. USDA suggests that although supply may expand without the cotton program as indicated by our model, it would not be long before farmers leave the business.

We believe that we have correctly applied our theoretical model. Our model is well tested, has withstood close internal and external scrutiny, and has proved to be an effective analytical tool to evaluate the economic effects of commodity programs. First, our use of the model and our interpretation of its results were reviewed by Dr. Bruce L. Gardner, who developed the model. He is currently a professor at the University of Maryland and formerly was a USDA assistant secretary. Dr. Gardner agrees that we have properly applied the model to the cotton program. Second, we have used this same model in essentially the same way to evaluate the rice and wheat commodity programs, and the model and results were described in detail in published reports.[2] Third, we recognize that our model, like any other model, is a simplification of the real world and has limitations. However, this chapter and appendix I clearly set forth how the model was constructed, relevant variables, and any limitations of the model. Fourth, the model is designed to evaluate the impact of a commodity program on the economic welfare of society as a whole—not any particular group—by measuring the inefficiencies that result from aspects of the cotton program that keep land from being used productively. For example, although farmers may respond to program

[2]Rice Program: Government Support Needs to Be Reassessed (GAO/RCED-94-88, May 26, 1994) and Wheat Commodity Program: Impact on Producers' Income (GAO/RCED-93-175BR, Sept. 8, 1993.

provisions by making certain decisions that benefit them, our model looks at whether these decisions provide an overall benefit or cost to society.

Regarding our use of voluntarily idled acres under flex acres and 50/92, we clearly explain in this chapter that producers are not required to leave land idle under flex acres and 50/92 to receive program benefits. Also, the idled acres used in our model, whether idled because of program requirements or voluntarily, were idled under provisions of the cotton program. From the standpoint of society, the reasons cotton producers decide to idle acres are not relevant to whether economic inefficiency results. The key point is that, as a result of the cotton program, productive land of potential benefit to society was idled.

USDA suggests the possibility that although cotton supply would initially expand without the program, it would not be long before farmers would leave the business because they could not meet their total costs from the market prices alone, as shown by the long-run cost data in table 4.3. Our report does recognize in chapter 6 that there will be negative consequences for some farmers if the program is reduced or eliminated. We should also point out that where turnover occurs among producers, some producers leaving the business could be replaced by those with lower costs.

Federal Efforts to Enhance Cotton Exports Are Costly

The cotton program's provisions to maintain and expand exports when world prices are low—the marketing loan and step 2—have not succeeded despite government expenditures of about $3 billion since 1986. Even with these provisions, U.S. cotton prices remained significantly higher than world prices, and U.S. exports fell when world prices were low. This situation occurred because the marketing loan and step 2 provisions could not counteract the effect of other cotton program provisions that keep U.S. prices higher than world prices. In addition to expenditures for the marketing loan and step 2, USDA spent $428 million under other agricultural programs for cotton export promotion between 1986 and 1994.

Although exports are generally beneficial to a nation, this has not been the case with cotton, which has continually sold at a loss. Under the cotton program, exports have regularly been sold for less than the combined costs of government expenditures and cotton production.

In the future under NAFTA and GATT, the United States may find it difficult to enhance exports, support domestic prices at higher than world levels, and maintain other aspects of the present cotton program. Under these trade agreements, the U.S. cotton program will be pushed toward a greater market orientation in response to the gradual elimination of trade barriers and increased foreign competition, particularly in textiles.

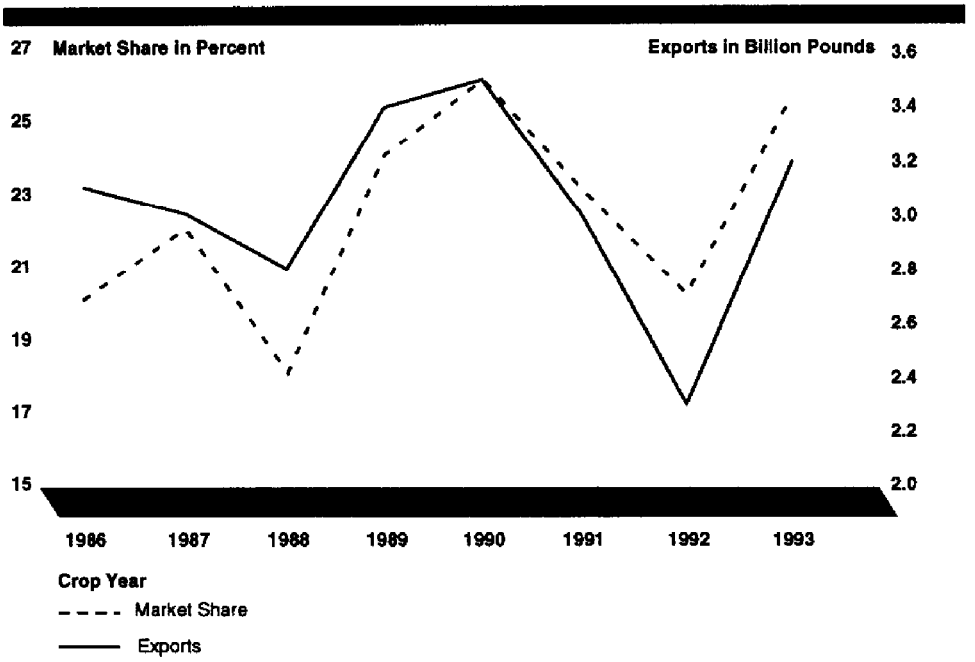
Costly Export Program Provisions Have Not Counteracted Effects of Other Provisions on U.S. Prices

While the marketing loan and step 2 provisions were used to try to support exports by making U.S. cotton available at lower prices on world markets, other cotton program provisions worked to keep U.S. prices higher, and, in fact, exports dropped. Furthermore, exports fell in 1988, 1991, and 1992 even though USDA expended an additional $428 million for export promotion and market development in foreign countries from 1986 through 1994.

Marketing Loan and Step 2 Provisions Have Not Prevented Periodic Declines in Exports

During the 3 years when world prices were low—1988, 1991, and 1992—U.S. cotton exports declined significantly: by 222 million pounds, or 7 percent, in 1988; by 500 million pounds, or 14 percent, in 1991; and by 700 million pounds, or 23 percent, in 1992. For these 3 years, the U.S. share of the world export market dropped from 22 to 18 percent, 26 to 24 percent, and 24 to 20 percent, respectively, as shown in figure 5.1.

Figure 5.1: Export Volume and Market Share, 1986-93



Source: GAO analysis of USDA data.

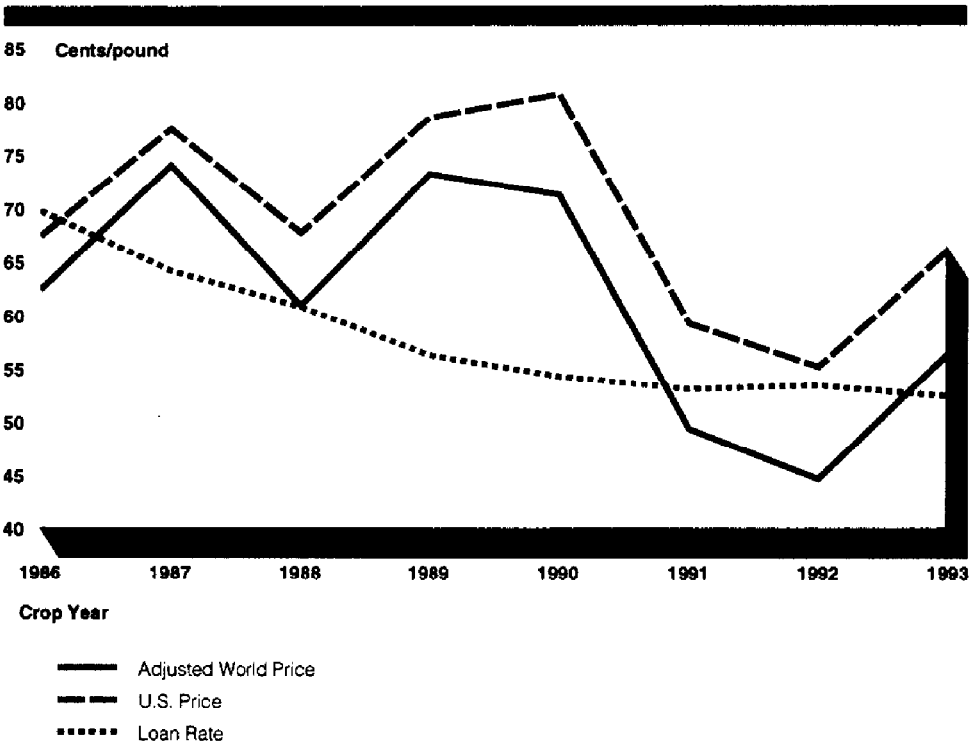
During 1988, 1991, and 1992, the adjusted world price was at or below the U.S. loan rate and below the U.S. domestic price.[1] This situation activated the marketing loan at a cost of $1.4 billion and step 2 at a cost of $357 million. The cost for these 3 crop years represented about 60 percent of the total $3 billion in expenditures for the marketing loan and step 2 provisions between 1986 and 1993.

The price of U.S. cotton remained above the adjusted world price during 1986-93. (See fig. 5.2.) This situation does not appear to affect U.S. cotton exports when world prices are relatively high, indicating a tight world supply. However, when world prices drop to or below the loan rate, as they did in 1988, 1991, and 1992, U.S. exports decline. The marketing loan and step 2 provisions were intended to alleviate this situation by making U.S. cotton more price-competitive. By allowing producers to redeem cotton from loan at the adjusted world price, the marketing loan provision was expected to encourage producers to sell cotton on the market because they would gain the difference between the loan rate and the

[1]The U.S. domestic price is also referred to as the spot price. Data on U.S. spot prices are collected and published by the Agricultural Marketing Service.

adjusted world price. In addition, these sales were expected to lower the U.S. price for cotton, eliminating the loan rate as the floor price and bringing U.S. prices in line with world prices. However, as figure 5.2 shows, the U.S. price (also referred to as the U.S. spot price) remained above the loan rate even when the adjusted world price approached or fell below the loan rate in 1988 and 1991-92.[2]

Figure 5.2: Relationship Between Adjusted World Price, U.S. Price, and Loan Rate, 1986-93 (in 1993 Cents/Pound)



Source: GAO analysis of USDA data.

In the 1990 Farm Bill, the Congress enacted the step 2 provision, which compensates domestic buyers and exporters for the higher price of U.S. cotton. However, cotton exports and market share still declined in 1991

[2]U.S. prices were below the loan rate in crop year 1986 during the transition to the marketing loan program. During this transition year, the government released to market the stocks it had accumulated during previous years. In addition, loans were repaid under plan A rather than the present plan B. Under plan A, the repayment rate was fixed at 80 percent of the loan rate regardless of how high market prices were. Under the present system—plan B—the loan repayment rate equals the adjusted world price or the loan rate, whichever is lower.

and in 1992, when the adjusted world price was below the loan rate. These periodic declines in U.S. cotton exports indicate that the marketing loan and step 2 provisions have been unable to overcome other provisions of the cotton program that keep U.S. prices high.

During our review, USDA officials and cotton industry representatives pointed out that the breakup of the Soviet Union was an important factor in explaining declining U.S. cotton exports in 1991 and 1992. According to these officials and representatives, Uzbekistan and other cotton-producing Central Asian countries in the former Soviet Union, which had traditionally sold their cotton to textile mills in Russia, now offered their cotton for sale on the world market in order to obtain needed hard currency. Because of market uncertainty regarding the reliability of these Central Asian countries in meeting contract commitments, their cotton could be sold only at heavily discounted prices. The end result was that world cotton prices dropped during this period.

The breakup of the Soviet Union was a factor in the decline in world price during the 1991-92 period; however, such world events are not relevant in assessing whether the marketing loan and step 2 provisions are effective. These provisions were designed specifically to help make U.S. cotton competitive by bringing the U.S. price more in line with a lower world price—whatever the reason for the lower world price. As shown in figure 5.2, the marketing loan provision, in particular, has been unable to bring down the U.S. price to the lower world price. In fact, figure 5.2 shows that the gap between the U.S. price and the adjusted world price is actually widening.

Other Program Provisions Keep U.S. Prices Higher Than the Adjusted World Price

Five features of the cotton program reduce producers' incentive to sell cotton to the market and thereby keep the U.S. price above the world price: import restrictions, production restrictions, the loan rate, loan extension, and free storage.

- Import restrictions. Because domestic textile mills are largely prohibited from importing cotton, U.S. prices are insulated from world competition. Therefore, producers have a captive domestic market and do not have to compete against foreign producers selling cotton at lower world prices. This makes it possible for other program features to operate.
- Production restrictions. To the extent that cotton production is reduced through such program provisions as acreage set-asides, 50/92, and idled

flex acres, prices will be higher because less cotton will be available to the market.

- Loan rate. By guaranteeing a minimum price to producers, the loan rate enables them to keep cotton off the market unless they are offered a price higher than the loan rate. In effect, despite the introduction of the marketing loan, the loan rate still acts as the floor price for the U.S. market, as figure 5.2 shows.
- Loan extension. The 8-month extension of the basic 10-month nonrecourse loan makes it easier for producers to be selective in the price they accept for their cotton. In total, producers may have up to 18 months in which to sell their cotton.
- Free storage. Because producers can receive free storage for the first 10 months of their nonrecourse loan when the adjusted world price nears or drops below the loan rate, producers can keep cotton off the market at no cost. USDA does not provide free storage for any other commodity.

With these provisions, U.S. cotton producers can hold their cotton under loan until pricing conditions are favorable or forfeit cotton to the government. Therefore, to get cotton to the market, cotton buyers (domestic textile mills and exporters) have to overcome the disincentives created under the domestic program by paying premiums, known as equities.[3] For example, as shown in table 5.1, a producer put cotton under loan and received the loan rate of 52 cents per pound from USDA. Cotton buyers offered the producer 11 cents per pound in equity payments for the right to redeem cotton held under loan. The producer therefore received 63 cents per pound for the cotton—52 cents from the loan rate and 11 cents in equity. Using the marketing loan, the buyer then redeemed the cotton at 43 cents per pound, which was the adjusted world price when the cotton was redeemed. Therefore, the cotton buyer's total purchase price was 54 cents per pound—43 cents to redeem the cotton from loan and 11 cents for the equity payment to the producer.

[3]Under the cotton program, after taking out a loan, a producer has three marketing options: the producer may (1) allow the government to keep the cotton, called "forfeiting"; (2) repay the loan and market the cotton; or (3) sell the right to redeem the cotton from loan to a merchant or domestic mill. The value of the right to redeem cotton from loan is typically referred to as "buying an equity." In an equity transaction, the producer retains beneficial interest (ownership) in the cotton until it is actually redeemed from loan by the buyer.

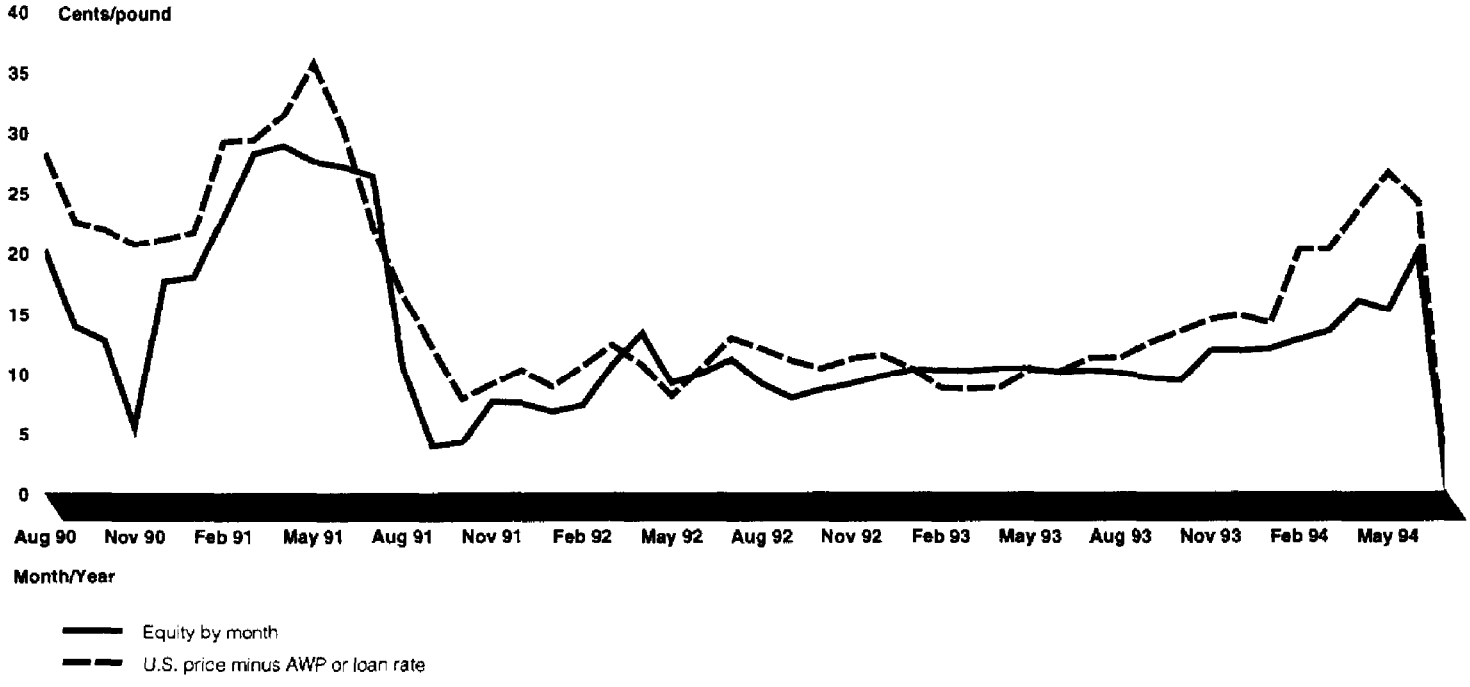
Table 5.1: Illustration of the Effect of Equity Sale on Payments and Receipts of Producer, Government, and Buyer

Cents/pound

Producer and buyer actions	Producer receipts	Government payments and receipts	Buyer payments
Producer puts cotton under loan	52 cents	(52 cents)	Not applicable
Buyer pays equity for right to redeem cotton	11 cents	Not applicable	(11 cents)
Buyer redeems cotton from loan at adjusted world price	Not applicable	43 cents	(43 cents)
Net result	**63 cents**	**(9 cents)**	**(54 cents)**

As shown in table 5.1, although buyers redeemed cotton from the government at the adjusted world price of 43 cents, the additional 11 cents equity payment resulted in a domestic price of 54 cents. Our analysis found that these equity payments to producers kept the domestic price above the adjusted world price. As shown in figure 5.3, equity payments are closely related to the amount by which the domestic price exceeded the adjusted world price between August 1990 and July 1994.

Figure 5.3: Role of Equities in Explaining the Gap Between the U.S. Price and the Adjusted World Price (in 1993 Cents/Pound)



Source: GAO's analysis was based on unpublished equity data collected by USDA's National Agricultural Statistics Service as part of its monthly survey of market prices received by farmers.

Domestic cotton buyers are able to pay equities to producers because the government compensates them through several components of the cotton program. First, buyers receive step 2 payments. Second, the government's provision for free storage under the marketing loan represents a cash value associated with cotton for which cotton buyers are willing to pay. Third, under the marketing loan program, buyers receive a price advantage as a result of the method used to calculate the adjusted world price. This advantage occurs because the adjusted world price is calculated as if all cotton were transported to Europe at a cost of 12 cents per pound. Domestic buyers, however, actually incur only the 5-cent cost of transporting cotton to domestic mills. Therefore, domestic buyers gain a benefit of 7 cents per pound on the value of the cotton they purchase.

Other Agricultural Programs Promote Cotton Exports

In addition to the approximately $3 billion spent since 1986 on marketing loan and step 2 payments, USDA spent another $428 million to enhance cotton exports through its export promotion and market development programs for agricultural commodities. (See table 5.2.) Despite these programs, cotton exports periodically declined. While each export promotion and market development program has specific objectives, such as countering the actions of foreign competitors who subsidize their own exports, all of these programs are used to support the development of commercial markets in foreign countries.

These export promotion programs include Foreign Market Development, the Market Promotion Program, Public Law 480, and General Sales Manager 102 and 103 programs. The Foreign Market Development and the Market Promotion Program promote exports in specified markets. Public Law 480 has the multiple objectives of developing and expanding U.S. agriculture export markets, encouraging economic development, providing humanitarian assistance, and promoting U.S. foreign policy. The General Sales Manager programs guarantee repayment of private short- and intermediate-term credit to potential foreign customers who cannot otherwise obtain commercial credit. General Sales Manager 103, added in 1985, created an alternative program with a longer repayment period than that available under General Sales Manager 102. These credit guarantee programs incur losses when loans are defaulted on. USDA has guaranteed loans of about $2.6 billion to foreign cotton buyers from fiscal years 1986 through 1994 and incurred estimated losses of about $154 million from defaulted loans.

Table 5.2: Export Program Costs, Fiscal Years 1986-94

In millions of 1993 dollars

Fiscal year	General Sales Manager defaults	Public Law 480	Market Promotion Program	Foreign Market Development	Total cost
1986	$17	$15	$8	$3	$42
1987	16	16	0	0	42
1988	15	12	9	1	37
1989	15	17	19	1	52
1990	15	25	15	2	57
1991	19	0	13	2	34
1992	19	26	16	1	62
1993	19	30	14	2	65
1994	19	9	8	1	37
Total	**$154**	**$160**	**$102**	**$12**	**$428**

Source: GAO analysis of USDA data.

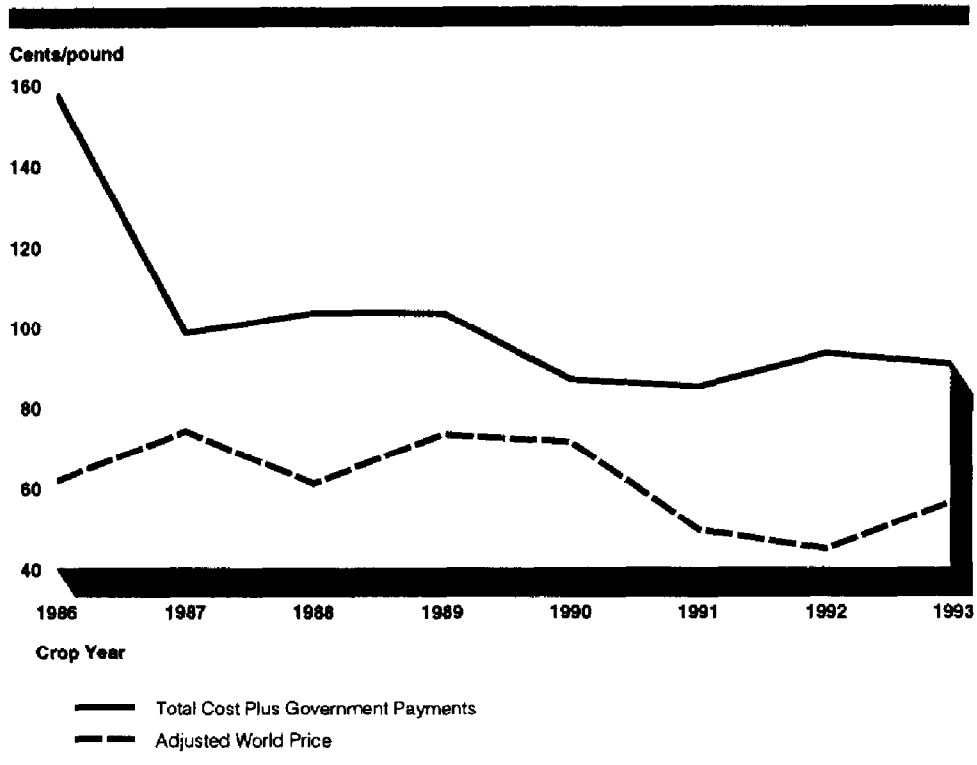
Cotton Exports Are Sold at a Loss

While exports are generally beneficial, this has not been the case for the cotton program. Although the cotton industry does benefit from selling cotton on the world market, it has been able to do so largely because of government assistance. When the benefits of exporting cotton are analyzed from a national viewpoint and both the producers' and the government's costs are combined, cotton exports occur at a loss.

From a national standpoint, government payments combined with production costs are higher than the adjusted world price. As a result, the United States sells cotton on the world market for less than its cost. For example, to be competitive in world markets in 1993, U.S. exporters would have had to sell cotton at the adjusted world price of 56 cents per pound; however, U.S. cotton cost 90 cents per pound—66 cents for the cost of production and 24 cents in federal payments.

As figure 5.4 shows, the cost of production plus government payments have been higher than the world price in every year from 1986 to 1993. As a result, the nation has exported cotton at a loss in each of those years.

Figure 5.4: Comparison Between Total Cost Plus Government Payments and Adjusted World Price, Crop Years 1986-93 (in 1993 Cents/Pound)



Source: GAO analysis of USDA data.

Furthermore, the value of cotton exports has been declining as the real price of cotton has fallen. Cotton prices, in real terms, have declined generally from 1981 to 1993, falling by more than 30 percent. As a result, the value of U.S. exports has declined even though export volume has shown a slight upward trend. For example, even though the volume of cotton exports in 1993 was up by 2 percent from its 1981 level, the value of these exports fell by about 30 percent, from about $2.7 billion in 1981 to less than $1.9 billion in 1993.

Trade Agreements Will Push Cotton Industry Toward Greater Market Orientation

The gradual elimination of trade barriers brought by provisions of NAFTA and GATT will open the United States to increased market opportunities and challenges from foreign competition and thereby push the U.S. cotton industry toward a greater market orientation. These agreements convert quotas into tariffs, reduce tariffs over time, and allow greater market access. In an environment of open, competitive markets, it may be increasingly difficult to maintain price supports and other aspects of the present U.S. cotton program.

The effect of these agreements upon the cotton industry will depend upon changes in the raw cotton trade as well as the trade in cotton textiles and apparel. Although the precise impact is unclear, the impact on the raw cotton trade is expected to be small in comparison to the potential impact on cotton textiles and apparel.

The Impact of Reducing Barriers on Raw Cotton Trade Are Expected to Be Small

Both the NAFTA and GATT agreements are phased in over a number of years, and the impact on the raw cotton trade will be gradual. Little change occurred during NAFTA's first year, and impacts are not likely to be significant for the next few years. The direct effects of GATT on the raw cotton trade are also expected to be modest.

NAFTA Impact

Under NAFTA, import restrictions shaping present cotton trade flows will be gradually phased out by the United States and Mexico over 5 to 10 years. Initially, the impact on trade is expected to be small. In the longer term, the impact will depend on such factors as future Mexican agricultural policy and the relative competitiveness of the Mexican and U.S. textile and apparel industries.

Mexico will gradually phase out its 10-percent tariff on cotton over the next 10 years. Likewise, U.S. section 22 import quotas on Mexican cotton—currently about 9 million pounds—will be replaced by a tariff-rate quota[4] that will remain in place during a 10-year transition period. This duty-free quota, set at 22 million pounds, is to grow by 3 percent compounded annually over the transition period. Any additional cotton imported will face a tariff of 26 percent of the import price. This 26-percent tariff will be phased out over 10 years.

[4]Under a tariff-rate quota, a certain amount of the product is imported free or nearly free of duty, while a heavier import duty is levied on additional quantities.

NAFTA has been in effect since January 1, 1994. Exports from January to October 1994 were about the same as exports during the same period in 1993. Mexican consumption of cotton has increased; however, this increase has been met by additional domestic production rather than by imports from the United States. This is because farm acreage in Mexico shifted from corn production to cotton production as a result of the changes in agricultural policy that the Mexican government made in 1993. U.S. imports of cotton from Mexico continue to be minimal. Since Canada does not grow cotton and has only a relatively small textile and apparel industry, NAFTA is expected to have little effect on cotton trade between the United States and Canada.

GATT Impact

As in the case of NAFTA, the direct effects of GATT on raw cotton trade appear to be modest over the 6-year implementation period. GATT does not require any reduction in the domestic support of the U.S. cotton program. GATT, however, will result in a reduction of section 22 import quotas and, as a result, the potential exists for U.S. imports to increase. The quota under section 22 was about 60 million pounds, or less than 2 percent of domestic consumption during the GATT base period—1986 to 1988.[5] Under GATT, the United States will initially implement a tariff-rate quota for cotton of about 114 million pounds, or 3 percent of the base period's domestic consumption. By 2001, this import quota will increase to 191 million pounds, or 5 percent of the base period's domestic consumption.

Imports under GATT are not likely to exceed the 3 to 5 percent level of domestic consumption during the base period because the tariff on additional cotton imports will be relatively high. Under the tariff-rate quota—the 3 to 5 percent of GATT base-period domestic consumption—imports will be subject to a maximum tariff of 2 cents per pound. Any additional cotton will be imported at a higher tariff of 16.7 cents per pound. This tariff will be reduced by 15 percent in equal annual installments over 6 years, beginning in 1995, to a tariff of about 14.2 cents per pound in 2001.

GATT's impacts on exports, like those for imports, are expected to be modest. Increased exports under GATT are expected to result from increased demand for cotton caused by trade liberalization and resulting

[5]In the past, these quotas have not been filled. According to representatives of the U.S. textile industry, domestic textile mills chose not to import cotton because the annual import quota equates to less than 1 week's consumption by their mills. According to these representatives, it is not practical for domestic mills to import such a small quantity of cotton.

increases in world income. Studies by the Economic Research Service and the International Trade Commission have projected that GATT will cause a small increase in cotton exports. Specifically, the Economic Research Service projected that cotton exports would increase by 7 to 14 percent by 2005. The International Trade Commission projected a negligible increase.

We discussed the Economic Research Service estimates of GATT impacts on agricultural products in a July 1994 report.[6] We pointed out that GATT's projected impacts on U.S. agriculture are based on assumptions about future events, which are subject to substantial uncertainty. For example, uncertainty exists concerning assumptions about (1) what projections are for world income growth, (2) how governments of other countries would implement GATT requirements, and (3) how agricultural producers in the United States and other countries would respond to the expected changes in agricultural policies.

Liberalized Textile and Apparel Trade Will Affect Cotton Industry

NAFTA and GATT will reduce the highly protective restrictions on the cotton textile and apparel trade. These changes will provide increased opportunities for world trade in textile and apparel and for the sectors that supply those industries, including cotton.

Prior to NAFTA and GATT, most U.S. imports of cotton textiles and apparel were subject to restrictive quotas associated with the Multi-fiber Arrangement.[7] For example, we found that at any one time, the United States maintained quotas covering about two-thirds of U.S. textile and apparel imports. Reductions in these trade barriers under NAFTA and GATT mean that markets and market prices will play a greater role in shaping trade. These changes in textiles and apparel trade will, in turn, affect trade in the raw cotton from which textiles and apparel are produced—pushing the cotton program toward greater market orientation.

It is expected that movements toward free trade will increase world income, which would lead to increased world consumption of textiles and

[6]General Agreement on Tariffs and Trade: Agriculture Department's Projected Benefits Are Subject to Some Uncertainty (GAO/RCED-94-272, July 22, 1994).

[7]The Arrangement Regarding International Trade in Textiles, known as the Multi-fiber Arrangement, has governed world trade in textiles and apparel since 1974. The Multi-fiber Arrangement allows signatories to place quantitative limits, or quotas, on most imports of textiles and apparel. These quotas are a departure from the general principles of GATT in that they are bilateral rather than multilateral and they lower restrictions for some countries rather than all countries. The present Uruguay Round of GATT supersedes the Multi-fiber Arrangement by setting a 10-year phaseout of these bilateral quotas, resulting in a reduction in the trade restrictions imposed by the Multi-fiber Arrangement.

apparel. This in turn, will increase the demand for fibers such as cotton that are used in textile and apparel production. To the extent that U.S. cotton is competitive on the world market, U.S. producers could increase their exports of cotton. Domestic cotton sales could also be affected by increasingly open trade in textiles and apparel. U.S. textile and apparel producers will be subject to growing competitive pressures from abroad as import barriers are reduced and will have difficulty competing if the domestic price for cotton is higher than the world price. The net effect of changes in textiles and apparel on raw cotton trade is difficult to predict because it is unclear, for example, how U.S. textile and apparel producers will respond to the new market conditions, particularly potential increases in textile and apparel imports. However they respond, this new environment, in the long run, will make it difficult to support cotton prices through the present cotton program.

Under NAFTA, U.S. quotas on various textile and apparel imports from Mexico will either terminate immediately or be phased out in three stages over a 10-year period. Canada and Mexico, the two largest single-country markets for U.S. textile exports, are phasing out their tariffs on U.S. textiles under NAFTA. In the first year of NAFTA, trade has grown in both directions as apparel components are shipped to Mexico and goods that have had some further processing in Mexico are in turn shipped to the United States. From January to September 1994, the United States maintained an export surplus, in value terms, with Mexico in yarn and fabric trade that just offset an increase in the trade deficit in apparel and made-up goods. Under GATT, the Uruguay Round Agreement on Textiles and Clothing, according to the U.S. International Trade Commission[8] and GAO,[9] will have a greater impact on the U.S. clothing and apparel sectors. GATT will integrate textile and clothing into the agreement by phasing out quotas under the Multi-fiber Arrangement and accelerating quota growth rates for products not yet integrated into GATT. This process is to occur over 10 years in three stages.

The International Trade Commission has estimated that over the long run the United States will experience a sizable increase (over 15 percent) in apparel imports as a result of GATT. Increased import penetration in this sector substitutes foreign-produced yarn and fabric for domestic

[8]U.S. International Trade Commission. Potential Impact on the U.S. Economy and Industries of the GATT Uruguay Round Agreements. Investigation No. 332-353, June 1994.

[9]The General Agreement on Tariffs and Trade: Uruguay Round Final Act Should Produce Overall U.S. Economic Gains (GAO/GGD-94-83B, Volume 2, July 1994).

materials. As apparel imports increase, the demand for domestic textile and cotton inputs decreases.

While the net effect of these forces are uncertain, competitive pressures resulting from trade liberalization could make it difficult to support domestic cotton prices at higher than world levels. Therefore, while NAFTA and GATT do not formally require any changes in U.S. internal support for cotton, market forces may in fact demand some long-term changes in the present program.

Agency Comments and Our Evaluation

In commenting on a draft of this report, USDA raised two concerns relating to our analysis of export costs and world prices. We found that from a national viewpoint, the United States exports cotton at a loss when both government payments and total (long-run) production costs are taken into account. First, USDA said that, rather than long-run production costs, short-run cost would be more appropriate since the marginal cost of an additional bale shipped would be of most interest. (In table 4.1, we reported that the average short-run costs over 1986-93 were 48 cents and the long-run costs were 78 cents.) Second, USDA questioned whether we properly accounted for the impact of step 2 and marketing loan provisions in measuring the loss on export sales. USDA is concerned that we have included the costs of step 2 and marketing loan payments in determining the government's costs but have not properly reflected that these provisions may result in lowering the price of cotton and result in sales that may not produce losses.

We agree that short-run costs are appropriate to use if the question is whether exporting cotton is profitable in the short-term, that is, annually or for a few years. In other words, the United States might be willing to take losses on cotton exports in one year if it expected that exports would be profitable the next year. However, the cotton program has created a situation in which these losses continue over the longer term. Our analysis found that as a nation, we sustained losses from 1986 through 1993. This is the context in which the use of long-run costs is appropriate.

We believe our analysis properly incorporates the impact of marketing loan and step 2 provisions in the measurement of losses through export. Our analysis is based on three data elements: (1) the cost of producing cotton in the United States; (2) government payments made under the cotton program; and (3) the adjusted world price. Step 2 and marketing loan costs are appropriately included in government payments made under

the program. Although these provisions may also influence the adjusted world price on those occasions when the U.S. northern European price is actually used in the computation of the world price, the difference between the adjusted world price and producer costs plus government subsidies appropriately reflects losses from exports. The adjusted world price is USDA's official measure of prevailing world prices and is used to calculate step 2 and marketing loan payments under the cotton program. To the extent that step 2 and marketing loan payments contribute to lowering the adjusted world price, they also contribute to increasing government costs, thereby further increasing losses.

Conclusions and Matters for Congressional Consideration

The cotton program has so evolved over the years that its provisions work at cross-purposes in an attempt to meet conflicting goals. As a result, the government spends money to do one thing and then spends money to undo it. The program

- protects producers' income by guaranteeing a minimum price to encourage production, then pays farmers to idle land to reduce production;
- supports the price the producers get, then subsidizes buyers to reduce their costs;
- attempts to make cotton prices competitive and move cotton quickly to market, yet allows farmers to hold their crop off the market for up to 18 months (free of storage cost for 10 of those months) and ultimately forfeit their cotton if prices do not rise sufficiently; and
- reduces payments to producers by lowering and freezing the target price and introducing flex acres, then increases payments by allowing producers to earn revenues in excess of the target price from the marketing loan provision.

In an effort to accomplish all of these goals simultaneously, the program has become complex and costly, concentrates benefits among a small percentage of producers, and results in troubling economic consequences. This program will be difficult to sustain in the era of greater fiscal constraint and increased international competition being imposed by NAFTA and GATT.

We recognize that if government support were reduced or eliminated, some producers could not profitably remain in cotton farming. In addition, because lower government support would cause declines in land values, some producers and rural economies would be negatively affected. Among the producers most adversely impacted would be those who are heavily in debt for land or machinery.

Matters for Congressional Consideration

The Congress may wish to consider whether benefits from the cotton program are worth its costs and whether the program should be continued. The severe economic conditions and many of the motivations that led to the cotton program in the 1930s no longer exist. If the program were eliminated, the Congress might want to consider options to give producers and other affected parties time to make adjustments in their investment decisions. The Congress could, for example, reduce or phase out payments or outlays over a number of years, perhaps over the life of

the next farm bill. One way to cut outlays would be for the Congress to include marketing loan gains in the calculation of the deficiency payments and to resume the process of reducing the target price that it began under the 1985 farm bill.

The gradual implementation of GATT and NAFTA requirements will give the cotton industry time to make adjustments during the transition from reliance on the government program to greater reliance on the market. The elimination of trade barriers for both raw cotton and cotton textiles will push the U.S. cotton industry and program toward greater market orientation and reliance on market prices. However, because the economic changes imposed by GATT and NAFTA will be phased in over a number of years, the U.S. cotton industry will have time to adjust to more competitive world markets.

Agency Comments and Our Evaluation

In commenting on a draft of this report, USDA took issue with our statement that "the economic situation that led to the cotton program no longer exists." USDA indicated that such a statement questions the need for a cotton program if the economic emergency and related problems that generated a cotton program in the 1930s no longer exist. USDA noted that some problems have not gone away, in particular the continuing problem of trade protectionism and subsidization by other cotton-producing countries.

We believe that the economic conditions affecting farming have changed significantly since the 1930s. Nevertheless, we did not mean to imply by our statement that every economic problem of the 1930s has been solved, and we have qualified our statement accordingly to say that "the severe economic conditions and many of the motivations that led to the cotton program in the 1930s no longer exist." This revised statement is consistent with the following views expressed by the Council of Economic Advisers in its 1995 Annual Report:[1]

"Today's agricultural commodity support programs are rooted in landmark New Deal legislation that followed the agricultural depressions of the 1920s and 1930s. These programs were designed to sustain prices and incomes for producers of cotton, milk, wheat, rice, corn, sugar, tobacco, peanuts, and other crops. However, changing economic conditions and trends in agriculture over the past half-century suggest that many of the original motivations for farm programs no longer apply."

[1]Economic Report of the President. Together With the Annual Report of the Council of Economic Advisers. Transmitted to the Congress. Washington, D.C.: U.S. Government Printing Office, Feb. 1995.

The Council cited the following changing economic conditions and trends to support its views:

- The farm sector is no longer a major factor in the macroeconomy. Commodity programs were originally instruments of macroeconomic policy as well as a means of sustaining farm families' incomes. In the 1930s, farm households accounted for 25 percent of the U.S. population and generated over 10 percent of the gross domestic product. Today, these households account for less than 2 percent of the population and generate less than 2 percent of the gross domestic product.
- The average farm payment recipient is no longer poor. In the 1930s, per capita farm income was only one-third the per capita income of the rest of the population. Commodity programs were intended to reduce this disparity. Today, recipients of farm program payments (about one-third of all farm operators) tend to have higher incomes than the average American. Moreover, two-thirds of program payments go to the largest 18 percent of farms.
- The number of farms has fallen by more than 60 percent since 1950, while the size of the average farm has doubled. Moreover, 92 percent of farm households (according to the Bureau of the Census definition) operate small farms and receive almost all their income from off-farm sources and only a small share of government farm program payments.
- Farmers now can insure themselves against price declines. In the early 1930s, farm incomes were at the mercy of year-to-year fluctuations in farm prices. Commodity programs provided price floors for agricultural producers, insuring them against adverse price swings. The growth of futures and options markets now lets farmers protect against short-term price declines without the need for a government program.

USDA also cited the use of futures and options as a form of insurance against price fluctuations in its comments on a draft of this report. USDA stated, "Many cotton farmers today employ marketing strategies which involve locking in prices through the futures and options markets."

Regarding the trade issue USDA raised, we recognize that certain of our competitors in the world market intervene in various ways in the cotton market. Some of these actions put our cotton at a price disadvantage in world markets. We believe that, ultimately, it is up to the Congress to determine whether it is in the nation's best interest to respond to these countries in kind by continuing to subsidize our cotton industry. As the last 8 years have shown, subsidizing the U.S. cotton industry to make it more competitive on world markets has been very costly. For example, as

discussed in chapter 5, the marketing loan and step 2 provisions, which were designed specifically to help make U.S. cotton competitive in world markets, cost $3 billion between 1986 and 1993. Yet, when these provisions were in effect, U.S. exports declined. Moreover, as a nation we have been exporting cotton at a loss when both production costs and government payments are taken into account.

GAO's Economic Welfare Analysis of the Cotton Program

This appendix discusses the economic welfare analysis we used to measure the economic gains and losses of the U.S. cotton program we have reported on. The first section of the appendix discusses the methodology used to estimate the market price and the amount of cotton that would be produced if the cotton program were not in place (the "no-program" scenario). These estimates are called the equilibrium price and quantity. The second section explains the methodology used to measure welfare gains and losses to cotton buyers, cotton producers, and taxpayers.[1] According to this methodology, gains and losses are measured by using the estimated equilibrium price and quantity as reference points against which we estimated changes caused by the program in real income for market participants. The third section presents the results derived from the methodologies described in the first two sections.

This analysis shows that between 1986 and 1993, the average annual cost of the cotton program to the government (taxpayers) and to cotton buyers was $1.5 billion.[2] The majority of this cost was borne by taxpayers. About 51 percent of this cost was transferred to producers as income; the remaining proportion represented a loss in social welfare (deadweight loss) resulting from inefficiencies in production and consumption caused by the cotton program. For the most part, these social welfare losses are attributed to the opportunity cost associated with land left idle because of the program.

Methodology for No-Program Equilibrium Price and Quantity

We used a methodology developed by Gardner (1989)[3] to determine the price and quantity of cotton if there were no program that could be compared to prices and quantities with the program in effect in order to estimate the economic gains and losses from the cotton program.[4] We conducted the analysis for 1986 through 1993.[5] We chose these years

[1]In this analysis, "cotton buyers" refers to buyers at the first processor stage because the analysis is based on prices for unprocessed cotton.

[2]These estimates of economic gains and losses are in 1993 dollars.

[3]Bruce L. Gardner, "Gains and Losses from the Wheat Program," Department of Agricultural and Resource Economics, Working Paper 88-11, University of Maryland, 1989.

[4]This model, like most models used for welfare analyses, is a static partial equilibrium model. It does not consider a movement to worldwide free trade, nor does it consider a complete absence of governmental intervention in agriculture (such as an absence of disaster payments, research and development.)

[5]These years, 1986 to 1993, correspond to crop years 1986-87 to 1993-94, respectively, throughout the analysis.

because they incorporated the major and most recent changes made to the program by the 1985 and 1990 Farm Bills.

Graphic Presentation of the Cotton Model

The basic model used in the analysis is shown in figure I.1. It is a simplified economic representation of how the cotton market operates.[6] The demand curve, identified as D, shows the quantity of cotton that cotton buyers will demand at each price. The supply curve, identified as S, represents the no-program supply curve.[7] With no program in effect, the market clears at point e (equilibrium). At this point, cotton buyers purchase and producers sell Q_e quantity of production at P_e price.[8]

With the cotton program in effect, however, prices and quantities diverge from equilibrium. Because the focus of the cotton program is on producers' income and therefore supply, the program does not cause a shift in the demand curve.[9] With the program in effect, cotton buyers purchase what they want at the market price, just as they would in the absence of the program. Therefore, the major impact of the cotton program on demand is through its effect on price.

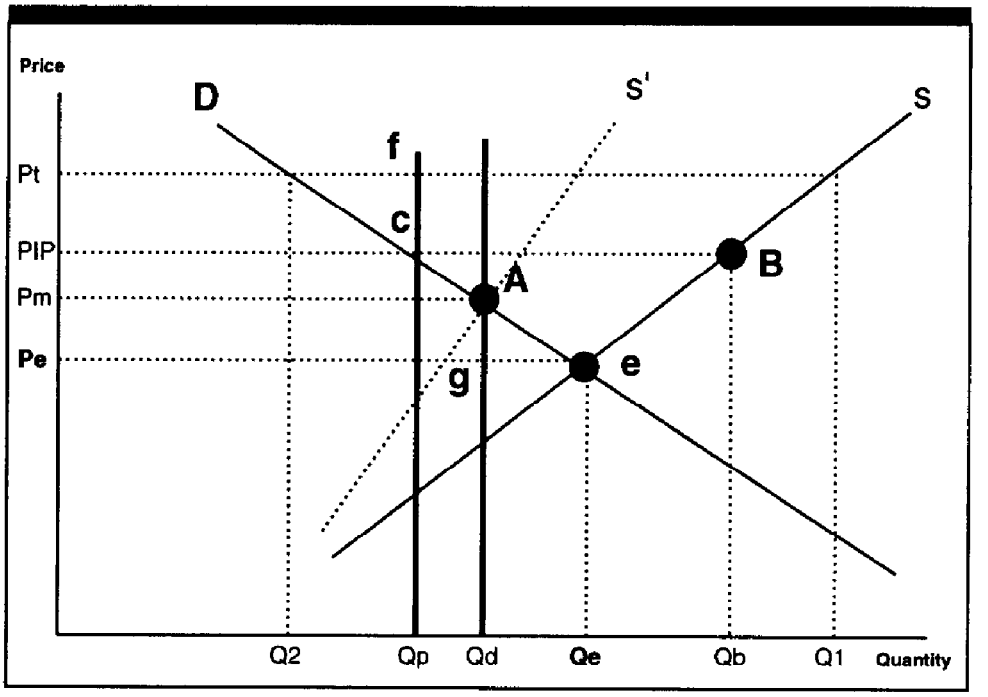
[6]The figure is a theoretical construct that represents a generalization of the U.S. cotton market. In any given year, specific details may differ from those in the figure. In addition, participation in the cotton program is between 84 to 92 percent. The fact that there are both program participants responding to the program and nonparticipants responding to the market price makes graphic depiction somewhat difficult.

[7]The no-program scenario assumes no deficiency payments, no marketing loan program, no acreage reduction program (ARP), no flex acreage, and no 50/92 program.

[8]Consistent with the treatment in Gardner's model, our analysis incorporates the assumption that in a no-program scenario, annual beginning and ending stocks would cancel each other out under normal market conditions, so that stocks would not accumulate.

[9]This analysis does not incorporate export promotion programs that may or may not affect demand.

Figure I.1: The Program/No-Program Cotton Supply and Demand Curves



Legend

S' = Supply curve with program acreage controls
S = No-program supply curve
D = Demand curve for cotton
P_t = Target price
PIP = Producer incentive price
P_m = 12-month-season average market price
P_e = No-program equilibrium price
Q_d = Total quantity demanded
Q_e = No-program equilibrium quantity
Q_b = Quantity without acreage constraints at point B
Q_2 = Quantity of cotton that would be consumed at target price
Q_1 = Quantity of cotton that would be produced at target price
Q_p = Quantity of production for which producers receive deficiency payments under program yields that are frozen

Note: The shape of the supply curve S' is uncertain because it has to account for participants entering and leaving the program in response to expectations about price. However, this uncertainty does not affect the calculations because they are based on point A, which remains the same regardless of the shape of the curve. In addition, to the extent that the program has caused higher profits, it may have attracted more resources into the industry than otherwise would have occurred. In any event, there will still be social welfare loss due to the inappropriate allocation of resources.

Under the U.S. cotton program, the government supports producers' income and, in so doing, causes a leftward shift of the supply curve from S to S'. This shift in the supply curve results from the effect of the acreage reduction program (ARP) on land use and consequently on the quantities produced. In simplified terms, under the program (in the absence of acreage restrictions), producers participating in the program do not receive P_e; instead, they receive P_t, which is much higher. At this higher price, producers would supply much more cotton (Q_1) than cotton buyers would purchase at that price (Q_2). In order to maintain the support price at its high level, the difference between what farmers produced and cotton buyers bought would have to be purchased (through the Commodity Credit Corporation—CCC—loan program) and held in storage by the government, at taxpayers' expense.[10]

The government reduces the costs it would incur, as well as the quantities of cotton put into storage, by restricting supply through acreage controls. The government does this by requiring producers to reduce the acreage on which they produce cotton by a specified amount in order to be eligible to receive the support price on the remaining amount. These acreage reductions have the effect of reducing the quantity produced under the program to Q_d.

During the period covered by this analysis, the total acreage left idle under the program ranged from a high of 29 percent of the complying base in 1986 to a low of 13 percent of the base in 1993. During the first few years covered by the analysis, ARPs accounted for the majority of the idled acres. Although ARPs were reduced in subsequent years, other aspects of the program, particularly the 50/92 program and planting flexibility (flex acres), have provided producers with incentives to leave land idle.[11]

The government further reduces the costs associated with the cotton program by limiting the quantity on which deficiency payments are made. This is done by limiting the yield and/or acreage eligible for payment. For example, the program yield used to calculate the deficiency payment has been frozen since 1985. This limits deficiency payments to the Q_p level of

[10]Government costs will in part depend on the quantity of cotton put into storage, which is related to the price elasticity of supply and demand as well as the level of support in relation to the no-program price.

[11]Land is also removed from production through the Conservation Reserve Program (CRP). Although the point can be made that without the CRP, ARPs would have been higher, it is assumed in this model that the CRP would continue in the absence of the cotton program for environmental reasons. The ARP was not considered for environmental benefits because, unlike the CRP, it is a short-term idling of land, and benefits, if measurable, are likely to be minimal.

production shown in the figure. Actual yields, however, have continued to increase and in 1992 were about 15 percent higher than program yields (the yields used to calculate deficiency payments). Production above program yield is the participants' marginal production and is sold at the market price represented by P_m in the figure.[12]

Furthermore, under the flex acre program, acreage on which producers receive the deficiency payment is reduced by 15 percent (after ARPs) for normal flex acres and an additional 10 percent for optional flex acres. Production on this acreage can be sold for the market price. In the figure, Q_d-Q_p represents the quantity produced and sold at the market price by participants as a result of production on flex acres and the production of nonparticipants, who also sell their product at the market price.[13]

Under the cotton program, government-held stocks have been greatly reduced as a result of the marketing loan program. Under this provision, producers are permitted to redeem their loan at the USDA-calculated world price, which is lower than the loan rate. The difference between the loan rate and this lower redemption rate represents a payment from the government to producers, which is called the marketing loan gain. Producers receive this gain in addition to the target price. In some years, this additional payment has resulted in producers' receiving more than the target price on eligible production.

Derivation of the No-Program Supply and Demand Functions

In order to calculate the economic welfare effects of the cotton program, it is necessary to know more about the no-program supply and demand curves as well as equilibrium price and quantity. This is because these equilibrium prices and quantities are used as reference points against which changes in the market caused by the program are measured. Unfortunately, much of this information is not observable (particularly on the supply side) in today's market because today's market operates under the program. Therefore, the no-program supply and demand curves as well as equilibrium price and quantity must be estimated.

According to the Gardner method, this estimation is done by using current available data (with the program in effect) to estimate a single point on each of the no-program supply and demand curves. (In the figure, these

[12]Participants can sell this marginal production at the loan rate or the market price, whichever is higher. During most of the period covered by the analysis, the market price has been higher than the loan rate. Therefore, the market price is depicted in the figure.

[13]The marginal production of program participants sold in the open market is based on actual yield, which is higher than program yield.

points are represented as point B for the supply curve and point A for the demand curve.) Then, using the assumption of constant elasticity in the relevant range of the function, the identified points are extended so that the entire no-program supply and demand functions can be approximated. These extended supply and demand functions are then used to calculate the no-program equilibrium price and quantity.

Calculation of Point A on the No-Program Demand Function

As stated above, the components of the cotton program included in this analysis do not cause a shift in the demand curve. Therefore, the most readily observable point on the demand curve is the one at today's current price-quantity combination represented by point A in the figure. At this point, Q_d quantity of production is sold at P_m (defined as the farm-level, 12-month-season average price).

Calculation of Point B on the No-Program Supply Function

As stated above, the cotton program does cause a shift in the supply curve, making the no-program supply curve more difficult to estimate than the no-program demand curve. To locate the no-program supply curve, we identified one price-quantity combination (point B) representing a point on the curve. As the first step in this process, we estimated a no-program market price (with no acreage restrictions in place) that would leave producers as well off as the current situation (with acreage restrictions in place). This price, called the producer incentive price (PIP), is the weighted average of the price that program participants receive from the cotton program (called returns from participation) and the market price that nonparticipants receive. The PIP therefore can be thought of as a price faced by an aggregated "composite" producer made up of both program participants and nonparticipants. Instead of responding solely to returns from participation in the program or to the market price, producers respond to a blend of the two prices.

We then located the appropriate no-program quantity, called Q_b, that corresponds to the PIP. Starting from observed production data under the program, we calculated the quantity of cotton that would have been produced in the absence of the program by using information on yearly ARP levels, 50/92 acres, flex acres idled, and estimates of slippage.[14] These acres would come back into production because, adjusting for slippage,

[14]Slippage occurs when the level of commodity production decreases by a smaller percentage than the number of idled acres under a program such as ARP. Although slippage ranges for ARP, 50/92, and idled flex may differ, data on slippage for specific program provisions is not available. Therefore, we used a range of slippage estimates (0.30-0.42) which includes acreage and yield slippage for all program provisions.

producers would have an economic incentive to plant on them at the market price equivalent to the average return the producers earn when the program is in effect. Given the producers' original commitment of land under the program provisions at the PIP, producers would be likely to produce on these additional acres because by doing so they would earn the same return as they were earning with the program. This quantity, in combination with the PIP, identifies point B on the no-program supply curve. We then used estimates of elasticities of supply to identify the remainder of the curve and find its intersection with the demand curve.

The following section describes how we calculated the PIP and its major component, the return from participation in the program. The subsequent section describes how we found the no-program quantity that corresponds to the PIP.

Calculation of the PIP, the Price Coordinate for Point B

The PIP is the weighted average of two prices: (1) a price representing net returns from participation in the program and (2) the market price that represents the expectations of nonparticipants. The PIP elicits the quantity that is produced by a representative or "average" producer, accounting for both participants and nonparticipants. It is lower than the target price because it incorporates the cost to participants of idled land as well as the market price weighted by nonparticipants. This price would produce the equivalent net returns, without acreage constraints and other program provisions, that producers obtain under the program with acreage restraints. The expression for the PIP is:

(1) PIP = (Participation Rate * Net Returns From Participation) + ((1 - Participation Rate) * Market Price)

Several terms in equation 1, such as the participation rate and market price, are data that are readily available. However, net returns from participation must be calculated. This calculation incorporates aspects of the program, such as the target price, frozen program yields, marketing loan gains, 50/92 payment on idled acres, revenues foregone on idled acres, and the return from flex acres planted to crops other than cotton, which affect producers' returns under the program.

Calculation of Returns From Participation, Used to Determine the PIP

The returns from participation are calculated as the difference between the expected revenues from the program and the costs of participating. Producers derive revenues from the program through the target price and

marketing loan gains. However, in order to be eligible to receive this income support, producers must agree to leave a specified portion of their land idle under the ARP. Additional land is left idle because of the economic incentives provided by the 50/92 and flex acre programs. By leaving land idle, producers incur costs represented primarily by the opportunity costs of not producing on the idled land.

The calculation of the returns from participation derives from the fact that producers have an incentive to join the program if they receive more from the program (after accounting for program costs) than they would if they did not join and received only the market price for their production. On a per-acre basis, producers would join the program if[15]

(2) $(P_T*Y_P*(1\text{-ARP})\text{-TFC-VC}(1\text{-ARP}))>(MP*Y_A\text{-TFC-VC})$

where

P_T = Target price per pound (lb.)
Y_P = Program yield in lb. per acre
ARP = Effective acreage reduction as a percentage of the complying base acres (percentage)
TFC = Total fixed costs per acre
VC = Variable cost per acre
MP = Expected market price per lb.
Y_A = Average yield in lb. per acre

Substituting and rearranging the terms,

(3) $(P_T*Y_P*(1\text{-ARP})\text{-TFC+TFC+}(1\text{-}1\text{+ARP})VC)>(MP*Y_A)$

or

(4) $(P_T*Y_P*(1\text{-ARP})\text{+ARP*VC})>(MP*Y_A)$

Dividing through by yield to obtain the revenue per pound (the per-unit price):

(5) $((P_T*(Y_P/Y_A)*(1\text{-ARP}))\text{+(ARP*VC)}/Y_A)>(MP)$

[15]This equation is a simplification of a producer's decision about participation. Other components are discussed below.

The calculation of returns for participation (RP) in equation 6 is based on equation 5. The left-hand side of equation 5 specifies that the return for participation equals the revenue received on program acres plus saved variable costs on the idled acreage.[16] The actual calculation, however, is further modified to account for additional aspects of the program, such as frozen program yields, marketing loan gains, 50/92 payments on idled acres, and, starting in 1991, foregone deficiency payments on flex acres and returns from flex acres planted to crops other than cotton, all of which affect producers' returns under the program.

One such modification is shown in equation 6.

(6) $[RP=(P_T*(Y_P/Y_A)*(1\text{-}ARP))+(1\text{-}ARP)*(MP*(Y_A\text{-}Y_P)/Y_A)+((ARP*VC)/Y_A)]>MP$

Equation 6 differs from equation 5 by the addition of the term

(6a) $(1\text{-}ARP)*(MP*(Y_A\text{-}Y_P)/Y_A)$

This term reflects the fact that program yield and actual yield are not equal. As shown by the first term in equation 6, producers receive the target price only on program yield. The program yield for cotton has been frozen at historic levels since the 1985 Farm Bill. However, actual yields have continued to increase and in 1992 were 15-percent greater than frozen program yields. Producers receive returns from the market on this additional production. These additional returns affect their incentive to participate in the program. Other similar adjustments were made to account for other components of the program and their effect on participants' returns. In addition, because the data were unavailable, we did not take into consideration the costs associated with cover crops on the idled acres. The impact of these costs are likely to be very small.

Calculation of Q_b, the Quantity Coordinate for Point B

The PIP provided the price coordinate for an estimated point on the no-program supply curve (point B in the figure). Additional calculations are necessary, however, to identify the corresponding quantity coordinate, Q_b. This quantity represents the amount that farmers would produce, in the absence of the program's acreage constraints, if they received from the market the same return (as indicated by the PIP) in the absence of a program that they currently receive under the program. To calculate this quantity, we used actual cotton production adjusted for program

[16]Saved variable costs are defined as variable costs plus unpaid labor.

participation and the percentage of idled ARP, flex acres, and 50/92 acres. However, not all acres currently left idle would be expected to be brought back into production. In addition, the idled acres are likely to be lower-yielding acres. Therefore, the estimate of no-program production was further adjusted by estimates of production slippage. The resulting estimated production, in the case of cotton, was greater than present quantities.

Under this scenario, quantity in conjunction with the PIP located a point (B) on the no-program supply curve. We found the remainder of the no-program supply curve by using estimates of supply elasticities from other studies and the assumption of constant elasticity in the relevant range of the supply function.

No-Program Equilibrium Price and Quantity

After finding a probable point on each of the no-program supply and demand curves—points A and B—we used constant elasticity functional forms and elasticities of supply[17] and demand[18] to extend the points:

(7) $Q_d=K_dP^n$

(8) $Q_s=K_sP^E$

where

Q_d = Quantity demanded
Q_s = Quantity supplied
K_d = Shift parameter or intercept term for demand equation
K_s = Shift parameter or intercept term for supply equation
P = Price
n = Price elasticity of demand
E = Price elasticity of supply

The shift parameter for the demand equation, K_d, was found by substituting the data for point A in the figure into equation 7 and then solving for K_d. For example, the actual quantity demanded was substituted for Q_d and the 12-month-season average price was substituted for P. These

[17]We used supply elasticities ranging from 0.5 to 0.74, with 0.62 as the average. This range was based on elasticities presented in the economic literature.

[18]We used a weighted average of domestic and export demand elasticities, which ranged from –1.05 to –0.78, depending on the years. These elasticities were the midpoints of the ranges presented in the economic literature.

values were then used to solve for the intercept. The same procedure was used to determine the supply intercept, K_s, in the supply equation. The data for point B in the figure were substituted into equation 8. In this case, the PIP was used for P and the quantity supplied at point B (Q_B) was used for Q_s. These values were then used to solve for K_s.

Once we determined the intercepts, we solved for the no-program equilibrium price and quantity, P_e and Q_e. This was done by equating supply and demand, substituting the estimated values for the shift parameters into the equations, and solving for P_e:

(9) $P_e=(K_s/K_d)^{1/(n-E)}$

We calculated equilibrium quantity by substituting the appropriate demand/supply shift parameters into the appropriate demand/supply function and solving for Q_e.

The resulting estimates are shown in table I.1. On average, over the period, no-program production would have been greater than program levels, while prices would have been about the same. This implies that over the period covered by the analysis, the cotton program, through its reductions in acreage, has generally had a restrictive impact on production, despite the incentives to increase production provided by the target price.[19]

[19]If in fact the analysis had shown that on average the no-program prices were lower and quantities were higher than program levels, the program would still have resulted in social welfare losses. In this case the losses would have been due to overproduction.

Table I.1: Estimated No-Program Price and Quantity, Crop Years 1986-93

Prices in 1993 dollars; quantities in millions of pounds

Crop year	No-program price	No-program quantity	Program price	Program quantity
1986	$0.75	5,773	$0.65	4,572
1987	0.75	7,006	0.78	6,948
1988	0.61	6,950	0.65	7,237
1989[a]	0.66	8,278	0.72	5,522
1990	0.71	7,801	0.72	7,271
1991	0.59	7,703	0.59	8,264
1992	0.60	6,687	0.55	7,541
1993	0.61	7,837	0.58	7,567
Average	$0.66	7,254	$0.66	6,865

[a]No-program quantities for 1989 are estimated on the basis of average acreage because adverse weather in the Southwest and Delta regions severely reduced harvested acreage in this year. These estimates indicate what would have been produced in the absence of adverse weather.

Methodology for Measuring Gains and Losses

After we calculated the no-program price and quantity, we measured the economic welfare effects of the cotton program on cotton buyers, cotton producers, and taxpayers. We measured these effects by using the estimated no-program equilibrium price and quantity as reference points against which we measured, as gains or losses, changes caused by the program in real income for market participants.

Cotton Buyers' Gain or Loss

Cotton buyers' gain or loss[20] as a result of the cotton program is determined by the relationship between market prices with and without the program. Buyers of cotton gain if they pay a lower price under the program than they would have paid if there were no program. Conversely, they lose if they pay a higher price. In 1986, 1992, and 1993, buyers gained because they paid less for cotton than they would have in the absence of the program. Cotton buyers' gains in 1992 and 1993 derived, in part, from the extent to which step 2 payments made to domestic mills contributed to lower prices. From 1987 to 1991, however, cotton buyers incurred costs by paying higher prices for cotton than they would have without the program. Mathematically, domestic cotton buyers' losses or gains was estimated using the following expression:

[20]To the extent that the cotton program affects world prices, international consumers would also experience gains and losses. The present analysis focuses only upon the program's impact on domestic buyers.

(10) $DCB=((SAP-P_e)*(0.5*(Q_d+Q_e)))*DD$

where

DCB = Domestic cotton buyers' loss or gain
SAP = 12-month-season average price
P_e = No-program equilibrium price
Q_d = Quantity demanded under program
Q_e = No-program equilibrium quantity
DD = Domestic quantity demanded as a percentage of total quantity demanded

Producers' Gain or Loss

Producers' gain or loss under the cotton program is determined by the net welfare effect of the program on participants and nonparticipants. As is the case with cotton buyers, nonparticipants' gain or loss depends upon the relationship between market prices under the program and no-program prices. This is because, as defined above, nonparticipants receive the market price for their production. Nonparticipants gain if the program market price is higher than the no-program price. Conversely, they lose if this price is lower.

Since participants respond to program prices, participants' gain depends on the relationship between the returns from participation per pound, which was used above to calculate the PIP and the no-program price.

Average producer gain for both participants and nonparticipants is shown in figure I.1 by area $PIPBeP_e$, which is the difference between the PIP and the no-program price to the left of the no-program supply curve. The PIP/Q_b price-quantity combination is used to determine producers' surplus because it represents the quantity that would be produced, in the absence of the program, if producers received the PIP (which is the price they currently receive under the program, adjusted for the costs of ARPs).

Mathematically, producers' net gain or loss was determined using the following expressions for participants' gain and nonparticipants' gain or loss:

(11) $PG=((RP-P_e)*PR)*(0.5*(Q_e+Q_b))$

(12) $NGL=((SAP-P_e)*(1-PR))*(0.5*(Q_e+Q_b))$

where

PG = Participants' gain
RP = Returns from participation (used to calculate the PIP)
PR = Participation rate
P_e = No-program equilibrium price
Q_e = No-program equilibrium quantity
Q_b = Observed quantity without program set-asides
NGL = Nonparticipants' gain or loss
SAP = 12-month-season average price

Government Costs

We calculated the budgetary costs as the sum of deficiency payments, marketing loan gains, storage, transportation, handling of CCC stocks, and losses on the sale of CCC stocks. Deficiency payments are represented by the rectangle P_t-P_m for the volume of Q_p in the figure. Other budgetary costs, however, are not represented.

Social Welfare Loss

The social welfare loss is the amount of revenue that taxpayers or cotton buyers give up but that producers do not gain. For every dollar paid by cotton buyers and the government, the gains to producers are less than a dollar. This revenue is lost to society and actually measures the economic inefficiencies of income transfer associated with having a cotton program. In the case of cotton, most of the deadweight loss is due to the lost returns from idled land that can be approximated by the area $P_t$fcPIP in figure I.1.[21] This area is based on the supply curve S', which takes into account the cost of idle land. In addition, some social welfare loss occurs when ARPs result in cotton buyers' consuming less cotton at higher prices than they would in the absence of the cotton program. This social welfare loss is approximately represented by area Aeg in the figure. Another component of social welfare loss, which was important during the period covered by our analysis, was CCC stocks that had been accumulated prior to 1985 but that were sold at a loss as part of the transition to the marketing loan program.[22]

[21]Again, because of the complexity of the program, graphic representation is an approximation.

[22]The sale of CCC stocks reduced market prices, resulting in a loss for the government and society. This loss was partially offset by a gain for the cotton buyers who purchased cotton at the reduced prices.

We used the following equation to arrive at our estimates of deadweight loss:[23]

(13) DWL=(GOVT+DCB)-(PG+NGL)

where

DWL = Deadweight loss
GOVT = Government budgetary cost
DCB = Domestic cotton buyers' gain or loss
PG = Participants' gain
NGL = Nonparticipants' gain or loss

Results of Economic Welfare Analysis

The results of our economic welfare analysis of the cotton program appear in tables I.2, I.3, I.4, and I.5. The analysis shows that from 1986 to 1993, cotton buyers gained an average of $16 million from the cotton program. In 5 of the 8 years analyzed, the cotton program resulted in additional costs to cotton buyers. These costs occurred because the cotton program generally restricted production. In 3 of the 8 years, cotton buyers gained as a result of the program, and these gains outweighed the costs incurred the other years. In 1986, cotton buyers gained $329 million. This occurred as a result of the transition to the marketing loan program, when the government released previously accumulated stocks onto the market, reducing market prices. In crop years 1992 and 1993, cotton buyers also received a gain because ARPs were relatively low and cotton yields were relatively high, resulting in low prices. In addition, cotton buyers gained by the extent to which step 2 payments made to domestic mills those years contributed to the lower prices. From 1986 to 1993, taxpayers' costs averaged $1,509 million over the period. Total cotton buyers' and taxpayers' costs amounted to $1,493 million. Only about 51 percent of these costs were actually transferred to producers. Social welfare loss accounted for the remaining percentage. Producers gained an average of $754 million during the period, while the social welfare loss averaged $738 million.

[23]Since this equation contains the gains or losses for domestic cotton buyers only, the deadweight loss is domestic deadweight loss only.

Table I.2: Gains and (Losses) to Cotton Buyers, Crop Years 1986-93

In millions of 1993 dollars

Crop year	Baseline	Minimum	Maximum
1986	$329	$275	$376
1987	(134)	(194)	(82)
1988	(156)	(224)	(97)
1989	(233)	(288)	(186)
1990	(50)	(75)	(30)
1991	(28)	(85)	21
1992	270	202	327
1993	134	84	177
Average	$16		

Note: The baseline estimate represents the average estimate for the year, calculated using the average elasticity and slippage estimates. We used three supply and demand elasticity combinations (high, low, average) and two slippage rates to produce a total of six different estimates of gains or losses to cotton buyers, taxpayers, and producers and the social welfare loss for each year. Of these six, the average estimate was calculated using the average elasticity and slippage factor. The minimum and maximum represent the high and low of the six estimates.

Table I.3: Net Gain to Cotton Producers, Crop Years 1986-93

In millions of 1993 dollars

Crop year	Baseline	Minimum	Maximum
1986	$ 688	$ 583	$ 809
1987	625	515	752
1988	1,405	1,270	1,561
1989[a]	522	424	634
1990	162	122	209
1991	982	885	1,096
1992	887	787	1,005
1993	766	684	861
Average	$ 754		

Note: The baseline estimate represents the average estimate for the year, calculated using the average elasticity and slippage estimates. We used three supply and demand elasticity combinations (high, low, average) and two slippage rates to produce a total of six different estimates of gains or losses to cotton buyers, taxpayers, and producers and the social welfare loss for each year. Of these six, the average estimate was calculated using the average elasticity and slippage factor. The minimum and maximum represent the high and low of the six estimates.

[a]Producer gains in 1989 are estimated on the basis of average acreage because adverse weather in the Southwest and the Delta regions severely reduced harvested acreage that year. These estimates indicate what the gains would have been in the absence of the adverse weather.

Table I.4: Government Costs, Crop Years 1986-93

In millions of 1993 dollars

Crop year	Baseline
1986	($ 2,693)
1987	(1,546)
1988	(1,585)
1989	(748)
1990	(439)
1991	(1,223)
1992	(2,031)
1993	(1,810)
Average	($ 1,509)

Table I.5: Social Welfare Loss, Crop Years 1986-93

In millions of 1993 dollars

Crop year	Baseline	Minimum	Maximum
1986	($ 1,676)	($ 1,734)	($ 1,609)
1987	(1,055)	(1,113)	(987)
1988	(336)	(412)	(248)
1989	(460)	(510)	(402)
1990	(327)	(347)	(305)
1991	(269)	(317)	(212)
1992	(875)	(917)	(824)
1993	(910)	(949)	(865)
Average	($ 738)		

Note: The baseline estimate represents the average estimate for the year, calculated using the average elasticity and slippage estimates. We used three supply and demand elasticity combinations (high, low, average) and two slippage rates to produce a total of six different estimates of gains or losses to cotton buyers, taxpayers, and producers and the social welfare loss for each year. Of these six, the average estimate was calculated using the average elasticity and slippage factor. The minimum and maximum represent the high and low of the six estimates.

Objectives, Scope, and Methodology

In response to a request from Representative Richard K. Armey, we conducted a broad-based review of the federal cotton program. We evaluated the program's cost and complexity, distribution of payments and benefits, effects on producers' costs and returns, and effectiveness in enhancing U.S. cotton exports.

We obtained an understanding of how the cotton program works and how it has evolved to its current level of complexity by interviewing Deputy Directors, Branch Chiefs, and analysts in several divisions of the USDA's Consolidated Farm Service Agency. In addition, we met with agricultural economists from USDA's Economic Research Service; the Director and Deputy Director of the Tobacco, Cotton, Seeds Division of USDA's Foreign Agricultural Service; and the Deputy Director, Cotton Division of USDA's Agricultural Marketing Service. We also spoke with executive officers of the National Cotton Council and member associations. To obtain cotton producers' perspectives on the program, including such issues as the benefits and environmental effects of cotton farming, we spoke with executive officers of the three largest producer marketing cooperatives and with individual producers in California, Texas, Georgia, and Mississippi. In addition, we analyzed legislation, regulations, and USDA reports on the history of the cotton program.

To develop cost estimates of the cotton program and of other government programs that support cotton, we interviewed personnel in the Consolidated Farm Service Agency's Fibers and Rice Analysis Division and Budget Division and collected and analyzed cost data from various USDA offices for crop years 1986-93.

To understand the program's many elements, we reviewed regulations, documents, and reports, and interviewed USDA County Executive Directors and several Branch Chiefs in the Cotton, Grain, and Rice Price Support Division at USDA headquarters. Using this information, we prepared graphs and flow charts to illustrate how the program works and obtained USDA concurrence on the accuracy of our depiction.

To determine the distribution of program payments and benefits among cotton producers, we used USDA's records of payments for all U.S. cotton farms for crop year 1993.

To evaluate the effects of the program on producers' cost and revenue, we obtained and analyzed USDA data on average U.S. domestic prices and U.S. and geographic regional production costs for upland cotton for crop years

1986-93. To compute aggregate U.S. per pound production cost, we used USDA's reported total planted acres and production and computed the aggregate U.S. per pound yield per planted acre for each of the 8 crop years. Our analysis assumes that each producer has full ownership of all assets required to produce and market cotton. In addition, our analysis considers only cotton produced on acreage participating in the program for which the government was liable to make some type of benefit payment to the producer, including deficiency, marketing loan gains, or loan deficiency payments.

To compute the per pound market revenues received by producers, we used USDA's July 1994 and October 1994 Agricultural Prices Summaries for upland cotton, which reported the U.S. average market price per pound received by farmers. The U.S. average government payment rates per pound used in our analysis came from a USDA-prepared schedule showing the U.S. average deficiency payment and loan deficiency payment rates USDA paid on a pound of cotton participating in the program. Our analysis was conservative, in that it did not include disaster payments that producers might have received.

To estimate the range of cotton producers' short-run and long-run total production cost, we computed each producer's average per pound production cost using the 1981-85 historical per harvested acre yield for each farm (as recorded in USDA files). Also, we assumed that the producer's per acre cost was equal to the average for a producer's regional location. We used the 1981-85 per harvested acre yields for each cotton farm, called "program yields," because under the Food Security Act of 1985, USDA "froze" the yields for each farm and still uses them today to compute deficiency payments. USDA no longer collects actual up-to-date yields, neither of planted nor harvested acres, on each cotton farm. Therefore, the 1981-85 yields are the only yield data available within USDA that are based on the actual cotton production for each farm participating in the cotton program.

To assess the economic impact of the program on cotton buyers' costs and producers' benefits, we identified and analyzed economic studies of the U.S. cotton program. We used a methodology developed by Bruce L. Gardner of the University of Maryland to determine the welfare effects—economic gains and losses—of the program. We worked with him to ensure that we accurately applied the model to the cotton program. A discussion of how we measured the welfare gains and losses of the cotton program and how we modified the Gardner model is included in appendix

I. The Gardner model, like most models used for welfare analyses, is a static partial equilibrium model. It does not consider a movement to worldwide free trade, nor does it consider a complete absence of governmental intervention in agriculture (such as an absence of disaster payments, research and development, etc.). We used program cost data provided by USDA. We used this model in our previous evaluations of the rice and wheat programs.[1]

To evaluate the impact of program features on cotton exports and on the U.S. share of cotton export markets, we obtained and analyzed USDA data on U.S. cotton exports and on U.S. export promotion efforts. We assessed the effect of the cotton program on domestic and international cotton marketing by reviewing and analyzing program features dealing with controlling the supply of cotton (such as acreage reduction requirements) and producers' use of the nonrecourse loan and the effect of these program features on the marketing of cotton.

To assess prospects for cotton exports under changing international trade conditions, we reviewed analyses of the potential effects of NAFTA and GATT. We also discussed possible future opportunities for U.S. cotton exports under increased free-trading conditions with the (1) Director and Deputy Director of the Tobacco, Cotton, Seeds Division of the Foreign Agricultural Service; (2) Executive Director of Cotton Council International (Cotton Council International is the export promotion arm of the Cotton Council); and (3) Executive Director of the International Cotton Advisory Committee (an association of governments having an interest in the production, export, import, and consumption of cotton). We also talked with officers of the American Textile Manufacturers Institute, including the Director, International Trade.

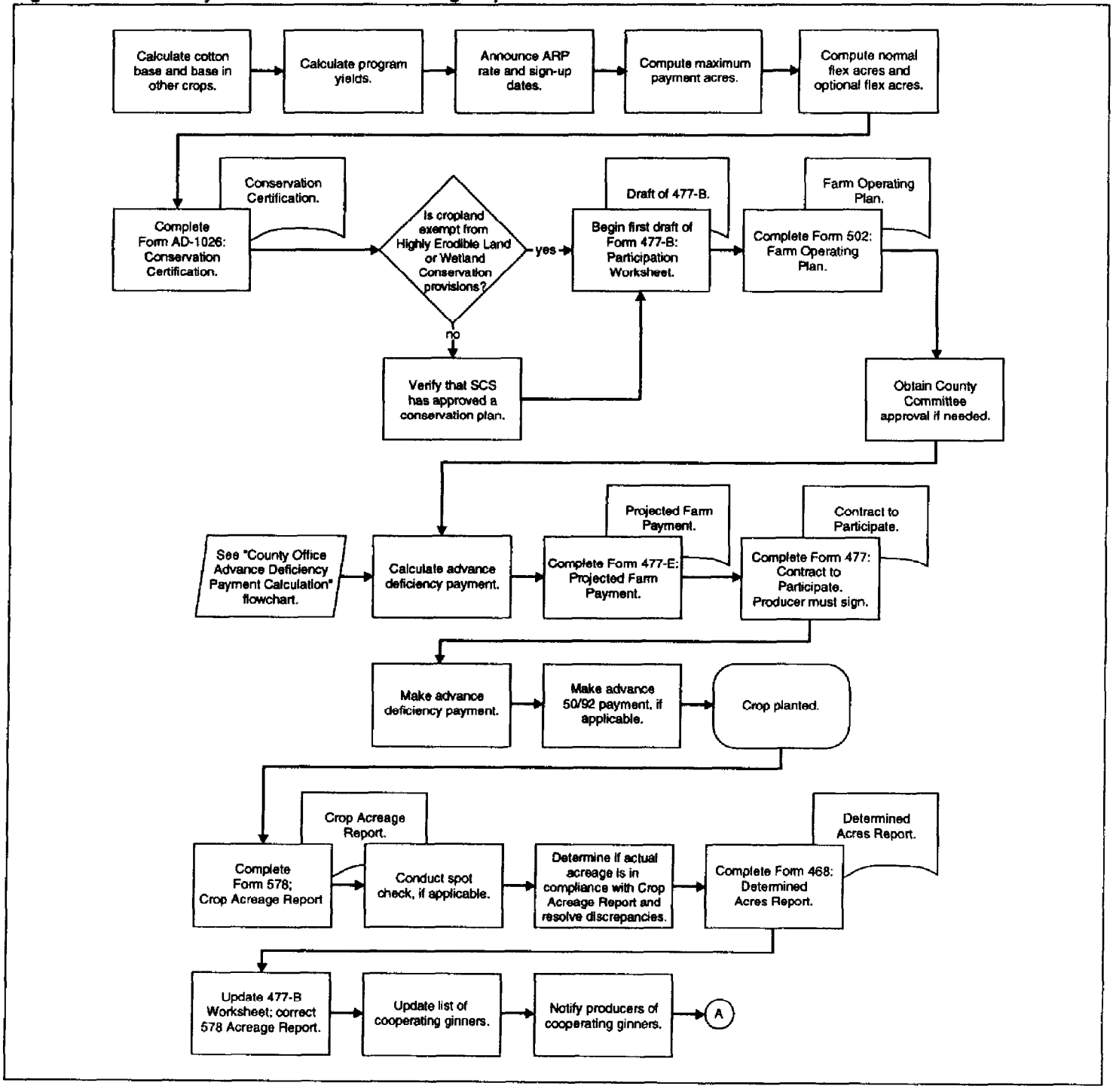
We did not independently verify the USDA data used in this report. As necessary, we adjusted figures in this report to 1993 dollars to more accurately compare prices and costs over time. For this adjustment, we used the gross domestic product implicit price deflator, with 1993 being equal to 1.00.

[1]Rice Program: Government Support Needs to Be Reassessed (GAO/RCED-94-88, May 26, 1994) and Wheat Commodity Program: Impact on Producers' Income (GAO/RCED-93-175BR, Sept. 8, 1993).

Graphic Illustration of Cotton Program Operations

This appendix presents nine flow charts showing how the cotton program operates at USDA county offices and in headquarters. Figures III.1 through III.4 illustrate county office operations. Figures III.5 through III.9 show USDA headquarters operations.

Figure III.1: The County Office's General Processing Steps



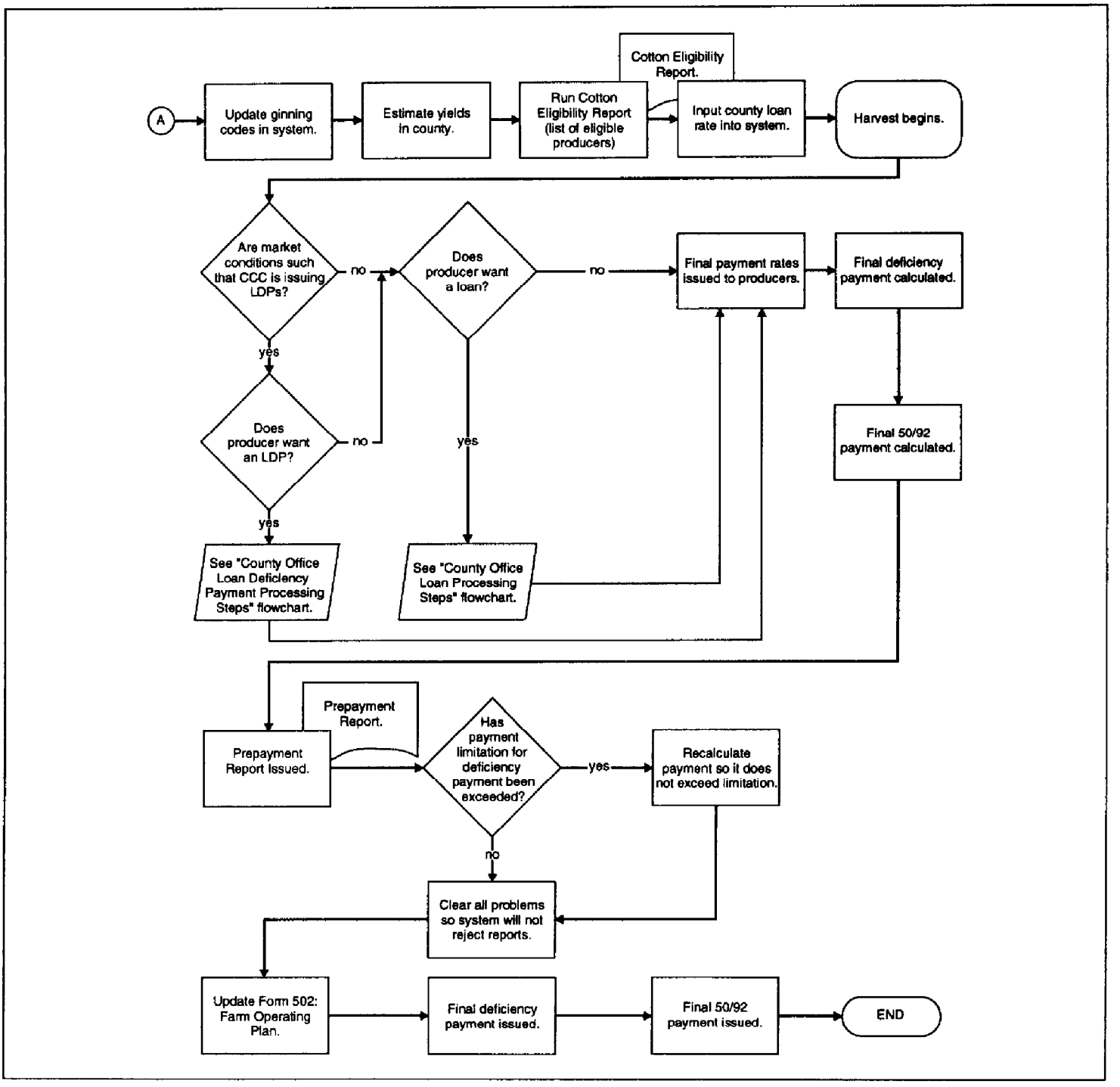

A
Update ginning codes in system.
Estimate yields in county.
Cotton Eligibility Report.
Run Cotton Eligibility Report (list of eligible producers)
Input county loan rate into system.
Harvest begins.
Are market conditions such that CCC is issuing LDPs?
no
Does producer want a loan?
no
Final payment rates issued to producers.
Final deficiency payment calculated.
yes
Does producer want an LDP?
no
yes
Final 50/92 payment calculated.
yes
See "County Office Loan Deficiency Payment Processing Steps" flowchart.
See "County Office Loan Processing Steps" flowchart.
Prepayment Report.
Prepayment Report Issued.
Has payment limitation for deficiency payment been exceeded?
yes
Recalculate payment so it does not exceed limitation.
no
Clear all problems so system will not reject reports.
Update Form 502: Farm Operating Plan.
Final deficiency payment issued.
Final 50/92 payment issued.
END

Figure III.2: Advance Deficiency Payment Calculation

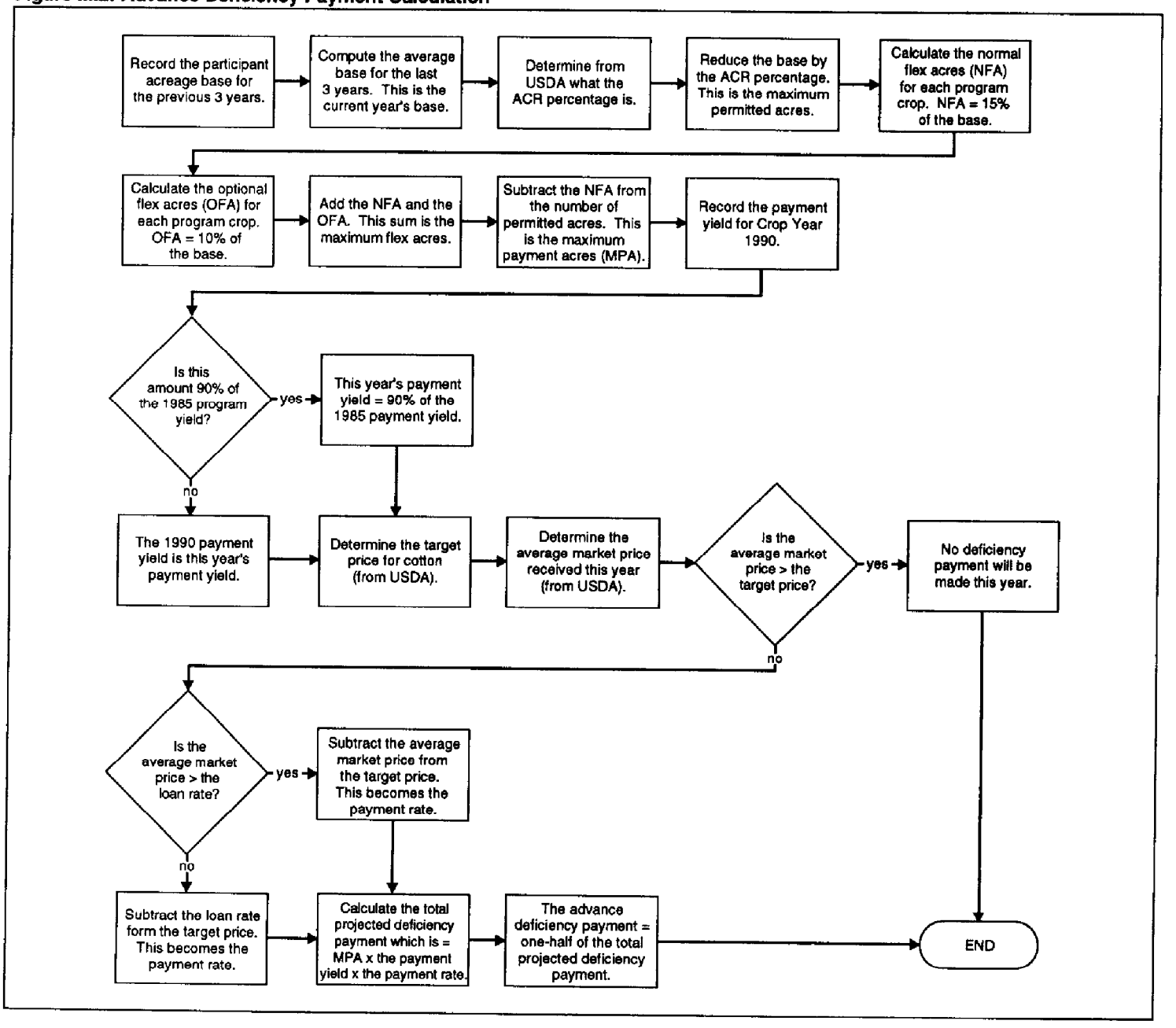


Figure III.3: Loan Deficiency Payment Processing Steps

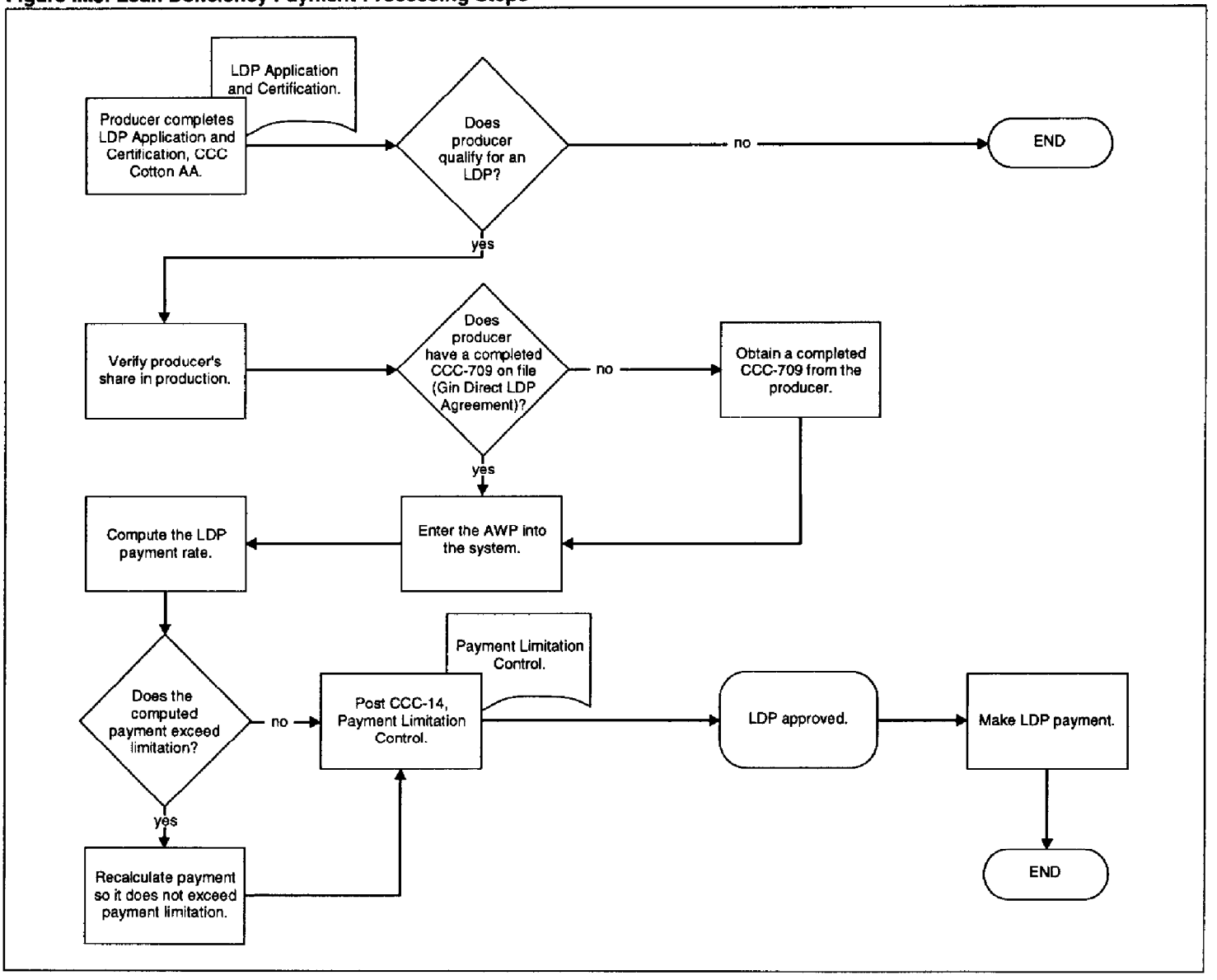
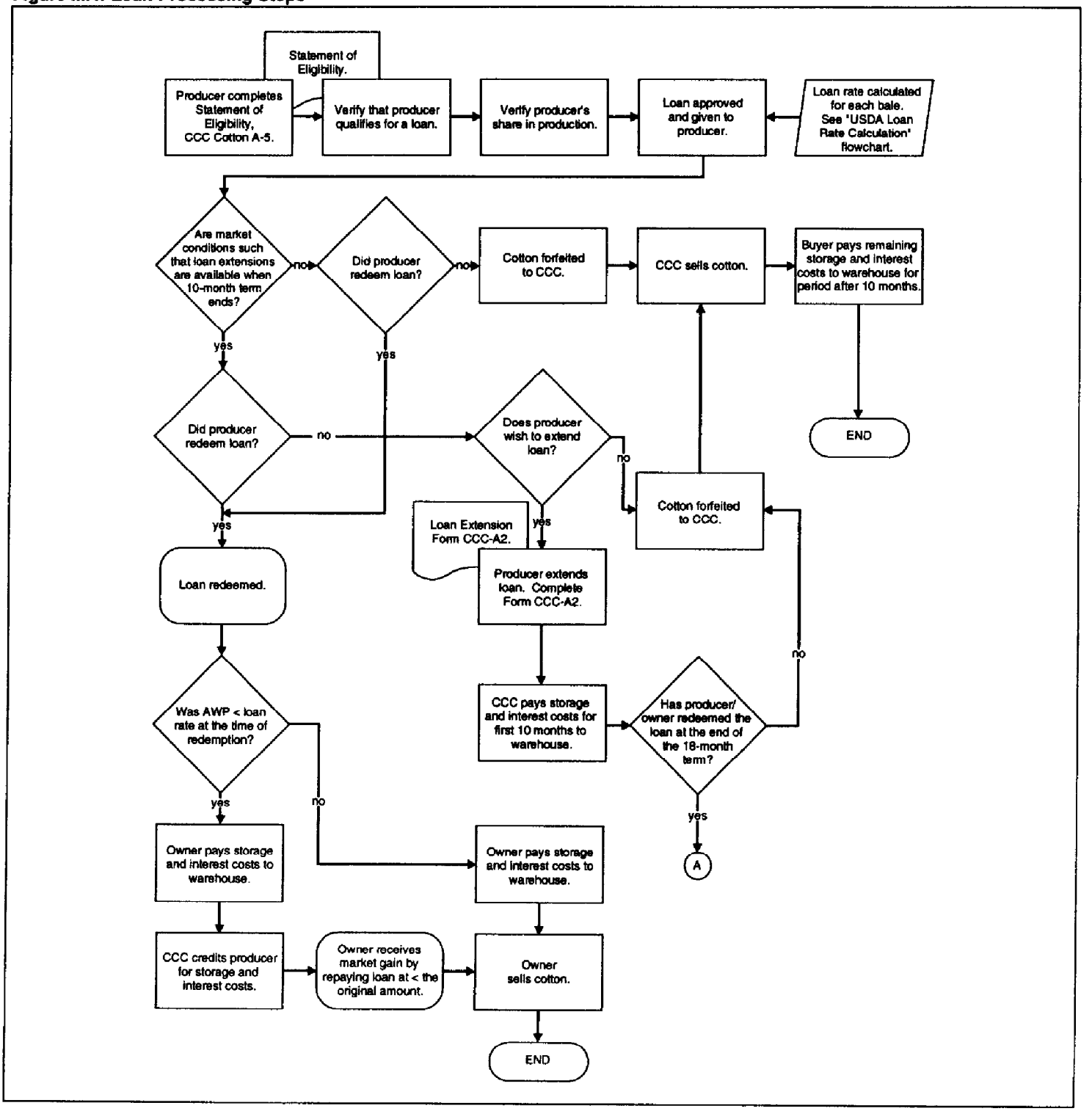


Figure III.4: Loan Processing Steps



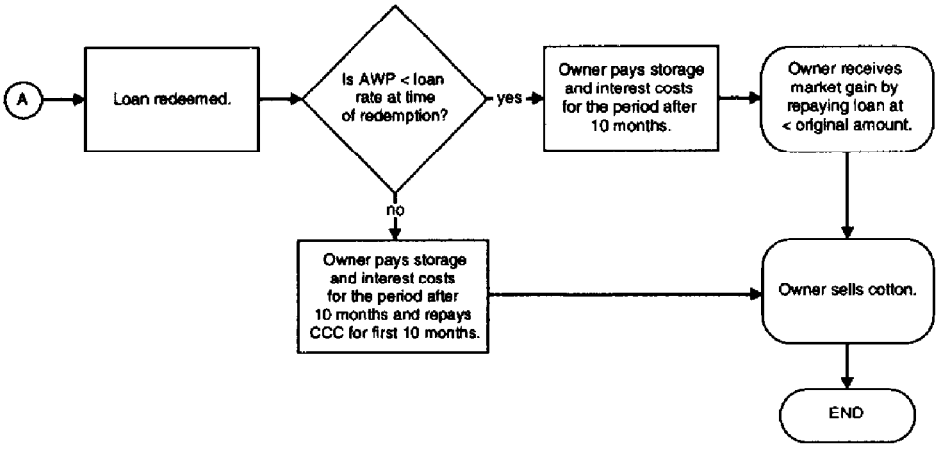

A
Loan redeemed.
Is AWP < loan rate at time of redemption?
yes
Owner pays storage and interest costs for the period after 10 months.
Owner receives market gain by repaying loan at < original amount.
no
Owner pays storage and interest costs for the period after 10 months and repays CCC for first 10 months.
Owner sells cotton.
END

Figure III.5: Loan Rate Calculations

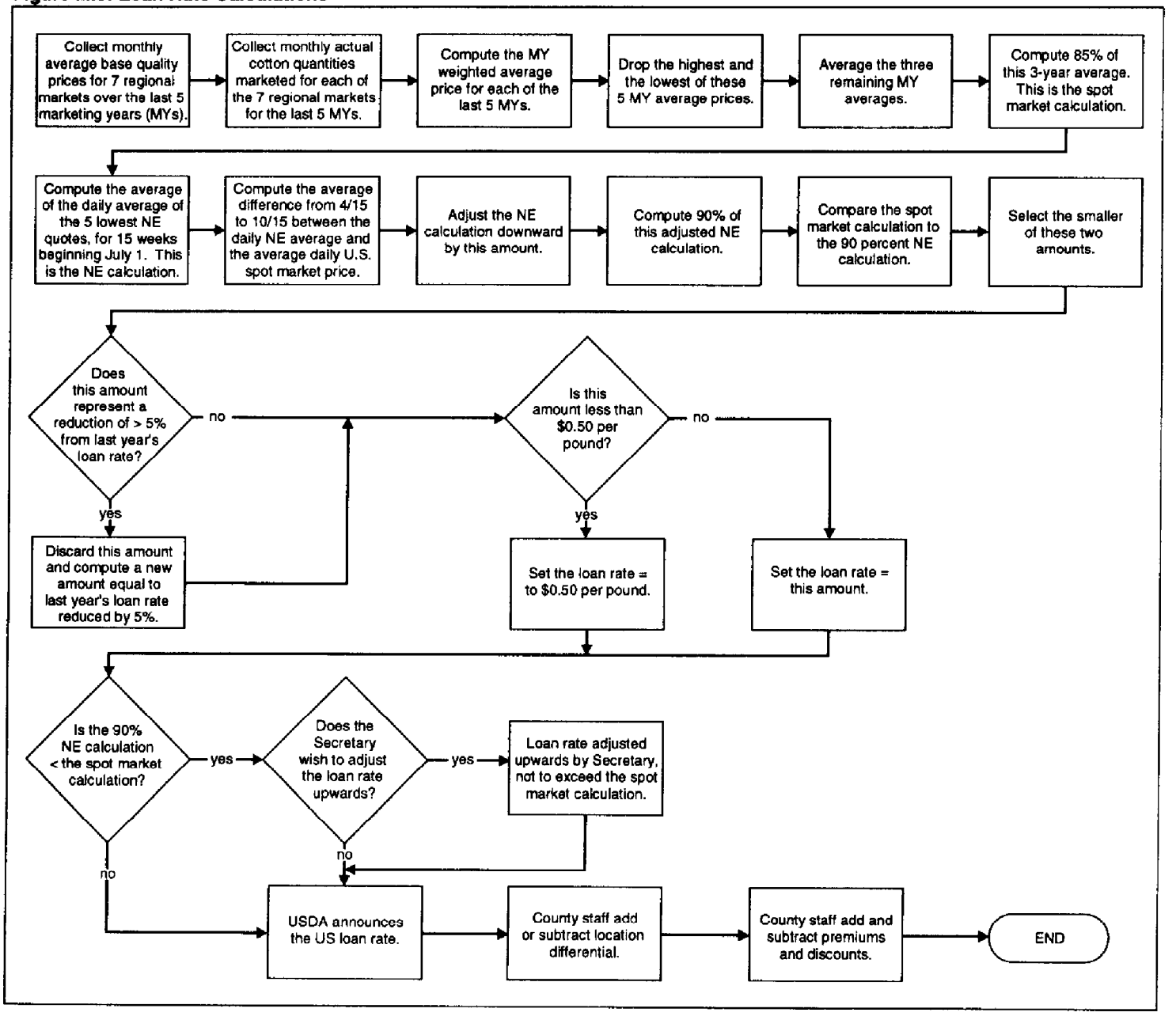
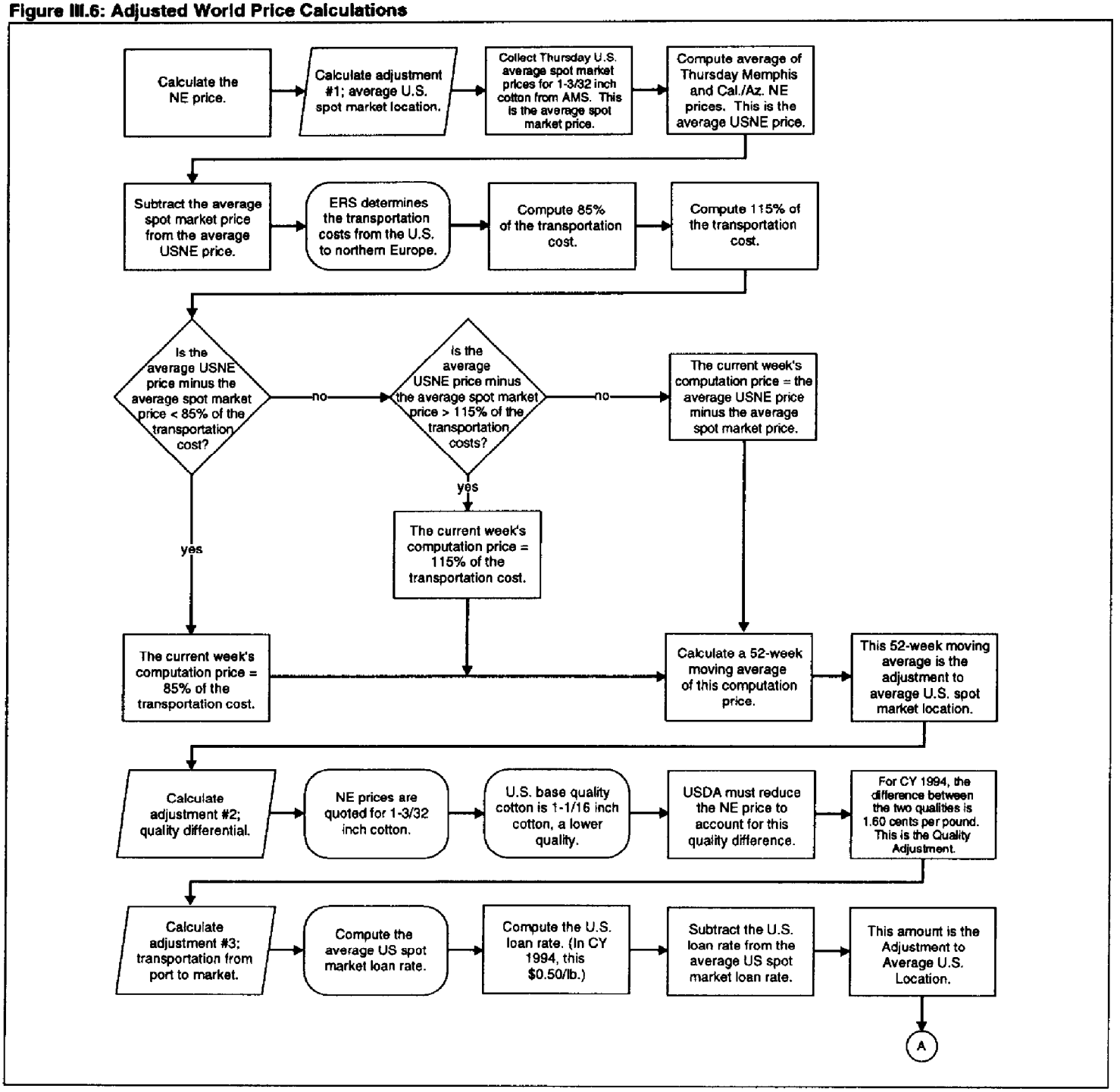


Figure III.6: Adjusted World Price Calculations



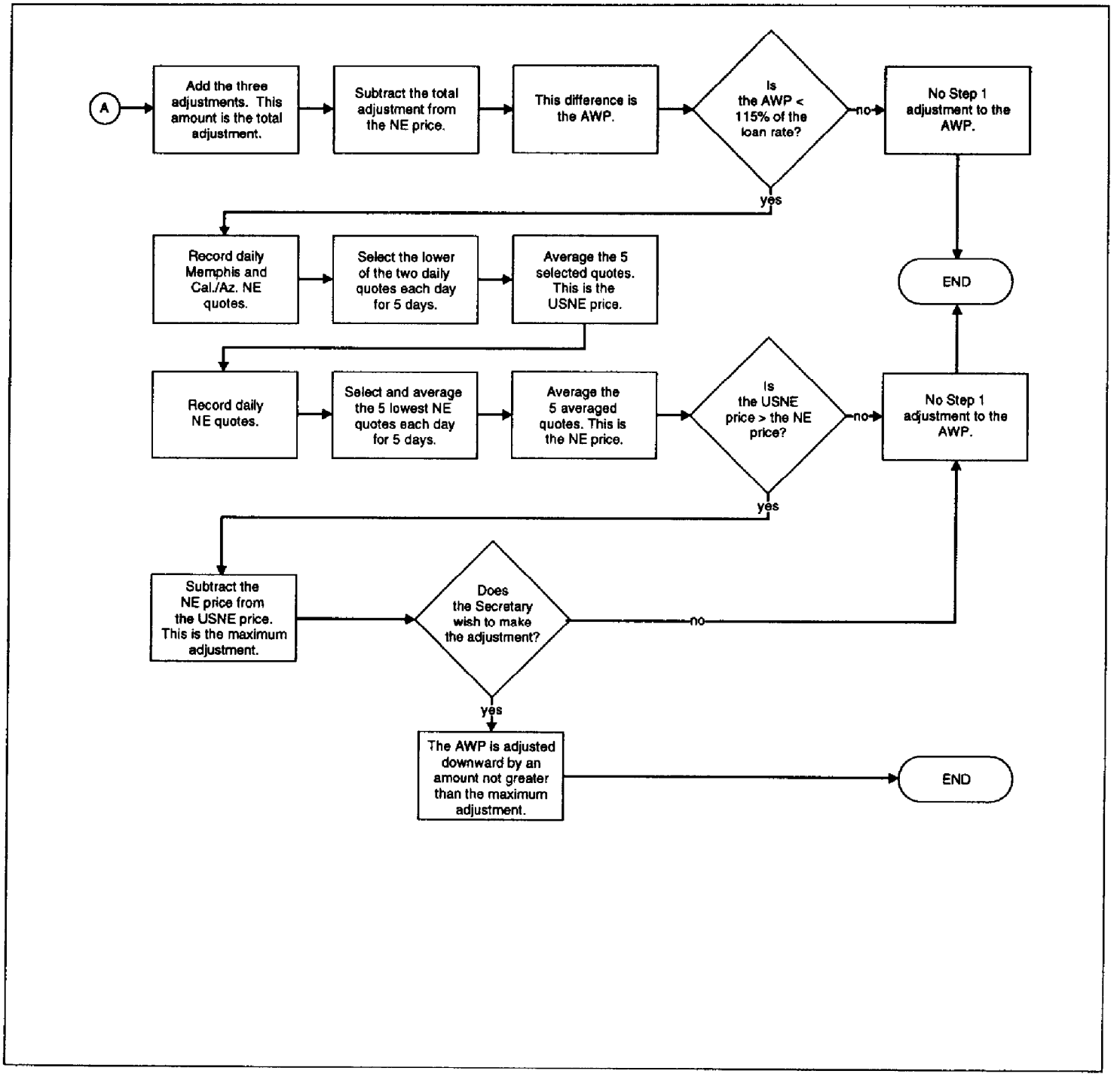

A
Add the three adjustments. This amount is the total adjustment.
Subtract the total adjustment from the NE price.
This difference is the AWP.
Is the AWP < 115% of the loan rate?
no
No Step 1 adjustment to the AWP.
yes
Record daily Memphis and Cal./Az. NE quotes.
Select the lower of the two daily quotes each day for 5 days.
Average the 5 selected quotes. This is the USNE price.
END
Record daily NE quotes.
Select and average the 5 lowest NE quotes each day for 5 days.
Average the 5 averaged quotes. This is the NE price.
Is the USNE price > the NE price?
no
No Step 1 adjustment to the AWP.
yes
Subtract the NE price from the USNE price. This is the maximum adjustment.
Does the Secretary wish to make the adjustment?
no
yes
The AWP is adjusted downward by an amount not greater than the maximum adjustment.
END

Figure III.7: Step 2 Payment Calculations

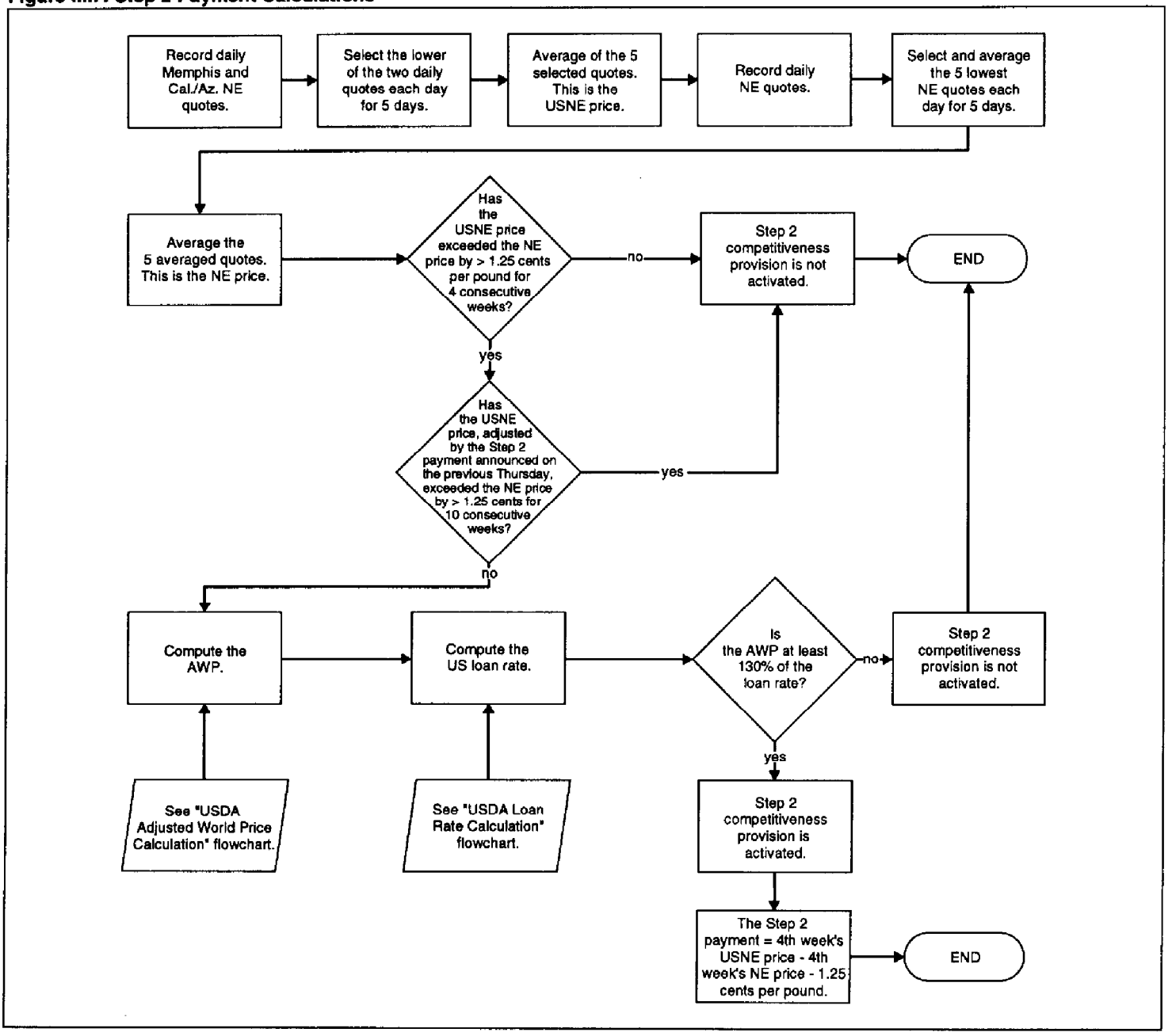


Figure III.8: Step 3 Import Quota Calculations

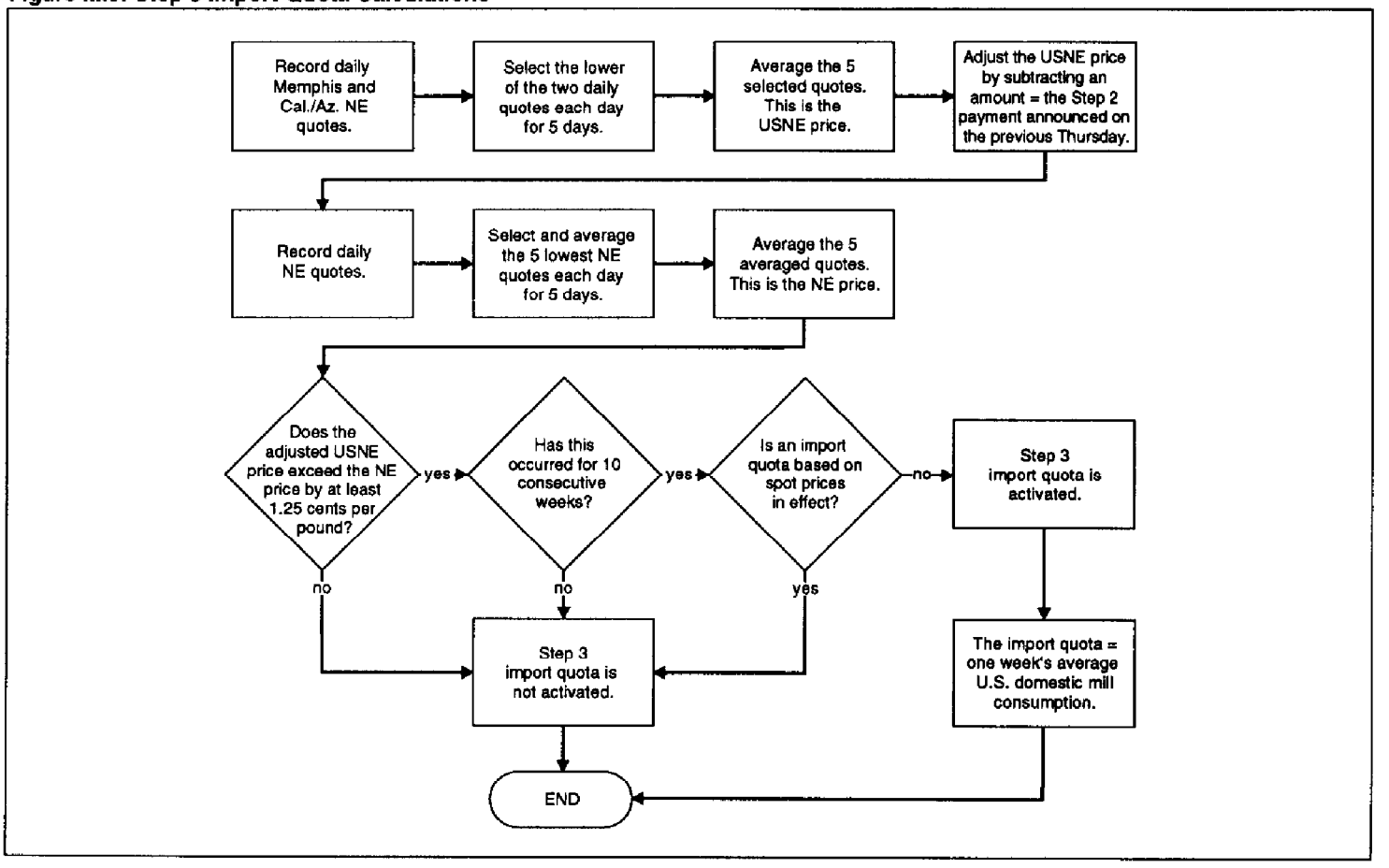
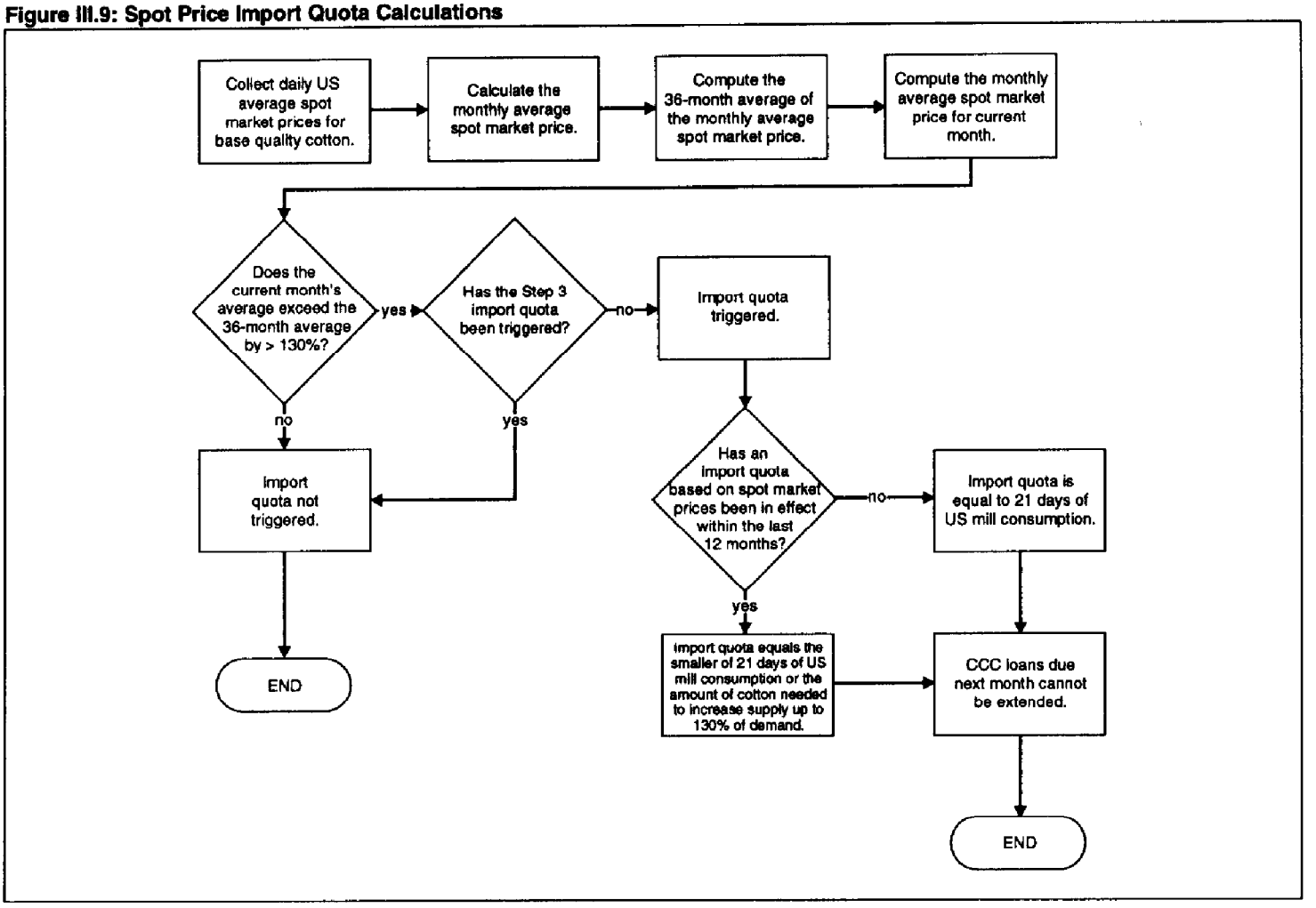


Figure III.9: Spot Price Import Quota Calculations



Comments From the U.S. Department of Agriculture

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Honorable Keith O. Fultz
Assistant Comptroller General
Resources, Community, and Economic Development Division
United States General Accounting Office
Washington, D.C. 20548

Dear Mr. Fultz:

Thank you for your letter of April 7, 1995, requesting the comments of the Department of Agriculture (USDA) concerning your study entitled "COTTON PROGRAM: Costly and Complex Government Program Needs to be Reassessed" (GAO/RECD-95-107). The study appears to be a comprehensive look at this complex program. We are in fundamental disagreement with certain conclusions which we believe were reached through misunderstanding of the program or through misapplication of the theoretical model.

See ch. 6.

The Economic Situation Which Led to the Cotton Program No Longer Exists

The report questions the need for a cotton program. The authors state that the program was conceived in the 1930's and was intended to be temporary, lasting only until the end of the economic emergency of those times.

However, the cotton program has evolved to meet changing conditions in the world wide industry of textiles and raw cotton. In the 1930's, trade protectionism was one of the leading causes of the economic depression, but U.S. agricultural productivity, spurred by new technological know-how arising from the increased investment in research and the recovering purchasing power of farmers, soon put our farm products at the forefront of trade. To compete with our farmers, other countries implemented government subsidization schemes, which had to be met in-kind.

These problems have not gone away with the conclusion of the Uruguay Round of the General Agreement on Tariffs and Trade (GATT). GATT recognizes that the United States has already reduced its supports to acceptable levels.

See ch. 2.

Cotton Program is Costly and Complex

The upland cotton program has averaged about $1.5 billion per year over the 1986 through 1993 program years. This amount averages about 33 cents in Government payments for each dollar of sales revenue realized by cotton farmers, as the study points out. Nonetheless, upland cotton program costs per dollar of revenue were lower than for many of the program crops during that period.

Expenditures under the upland cotton provisions were highest in earlier years when the marketing program was first implemented with the 1986 crop and, later, when cotton from central Asia came into the market following the breakup of the Soviet Union. The program is designed to respond to forces which threaten the price competitiveness of U.S.-grown cotton, and it did.

The costs in 1986 and 1987 were primarily the result of stocks which had accumulated under the previous program before marketing loans. During the 1991 and 1992 period, a world-wide economic recession reduced raw cotton utilization at precisely the time when central Asian nations of the former Soviet Union had lost their markets in Russian textile mills and were seeking manufactured goods and raw materials on their own in world markets. They bartered raw cotton for these goods, vastly discounting the price of their cotton in the process. The unprecedented entry of central Asian cotton into world markets drove prices down and added to the cost of the upland cotton marketing loan program.

In 1993 and 1994, exports of U.S. cotton recovered substantially, and the cost of the program came down. In fiscal year 1995, the cost is projected at $354 million. In contrast to the average of $1.5 billion per year, the projections are that the program will average little more than half that amount for the 1995 through 2000 program years.

The complexity of the cotton program is undeniable. Each of the steps that must be negotiated to compute an adjusted world price (AWP) or a Step 2 payment rate is either specified in legislation or was developed after exhaustive consultations with the cotton industry concerning the appropriate variables to include. Many of the trigger prices were imposed to reduce the cost exposure of the program.

Most Program Payments Go to . . . Few Large Producers

See ch. 3.

It is clear from Table 3.1 that payments are directly related to the production, not to the number of producers. The payments are designed to be based on production or on base acreage on the farm.

There have been many audits or reviews by both the General Accounting Office (GAO) and USDA's Office of Inspector General regarding the manner in which payment limitations are being administered. In 1987, legislation concerning payment limitations was rewritten in response to a GAO report (P.L. 100-203, Amendments to the Food Security Act of 1985 (1985 Act)). Payments are still closely correlated with production.

Cotton Program Has . . . Created Troubling Economic Consequences
Producers Receive Higher Returns When Market Prices Are Low

See ch. 4.

The notion that the relationship between an 8-year average revenue figure and an 8-year average cost figure has meaning with regard to a real profit/loss result in a given year among the 8 years examined is difficult to accept (Table 4.1). Each cost estimate is based on a yield for a specific year, and each revenue estimate is based on an assumed price for a year, but when they are averaged, they lose most of their power to explain what has happened over the period. It is to be expected that over an 8-year period sales revenue would at least equal costs. In addition, any Government payments would be expected to push the average revenue over the cost level.

As illustrated in Figure 4.1, the observation that producers are better off as prices move lower is likely to have suffered also from distortion caused by averaging, even though it is certainly possible to find cases in which, in fact, the producer did benefit from lower prices. Most probably do not, at least to any great extent. Many cotton farmers today employ marketing strategies which involve locking in prices through the futures and options markets. They would be able to capture nearly as much income from a higher market through timely trading than they would in a lower market through Government payments.

However, there is a potential for a producer who does not use futures and options to realize a higher return in a year with lower prices. This possibility stems from the overlapping among the market price at which the producer actually makes sales, the determinant of marketing loan gains and loan deficiency payment (LDP) rates--the AWP--and the determinant of target price deficiency payment rates--the calendar year domestic price. Even before the marketing loan program was implemented, a certain amount of duplicate coverage was afforded by the possibility that the producer could market cotton in a month with relatively high prices, then receive a deficiency payment based on an average price of the whole calendar year well below what was received from the sale. The introduction of the marketing loan brought an additional chance for overlapping coverage because of the occasional divergence between the AWP and U.S. prices.

The suggestion by GAO and others to incorporate the marketing loan gain or LDP into the computation of the target price deficiency payment rate would require legislation.

Producers Receive . . . Less Than a Dollar for Every Dollar Given Up by the Nation

See ch. 4.

A social welfare loss was measured by GAO at about $754 million, roughly half of the average annual Government spending on the upland cotton program. They ascribe the loss to the necessity of program participants to idle part of their land under the acreage reduction program (ARP). The so-called "flex acres" and "50/85 acres" are also mentioned as sources of this loss. However, idling these acres is a strictly voluntary act based on market prices of competing crops and would, presumably, not be undertaken at the cost of a net reduction in income to the farm.

GAO observes that, even though acreage idled has declined recently, the welfare loss is greater because higher program benefits have increased the cost of an idled acre. This will not be true for the 1994 or 1995 crops, but in 1992 and 1993 marketing loan and Step 2 expenditures were substantial and contributed to higher per acre costs in two ways. First, they added to Government spending. Second, they reduced the acreage idled because they helped stimulate domestic mill use and exports and reduced the projected ending stocks on which the following year's ARP was based.

The basis of the conclusion that social welfare would decline due to idled acreage is illustrated in a theoretical model used by GAO. In a "no-program" scenario, the model shows higher production, principally because there would not be an ARP or the other programs under which producers idle land. In this model, as it was applied to cotton by GAO under the assumption that a program was in effect, supply was restricted in response to price support levels being higher than market-clearing levels. An ARP requirement, as provided in the legislation, was assumed in order to reduce the production of surplus cotton.

The only evidence available which bears upon the question of cotton farmers' acreage decisions in the absence of an acreage reduction requirement is their use for planting cotton on flex acres of other program crops. There has been only a marginal net gain in cotton acreage planted of about 100,000 to 200,000 acres (about 1 percent).

Viewing GAO's model results from the opposite direction, what would happen if a program had been in effect but was assumed to be eliminated? Would the supply expand again because the ARP requirement had been removed? In Table 4.2, it is reported that some 77 percent of producers were able to cover their short-run costs with just the prevailing market price in 1993. Perhaps they might try expanding plantings in the year when the

the year when the program would be eliminated. Perhaps not. However, in Table 4.3, it is reported that only 27 percent of the producers, representing 39 percent of production, were operating with total costs covered by the 1993 market price. Perhaps any expansion would not last long before the results more commonly predicted for the no-program scenario would be experienced--farmers leaving the business.

The U.S. Sells Cotton on the World Market for Less Than its Cost

GAO reports that, in 1993, farmers' costs were 66 cents per pound, and the Government contributed another 24 cents to the cost of exporting cotton. The total cost was 90 cents, and the cotton was sold for 56 cents, the AWP.

See ch. 5.

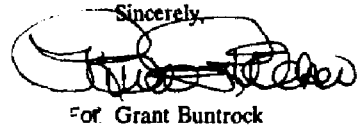
In Table 4.1, average costs of production over 1986-93 are reported at either 48 cents or 78 cents per pound, depending on whether short-run or long-run costs are of interest. In attempting to gauge the cost of shipping a bale of cotton in export, it would seem that the short-run cost would be more appropriate since the marginal cost of an additional bale shipped would be of most interest. Therefore, in the case of 1993, a production cost less than 66 cents is likely to be appropriate, perhaps the 47 cents shown in Table 4.2 as the median short-run cost for 1993.

See ch. 5.

In Table 5.1, it is reported that merchants face payments of about 11 cents above the AWP for equity payments to producers when they buy the cotton pledged as collateral for price support loans. Thus, the merchant in 1993 would have had roughly 67 cents in the cotton, plus any other costs such as compression or load-out charges. It is unlikely that cotton was offered for the AWP of 56 cents.

It may have been offered for less than 67 cents, however, if the merchant received a Step 2 payment. If that was true, though, GAO's attempt to balance farmer and Government costs against the sales price would not hold because they would be double-counting the Step 2 payment. It would be a Government cost, but it would also have served to lower the sales price, making the transaction appear to be a loss when, in reality, it may not be. The same can be said for any marketing loan costs that were recorded on the Government cost side, but enabled the merchant to redeem the cotton pledged as collateral for a price support loan for a lower price and ask a lower price of a foreign buyer.

Sincerely,



For Grant Buntrock
Acting Administrator

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Related GAO Products

Wheat Support: The Impact of Target Prices Versus Export Subsidies (GAO/RCED-94-79, June 7, 1994).

Rice Program: Government Support Needs to Be Reassessed (GAO/RCED-94-88, May 26, 1994).

Dairy Industry: Potential for and Barriers to Market Development (GAO/RCED-94-19, Dec. 21, 1993).

Wheat Commodity Program: Impact on Producers' Income (GAO/RCED-93-175BR, Sept. 8, 1993).

Peanut Program: Changes Are Needed to Make the Program Responsive to Market Forces (GAO/RCED-93-18, Feb. 8, 1993).

Cotton Program: The Marketing Loan Has Not Worked (GAO/RCED-90-170, July 31, 1990).

Sugar Program: Changing Domestic and International Conditions Require Program Changes (GAO/RCED-93-84, Apr. 16, 1993).

General Agreement on Tariffs and Trade: Agriculture Department's Projected Benefits Are Subject to Some Uncertainty (GAO/RCED-94-272, July 22, 1994).

General Agreement on Tariffs and Trade: Uruguay Round Final Act Should Produce Overall U.S. Economic Gains (GAO/GGD-94-83B, Volume 2, July 1994).

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