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Tobacco Production Costs and Returns in 2004

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Abstract

This study focuses on factors that led to changes in the estimated residual returns to management and risk from tobacco production in 2003-04. Residual returns per acre for flue-cured tobacco declined less than those for burley tobacco in 2004 because yield increases for flue-cured tobacco helped to offset increases in economic costs. Residual returns above economic costs were calculated using data from the last tobacco surveys, conducted in 1995 for burley tobacco and 1996 for flue-cured tobacco, and updated with 2004 data on prices, yields, marketing costs, and quota levels.

Keywords: Tobacco, burley, flue-cured, cost of production, net returns, quota.

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Introduction

In recent years, estimated production costs per acre for tobacco rose while tobacco prices remained fairly steady, placing producers in a price squeeze. Producers frequently cope with decreased profits by expanding their farm operations to achieve lower fixed costs per acre, a strategy likely to be more common with the ending of tobacco quotas in 2005. However, in 2004, the subject of this report, most tobacco producers could not expand their tobacco operations due to recent quota reductions. Lower profits led many producers to support a tobacco buyout. (See box, "Tobacco Quotas.")

This report examines the changes in the estimated returns to tobacco production from 2003 to 2004. Average residual returns above economic costs per acre for burley and flue-cured tobacco were negative in 2004 and lower than in the previous year. Residual returns per acre for flue-cured tobacco declined less than for burley tobacco in 2004, with yield increases for flue-cured tobacco helping to offset increases in economic costs.

Residual returns are the estimated returns from production after economic costs are subtracted from the value of production. Economic costs are the cash and noncash costs for an item used during a specified period, typically a year.

Tobacco Quotas

The Fair and Equitable Tobacco Reform Act of 2004, also known as the Tobacco Program Buyout, terminated price supports and marketing quotas for burley and flue-cured tobacco beginning with the 2005 tobacco crop. Quotas were designed to match supply with the demand for tobacco, keeping prices above the price support level. Without quota, a producer could not sell tobacco. The effective quota was the amount of tobacco that producers were permitted to market through all means, including auctions and contracts. Quotas were assigned each year to farms with a recent history of tobacco production. Thus, tobacco quota was owned by tobacco producers, and by landlords who rented quota to producers.

Under the tobacco quota system, producers could sell up to 103 percent of their quota for a given year, with their quota for the following year reduced by the same percentage. Tobacco growers producing more than 103 percent of their allotted tobacco quota could store tobacco until the following year or, if possible, rent tobacco quota from someone whose production fell short of their quota. Storing tobacco gave producers the option of (1) renting sufficient quota the next spring to allow them to sell tobacco in the fall or (2) reducing the amount of tobacco planted in the spring so that the current year's production plus the stored tobacco from the prior year equaled their quota for the current year. If producers did not produce enough tobacco in a year, they were allowed to transfer up to 3 percent of their effective quota to the next year. Producers falling short of their quota could rent quota to someone else who needed it.

The noncash items include capital replacement for farm machinery and buildings and opportunity costs for land, quota, unpaid labor, and machinery. Capital replacement is the cost to replace capital assets consumed in production during the year. Opportunity costs are a measure of the highest income producers would have received if they had used the resources that they own in another way. For example, the opportunity cost for using the owner's tobacco quota is the income the owner would have received by renting the quota to another producer. The opportunity cost of unpaid labor is the income he or she would have received by working for someone else.

Residual returns from burley tobacco production fell to an estimated -$119 per acre in 2004 from -$10 per acre in 2003. The larger loss is explained by a $171 increase in total economic costs to $3,982 per acre in 2004 while the gross value of production rose $62 to $3,863 per acre (table 1, p. 7). Burley prices edged up slightly by an average of 64 cents per hundredweight (cwt) from the 2003 marketing season to $198.59 in 2004. Average yields for burley tobacco increased slightly to 1,945 pounds per acre, up 25 pounds from 2003 yields. Total costs per acre for burley production rose primarily due to higher costs for energy (up 16 percent) and labor (up 9 percent).

Residual returns per acre from flue-cured tobacco production also continued negative, falling $68 from 2003 returns to an estimated -$824 per acre in 2004, as the increase in the economic costs exceeded the increase in the gross value of production (table 2, p. 10). Yields rose by an average of 322 pounds per acre from 2003 to 2,268 pounds in 2004, while prices averaged $1.84 per pound in 2004 compared with $1.85 in 2003. Total economic costs for flue-cured tobacco rose due to higher costs for energy, up 25 percent; labor, up 4 percent; marketing, up 94 percent; and land and quota, up 26 percent.

Increases in economic costs per acre were greater for flue-cured tobacco than for burley tobacco in 2004 because of increases in the no-net-cost assessments and quota costs for flue-cured tobacco.[1] The increase in economic costs for flue-cured tobacco was offset by yield increases. As a result, net returns for flue-cured tobacco declined less than net returns for burley tobacco in 2004.

[1]The no-net-cost assessments were fees imposed by USDA's Farm Service Agency on tobacco sold. These fees assured that the tobacco price support program operated at no net cost to the taxpayer, as required under the Agricultural Act of 1949.

Notice to Users of ERS's Tobacco Cost-of-Production Estimates

The 2004 burley and flue-cured tobacco cost-of-production figures will be the last set of tobacco cost-of-production estimates produced by the Economic Research Service until enough high- quality data become available to compute the estimates. Data for the estimates were last collected in 1995 for burley tobacco and 1996 for flue-cured tobacco. Estimates were updated yearly, based on annual data on price indices, yields, interest rates, acreage, and other statistics. Since the last surveys, many changes have influenced the structure of tobacco farms and enterprises. While every effort has been made to adjust the cost-of-production estimates for these changes, it has not been possible to measure and adjust the costs for all the changes

The passage of the Fair and Equitable Tobacco Reform Act of 2004, which eliminated tobacco quotas and tobacco price supports, will likely accelerate structural changes and lead to further changes in production practices as growers adjust to a more competitive marketplace. Also, some data sources for maintaining the tobacco cost-of-production estimates vanished with the passage of the Tobacco Act. The acceleration of changes and loss of data sources render it infeasible for the agency to continue with the tobacco cost-of-production estimates.*

USDA's National Agricultural Statistics Service (NASS) plans to conduct another tobacco survey to collect data for 2008. The survey will gather data about the structural changes in tobacco production to assess the impact from policy reform. Information for cost estimates is usually collected at the same time. In the meantime, questions on tobacco acreage were added to the 2005 annual survey of farms in the 48 contiguous States. Data from the 2005 survey may allow ERS researchers to analyze tobacco producers' initial reaction to the new policy. (The study of the tobacco producers' responses will be limited by the sample size of tobacco producers in the survey.)

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*See the appendix, "Data and Methods," in this article, and *Tobacco 2001 Production Costs and Returns and Recent Changes That Influence Costs,* Electronic Outlook Report, TBS-2002-01, Economic Research, USDA, February 2003, for further details on the changes that have occurred, http://www.ers.usda.gov/Publications/tbs/feb03/tbs200201/

Burley Tobacco: Costs and Returns for 2004

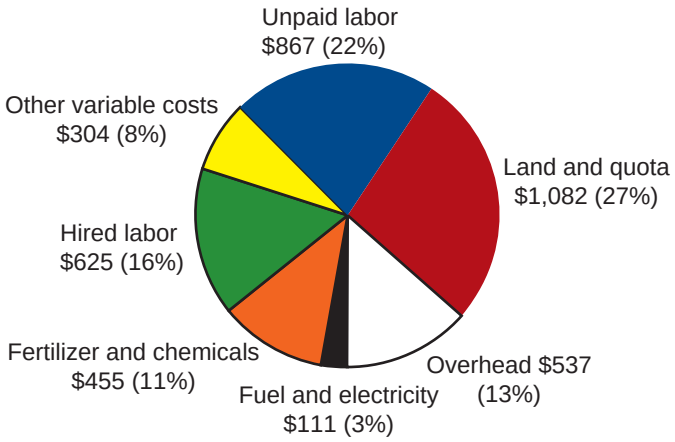
Our estimates of burley tobacco returns are based primarily on updates to data from a 1995 survey of tobacco producers in Kentucky and Tennessee. Residual returns to management and risk from burley tobacco production fell to -$119 per acre in 2004, a higher loss than the -$10 per acre in 2003 (table 1). An increase in total economic costs per acre exceeded the small increase in the gross value per acre. In comparison, residual returns to management and risk averaged $277 per acre from 1999 to 2003. The gross value of production, less cash expenses, declined to an estimated $2,021 per acre in 2004, down from $2,062 in 2003 and from a 5-year average of $2,144 between 1999 and 2003.

Slight increases in yields and prices led to a small rise in the gross value of burley tobacco production in 2004, to $3,863 per acre from $3,801 in 2003. Burley tobacco yields averaged 1,945 pounds per acre in 2004, up from 1,920 pounds in 2003.[2] Average burley tobacco yields rose 25 pounds for Kentucky tobacco farmers in 2004 to 1,950 pounds per acre, while yields for Tennessee farmers rose by 20 pounds to 1,920 pounds per acre. Burley tobacco prices rose by 64 cents per cwt between 2003 and 2004 to an average of $198.59 per cwt, a record-high. On average, contract prices were higher than auction prices by an average of $3.53 per cwt.

Total cash expenses in 2004 rose to $1,841 per acre, up $103 per acre from 2003. Total economic costs increased $171 from the previous year to $3,982 per acre. Higher costs of energy and labor significantly increased expenses per acre. Costs for energy-related items, such as fuel, electricity, fertilizers, and chemicals, were 14 percent of total expenses per acre, while labor costs

[2]Yields are the weighted average yield of burley tobacco in Kentucky and Tennessee. These two States accounted for 85 percent or more of total burley tobacco production in 9 of the last 10 years.

Figure 1
Burley tobacco: Estimated costs of production per acre, 2004



Note: Other variable costs include cash costs for seed and plant beds, custom operations, repairs, marketing, and other items, as well as operating capital costs. Overhead costs include costs for general farm overhead, taxes and insurance, capital replacement, and other nonland capital. Land and quota costs are the opportunity and rental costs for land and quota.

Source: ERS cost of production accounts.

(hired and unpaid labor) accounted for 38 percent (fig. 1). Diesel prices rose 13 percent between April 2003 and April 2004**,** while fertilizer costs rose 6 percent in Kentucky and 12 percent in Tennessee. Higher wages increased labor costs per acre in 2004. In Kentucky, the average hourly rate for field workers increased by 10 percent, compared with 6 percent in Tennessee. In contrast to recent years, during which the effective quota levels have fallen, the effective quota for burley tobacco increased 3 percent between 2003 and 2004, causing a slight decline in the estimated quota rental rate for burley tobacco in 2004.

Table 1—U.S. burley tobacco, estimated production costs and returns, 2003-2004

Item	2003	2004	2003	2004
	Dollars per acre		*Dollars per cwt*	
Gross value of production	3,800.64	3,862.58	197.95	198.59
Cash expenses:				
Seed and plant bed	110.34	115.51	5.75	5.94
Fertilizer	333.81	356.58	17.39	18.33
Chemicals	99.47	98.65	5.18	5.07
Custom operations	13.80	13.91	0.72	0.72
Fuel, lube, and electricity	95.28	110.93	4.96	5.70
Repairs	82.05	83.89	4.27	4.31
Hired labor	574.81	624.96	29.94	32.13
Marketing expenses	56.84	57.12	2.96	2.94
Other variable cash expenses	22.22	23.65	1.16	1.22
Total, variable cash expenses	1,388.62	1,485.20	72.33	76.36
General farm overhead	228.42	233.53	11.90	12.01
Taxes and insurance	48.58	48.85	2.53	2.51
Interest[1]	73.16	73.88	3.81	3.80
Total, fixed cash expenses	350.16	356.26	18.24	18.32
Total, cash expenses	1,738.78	1,841.46	90.57	94.68
Gross value of prod. less cash expenses	2,061.86	2,021.12	107.38	103.91
Economic (full ownership) costs:				
Variable cash expenses	1,388.62	1,485.20	72.33	76.36
General farm overhead	228.42	233.53	11.90	12.01
Taxes and insurance	48.58	48.85	2.53	2.51
Capital replacement[2]	163.91	175.88	8.54	9.04
Operating capital[3]	7.08	10.25	0.37	0.53
Other nonland capital[4]	79.12	78.50	4.12	4.04
Land and quota[5]	1,097.76	1,082.40	57.18	55.65
Unpaid labor	797.48	867.05	41.54	44.58
Total economic costs	3,810.97	3,981.66	198.51	204.72
Residual returns to management and risk	-10.33	-119.08	-0.56	-6.13
Price (dollars/lb and dollar/cwt)	1.98	1.99	197.95	198.59
Yield (lbs/acre and cwt/acre)	1,920	1,945	19.20	19.45

[1]Actual interest paid by the farm enterprise. Includes interest paid on loans secured by farm real estate and interest paid on the portion of farm machinery loans allocated to tobacco production, as well as interest paid on loans to cover operating costs for items such as fertilizers, chemicals, and fuel. Interest is not listed under economic costs because interest paid on operating loans would be part of the operating cost, while interest paid on farm machinery loans would be included in other nonland capital. Interest paid on farm mortgages or loans would be included in the land and quota costs.

[2]Capital replacement is the value of machinery, equipment, and buildings consumed annually in tobacco production.

[3]Costs for operating capital are the opportunity costs for inputs invested in production, such as fertilizers, chemicals, and fuel.

[4]Other nonland capital costs are the opportunity costs for using machinery.

[5]Land and quota costs are the opportunity and rental costs for land and quota.

Source: Estimates were developed from the 1995 Farm Costs and Returns Survey and updated with current price indices, yields, interest rates, and other data (see appendix, “Data and Methods").

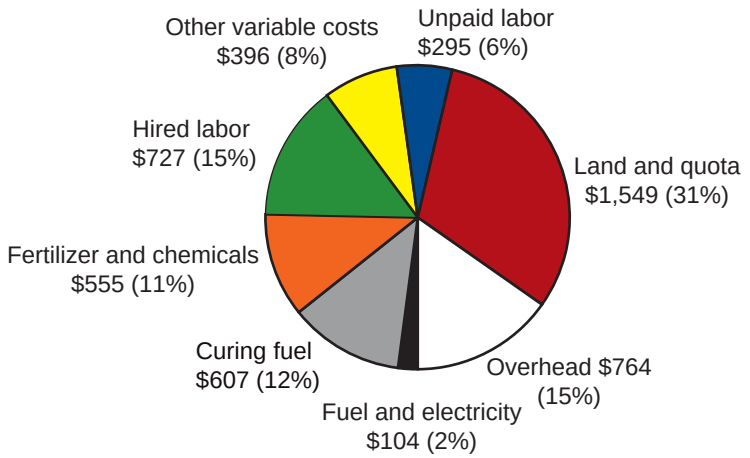
Flue-Cured Tobacco: Costs and Returns for 2004

Our estimates of tobacco returns are based primarily on updates to data from a 1996 survey of flue-cured tobacco producers in Virginia, North Carolina, South Carolina, and Georgia.[3] In 2004, residual returns to management and risk from flue-cured tobacco production dropped to -$824 per acre from -$755 in 2003 as the increase in economic costs exceeded the increase in the value of gross production (table 2). By comparison, residual returns averaged -$280 per acre for 1999 through 2003. Low yields contributed significantly to low residual returns in 2003, whereas higher costs lowered net returns in 2004. Total economic costs averaged $4,997 per acre in 2004 and $4,355 in 2003, compared with an average of $4,278 per acre for 1999 through 2003.

Gross production value per acre rose to $4,173 in 2004 from $3,600 in 2003, based on estimates of higher yields. Prices declined by 76 cents per cwt in 2004, while the average yield rose to 2,268 pounds per acre, up 17 percent from 1,946 pounds in 2003.[4] In comparison, yields averaged 2,203 pounds per acre for 1999 through 2003. North Carolina and Virginia tobacco yields returned to normal levels in 2004. In 2003, lower yields resulted from abundant rain that limited the tobacco plant's ability to form a root system and washed fertilizer away from the plant's smaller-than-usual roots.[5] The share of the flue-cured tobacco crop marketed under the auction system rose to 26 percent in 2004, compared with 19 percent in 2003. Prices at auction averaged $1.80 per pound in 2004, while contract tobacco averaged $1.86 per pound.

Total cash expenses rose 11 percent from 2003 to an estimated $2,898 per acre in 2004, while total economic costs rose 15 percent to $4,997 per acre. Direct energy costs (curing fuel and fuel and electricity) made up 14 percent

Figure 2
Flue-cured tobacco: Estimated costs of production per acre, 2004



Note: Other variable costs include cash costs for seed and plant beds, custom operations, repairs, marketing, and other items, as well as operating capital costs. Overhead costs include costs for general farm overhead, taxes and insurance, capital replacement, and other nonland capital. Land and quota costs are the opportunity and rental costs for land and quota.
Source: ERS cost of production accounts.

[3]The survey for flue-cured tobacco is available on the ERS web site at http://www.ers.usda.gov/Data/ARMS/app/CostDocumentation.aspx

[4]Yields are the weighted average yield of flue-cured tobacco in Virginia, North Carolina, South Carolina, and Georgia. Production in these States accounted for at least 97.5 percent of the commodity in each of the last 10 years.

[5]Bateman, Ken. *The 2003 Tobacco Growing Season*. North Carolina State University and Agricultural and Technical State University Cooperative Extension Service, December 2004.

of total costs per acre in 2004, while labor costs accounted for 21 percent and land and quota costs for 31 percent (fig. 2). Increases in cash expenses were due to higher estimates for energy prices, agricultural labor wage rates, and marketing costs per acre. Increases in the quota rental rates contributed to the boost in economic costs of flue-cured tobacco production in 2004. Rising fuel prices boosted the 2004 costs for energy-related production items like fertilizers, and fuel costs for farm machinery and curing. Agricultural wage rates rose nearly 4 percent in 2004, with the greatest percentage increase in South Carolina and the smallest in Virginia. A 7-percent decline in the effective flue-cured tobacco quota in 2004 boosted quota rental rates by an estimated 9 percent. Yield increases also boosted the per acre costs of land and quota. Our estimates for marketing expenses per acre increased due to increases in yield and the no-net-cost assessment rate (from 2½ cents per pound in 2003 to 5 cents in 2004), as well as to the increased share of tobacco sold at auction, which boosted warehouse fees paid by producers.[6]

[6]Warehouse fees were paid by producers who sold their tobacco through auction to cover the cost of handling tobacco at the warehouse.

Table 2—U.S. flue-cured tobacco, estimated costs and returns, 2003-2004

Item	2003	2004	2003	2004
	Dollars per acre		*Dollars per cwt*	
Gross value of production	3,600.10	4,173.12	185.16	184.4
Cash expenses:				
Seed and plant bed	74.60	76.54	3.83	3.37
Fertilizer	302.44	338.22	15.54	14.91
Chemicals	218.39	216.59	11.22	9.55
Custom operations	8.05	8.12	0.41	0.36
Fuel, lube, and electricity	89.68	104.41	4.61	4.60
Curing fuel	476.94	607.08	24.51	26.77
Repairs	124.62	127.41	6.4	5.62
Hired labor	699.63	726.63	35.95	32.04
Marketing expenses	83.96	162.64	4.31	7.17
Other variable cash expenses	4.26	4.53	0.22	0.20
Total, variable cash expenses	2,082.57	2,372.17	107	104.59
General farm overhead	204.65	209.23	10.52	9.23
Taxes and insurance	152.02	153.76	7.81	6.78
Interest[1]	161.60	163.18	8.30	7.19
Total, fixed cash expenses	518.27	526.17	26.63	23.20
Total, cash expenses	2,600.84	2,898.34	133.63	127.79
Gross value of prod. less cash expenses	999.26	1,274.78	51.53	56.61
Economic (full ownership) costs:				
Variable cash expenses	2,082.57	2,372.17	107.0	104.59
General farm overhead	204.65	209.23	10.52	9.23
Taxes and insurance	152.02	153.76	7.81	6.78
Capital replacement[2]	324.49	335.44	16.67	14.79
Operating capital[3]	10.62	16.37	0.55	0.72
Other nonland capital[4]	68.95	65.69	3.54	2.90
Land and quota[5]	1,227.67	1,549.22	63.09	68.31
Unpaid labor	283.87	294.83	14.59	13.00
Total, economic costs	4,354.84	4,996.71	223.77	220.32
Residual returns to management and risk	-754.74	-823.59	-38.61	-35.92
Price (dollars/lb and dollars/cwt)	1.85	1.84	185.16	184.40
Yield (lbs/acre and cwt/acre)	1,946	2,268	19.46	22.68

[1]Actual interest paid by the farm enterprise. Includes interest paid on loans secured by farm real estate and interest paid on the portion of farm machinery loans allocated to tobacco production, as well as interest paid on loans to cover operating costs for items such as fertilizers, chemicals, and fuel. Interest is not listed under economic costs because interest paid on operating loans would be part of the operating cost, while interest paid on farm machinery loans would be included in other nonland capital. Interest paid on farm mortgages or loans would be included in the land and quota costs.

[2]Capital replacement is the value of machinery, equipment, and buildings consumed annually in tobacco production.

[3]Costs of operating capital are the opportunity costs for inputs invested in production, such as fertilizers, chemicals, and fuel.

[4]Other nonland capital costs are the opportunity costs for using machinery.

[5]Land and quota costs are the opportunity and rental costs of land and quota.

Source: Estimates were developed from the 1996 Agricultural Resource Management Survey and updated with current price indices, yields, interest rates, prices, and other data (see appendix, "Data and Methods").

The Future

The termination of tobacco programs and quotas will influence tobacco production as producers make adjustments over several years. Production is expected to shift to the regions with consistently high yields and low production costs per acres where tobacco can be produced most profitably. If production consolidates, as we expect it to, fewer producers will raise tobacco, and those that remain are likely to farm more tobacco acreage to take advantage of economies of scale. As tobacco acreage per farm increases, producers may be able to invest in new production techniques or machinery to improve profitability. Producers most likely to opt out of tobacco farming are those with the least profitable tobacco enterprises and those who need to make capital expenditures to remain competitive, but who do not expect to continue tobacco farming for long enough to recoup their investments.

Appendix: Data and Methods

Most data used to compute enterprise costs and returns are derived from the 1996 Agricultural Resource Management Survey (ARMS) and from the 1995 Farm Costs and Returns Survey (FCRS). Multiple versions of the ARMS survey are conducted each year.[7] Data on commodities are collected on a rotating basis. Agricultural enterprises included in the survey program are corn, soybeans, wheat, cotton, grain sorghum, rice, peanuts, oats, barley, sugar beets, burley tobacco, flue-cured tobacco, dairy, hogs, and cow-calf.

Data from the 1995 FCRS provided the basis for the burley tobacco cost-of-production estimates, since that was the last survey to collect burley tobacco production and cost information. The information was collected from personal interviews with 131 Kentucky farmers and 104 Tennessee farmers. The 1996 tobacco version of the ARMS collected data on the cost of production for flue-cured tobacco from 316 flue-cured tobacco producers in Virginia, North Carolina, South Carolina, and Georgia.

Cost-of-production estimates after the survey year are often computed by adjusting survey year estimates by an index of current-year to survey-year input prices and, in some cases, adjusting for yield changes. This procedure holds production input and technology levels constant for post-survey years. Hence, cost-of-production estimates are generally most accurate for the survey year, since these estimates reflect the actual level of technology and the sizes of farm enterprises at that time. The accuracy of the cost estimates for post-survey years depends on the extent of changes in production practices, enterprise size, and technology since the last survey.

Whenever possible, data were incorporated in the annual updates of production costs to reflect changes since the 1995 and 1996 surveys.[8] Significant changes included quota reductions, a shift from marketing tobacco through auctions to the use of marketing contracts, use of heat exchangers for flue-cured tobacco, and increased use of larger tobacco bales. In 2004, the effective quota for burley tobacco had dropped 43 percent since the 1995 survey was conducted, while flue-cured tobacco quota had dropped 47 percent since 1996. Marketing contracts accounted for 77 percent of burley tobacco and 74 percent of flue-cured tobacco sales in the United States in 2004, compared with close to zero percent in 1995 and 1996.

Data for computing the annual updates for tobacco came from a variety of sources, mostly from the National Agricultural Statistics Service (NASS) of USDA. NASS reports annual and sometimes monthly estimates of quantities and prices for a variety of farm input items. NASS also provided State-level figures for harvested tobacco acreage, yields, and production, as well as information on the average cash rents for farmland. USDA's Agricultural Marketing Service provided data for updating marketing costs, tobacco prices, and shares of contract and auctioned tobacco. The estimate of the quota rental rate was based on the historical relationships between quota cash rents and the effective quota for burley tobacco. This historical relationship was applied to the effective quota in the current year to estimate quota rent. The influence of buyout speculation and phase II payments was embedded in the relationship between quota levels and quota rents.

[7]For more information on ARMS, please visit the ARMS briefing room, http://www.ers.usda.gov/briefing/ARMS/.

[8]For further information, see *Tobacco 2001 Production Costs and Returns and Recent Changes That Influence Costs*, E-Outlook Report, TBS-2002-01, Economic Research Service, USDA, February 2003. http://www.ers.usda.gov/Publications/tbs/feb03/tbs200201/