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Flue-Cured Tobacco Production Costs

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FLUE-CURED TOBACCO PRODUCTION COSTS. By Verner N. Grise, National Economics Division, Economic Research Service; U.S. Department of Agriculture. ERS-667.

ABSTRACT

Excluding land and quota costs, it cost $1,612 per acre, or $85 per 100 pounds, to produce flue-cured tobacco in 1979. Including land and quota pushed total costs to $2,300 per acre or $121 per 100 pounds when land and quota values were based on average net share rent paid. Production costs, excluding land and quota, were highest in the Piedmont region of North Carolina and Virginia. Costs were also higher on farms with small acreages of tobacco than on larger farms that used more mechanized harvest systems. This study examines national and regional costs on farms with various acreages of tobacco, and costs under different methods of harvesting tobacco.

Keywords: Flue-cured tobacco, production costs, tobacco acreage, tobacco harvesting system.

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PREFACE

The U.S. Department of Agriculture (USDA) conducts a comprehensive program of research on annual production costs for major U.S. crop and livestock commodities through the National Economics Division (NED) of the Economic Research Service (ERS).

Data for the cost of production estimates come from a variety of sources, the primary being enumerative farm surveys conducted for the various commodities on a rotating basis. The assembled data and information are processed through NED's Firm Enterprise Data System (FEDS) which produces cost budgets for individual commodities. For nonsurvey years, costs are updated using various secondary data. Land grant university personnel contribute to the effort and sometimes review enterprise budgets before they are published. A 1979 survey of 1,033 flue-cured tobacco farmers provided data for estimates of flue-cured tobacco production costs in that year, which provides a benchmark for cost updates in succeeding years.

ACKNOWLEDGMENTS

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Note: This report was prepared by the Economic Research Service, formerly part of the Economics and Statistics Service, U.S. Department of Agriculture.

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SUMMARY

The average cost of producing flue-cured tobacco, excluding land and quota, was estimated at $1,612 per acre or $85 per 100 pounds in 1979. The cost was $2,300 per acre and $121 per 100 pounds when land and quota values were included, based on average net share rent paid. Costs were slightly lower with land and quota values based on net cash rent paid. This study examines national average flue-cured tobacco production costs and costs in four regions of North Carolina, Virginia, South Carolina, and Georgia.

The Coastal Plain of North Carolina had the lowest production costs per acre, excluding land and quota, and the Piedmont of North Carolina and Virginia had the highest cost per acre and per 100 pounds. This is because Coastal Plain farms are larger, and greater adoption of mechancial harvesters and bulk barns has occurred on these farms than in the Piedmont. The Pee Dee-Lumber River had the lowest costs per 100 pounds, excluding land and quota. This is because much mechanization has occurred in the Pee Dee-Lumber River and yields are higher. When land and quota costs are added, the Piedmont became the lowest cost region per acre, but the Coastal Plain had the lowest costs per 100 pounds of tobacco produced.

Production costs are higher on farms with smaller tobacco acreages. Variable costs of producing 100 pounds of flue-cured tobacco on farms growing 35 acres of tobacco or more were only 68 percent of those growing 9 acres of tobacco or less in the four regions. Labor costs were only half as much on farms growing larger acreages.

Production costs varied depending on how the tobacco was harvested. The more traditional labor intensive harvest systems were the most costly. More mechanized tobacco harvest systems reduced production costs on farms with sufficient acreage to justify investment in these systems. The trend to more mechanized tobacco harvest systems is expected to continue.

Flue-Cured Tobacco Production Costs

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INTRODUCTION

Information about flue-cured tobacco production costs is essential for evaluating Government tobacco programs and policies, determining the competitive position of flue-cured tobacco farmers, providing farmers with a basis of cost comparisons for their own operations, and comparing the costs of producing different crops.

Flue-cured tobacco price supports are currently based on changes in the parity index, a measure of prices paid by farmers for commodities and services including interest, taxes, and farm wage rates. An alternative method of establishing support prices that has been proposed by some policymakers is to base price supports on costs of production. This report gives the total cost of producing tobacco in the United States and the costs of specific input items.

Flue-cured tobacco production is currently constrained by acreage allotments and poundage quotas. Tobacco quotas assigned to a county cannot be grown outside that county. In recent years, a number of bills have been introduced in Congress to allow quota to be moved from one county to another within States or to eliminate quotas as a requirement for tobacco production altogether. This report shows production costs by region and acreage of tobacco grown. With greater flexibility in movement of quotas or under "free market" conditions, production would tend to shift to lower cost farms and regions.

Production costs vary widely from farm to farm. Information in this report shows averages for various cost items. Farmers can compare their costs for these items to determine where they might achieve greater efficiencies. Together with cost estimates published by the U.S. Department of Agriculture (USDA) for other commodities, farmers can compare production costs of different enterprises.

This report is a benchmark for updating production costs from one year to another. Information on changes in tobacco costs will be useful to tobacco buyers, policymakers, and farmers in their decisions.

THE STUDY AREA

The study area includes the entire flue-cured tobacco belt. Four regions in four southeastern States were chosen for more detailed study (see figure). These subregions produce about three-fourths of the flue-cured tobacco in the United States.

Pee Dee-Lumber River, North Carolina and South Carolina--Census Subregion 16

Cotton had traditionally been grown in the Pee Dee and Lumber River area but tobacco has become the leading cash crop. The area is located in the drainage basin of the lower Pee Dee River and its tributary, the Lumber River. Most of the subregion lies in the Coastal Plain, but a few tobacco producing counties of the North Carolina Sand Hills are also included. Farmland is interspersed with large acreages of swamp or other poorly drained land. In the Sand Hills portion, much of the land is suitable only for forestry or nonagricultural uses. An average of 13.2 acres of tobacco was produced per farm in region 16 in 1979.

Coastal Plain, North Carolina--Census Subregion 17

The Coastal Plain of North Carolina is the most concentrated area of flue-cured tobacco production in the United States. It has ideal soil and climatic conditions. The sandy-clay subsoils warm early and can be readily worked. Commercial cultivation of tobacco did not begin in most of the subregion until the 1890's. Once established, tobacco supplanted cotton as a principal source of farm income, and now accounts for a large percentage of farm sales. An average of 18.8 acres of tobacco was produced per farm in this region in 1979.

Flue-cured tobacco production regions

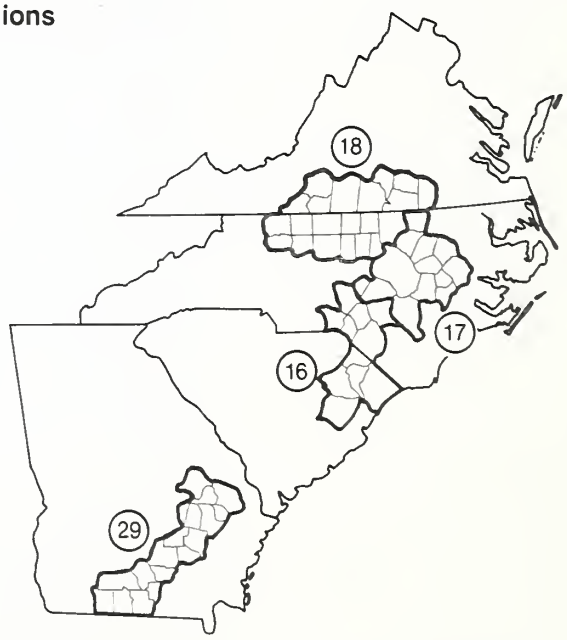
(16) Pee Dee-Lumber River, North Carolina-South Carolina

(17) Coastal Plain, North Carolina

(18) Piedmont, Virginia-North Carolina

(29) Georgia

Numbers refer to designated census of agriculture subregions



Piedmont of North Carolina and Virginia--Census Subregion 18

The Piedmont of North Carolina and Virginia is the Nation's oldest flue-cured tobacco growing region, and the second most important producer of tobacco leaf, as well as the center of the cigarette manufacturing industry. Tobacco is grown mostly on light-textured soils of fine sand loam. The fields are often small and irregularly shaped. Usually, they lie on hilly ground because the terrain of the Piedmont varies from undulating to hilly, with mountainous regions in the west. Half the farmland remains in woods, most of which are unpastured. An average of 10.8 acres of tobacco was produced per farm in region 18 in 1979.

Georgia--Census Subregion 29

The Georgia subregion located in the Southern Coastal Plain was traditionally a cotton area. Today's major crops are tobacco (introduced in the twenties), soybeans, and peanuts. This predominantly rural subregion is a diversified farming area. Many farms have livestock, and much of the land is in forests for pulpwood. An average of 11.5 acres of tobacco was produced per farm in region 29 in 1979.

METHODOLOGY AND PROCEDURES

The survey population consisted of all farm units growing flue-cured tobacco in the United States in 1979. Four concentrated areas of production were delineated to include counties that were relatively homogeneous in terms of topography, crops, and cropping practices. These four concentrated production regions produce three-fourths of the U.S. tobacco and were surveyed more heavily than other regions. The larger sample in the concentrated regions permitted estimation of costs by farm size and harvest method.

Survey respondents were asked for information on land use and rental arrangements; expenditures for items such as chemicals and plant bed materials; fertilizer use; field operations and practices; power and equipment inventory, including size and age; family, exchange, and hired labor used; and wages paid hired workers.

This information provided the basis for production cost budgets for flue-cured tobacco. The budgets report variable costs, machinery and barn ownership costs, and general farm overhead costs. Variable costs include expenditures for labor, fertilizer, chemicals, fuel and lubricants, repairs, tobacco curing fuel, plant bed materials, interest, and miscellaneous items. Ownership costs include charges for replacement, interest, insurance, and taxes on machinery (including trucks) and barns. General farm overhead includes costs for recordkeeping, utilities, general farm maintenance,

and similar items that are difficult to associate with a specific enterprise.

The budgets also report two additional cost components, management and quota, together with land. The management charge is related to the quantity of resources used in producing the crop and is computed as 10 percent of the estimated variable, machinery and barn ownership, and general farm overhead costs.

Land and quota charges are combined and estimated by two methods. Share rent is estimated using the average share rent less the landlord`s share of costs for labor, fertilizer, chemicals, tobacco curing, tobacco sales fee, irrigation, barn ownership costs, and other expenses as reported in the 1979 survey. Cash rent is estimated based on payments reported by respondents less estimated barn ownership costs. The estimated annual barn ownership costs are subtracted from the cash rent payment to preclude double-counting. Cash rent payments reported by farmers included a payment for barns, but these costs have been calculated elsewhere in the budgets.

Tobacco yields are based on the per acre averages reported in the 1979 survey. It is assumed that all acres planted to tobacco are subsequently harvested.

Sixty-two budgets were developed to reflect cost differences by region, size of tobacco acreage, and harvest system (harvest technology). These budgets can be weighted on the basis of the production they represent to obtain national, regional, and average cost estimates for different acreage levels of tobacco.

Variable Costs

The hired labor input charge is straightforward. It is more difficult to establish a cost for services of unpaid family and exchange labor because there is no established price. Unpaid labor services were valued at a rate equal to wages paid hired workers in the region. This opportunity cost concept may understate the productivity and actual opportunity cost of operator and family labor in some cases, but in other cases it is unlikely that all family labor would have alternative employment opportunities.

Fertilizer and lime use estimates were obtained in the 1979 survey. Fertilizer and lime prices were obtained from Agricultural Prices, published by USDA.

Plant bed materials include the cost of seed, fertilizer, chemicals, and canvas used on the tobacco plant bed. The cost also includes the prevailing custom charge for fumigating

plant beds. The custom charge for fumigation includes the fumigant and plastic cover.

The costs of chemicals such as herbicides, nematicides, and insecticides were obtained in the 1979 survey. Cost of sucker control chemicals were also obtained in the survey and are reported separately.

The types and sizes of tractors and equipment were obtained in the survey of farmers. The number of times each field operation was performed was also obtained in this survey.

Fuel consumption estimates were based on reports published by the Nebraska Tractor Testing Laboratory. Fuel prices were determined by region (table 1). Lubrication costs were estimated at 15 percent of fuel costs.

Estimates of fuel used or fuel expenditures were obtained from survey respondents for liquid fuels (liquefied petroleum or LP gas, fuel oil, diesel) and for electricity. When quantity of use was reported, Agricultural Prices estimates (table 1) were used to calculate total costs.

Table 1--Prices of various fuel used on flue-cured tobacco farms, by region, 1979

Type of fuel	Region			
	Pee Dee-Lumber River, N.C.-S.C. 16	Coastal Plain, N.C. 17	Piedmont, N.C.-Va. 18	Georgia, Ga. 29
	Dollars/gallon			
Gasoline[1/]	0.684	0.690	0.688	0.695
Diesel[1/]	.720	.730	.710	.750
L.P. gas	.467	.480	.477	.450
Fuel oil	.52	.52	.52	.52
	Dollars/kWh			
Electricity	.043	.044	.044	.045

[1]Net of refundable State and excise taxes.

Repair costs vary over the life of a tractor or piece of equipment. The formulas to obtain repair costs were taken from Bowers (1). 1/ An alternative approach would have been to obtain the actual repair costs for each farmer. This approach was deemed impractical for equipment for which reliable engineering formulas are available. But formulas have not been developed to reflect repair costs associated with flue-cured tobacco harvest equipment and barns. These costs were based on information obtained from farmers in the 1979 survey.

Marketing costs (fees for selling the tobacco) vary depending on the warehouse in which the tobacco is sold. A charge of 3 percent of gross sales was used.

Other costs include sticks, twine, burlap sheets, cover crop seed, and tobacco crop insurance.

Interest on operating expenses was taken at the prevailing rate charged by production credit associations in the district in 1979. The interest charge was applied to the approximate amount of time the money was borrowed. Interest was charged on all operating expenses.

Machinery and Barn Ownership

Alternative methods can be used to estimate the decline in value of farm power, equipment, and barns because of use and/or age. The generally accepted procedure for tax purposes is to charge depreciation for the taxable year based on the price paid for the equipment. The procedure adopted for this study was to calculate a replacement charge based on the current cost of a piece of equipment or barn. The replacement cost concept represents the annual contribution needed to maintain a reserve to purchase new equipment when existing equipment must be replaced.

General Farm Overhead

Many farms that grow flue-cured tobacco also produce other crops and livestock, making it necessary to allocate overhead costs between flue-cured tobacco and other crops and livestock. The method chosen was to allocate general farm overhead costs not specifically related to flue-cured tobacco based on flue-cured's proportionate share of the total value of farm sales. Survey data was not collected on overhead costs on flue-cured tobacco farms in 1979. Data from university flue-cured tobacco budgets, a 1976 survey of burley

1/ Underscored numbers in parentheses refer to items in the References.

tobacco farmers, and USDA's production expenditure survey were used as a basis for deriving general farm overhead cost estimates.

Management

Determining management costs poses a difficult problem because the farm management function is usually rewarded by profit. It is not usually separated in farm management budgets and there are no fee schedules on which to base charges. The management charge was computed as 10 percent of the variable, machinery and barn ownership, and general farm overhead costs. Justification for use of this procedure is detailed in (3).

Land and Tobacco Quota

Calculation of land costs for farm commodities always raises conceptual problems. For flue-cured tobacco, the problems are even greater because quota production rights combined with support prices are capitalized into land prices. Even though flue-cured tobacco quotas can be leased within county lines, the basic value of quota lies within the lessor's land.

For purposes of this study, the charge for land and tobacco quota is calculated for the net share rent and net cash rent approaches. Net share rent is the residual after landlord payments for fertilizer, chemicals, and other inputs, together with barn ownership costs, are subtracted from the value of the landlord's share of the crop under prevailing share-rent arrangements. Cash rental payments were obtained directly in the 1979 farm survey and adjusted to exclude that part of the payment for the barn. It is assumed that cash rent includes payment for land, quota, and barns.

NATIONAL RESULTS

A major objective of this study was to establish a national estimate of the weighted average cost of producing flue-cured tobacco in 1979. Another objective was to provide a consistent and easily accessible data base that can be used to update the costs for future years.

Excluding land and quota, the average cost of producing U.S. flue-cured tobacco was $1,612 per acre, or $85 per 100 pounds of tobacco produced in 1979 (tables 2 and 3). With land and quota costs included, U.S. costs averaged almost $2,300 per acre with land and quota valued on the basis of net share rent paid, and $2,236 per acre with land and quota valued on a net cash rent basis. Average costs per 100 pounds, including land and quota, were $121 and $118, respectively.

Labor costs made up 32 percent of total nonland and nonquota costs. Machinery and barn ownership and curing and

electricity costs accounted for 17 and 12 percent of total nonland and nonquota costs, respectively.

Variable costs accounted for 72 percent of total costs, excluding land and quota, with labor accounting for 45 percent, and curing fuel and electricity another 16 percent.

REGIONAL RESULTS

Production costs vary by region because of differences in tobacco grown per farm, methods used to harvest tobacco, and yields. The Coastal Plain of North Carolina had the lowest production costs per acre (excluding land and quota), while the Piedmont of North Carolina and Virginia had the highest (tables 2 and 3). The Pee Dee-Lumber River had the lowest costs and the Piedmont the highest costs per 100 pounds, excluding land and quota. Tobacco acreage per farm is largest and greater adoption of mechanical harvesters and bulk barns has occurred on Coastal Plain farms than in the Piedmont (2). Much mechanization has occurred in the Pee Dee-Lumber River and yields are higher. Georgia costs, excluding land and quota, are lower than the Piedmont per acre and per 100 pounds but are higher than the Coastal Plain and the Pee Dee-Lumber River.

Labor costs were over 40 percent higher in the Piedmont than in the other three regions. However, 39 percent of the labor used to harvest tobacco in the Piedmont was performed by family and exchange workers (2). In the other regions, only 18 to 20 percent of the harvest work was performed by family and exchange workers (2). Consequently, out-of-pocket costs for labor in the four regions are similar.

Machinery and barn ownership costs are lowest in the Piedmont where less mechanization has occurred. General farm overhead and management costs are estimated to be higher in the Piedmont because a larger proportion of total farm income is derived from tobacco and more resources are used per pound of tobacco.

The Piedmont of North Carolina and Virginia is the highest cost production region per acre and per 100 pounds when land and quota costs are excluded. When land and quota costs are included, the Piedmont is the lowest cost region per acre, but costs per 100 pounds (including land and quota charges based on the net cash rent approach) are lower in the Coastal Plain and the Pee Dee-Lumber River. Lease and rental costs are lower in the Piedmont because the topography of the region limits the size of the tobacco acreage and the adaptability of mechanical harvesters. Also, off-farm employment opportunities are greater in the Piedmont than in other regions, which may reduce the demand for tobacco quota.

Table 2--Production costs per acre for various items on flue-cured tobacco farms, by region, 1979

Cost item	Region				
	Pee Dee-Lumber River, N.C.-S.C. 16	Coastal Plain, N.C. 17	Piedmont, N.C.-Va. 18	Georgia, Ga. 29	U.S. average 1/
			Dollars/acre		
Variable	1,143.48	1,097.62	1,264.01	1,202.61	1,160.35
Labor 2/	475.96	476.29	678.22	476.53	522.15
Plant bed materials 3/	36.98	34.00	36.05	41.93	36.56
Fertilizer and lime	68.91	69.29	62.86	77.49	70.93
Pesticides 4/	76.12	65.15	45.43	97.85	69.16
Sucker control	28.96	33.01	24.79	32.74	29.98
Fuel and lubrication 5/	47.58	44.48	46.57	55.74	44.84
Curing fuel and electricity 6/	193.84	179.06	166.05	205.51	186.32
Repairs 7/	58.93	55.10	50.79	67.68	53.08
Marketing fee	84.90	78.92	74.70	82.07	79.38
Other 8/	57.81	49.27	63.42	51.29	53.99
Interest	13.49	13.05	15.13	13.78	13.92
Machinery and barn ownership	283.93	282.11	250.01	307.62	274.41
Replacement	153.01	156.19	130.85	168.85	149.37
Interest	103.74	100.84	94.79	110.33	99.54
Taxes and insurance	27.18	26.18	24.37	28.44	25.83
General farm overhead	28.59	29.63	36.32	20.58	30.56
Management 9/	145.60	141.06	155.03	152.87	146.55
Total, excluding land and quota	1,601.60	1,550.42	1,705.37	1,683.67	1,611.83
Land and quota allocation:					
Share-rent 10/	994.06	644.05	440.25	788.99	683.97
Cash-rent 11/	823.78	655.12	471.05	745.81	624.46
			Pounds		
Yield per acre	2,020	1,878	1,779	1,954	1,890

[1]Includes all U.S. flue-cured tobacco. [2]Includes operator, family, exchange, and hired labor valued at prevailing hired wage rates. [3]Includes plant bed seed, fertilizer, pesticides, and custom fumigation. [4]Includes insecticides, herbicides, and fungicides. [5]Includes tractor and machinery fuel and lubrication. [6]Includes cost of LP gas, fuel oil, or diesel and electricity used to cure tobacco. [7]Includes machinery, equipment, and barn repairs. [8]Includes sticks, twine, sheets, cover crop seed, and tobacco crop insurance. [9]Based on 10 percent of above costs. [10]Based on net share rent approach. [11]Based on net cash rent approach.

Table 3--Production costs per 100 pounds for various items on flue-cured tobacco farms, by region, 1979

Cost item	Region				
	Lumber River, N.C.-S.C. 16	Coastal Plain, N.C. 17	Piedmont, N.C.-Va. 18	Georgia, Ga. 29	U.S. average 1/
	Dollars/100 pounds				
Variable	56.61	58.43	71.03	61.56	61.40
Labor 2/	23.56	25.36	38.12	24.39	27.63
Plant bed materials 3/	1.83	1.81	2.03	2.15	1.93
Fertilizer and lime	3.41	3.69	3.53	3.97	3.75
Pesticides 4/	3.77	3.47	2.55	5.01	3.66
Sucker control	1.43	1.76	1.39	1.68	1.59
Fuel and lubrication 5/	2.36	2.37	2.62	2.85	2.37
Curing fuel and electricity 6/	9.60	9.53	9.33	10.52	9.86
Repairs 7/	2.92	2.93	2.85	3.46	2.81
Marketing fee	4.20	4.20	4.20	4.20	4.20
Other 8/	2.86	2.62	3.56	2.62	2.86
Interest	.67	.69	.85	.71	.74
Machinery and barn ownership	14.06	15.02	14.06	15.75	14.52
Replacement	7.57	8.32	7.36	8.64	7.90
Interest	5.14	5.37	5.33	5.65	5.27
Taxes and insurance	1.35	1.39	1.37	1.46	1.37
General farm overhead	1.42	1.58	2.04	1.05	1.62
Management 9/	7.21	7.51	8.71	7.82	7.75
Total, excluding land and quota	79.30	82.54	95.84	86.18	85.29
Land and quota allocation:					
Share-rent 10/	49.21	34.29	24.75	40.38	36.19
Cash-rent 11/	40.78	34.88	26.48	38.17	33.04
			Pounds		
Yield per acre	2,020	1,878	1,779	1,954	1,890

[1]Includes all U.S. flue-cured tobacco. [2]Includes operator, family, exchange, and hired labor valued at prevailing hired wage rates. [3]Includes plant bed seed, fertilizer, pesticides, and custom fumigation. [4]Includes insecticides, herbicides, and fungicides. [5]Includes tractor and machinery fuel and lubrication. [6]Includes cost of LP gas, fuel oil, or diesel and electricity used to cure tobacco. [7]Includes machinery, equipment, and barn repairs. [8]Includes sticks, twine, sheets, cover crop seed, and tobacco crop insurance. [9]Based on 10 percent of above costs. [10]Based on net share rent approach. [11]Based on net cash rent approach.

TOBACCO ACREAGE RESULTS

Production costs of growing flue-cured tobacco vary by the amount of tobacco grown. This is because it is not feasible to mechanize jobs (particularly harvest jobs) on farms with small tobacco acreages to the extent that they are mechanized on farms with larger tobacco acreages. A larger proportion of family labor can be used on smaller farms. This labor may have little opportunity cost on some farms, which results in higher labor use than might otherwise occur.

Four groupings of farms by acreage of tobacco produced were studied: (1) farms with less than 9 acres of tobacco, (2) those with 9 to 19.9 acres of tobacco, (3) those with 20 to 34.9 acres of tobacco, and (4) those with 35 acres of tobacco or more.

Variable costs of producing 100 pounds of flue-cured tobacco on farms growing 35 acres of tobacco or more were only 68 percent of variable costs per 100 pounds on farms growing 9 acres of tobacco or less (tables 4-11). Labor costs per 100 pounds on farms with the largest tobacco acreages were less than half those on the smallest acreages. Fuel and electricity curing costs per 100 pounds were lower on the largest farms. Pesticide costs per 100 pounds were higher.

As expected, machinery and barn ownership costs were lower on the smaller farms (tables 4-11). This results from less mechanizaton and less expensive conventional barns being used on the smaller farms.

The total costs of producing flue-cured tobacco per 100 pounds with 35 acres of tobacco or more was about 80 percent that of farms with 9 acres of tobacco or less (tables 4-11). Total costs on farms growing 20 to 34.9 acres of tobacco were only slightly higher than on farms with 35 acres of tobacco or more. Farms with 9 to 19.9 acres produced tobacco at a somewhat higher cost than those with 20 acres of tobacco or more, but at considerably lower cost than those with less than 9 acres of tobacco. Yields were higher on farms with larger tobacco acreages, perhaps reflecting better resource management.

Land and quota costs were about the same for all farms regardless of the amount of tobacco grown. These costs vary from county to county because of inter-county leasing constraints, but vary little within counties.

HARVEST SYSTEM RESULTS

Budgets were first developed for different harvest systems (alternative ways of harvesting and curing tobacco) on four tobacco acreage groups. The harvest systems for which cost

Table 4--Production costs per acre for various items on farms with less than 9 acres of flue-cured tobacco, by region, 1979

Cost item	Region				
	Pee Dee-Lumber River, N.C.-S.C. 16	Coastal Plain, N.C. 17	Piedmont, N.C.-Va. 18	Georgia, Ga. 29	Average, four regions
			Dollars/acre		
Variable	1,325.86	1,399.32	1,450.16	1,394.61	1,408.49
Labor[1]	684.96	751.16	846.77	666.34	773.79
Plant bed materials[2]	38.88	34.70	42.29	36.55	39.34
Fertilizer and lime	62.35	66.01	60.64	67.33	62.88
Pesticides[3]	58.76	37.79	35.55	96.24	47.59
Sucker control	23.54	30.27	19.78	26.89	23.58
Fuel and lubrication[4]	49.84	49.51	46.62	53.46	48.66
Curing fuel and electricity[5]	171.93	193.85	168.72	217.80	180.35
Repairs[6]	65.57	65.10	64.42	77.78	66.33
Marketing fee	76.86	78.54	70.53	74.37	73.92
Other[7]	78.00	78.00	78.00	63.00	76.28
Interest	15.17	14.39	16.84	14.85	15.77
Machinery and barn ownership	220.48	216.17	215.17	251.10	220.57
Replacement	110.81	109.47	106.79	132.46	111.11
Interest	86.58	84.44	85.79	94.11	86.62
Taxes and insurance	23.09	22.26	22.59	24.53	22.84
General farm overhead	30.00	29.20	38.80	16.80	32.49
Management[8]	157.63	164.47	170.41	166.25	166.14
Total, excluding land and quota	1,733.97	1,809.16	1,874.54	1,828.76	1,827.69
Land and quota allocation:					
Share-rent[9]	825.99	719.62	436.54	707.56	604.73
Cash-rent[10]	785.96	730.36	477.65	698.53	617.61
			Pounds		
Yield per acre	1,830	1,870	1,679	1,771	1,760

[1]Includes operator, family, exchange, and hired labor valued at prevailing hired wage rates. [2]Includes plant bed seed, fertilizer, pesticides, and custom fumigation. [3]Includes insecticides, herbicides, and fungicides. [4]Includes tractor and machinery fuel and lubrication. [5]Includes cost of LP gas, fuel oil, or diesel and electricity used to cure tobacco. [6]Includes machinery, equipment, and barn repairs. [7]Includes sticks, twine, sheets, cover crop seed, and tobacco crop insurance. [8]Based on 10 percent of above costs. [9]Based on net share rent approach. [10]Based on net cash rent approach.

Table 5--Production costs per 100 pounds for various items on farms with less than 9 acres of flue-cured tobacco, 1979

Cost item	Region				
	Pee Dee-Lumber River, N.C.-S.C. 16	Coastal Plain, N.C. 17	Piedmont, N.C.-Va. 18	Georgia, Ga. 29	Average, four regions
	Dollars/100 pounds				
Variable	72.45	74.84	86.38	78.74	80.03
Labor[1]	37.43	40.17	50.43	37.62	43.97
Plant bed materials[2]	2.12	1.86	2.52	2.06	2.24
Fertilizer and lime	3.41	3.53	3.61	3.80	3.57
Pesticides[3]	3.21	2.02	2.12	5.43	2.70
Sucker control	1.29	1.62	1.18	1.52	1.34
Fuel and lubrication[4]	2.72	2.65	2.78	3.02	2.76
Curing fuel and electricity[5]	9.40	10.37	10.05	12.30	10.25
Repairs[6]	3.58	3.48	3.84	4.39	3.77
Marketing fee	4.20	4.20	4.20	4.20	4.20
Other[7]	4.26	4.17	4.65	3.56	4.33
Interest	.83	.77	1.00	0.84	0.90
Machinery and barn ownership	12.05	11.56	12.82	14.18	12.53
Replacement	6.06	5.85	6.36	7.48	6.31
Interest	4.73	4.52	5.11	5.31	4.92
Taxes and insurance	1.26	1.19	1.35	1.39	1.30
General farm overhead	1.64	1.56	2.31	.95	1.85
Management[8]	8.61	8.80	10.15	9.39	9.44
Total, excluding land and quota	94.75	96.75	111.66	103.26	103.85
Land and quota allocation:					
Share-rent[9]	45.14	38.48	26.00	39.95	34.36
Cash-rent[10]	42.95	39.06	28.45	39.44	35.09
			Pounds		
Yield per acre	1,830	1,870	1,679	1,771	1,760

[1]Includes operator, family, exchange, and hired labor valued at prevailing hired wage rates. [2]Includes plant bed seed, fertilizer, pesticides, and custom fumigation. [3]Includes insecticides, herbicides, and fungicides. [4]Includes tractor and machinery fuel and lubrication. [5]Includes cost of LP gas, fuel oil, or diesel and electricity used to cure tobacco. [6]Includes machinery, equipment, and barn repairs. [7]Includes sticks, twine, sheets, cover crop seed, and tobacco crop insurance. [8]Based on 10 percent of above costs. [9]Based on net share rent approach. [10]Based on net cash rent approach.

Table 6--Production costs per acre for various items on farms with 9 to 19.9 acres of flue-cured tobacco, by region, 1979

Cost item	Region				
	Pee Dee-Lumber River, N.C.-S.C. 16	Coastal Plain, N.C. 17	Piedmont, N.C.-Va. 18	Georgia, Ga. 29	Average, four regions
	Dollars/acre				
Variable	1,253.82	1,187.25	1,309.10	1,191.52	1,241.00
Labor[1]	542.34	562.25	703.76	493.76	602.26
Plant bed materials[2]	37.71	34.69	34.65	38.66	35.52
Fertilizer and lime	72.13	71.78	63.95	75.20	69.40
Pesticides[3]	74.45	61.07	45.79	93.77	60.80
Sucker control	29.89	30.59	26.10	29.83	28.85
Fuel and lubrication[4]	55.96	44.01	49.30	52.20	48.53
Curing fuel and electricity[5]	208.17	180.55	174.41	200.12	184.67
Repairs[6]	66.49	54.33	55.10	61.71	57.24
Marketing fee	86.97	79.17	74.67	82.91	79.22
Other[7]	65.11	55.17	65.75	50.00	60.04
Interest	14.60	13.64	15.62	13.36	14.47
Machinery and barn ownership	280.72	265.84	253.01	296.13	266.46
Replacement	146.56	143.51	131.47	161.68	141.40
Interest	106.08	97.02	96.66	106.85	99.25
Taxes and insurance	28.08	25.31	24.88	27.60	25.81
General farm overhead	30.40	30.80	35.60	22.40	31.68
Management[8]	156.49	148.39	159.77	150.25	153.85
Total, excluding land and quota	1,721.43	1,632.28	1,757.48	1,660.30	1,692.99
Land and quota allocation:					
Share-rent[9]	1,017.01	647.03	440.07	827.39	651.74
Cash-rent[10]	866.13	674.03	477.35	758.13	644.60
	Pounds				
Yield per acre	2,071	1,885	1,778	1,974	1,886

[1]Includes operator, family, exchange, and hired labor valued at prevailing hired wage rates. [2]Includes plant bed seed, fertilizer, pesticides, and custom fumigation. [3]Includes insecticides, herbicides, and fungicides. [4]Includes tractor and machinery fuel and lubrication. [5]Includes cost of LP gas, fuel oil, or diesel and electricity used to cure tobacco. [6]Includes machinery, equipment, and barn repairs. [7]Includes sticks, twine, sheets, cover crop seed, and tobacco crop insurance. [8]Based on 10 percent of above costs. [9]Based on net share rent approach. [10]Based on net cash rent approach.

Table 7--Production costs per 100 pounds for various items on farms with 9 to 19.9 acres of flue-cured tobacco, by region, 1979

Cost item	Region				
	Pee Dee-Lumber River, N.C.-S.C. 16	Coastal Plain, N.C. 17	Piedmont, N.C.-Va. 18	Georgia, Ga. 29	Average, four regions
	Dollars/100 pounds				
Variable	60.53	62.98	73.64	60.36	65.78
Labor[1]	26.19	29.83	39.58	25.01	31.93
Plant bed materials[2]	1.82	1.84	1.95	1.96	1.88
Fertilizer and lime	3.48	3.81	3.60	3.81	3.68
Pesticides[3]	3.59	3.24	2.58	4.75	3.22
Sucker control	1.44	1.62	1.47	1.51	1.53
Fuel and lubrication[4]	2.70	2.33	2.77	2.64	2.57
Curing fuel and electricity[5]	10.05	9.58	9.81	10.14	9.79
Repairs[6]	3.21	2.88	3.10	3.13	3.03
Marketing fee	4.20	4.20	4.20	4.20	4.20
Other[7]	3.14	2.93	3.70	2.53	3.18
Interest	.71	.72	.88	.68	.77
Machinery and barn ownership	13.55	14.10	14.23	15.00	14.13
Replacement	7.08	7.61	7.39	8.19	7.50
Interest	5.12	5.15	5.44	5.41	5.26
Taxes and insurance	1.35	1.34	1.40	1.40	1.37
General farm overhead	1.47	1.63	2.00	1.13	1.68
Management[8]	7.56	7.87	8.99	7.61	8.16
Total, excluding land and quota	83.11	86.58	98.86	84.10	89.75
Land and quota allocation:					
Share-rent[9]	49.11	34.33	24.75	41.91	34.56
Cash-rent[10]	41.82	35.76	26.85	38.41	34.18
	Pounds				
Yield per acre	2,071	1,885	1,778	1,974	1,886

[1]Includes operator, family, exchange, and hired labor valued at prevailing hired wage rates. [2]Includes plant bed seed, fertilizer, pesticides, and custom fumigation. [3]Includes insecticides, herbicides, and fungicides. [4]Includes tractor and machinery fuel and lubrication. [5]Includes cost of LP gas, fuel oil, or diesel and electricity used to cure tobacco. [6]Includes machinery, equipment, and barn repairs. [7]Includes sticks, twine, sheets, cover crop seed, and tobacco crop insurance. [8]Based on 10 percent of above costs. [9]Based on net share rent approach. [10]Based on net cash rent approach.

Table 8--Production costs per acre for various items on farms with 20 to 34.9 acres of flue-cured tobacco, by region, 1979

Cost item	Region				
	Pee Dee-Lumber River, N.C.-S.C. 16	Coastal Plain, N.C. 17	Piedmont, N.C.-Va. 18	Georgia, Ga. 29	Average, four regions
			Dollars/acre		
Variable	1,123.85	1,048.32	1,151.11	1,176.19	1,104.85
Labor[1/]	448.94	426.75	583.41	453.04	472.00
Plant bed materials[2/]	35.09	32.99	34.86	41.15	34.87
Fertilizer and lime	66.87	73.36	62.39	75.69	69.57
Pesticides[3/]	70.72	68.68	42.41	97.49	66.31
Sucker control	29.91	35.08	24.39	33.23	31.16
Fuel and lubrication[4/]	46.84	39.65	49.20	58.67	45.78
Curing fuel and electricity[5/]	215.61	182.46	158.83	197.77	186.16
Repairs[6/]	55.68	52.74	44.98	69.20	53.51
Marketing fee	83.55	80.55	79.35	84.03	81.36
Other[7/]	58.00	43.00	57.32	52.55	50.91
Interest	12.64	13.06	13.97	13.37	13.22
Machinery and barn ownership	277.24	288.72	275.08	324.25	287.07
Replacement	149.88	161.27	146.29	179.29	157.27
Interest	101.03	101.18	102.67	115.26	103.15
Taxes and insurance	26.33	26.27	26.12	29.70	26.65
General farm overhead	26.40	30.40	34.80	20.40	29.37
Management[8/]	142.75	136.74	146.10	152.08	142.13
Total, excluding land and quota	1,570.24	1,504.18	1,607.09	1,672.92	1,563.42
Land and quota allocation:					
Share-rent[9/]	916.16	639.86	466.78	817.28	682.22
Cash-rent[10/]	807.17	654.97	491.70	760.30	663.10
			Pounds		
Yield per acre	1,989	1,918	1,889	2,001	1,937

[1]Includes operator, family, exchange, and hired labor valued at prevailing hired wage rates. [2]Includes plant bed seed, fertilizer, pesticides, and custom fumigation. [3]Includes insecticides, herbicides, and fungicides. [4]Includes tractor and machinery fuel and lubrication. [5]Includes cost of LP gas, fuel oil, or diesel and electricity used to cure tobacco. [6]Includes machinery, equipment, and barn repairs. [7]Includes sticks, twine, sheets, cover crop seed, and tobacco crop insurance. [8]Based on 10 percent of above costs. [9]Based on net share rent approach. [10]Based on net cash rent approach.

Table 9--Production costs per 100 pounds for various items on farms with 20 to 34.9 acres of flue-cured tobacco, by region, 1979

Cost item	Region				
	Pee Dee-Lumber River, N.C.-S.C. 16	Coastal Plain, N.C. 17	Piedmont, N.C.-Va. 18	Georgia, Ga. 29	Average, four regions
	Dollars/100 pounds				
Variable	56.50	54.65	60.93	58.78	57.03
Labor[1]	22.57	22.25	30.88	22.64	24.37
Plant bed materials[2]	1.76	1.72	1.85	2.06	1.80
Fertilizer and lime	3.36	3.82	3.30	3.78	3.59
Pesticides[3]	3.56	3.58	2.25	4.87	3.42
Sucker control	1.50	1.83	1.29	1.66	1.61
Fuel and lubrication[4]	2.35	2.07	2.60	2.93	2.36
Curing fuel and electricity[5]	10.84	9.51	8.41	9.88	9.61
Repairs[6]	2.80	2.75	2.38	3.46	2.76
Marketing fee	4.20	4.20	4.20	4.20	4.20
Other[7]	2.92	2.24	3.03	2.63	2.63
Interest	.64	.68	.74	.67	.68
Machinery and barn ownership	13.94	15.06	14.56	16.20	14.83
Replacement	7.54	8.41	7.74	8.96	8.12
Interest	5.08	5.28	5.44	5.76	5.33
Taxes and insurance	1.32	1.37	1.38	1.48	1.38
General farm overhead	1.33	1.58	1.84	1.02	1.52
Management[8]	7.18	7.13	7.73	7.60	7.34
Total, excluding land and quota	78.95	78.42	85.06	83.60	80.72
Land and quota allocation:					
Share-rent[9]	46.06	33.36	24.71	40.84	35.22
Cash-rent[10]	40.58	34.15	26.03	38.00	34.23
			Pounds		
Yield per acre	1,989	1,918	1,889	2,001	1,937

[1]Includes operator, family, exchange, and hired labor valued at prevailing hired wage rates. [2]Includes plant bed seed, fertilizer, pesticides, and custom fumigation. [3]Includes insecticides, herbicides, and fungicides. [4]Includes tractor and machinery fuel and lubrication. [5]Includes cost of LP gas, fuel oil, or diesel and electricity used to cure tobacco. [6]Includes machinery, equipment, and barn repairs. [7]Includes sticks, twine, sheets, cover crop seed, and tobacco crop insurance. [8]Based on 10 percent of above costs. [9]Based on net share rent approach. [10]Based on net cash rent approach.

Table 10--Production costs per acre for various items on farms with 35 or more acres of flue-cured tobacco, by region, 1979

Cost item	Region				
	Pee Dee-Lumber River, N.C.-S.C. 16	Coastal Plain, N.C. 17	Piedmont, N.C.-Va. 18	Georgia, Ga. 29	Average, four regions
			Dollars/acre		
Variable	994.58	1,001.90	1,101.26	1,107.92	1,031.02
Labor[1]	352.83	388.86	546.35	352.31	414.20
Plant bed materials[2]	37.10	33.98	32.66	49.81	35.53
Fertilizer and lime	71.21	65.68	63.91	88.88	68.18
Pesticides[3]	89.72	71.48	57.12	103.46	74.39
Sucker control	30.01	34.04	28.28	39.22	32.42
Fuel and lubrication[4]	41.03	46.72	40.75	57.66	45.07
Curing fuel and electricity[5]	175.90	172.91	157.32	210.79	172.92
Repairs[6]	52.98	55.06	35.62	64.90	51.02
Marketing fee	88.20	77.82	75.39	83.97	79.85
Other[7]	43.00	43.00	50.24	43.00	44.63
Interest	12.60	12.35	13.62	13.92	12.81
Machinery and barn ownership	320.98	303.13	261.67	340.40	300.27
Replacement	179.74	171.69	142.33	190.01	168.12
Interest	112.14	106.70	95.22	119.74	106.21
Taxes and insurance	29.10	27.54	24.12	30.65	27.33
General farm overhead	28.40	28.40	36.00	21.60	29.59
Management[8]	134.39	133.66	139.89	146.99	136.25
Total, excluding land and quota	1,478.35	1,467.09	1,538.82	1,616.91	1,497.13
Land and quota allocation:					
Share-rent[9]	967.91	629.14	424.19	776.39	662.73
Cash-rent[10]	819.05	626.37	440.15	750.58	632.95
			Pounds		
Yield per acre	2,100	1,853	1,795	1,999	1,901

[1]Includes operator, family, exchange, and hired labor valued at prevailing hired wage rates. [2]Includes plant bed seed, fertilizer, pesticides, and custom fumigation. [3]Includes insecticides, herbicides, and fungicides. [4]Includes tractor and machinery fuel and lubrication. [5]Includes costs of LP gas, fuel oil, or diesel and electricity used to cure tobacco. [6]Includes machinery, equipment, and barn repairs. [7]Includes sticks, twine, sheets, cover crop seed, and tobacco crop insurance. [8]Based on 10 percent of above costs. [9]Based on net share rent approach. [10]Based on net cash rent approach.

Table 11--Production costs per 100 pounds for various items on farms with 35 acres or more of flue-cured tobacco, by region, 1979

Cost item	Region				
	Pee Dee-Lumber River, N.C.-S.C. 16	Coastal Plain, N.C. 17	Piedmont, N.C.-Va. 18	Georgia, Ga. 29	Average, four regions
	Dollars/100 pounds				
Variable	47.36	54.07	61.35	55.42	54.25
Labor[1]	16.80	20.99	30.44	17.62	21.79
Plant bed materials[2]	1.77	1.83	1.82	2.49	1.87
Fertilizer and lime	3.39	3.54	3.56	4.45	3.59
Pesticides[3]	4.27	3.86	3.18	5.18	3.91
Sucker control	1.43	1.84	1.58	1.96	1.71
Fuel and lubrication[4]	1.95	2.52	2.27	2.88	2.37
Curing fuel and electricity[5]	8.38	9.33	8.76	10.54	9.10
Repairs[6]	2.52	2.97	1.98	3.25	2.68
Marketing fee	4.20	4.20	4.20	4.20	4.20
Other[7]	2.05	2.32	2.80	2.15	2.35
Interest	0.60	0.67	0.76	0.70	0.67
Machinery and barn ownership	15.28	16.36	14.57	17.03	15.80
Replacement	8.56	9.27	7.93	9.51	8.84
Interest	5.34	5.76	5.30	5.99	5.59
Taxes and insurance	1.38	1.49	1.34	1.53	1.44
General farm overhead	1.35	1.53	2.01	1.08	1.56
Management[8]	6.40	7.21	7.79	7.35	7.17
Total, excluding land and quota	70.39	79.17	85.72	80.88	78.77
Land and quota allocation:					
Share-rent[9]	46.09	33.95	23.63	38.84	34.86
Cash-rent[10]	39.00	33.80	24.52	37.55	33.30
			Pounds		
Yield per acre	2,100	1,853	1,795	1,999	1,901

[1]Includes operator, family, exchange, and hired labor valued at prevailing hired wage rates. [2]Includes plant bed seed, fertilizer, pesticides, and custom fumigation. [3]Includes insecticides, herbicides, and fungicides. [4]Includes tractor and machinery fuel and lubrication. [5]Includes cost of LP gas, fuel oil, or diesel and electricity used to cure tobacco. [6]Includes machinery, equipment, and barn repairs. [7]Includes sticks, twine, sheets, cover crop seed, and tobacco crop insurance. [8]Based on 10 percent of above costs. [9]Based on net share rent approach. [10]Based on net cash rent approach.

budgets were developed are described in the appendix. Budgets were not developed for all harvest systems identified because of the large number of budgets this would have required. Budgets were developed for harvest systems used to harvest from 50 to 90 percent of the acreage in each tobacco acreage category in each region, depending on the number and similarity of systems used. The remaining acreage was prorated to the harvest systems for which budgets were developed, based on similarities to harvest systems actually used on farms in 1979. Weights were applied to each budget to reflect its proportion of total production of regional and national costs of production.

Within the four study regions, 51 budgets were developed: 15 in the Pee Dee-Lumber River region, 14 in the Coastal Plain region, 9 in the Piedmont region, and 13 in the Georgia region. Variable and total costs are generally higher for the more labor-intensive harvest systems used on smaller farms (table 12).

Table 13 shows labor used with harvest systems specified in this report. The costs per 100 pounds for the same harvest system are lower on farms that produce larger tobacco acreages. Labor and other resources are used more efficiently on farms with larger acreages of tobacco.

For the harvest systems considered, total costs per 100 pounds, excluding land and quota, vary from $112 to $141 in the Pee Dee-Lumber River, from $108 to $149 in the Coastal Plain, from $103 to $140 in the Piedmont, and from $115 to $154 in Georgia. The lowest cost harvest systems are one- and two-row mechanical harvester systems. The highest cost system includes the oldest harvest method of walking primers, hand loopers with the tobacco cured in conventional barns, and a system using riding primers with hand loopers riding on the machine and the tobacco cured in conventional barns.

On farms with sufficient acreage to justify investment in mechanical tobacco harvesters, the mechanized tobacco harvest systems reduce production costs. The trend to more mechanized tobacco harvest systems is expected to continue.

Table 12--Specified costs of growing and harvesting various acreages of flue-cured tobacco in four regions, 1979

Region, acres of tobacco grown, and harvest system[1/]	Cost			Proportion of acres in size group[2/]
	Variable	Machinery and barn ownership	Total, excluding land and quota	
	--- Dollars/100 pounds ---			Percent
Pee Dee-Lumber River, N.C.-S.C. 16:				
Less than 9.0 acres--				
111 (Walking primers-hand loopers)	74.52	11.01	139.58	17
131 (Walking primers-tying machine)	69.14	12.35	139.01	42
221 (Riding primers-riding hand loopers)	66.19	12.11	141.36	26
9.0-19.9 acres--				
131 (Walking primers-tying machine)	60.92	12.10	133.19	30
221 (Riding primers-riding hand loopers)	63.91	11.50	134.65	20
252 (Riding primers-rack in field)	57.76	16.47	129.52	10
20.0-34.9 acres--				
131 (Walking primers-tying machine)	63.02	11.26	130.65	25
221 (Riding primers-riding hand loopers)	58.71	10.93	127.37	15
252 (Riding primers-rack in field)	55.91	15.50	124.35	17
342 (One-row mechanical harvester-rack at barn)	49.05	16.83	118.61	10
35 acres or more--				
142 (Walking primers-rack at barn)	47.60	13.89	114.97	12
252 (Riding primers-rack in field)	50.64	15.12	119.71	25
352 (One-row mechanical harvester-rack in field)	46.13	16.16	116.63	4
372 (One-row mechanical harvester-fill boxes in field)	48.24	16.16	116.77	5
442 (Two-row mechanical harvester-rack at barn)	42.43	15.10	112.18	6
Coastal Plain, N.C. 17:				
Less than 9.0 acres--				
111 (Walking primers-hand loopers)	88.47	10.65	148.91	22
131 (Walking primers-tying machine)	70.14	11.99	131.11	23
221 (Riding primers-riding hand loopers)	71.13	11.73	131.13	38
9.0-19.9 acres--				
131 (Walking primers-tying machine)	71.99	11.45	129.87	17
142 (Walking primers-rack at barn)	59.06	14.61	116.28	9
252 (Riding primers-rack in field)	57.74	15.97	116.07	22
20.0-34.9 acres--				
131 (Walking primers-tying machine)	56.17	14.18	112.13	15
252 (Riding primers-rack in field)	54.75	14.25	111.36	22
342 (One-row mechanical harvester-rack at barn)	53.60	16.70	112.15	17
35 acres or more--				
142 (Walking primers-rack at barn)	54.85	14.81	112.58	12
252 (Riding primers-rack in field)	57.26	16.20	116.52	23
342 (One-row mechanical harvester-rack at barn)	53.55	17.43	113.33	13
362 (One-row mechanical harvester-fill boxes at barn)	50.57	17.43	110.16	3
442 (Two-row mechanical harvester-rack at barn)	49.31	16.22	108.20	4

See footnotes at end of table.

Continued--

Table 12--Specified costs of growing and harvesting various acreages of flue-cured tobacco in four regions, 1979--Continued

Region, acres of tobacco grown, and harvest system[1]	Cost			Proportion of acres in size group[2]
	Variable	Machinery and barn ownership	Total, excluding land and quota	
	--- Dollars/100 pounds ---			Percent
Piedmont, N.C.-Va. 18:				
Less than 9.0 acres--				
111 (Walking primers-hand loopers)	89.13	11.69	139.95	16
131 (Walking primers-tying machine)	85.79	13.05	137.16	72
9.0-19.9 acres--				
131 (Walking primers-tying machine)	77.92	13.12	128.44	59
142 (Walking primers-rack at barn)	65.65	16.29	114.60	23
20.0-34.9 acres--				
131 (Walking primers-tying machine)	66.13	12.68	115.77	35
142 (Walking primers-rack at barn)	57.34	15.86	105.64	42
35 acres or more--				
131 (Walking primers-tying machine)	71.72	11.78	120.27	20
142 (Walking primers-rack at barn)	59.79	14.95	107.11	59
342 (One-row mechanical harvester-rack at barn)	52.67	17.68	102.51	4
Georgia, Ga. 29:				
Less than 9.0 acres--				
221 (Riding primers-riding hand loopers)	89.32	12.12	153.65	45
252 (Riding primers-rack in field)	64.65	16.92	129.30	29
9.0-19.9 acres--				
221 (Riding primers-riding hand loopers)	66.52	11.44	132.25	17
142 (Walking primers-rack at barn)	52.82	14.91	117.64	12
252 (Riding primers-rack in field)	60.18	16.22	126.10	56
20.0-34.9 acres--				
221 (Riding primers-riding hand loopers)	66.44	11.90	132.90	10
142 (Walking primers-rack at barn)	59.78	15.32	123.91	10
252 (Riding primers-rack in field)	60.21	16.57	125.61	46
342 (One-row mechanical harvester-rack at barn)	53.17	17.62	120.04	13
35 acres or more--				
142 (Walking primers-rack at barn)	56.02	15.60	118.27	12
252 (Riding primers-rack in field)	58.67	16.85	123.11	33
342 (One-row mechanical harvester-rack at barn)	53.56	17.90	118.62	17
472 (Two-row mechanical harvester-fill boxes in field)	51.42	16.78	115.32	6

[1]Codes refer to harvest systems as described in the appendix. [2]Proportion of acres actually harvested by specified harvest system in 1979.

Table 13--Harvest labor use on flue-cured tobacco farms, by harvest system, study area, 1979[1/]

Harvest system[2/]	Per acre	Per 100 pounds
	Hours	
Manual harvesting, conventional barns:		
Walking primers--		
111 Hand loopers	214.2	13.06
131 Tying machine	157.5	8.97
Riding primers--		
221 Riding hand loopers	166.0	8.57
Manual harvesting, bulk, and big box barns:		
Walking primers--		
142 Rack at barn	97.5	5.29
Riding primers--		
252 Rack in field	98.9	4.95
Mechanical harvesting, bulk, and big box barns:		
One-row mechanical harvester--		
342 Rack at barn	65.5	3.52
352 Rack in field	84.5	4.76
362 Fill boxes at barn	52.8	2.91
372 Fill boxes in field	51.0	2.89
Two-row mechanical harvester--		
442 Rack at barn	51.8	2.57
472 Fill boxes in field	49.7	2.85
Average, all systems[3/]	117.8	6.26

[1]Harvest labor is defined as the labor used for all harvest tasks beginning with priming of leaves up to and including market preparation. [2]Codes refer to harvest systems as described in text. [3]Average for all production in study area.

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APPENDIX

The process of tobacco harvesting has three stages: removal of leaves, preparation of leaves for curing, and curing of leaves. Pulling leaves is done one of three ways:

- Workers (primers) walk down the tobacco rows and break off the leaves.
- Workers ride over the field on tractor-drawn or self-propelled machines (priming aids) and break off the tobacco leaves. Most priming aids have four seats for the primers, and four rows are harvested each time the priming aid makes a trip through the field.
- A mechanical harvester wipes the leaves from the tobacco stalk. The harvester generally removes the leaves by rotating spiraled rubber wipers attached to a moveable head. Mechanical harvesters are both self-propelled and tractor-drawn, one and two row, and once over and multipass. These machines usually remove four to six leaves per plant per trip across the field.

Leaves are prepared for curing by either manually or mechanically tying them on sticks, placing them in bulk racks, or putting them in big boxes. In manual tying, the worker loops twine around the butt ends of tobacco leaves and attaches them to a stick which is then hung in the barn. Mechanical looping is done by an automatic tying or sewing machine. The tobacco leaves and sticks are placed on a moving conveyor belt which passes them under a sewing head. The leaves are attached to the stick by stitches at the butt end.

Bulk racks are two-piece steel frames about 50 inches long and 15 inches high. Workers fill the bottom part of the frame or rack with tobacco leaves. They close the rack by forcing steel tines attached to the top part of the frame through the leaves.

Big boxes are steel containers of various dimensions in which tobacco is placed for curing. Some have partitions in the middle, and hold the equivalent of 8 to 20 racks of tobacco. From 8 to 22 boxes are placed in the barn. Steel rods are generally inserted throughout the box to support the leaves.

Flue-cured tobacco is cured either in conventional or bulk barns (including box barns). Sticks of tobacco are generally cured in conventional barns, and racks of tobacco in bulk barns. Conventional barns are wooden frame structures that have several layers (tiers) of wooden rails horizontal to the

ground for hanging the sticks of tobacco. Bulk barns are compact structures generally holding from 84 to 153 racks of tobacco. These barns usually have two or three steel rails horizontal to the floor located on the sides of each room. Racks are placed on these rails and pushed toward the rear of the barn so that filling will be uniform. Box barns are similar to bulk barns.

Eleven tobacco harvest systems are used to represent harvest costs of flue-cured tobacco growers. Even though a total of 23 harvest systems were identified, budgets were developed only for those that were used the most in order to limit the number of budget situations. It was assumed that systems not included were represented by similar systems that were. See (2) for a description of systems that were not included.

Each harvest system is represented by a three-digit code (app. table 1). The first digit refers to how the leaves are removed from the stalk, the second to how and where the leaves are prepared for curing, and the third to the type of curing barn.

Conventional Barn Systems

Conventional barn harvest systems were used for about 39 percent of the flue-cured tobacco acreage in 1979. The percentage ranged from 18 in Georgia to 55 in the Piedmont.

System 111

Workers remove the tobacco leaves from the stalk and place them on sleds or trailers. They then take the leaves to the barn, hand loop them on sticks, and hang them in conventional curing barns.

Appendix table 1--Possible combinations of harvesting methods, curing preparation techniques, and curing methods, flue-cured tobacco farms

Harvesting method	Curing preparation	Curing method
(1) Walking primer	(1) Hand-loop on sticks at barn	(1) Conventional barn
(2) Riding primer	(2) Hand-loop on sticks in field	(2) Bulk or big box barn
(3) One-row multipass harvester	(3) Machine tie on sticks	
(4) Two-row multipass harvester	(4) Bulk rack at barn	
(5) Once over harvester	(5) Bulk rack in field	
	(6) Fill big boxes at barn	
	(7) Fill big boxes in field	

Thirteen percent of the flue-cured tobacco farms continue to use this system as their major harvest system (app. table 2). Four percent of the tobacco acreage was harvested by this method in 1979. This system is used primarily on small operating units.

System 131

Like system 111, workers pull the tobacco leaves from the stalk and place them on sleds or trailers. The tobacco leaves are taken to the barn, tied by machine on sticks, and hung in a conventional curing barn. This harvest system continues to be very popular, particularly on farms with less than 20 acres of tobacco. Thirty-five percent of the farms use it as their major harvest system and harvested 24 percent of the acreage with it in 1979 (app. table 2).

System 221

With this harvest system, primers ride and hand loop on the priming aid in the field. The tobacco is cured in a conventional curing barn. About 13 percent of the flue-cured tobacco farms used this system to harvest 9 percent of the acreage in 1979 (app. table 2).

Bulk Barn Systems

A bulk barn harvest system was the major harvest system for 37 percent of the flue-cured growers in 1979. Sixty-one percent of the flue-cured acreage was cured in bulk barns.

System 142

Walking primers put tobacco leaves on a sled or trailer. The leaves are placed in bulk racks at the barn, and racks filled with tobacco are put into the bulk barn. Ten percent of the producers used the 142 system as their major harvest method and 17 percent of the acreage was harvested with it (app. table 2).

System 252

This system requires a priming aid, and bulk racking is done in the field. Eleven percent of the producers harvested 16 percent of the acreage with this harvest method (app. table 2).

Systems 342, 352, 362, and 372

These harvest systems all use one-row multipass mechanical harvesters to remove the leaves from the plant. With the most popular one-row harvester system, the leaves are racked at the barn. Other systems require racking in the field and filling boxes in the field or at the barn. The tobacco is cured in bulk or big box barns. Seven percent of the growers harvested 13 percent of their crop with these systems in 1979 (app. table 2).

Systems 442 and 472

These harvest systems require two row mechanical harvesters. The 442 system requires racking at the barn and the 472 system requires filling boxes in the field. About 3 percent of the acreage was harvested by these methods in 1979 (app. table 2).

Other Harvest Systems Harvest systems described above were used to harvest about 86 percent of the tobacco acreage in 1979. Other systems were used to harvest the other 14 percent of the acreage. These systems are described in (2).

Appendix table 2--Extent of use of various flue-cured tobacco harvest systems, study area, 1979

Harvest system[1/]	Farms[2/]	Acres
	Percent	
Manual harvesting, conventional barns:		
Walking primers--		
111 Hand loopers	13	4
131 Tying machine	35	24
Riding primers--		
221 Riding hand loopers	13	9
Manual harvesting, bulk, and big box barns:		
Walking primers--		
142 Rack at barn	10	17
Riding primers--		
252 Rack in field	11	16
Mechanical harvesting, bulk, and big box barns:		
One-row mechanical harvester--		
342 Rack at barn	4	8
352 Rack in field	1	2
362 Fill boxes at barn	1	2
372 Fill boxes in field	1	1
Two-row mechanical harvester--		
442 Rack at barn	1	2
472 Fill boxes in field	3/	1
Other systems	10	14

[1]Codes refer to harvest systems described in text. [2]Refers to percentage of farms that harvested over half of their tobacco acreage with the specified harvest system. [3]Indicates less than 0.5 percent, rounded to nearest whole number.

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