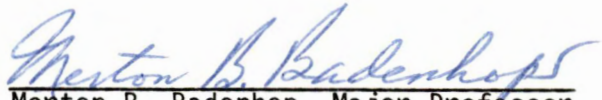
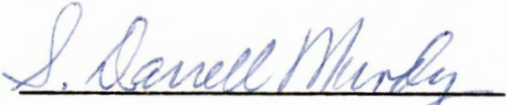
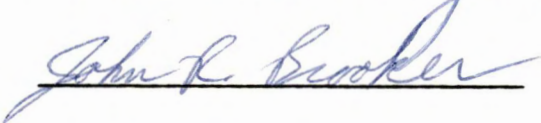


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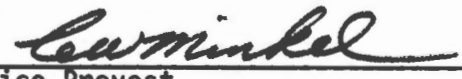
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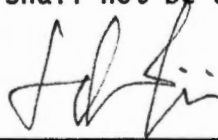

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**ADJUSTMENTS IN UPPER EAST TENNESSEE AGRICULTURE,
1978 TO 1982**

**A Thesis
Presented for the
Master of Science
Degree
The University of Tennessee, Knoxville**

Chidozie L. Onwuliri

July 1985

AG-VET-MED.

Thesis

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.Q596

DEDICATION

To My Parents

H. A. and C. N. Onwuliri

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ABSTRACT

This study was undertaken to document the agricultural characteristics of the Upper East Tennessee Area. The objective of the study was to identify the changes that occurred in the agriculture of the area between 1978 and 1982. By so doing, information was revealed on what resources were adjusted in preference to others.

Changes occurred in many aspects of the area's agriculture. The number of farms increased and so did acreage of land in farms. However, the average size of farm and acreage of total cropland decreased. Both the value of land and buildings and the value of all machinery and equipment on per farm basis declined.

Farmers in the area engaged in the production of diverse crops during the period. Acrewise, corn was the most important crop produced. Acres of land devoted to corn during the period increased by 25 percent. Tobacco was next in importance to corn. While acres of tobacco did not increase substantially, tobacco yields increased by 28 percent. Overall, crops including nursery and greenhouse products generated about \$79.3 million in 1978 and \$96.4 million in 1982.

Livestock production showed substantial strength during this period. Except for hog and pigs and poultry, higher inventories were reported for the other classes of livestock in 1982 than in 1978. During the same period sales from livestock and poultry and their products declined from \$113.8 million to \$110.2 million.

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CHAPTER I

INTRODUCTION

One major characteristic of time is the change it brings. It affects all aspects of a society, especially the economy. Of all the sectors of the economy, agriculture is one of the most affected.

In the United States (U.S.), there has been a tremendous change in agriculture since the inception of mechanized agriculture. Technology, in the form of mechanization, chemical pesticides, fertilizer, improved varieties of crops and the adoption of new production methods have all contributed to raise agricultural output. As production rises, the farm sector tends to get more competitive. Thus, farmers seek the best way to maintain and increase output to remain viable. The result is that farmers continue to adopt new technology.

The adoption of new technology, especially mechanization, by farmers has reduced their physical labor input. This causes the typical farmer to be inclined to expand the size of his farm to reduce cost and to attempt to maintain or raise his net income. This phenomenon has brought about a change in the structure of agriculture. Increasingly, fewer farmers produce a greater percentage of total agricultural output. The trend in the average size of farms has been upwards as the number of farmers decline. Farmers have also continued to incur larger debts.

Although Tennessee is not one of the larger agricultural states in the U.S., the pattern of change in its agriculture is generally similar to that of the nation. A review of available statistics reveals that Tennessee's agriculture has continued to progress. Like the nation's agriculture, Tennessee's agriculture has increased its productivity. More machinery is being used and more lime, and pesticides, for example are being used.

Economic conditions have continued to affect the financial position of Tennessee farmers. Because most of the inputs that are used in production are produced in the nonfarm sector, the level of debt that is owed by Tennessee farmers has continued to rise. This has resulted in increasing financial risk and uncertainty for the farmers.

Not only do farmers face risk and uncertainty due to their rising financial leverage but they face risk and uncertainty due to shifts in market demand, fluctuating prices and natural human and institutional changes.

Technology and economic conditions will continue to influence the farm sector. While the exact magnitude of changes cannot be forecast, a general pattern of change can be predicted. As long as farming remains competitive, farmers will continue to adopt new technology--they will continue to increase mechanization, use the latest pesticides, use soil improving chemicals and techniques and try to expand their businesses and production. All of these will tend to make them incur higher debts.

Statement of the Problem

Due to advances in technology, agricultural production generally follows an incremental growth pattern. While it is believed that technology will tend to improve productivity, it has not been fully established that it cannot have adverse effects on production. It is this concept that fails to rule out that changes in agriculture will always be positive.

Evaluating the trends of agriculture in an area involves taking into account changes that occur in the agriculture of the area. This fact brings into focus the problem to which this study is directed. Studies on trends in agriculture in Tennessee have been done for areas in the western and central parts of the state, but nothing specifically has been done in the area covered in this study. The study reveals the changes that occurred in Upper East Tennessee agriculture between 1978 and 1982.

Definition and Objectives

The 1982 Census of Agriculture defines a farm as any place from which \$1,000 or more of agricultural products were sold or normally would be sold during the census year. According to Wiegmann (p. 4), small farms, family farms, low income farms, commercial farms and corporate farms are descriptive terms that are used to refer to one or a group of the more broad groups that are known as farms. Given the above definition, a piece of land, considered as a farm

and included in statistics 10 or 15 years ago would not be included in the 1982 census.

It should be recognized that a polarized view of the direction of change in agriculture may be premature. Whereas general predictions always see positive changes, all the aspects of the changes may not actually be positive. In addition, the definition of a farm changes with time and that, in turn, determines which piece of land is included in farm statistics.¹ Therefore, any conclusion based on historical facts or based on a long-period-of-time study may distort important incremental changes. Given the new farm definition, this study sought to document the "marginal changes" that occurred in Upper East Tennessee agriculture. Marginal changes, as indicated, represented the changes that spanned four years--specifically the two most recent census reporting years, 1978 and 1982. Something worth noting, in addition, is that implicit in the changes in agriculture are the characteristics of the farms and the structure of agriculture in the area.

The study sought to determine whether some resources were adjusted in preference to others.

Therefore, the objectives of the study were to:

1. Document the changes that occurred in Upper East Tennessee agriculture from 1978 to 1982.
2. Document the characteristics in the agriculture of the area.

¹The definition of a farm for the 1978 census year is the same for the 1982 census year, which is different from the definitions for other census years.

Justification for the Study

In documenting the changes in the agriculture of an area, essential elements are revealed. One of the elements is whether the region is making progress agriculturally. If progress is being made, more should be done to enhance it, but if not, changes should be made to stabilize the situation from where progress can be made. So, documenting the changes that occur is worthwhile and documenting the adjustments in Upper East Tennessee agriculture or the state, as a whole, is of no less importance.

Similar studies had been done for the western region of Tennessee and for the state. Although the statewide studies covered the study area, the studies failed specifically to show all the changes in agriculture of the area. Unlike the western and central parts of the state, the Upper East Tennessee region is characterized by mostly rough terrain and high elevations. Therefore a study aimed at this region alone would reveal most of the important changes that tend to be concealed in a study of the entire state.

In organizing and comparing the data, several changes were seen that indicate how rapidly farmers adjusted their resources and how the region compared with other regions in resource adjustment.

Statistical updating of farm operations is of importance to extension workers who serve as a source of knowledge for farmers. Moreover, rapid changes, difficulties and costs of adjustment in today's agriculture make it imperative that policy makers keep abreast with current agricultural situations. The need for updating

farm operations can be stressed using Castle and Beckers observation:

That rapid change has characterized American agriculture in recent years is a matter of historical record. As far as the future is concerned, it appears that the only condition that can be taken as certain is that even more change is likely to occur. The magnitude of the underlying forces that affect both supply and demand conditions for agricultural commodities has not remained and will not remain constant [2].

Physical Characteristics of the Area

Tennessee lies within latitude 35° and 37° north and longitude 81° and 90° west. The state lies entirely in the isothermal zone of 40°F toward the north and 64°F in the south.² Different regions in the state have diverse climate. The diversity in climate is due to topography, natural vegetation and continentality (distance from the ocean) [10]. The diversity of Tennessee's climate has been identified into four regions meaningful to agriculture, by the U.S. Weather Bureau. The regions are as follows: 1) Eastern Tennessee, 2) Cumberland Plateau, 3) Middle Tennessee, centered on the Nashville Basin and extending as far as Kentucky lake, and 4) Western Tennessee [10].

The area of study occupies the extreme northeastern and east central parts of the state. It covers an area of 7,735 square miles and consists of 21 counties (Figure 1): Anderson, Blount, Campbell, Carter, Claiborne, Cocke, Grainger, Greene, Hamblen, Hancock,

² Isotherm means a line on a map connecting points on the earth's surface that have the same mean temperature or the same temperature at a given time.

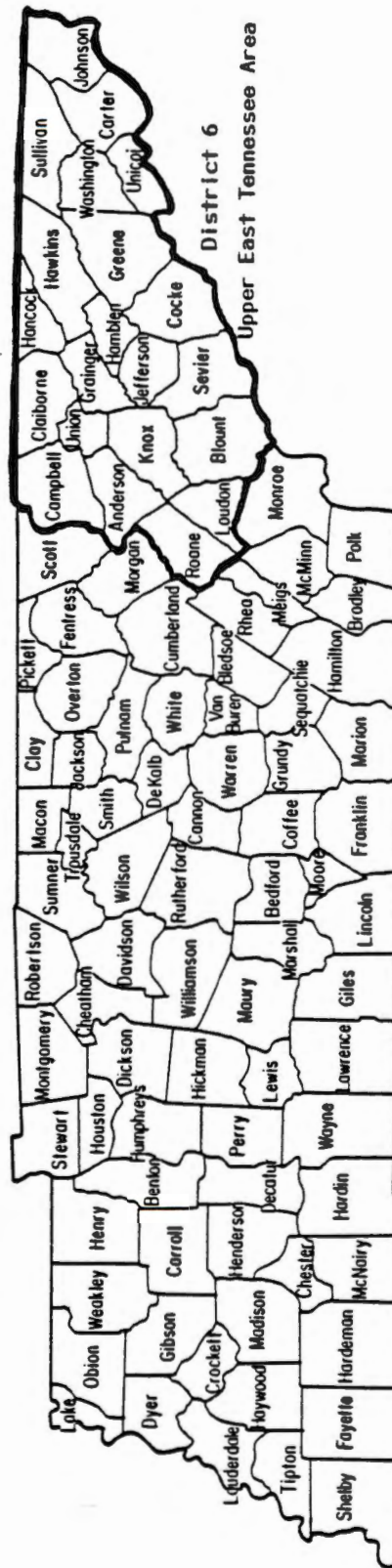


Figure 1. Map of Tennessee Showing the Study Area.

Hawkins, Jefferson, Johnson, Knox, Loudon, Roane, Sevier, Sullivan, Unicoi, Union and Washington.

Climate

Except for a portion of Anderson County whose mean annual precipitation ranges from 56 to 60 inches, the average annual precipitation for the study area ranges between 44 and 52 inches [9]. The average warm-season precipitation ranges from 22 to 28 inches. However, portions of Anderson, Blount, Sevier, Cocke, Washington, Greene, Unicoi, Carter and Johnson counties experience average warm-season precipitation of 28 inches and over. In terms of freeze-free period (growing season), the region experiences a range of 160 to 180 days.

The average annual temperature of this region varies from 45°F to 56°F. As elevation increases, the average temperature falls. Temperatures tend to increase in the state with increasing distance to the western part of the state where the terrain is lowland.

Soils

Physiographically, the study area lies within the Unaka Range, the Valley of East Tennessee and the Cumberland Plateau, which cuts into the western-most part of Campbell and Claiborne counties.

Unaka Range. This mountain range lies in the extreme eastern part of the area. The highest point of the range is 6,500 feet high [9]. The area occupied by this range is characterized by the Ramsey-Stony land-Porters Soil Association. Some of the soils are stony or

shallow to bedrock. The soil crust lying beneath is mostly metamorphic with lesser amount of igneous rocks.

The Valley of East Tennessee. This area is characterized by Fullerton-Dewey-Dunmore-Sequoia Soil Association, which is highly variable in context of rock and is poorly drained. It is also characterized by ridges and valleys and occupies a distance of 45 to 70 miles [9]. The elevation averages about 1,000 feet above sea level. The Valley of East Tennessee is also composed of the Dandridge-Whitesburg Soil Association. The soil is composed of calcareous shale and are shallow to bedrock. The water holding capacity of this type of soil is low, therefore, the association is suited for pasture and forest.

The Cumberland Plateau. The Cumberland Plateau occupies the northwestern-most part of the study area. The elevation is about 2,000 feet above sea level. The soil type comes under the Ramsey-Hartsells-Stony land Association and is composed of sandstones and shales. These soils are low in fertility and poorly suited to crops and pasture.

Related Economic Factors

Population and Employment Situation

Population. Between 1970 and 1980, the population of the study area increased 19 percent from approximately 1.01 to 1.2 million. Campbell, Hamblen, Claiborne and Sevier counties had the

biggest increase. In 1980, out of the area's population of 1.2 million, approximately 47.5 percent was rural. For most of the counties, more people lived in rural than in urban areas. A marked example is Sevier County, where 33,652 people lived in rural areas as opposed to 7,766 in urban areas (Table 1).

Of all the counties in the study area, Knox and Sullivan counties had the highest population density (persons per square mile) or 631.8 and 346.9, respectively. The lowest population density was in Hancock County where 30.7 people lived per square mile (Table 1).

Employment situation. The labor force estimates for Tennessee was 2.11 million in 1981. But by 1982, the labor force had increased to approximately 2.13 million. For the study area, the average unemployment rate was 11.2 in 1981 and 14.5 in 1982. Overall, 459,720 people were not employed in 1981 and 473,420 in 1982. In both 1981 and 1982, Cocke County had the highest unemployment rate out of all the counties in the study area.

A total of 433,750 people were employed in non-agricultural establishments in 1981. A distribution of employment is shown in Table 2 for selected non-agricultural sectors. A total of 100,120 people were employed in the manufacturing sector, 65,970 in construction and 87,630 by the government.

From 1970 to 1981, per capita income for the study area more than doubled for all the counties. Anderson County had the highest increase of \$6,210.

Table 1. Population Statistics of Upper East Tennessee Counties, 1970 and 1980.

County	Population		Percentage Change	Population Per Square Mile, 1980	Population 1980		Percentage of Total Population	
	1970	1980			Urban	Rural	Urban	Rural
Anderson	60,300	67,346	11.7	198.7	33,138	34,202	49.2	50.8
Blount	63,744	77,770	22.0	139.4	39,106	38,664	50.3	49.7
Campbell	36,045	34,923	34.1	72.9	10,996	23,927	31.5	68.5
Carter	43,259	50,205	16.1	147.2	25,911	24,294	51.6	48.4
Claborn	19,420	24,595	26.6	56.9	2,530	22,065	10.3	89.7
Cocke	25,283	28,792	13.9	66.6	7,580	21,212	26.3	73.7
Grainger	13,948	16,751	20.1	61.4	-----	16,751	-----	100.0
Greene	47,630	54,422	16.3	87.9	14,097	40,325	25.9	74.1
Hamblen	38,696	49,300	27.4	316.0	19,683	29,617	39.9	60.1
Hancock	6,719	6,887	2.5	30.7	-----	6,887	-----	100.0
Hawkins	33,757	43,751	29.6	90.0	14,900	28,851	34.1	65.9
Jefferson	24,940	31,284	25.4	117.6	5,612	25,672	17.9	82.1
Johnson	11,569	13,745	18.8	46.3	-----	13,745	-----	100.0
Knox	276,293	319,694	15.7	631.8	245,534	74,160	76.8	23.2
Loudon	24,266	28,553	17.7	121.5	9,389	19,164	32.9	67.1
Roane	38,881	48,425	24.5	135.6	21,948	26,477	45.3	54.7
Sevier	28,241	41,418	46.7	70.2	7,766	33,652	18.8	81.2
Sullivan	127,329	143,968	13.1	346.9	106,315	37,653	73.8	26.2
Unicoi	15,254	16,362	7.3	88.0	7,652	8,710	46.8	53.2
Union	9,072	11,707	29.0	53.7	-----	11,707	-----	100.0
Washington	73,924	88,755	20.1	272.3	57,242	31,513	64.5	35.5

N.B. Urban population includes all persons living in urbanized area and in places of 2,500 or more in habitants of more inhabitants outside urbanized areas. Rural population is all population not classified as urban.

----- represents zero.

Source: Tennessee Statistical Abstract, 1983/84 [11].

Table 2. Employment, Size and Distribution for Selected Non-agricultural Sectors, 1981.

	Total Non-agriculture Employed	Manufacturing	Construction	Wholesale and Retail Trade	Service	Government
Knoxville (SMSA)*	205,100	51,500	9,700	44,000	34,300	46,700
Johnson City-Kingsport	136,500	6,700	53,000	23,900	18,300	23,900
Bristol (SMSA)*	6,580	1,880	110	1,250	550	1,830
Campbell	4,310	1,770	40	530	380	960
Claiborne	5,200	2,770	150	700	340	990
Cocke	1,840	880	30	260	130	440
Grainger	16,830	8,480	390	2,150	2,050	2,940
Greene	19,220	11,760	430	2,390	1,980	1,910
Hamblen	710	90	30	70	D	400
Hancock	6,270	2,730	10	720	D	960
Jefferson	3,130	2,200	190	230	110	360
Johnson	7,290	3,610	890	810	350	1,270
Loudon	9,510	3,140	240	1,240	1,170	3,060
Roane	11,260	2,610	660	2,800	2,750	1,910
Sevier						

(D) Not included in the category to avoid disclosure of individual establishment data.

SMSA = Standard Metropolitan Statistical Area.

Knoxville (SMSA) is composed of Anderson, Blount, Knox and Union Counties.

Johnson City-Kingsport-Bristol (SMSA) is composed of Carter, Hawkins, Sullivan, Unicoi and Washington Counties in Tennessee and Scott and Washington Counties in Virginia.

Source: Tennessee Statistical Abstract, 1983/84 [11].

Procedure

Data for the study were obtained from a secondary source--the Tennessee Census of Agriculture for 1978 and 1982. The procedure used for collecting the census statistics was given in the census report. Both 1978 and 1982 census statistics were gathered by mailing out census report forms. For the 1978 statistics, a mail list of 4,430,000 names and addresses was used, which comprised all individuals, businesses and organizations that could readily be identified as being associated with agriculture. The list was made from the records of the 1974 census and administrative records of various government agencies, primarily, the Internal Revenue Service and the U.S. Department of Agriculture.

The mail list for the 1982 census was assembled from the records of the 1978 census and also from administrative records of various government agencies, primarily the Internal Revenue Service and the U.S. Department of Agriculture. Report forms were mailed to the approximately 3.6 million individuals, businesses and organizations on the mail list.

The data gathered from the report forms were subjected to item-by-item computer edit, which was aimed at checking for consistency and reasonableness. Also in the process, erroneous and inconsistent data were corrected, missing data based on similar farms within the same county were supplied and classification codes necessary for tabulating the data were assigned.

For the study, the different aspects of agriculture, based on the census statistics, were organized into sections. The sections include land use situation, input resources, crop situation, live-stock production, tenure and characteristics of farm operators.

The changes which occurred were shown mainly in real figures and percentages. Dollar value in 1982 and 1978 terms was deflated to the 1977 level.

Although there were indications of how the changes in the study region compare with the state, there was no in-depth comparison of the sort. The entire study focused on highlighting the changes that occurred. One thing that the study did not do was to try to determine the causal factors resulting in various changes. Thus, the study was descriptive rather than deductive or analytical.

Literature Review

As long as agriculture remains competitive, its structure will continue to change and farmers will continue to adjust their method of production to increase or stabilize their net income.

According to Ackerman and Heady (p. 10), two major sets of forces are at work which call for adjustment in agriculture. The first factors are those facets of growth which exert forces on agriculture from the outside, including changes in the relative importance of products from different sectors of the economy as consumers allocate a growing income in line with their tastes and preferences. As incomes of consumers increase, food no longer becomes their major concern. Hence, as incomes increase, the American consumers spend

relatively little more on food [5]. The focus seems to shift toward the acquisition of tangible goods like cars, stereos and televisions. The second factors that cause adjustment in agriculture are those elements of progress generated within agriculture. These are represented by technical improvement and the ability to expand output using available resources. Farming is strongly being interwoven with other sectors of the economy. That interdependence which causes problems would continue to call for adjustment in agriculture [6].

Agriculture in the United States has changed drastically over the last four decades; many of the self-sustaining labor intensive small farms of the 1940s have developed into highly mechanized large commercial farms [3]. Greater investment in mechanical power has facilitated the acquisition of larger acreage to enable the spreading of fixed cost in machinery and equipment [8]. The degree of mechanization of agriculture has also affected its structure (as reflected in the number of farms), total capital used, the extent of enterprise specialization and farm employment [3].

From 1940 to 1960, total farm output increased 55 percent in the U.S. even though total capital input increased only 5 percent [4]. Output per unit of labor increased 210 percent in the same period. One farm worker produced enough to supply the needs of 10.7 persons in 1940; by 1960 he could supply 26.2 persons. Despite the large increase in farm labor productivity, real income per farm worker was 17 percent lower in 1960 than in 1946. The level of technology employed by agriculture in a particular case is itself a reflection of the prevailing supply and demand of inputs. The supply and demand

of such inputs determine their prices. In turn the prices help farmers determine the most economical way of producing commodities [4].

Heady, Haroldsen, Mayer and Tweeten, 1965 (p. 197), predicted there would be a decrease in the number of farms to 1.4 million farms in the 1980s. They further noted that even with much greater reduction in farms, the remaining farms could increase their size and still produce the nations food supply and exports, with some surplus. The current situation in agriculture attests to that projection; although the number of farms is decreasing, the average size of a farm is increasing and production continues to rise.

Agriculture, whether considered in a national or state context, is composed of changing structure, changing input sources and changing marketing channels [9]. In Tennessee, there has been a marked change in agriculture. From 1930 to 1982, the number of farms decreased from about 245,600 to 90,568, which was a decrease of 63 percent [9]. Farm sizes increased from approximately 73 to 138 acres. From 1959 to 1964, the value of the average farm rose from \$13,288 to \$21,088 [1]. About three-fourths of the increase resulted from increasing value per acre of land and buildings, while one-fourth was due to increased size of farm. The number of farms using fertilizer decreased, however, the tonnage of commercial fertilizer used increased. Badenhop concluded that farms were fewer and bigger, that farmers were using more machinery and that land use practices were changing.

Kolberg (p. 59) observed in 1960 that a total of 24,312 people were employed in fisheries, agriculture and forestry (the overwhelming

majority of which were in agriculture) in Upper East Tennessee.³ But in 1970, only 10,700 were employed in this category, which was a decrease of 56 percent. He further noted that by 1969, commercial farms accounted for 55 percent of the area's total acreage in farms, while part-time and other farms accounted for 45 percent. He concluded that in the study period, full-time employment in agriculture declined at a rapid pace and that tobacco-livestock enterprise mix dominated, with livestock enterprises becoming the major source of farm cash receipt in the area.

³Counties included were Carter, Claiborne, Cocke, Grainger, Greene, Hamblen, Hancock, Hawkins, Jefferson, Johnson, Sevier, Sullivan, Unicoi, Union and Washington in Tennessee and Russel, Scott, Smyth and Washington in Virginia.

CHAPTER II

LAND USE SITUATION

This chapter describes the land use situation in general for the study area during the period 1978 to 1982. It describes specifically land availability and the distribution of land.

Although the Upper East Tennessee Area is marked by ranges and valleys, it occupies an area of 7,735 square miles. This area is partly composed of a substantial 4.9 million acres of land area approximately.

Out of this, about 1.9 million acres were land in farms in 1982. That constituted only about a 4.5 percent increase from 1978. For the area, the number of farms increased from 24,750 to 26,866. While farms increased in number, the average size of farm fell from 85 acres in 1978 to 75 acres in 1982.

Similar to the study area, the average size of farms for the state declined but by a smaller magnitude. Nevertheless, the fall in the average size of farms was in contrast to the expected trend of fewer farms and larger farm size.

Of the total acreage of 1.9 million acres of land in farms, 1.1 million acres were cropland (Table 3). In 1982, about 412,173 acres of cropland were harvested, which constituted approximately 0.9 percent increase from 1978. A significant proportion of cropland was devoted to pasture and grazing over the period. In 1978, cropland devoted to pasture and grazing was 55 percent; in 1982, the proportion

Table 3. Changes in Land Use for Upper East Tennessee Area During the Period 1978 to 1982.

Item	Unit	1978	1982	Change	Percent Change
Number of farms	number	24,750	26,866	2,116	8.5
Land in farms	acres	1,972,431	1,981,222	8,791	4.5
Average size of farms	acres	82	75	-7	-8.5
Farms with irrigation	number	636	454	-182	-28.6
Irrigated land	acres	3,684	3,688	4	0.1
Total cropland	number	24,170	25,958	1,788	7.4
Total cropland	acres	1,121,453	1,099,408	-22,045	-2.0
Cropland harvested	acres	408,602	412,173	3,571	0.9
Cropland used for pasture and grazing	acres	612,269	609,898	-2,371	-0.4
Pastureland and rangeland other than cropland and woodland pastured	acres	162,695	179,474	16,779	10.3
Woodland	acres	565,841	560,290	-5,551	-1.0
Woodland pastured	acres	201,703	191,926	-9,777	-4.8

was about 56 percent. Acreage of cropland that was used for pasture and grazing fell between 1978 and 1982 by about 0.4 percent. In contrast, acreage of pastureland and rangeland other than cropland and woodland increased.

More acres of land were categorized as cropland than woodland and less acreage of cropland was listed as harvested than listed as woodland (Table 3). However, over the period, woodland decreased from 565,841 to 560,290 acres. Of the total acres of woodland, 36 percent and 34 percent were devoted to pasture in 1978 and 1982 respectively.

An intra area breakdown shows there were more positive changes between 1978 and 1982 for some counties than for others. For example, while Jefferson, Loudon and Roane counties experienced increases in acreage of land in farms, total cropland and woodland, Unicoi, Union and Washington counties experienced a decrease in the three variables.

Farms with sales of \$10,000 or more contributed about 40 and 45 percent of total acres of land in farms in 1978 and 1982, respectively. Table 4 presents the changes in selected land distributions for farms in this category. Average size of farms decreased from 200 to 177 acres, a decline of about 12 percent. The number of cropland increased, so also did acreage of harvested cropland.

Irrigation

Irrigation was not adequately practiced in the Upper East Tennessee Area and in the state as a whole during this period. For the state, out of 86,910 farms only 1,254 farms were irrigated in

Table 4. Changes in Selected Land Distributions for Upper East Tennessee Area, 1978 and 1982.

Items	Farms with Sales of \$10,000 or More			Change	Percent Change
	Unit	1978	1982		
Number of farms	number	3,990	5,207	1,217	30.5
Land in farms	acres	781,826	885,847	104,021	13.3
Average size of farms	acres	200	177	-493	-11.7
Farms with irrigations	number	212	171	-41	-19.3
Irrigation land	acres	2,273	2,281	8	0.4
Total cropland	number	4,290	5,170	880	20.5
Cropland harvested	acres	212,016	247,373	35,357	16.7

1978. This comprised only about 1.4 percent of total number of farms. In 1982, the number of irrigated farms remained almost the same.

For the Upper East Tennessee Area there were 212 farms with irrigation in 1978 and 177 in 1982. Over the period, acres of irrigated land increased slightly for both Tennessee and the Upper East Tennessee area.

CHAPTER III

INPUT RESOURCES

This chapter presents adjustments farmers in the Upper East Tennessee Area made in the use of resources. Generally, non-monetary investments, whether capital investments or otherwise can be classified as input resources as long as they go into the production process. Resources can be divided into fixed and variable. Fixed resources are those whose quantities are not varied during the production period. Examples of fixed resources are machinery and equipment and land and building.

Variable resources are those resources whose quantities are varied at the beginning or during the production period. In the farm sector, fertilizer, lime, energy or fuel, labor, seeds, are considered as variable. In the long run, however, all resources become variable. The reason is that over a long period of time, farmers are able to buy or rent inputs, like machines, or expand or reduce their farm business.

In this study, resources were divided into two groups. The first group comprised fixed resources broken down into land and buildings and machinery and equipment. The second group comprised the variable resources, made up, for example, of feed, fertilizer, and agricultural chemicals, etc.

Fixed Resources

Land and Buildings

Table 5 presents the dollar values of the major fixed resources for the study period. The value of land and buildings constituted a big share of fixed resources per farm. The value amounted to 88 percent in both 1978 and 1982. The value of land and buildings per acre also remained about the same, at \$1,031.

Machinery and Equipment

Machinery and equipment comprised approximately 11.6 percent of the value of fixed resources per farm for 1978 and 1982. Measured in absolute terms, the estimated value of all machinery and equipment per farm was higher in 1982 at \$15,331 than in 1978 at \$12,008. However, in real dollar terms, the value for 1978 was higher (Table 5).

Table 5. Dollar Values^{*} of Selected Fixed Resources, Upper East Tennessee Area, 1978 and 1982.

Item	1978	1982
Value of land and buildings-- average per farm	83,002	76,159
Value of land and buildings-- average per acre	1,031	1,024
Estimated value of all machinery and equipment-- average per farm	11,017	9,292

^{*} Dollar value measured at 1977 level.

The reason for the disparity is that from 1977 to 1978, consumer price index (CPI) for machinery and equipment purchased by farmers rose by 8 percent and by 1982, had risen by 65 percent.

Figure 2 shows a breakdown in the quantities of machinery and equipment on farms during the study period. In both 1978 and 1982, Upper East Tennessee farmers had more tractors on place than any other pieces of farm equipment. The quantity of each of the equipment items on farms for 1982 exceeded that of 1978, with the difference in the number of motor trucks and pickups being the greatest. Similar to the Upper East Tennessee Area, Tennessee, as a whole, showed an increase in each of the items shown in Figure 2 except for automobiles.

Variable Resources

Variable resources were divided into three groups, namely, labor, energy and fuel and miscellaneous resources. Upper East Tennessee farmers spent \$83.9 million and \$76.03 million on variable inputs in 1978 and 1982, respectively. Given the number of farms for 1978 and 1982 in Table 3, p. 19, the value per farm was \$3,632 in 1978 and \$2,830 in 1982.

Table 6 presents the changes in dollar values of selected variable inputs consumed on Upper East Tennessee farms within this period. Expenses on miscellaneous inputs made up the bulk of total expenditure. This group of inputs comprised over 50 percent of the total expenditure. While this was a large proportion, consumption of these inputs fell by an equally substantial amount of 14 percent

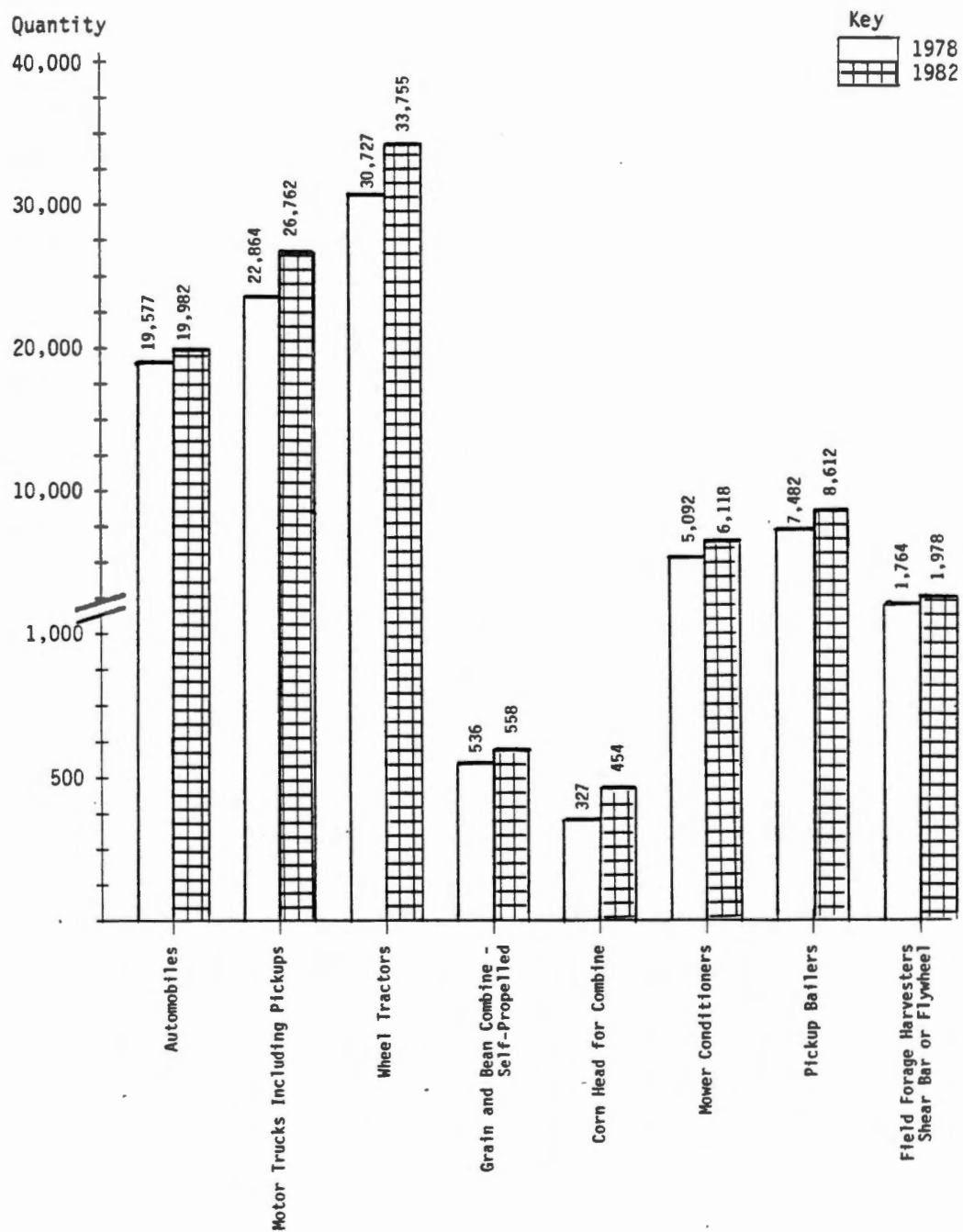


Figure 2. Selected Machinery and Equipment--1978 and 1982.

Table 6. Changes in Dollar Values of Selected Variable Resources
for Upper East Tennessee Area, 1978 to 1982.

Input	Dollar Value (million)		Percent of Total		Percent Change 1978 to 1982
	1978	1982	1978	1982	
<u>Labor</u>					
Hired farm labor	15.66	17.91	16.8	21.3	14.4
Contract labor	1.44	1.32	1.5	1.6	-8.3
Rental of machinery and equipment	2.43	1.70	2.6	2.0	-30.0
Subtotal	19.53	20.93	20.9	24.9	7.2
<u>Energy and Fuel</u>					
Gasoline and gasohol	5.32	4.03	5.7	4.8	-24.2
Diesel fuel	2.28	2.71	2.4	3.2	18.9
LP gas, butane and propane	0.10	0.12	0.1	0.1	20.0
Fuel oil and kerosene	0.29	0.19	0.3	0.2	-34.5
Natural gas	0.04	0.05	--	0.1	25.0
Motor oil and grease	1.17	0.68	1.3	0.8	-41.9
Electricity	2.53	2.05	2.7	2.4	-19.0
Subtotal	11.73	9.83	14.0	13.0	-16.2
<u>Miscellaneous Resources</u>					
Feed for livestock and poultry	32.19	29.82	34.5	35.5	-7.4
Seeds, bulbs, plants and trees	3.28	2.65	3.5	3.2	-19.2
Commercial fertilizer	14.76	10.26	15.8	12.2	-30.5
Agricultural chemicals	2.41	2.54	2.6	3.0	5.4
Subtotal	52.64	45.27	56.5	53.9	-14.0
 Total	 83.9	 76.03			 -9.4

Dollar adjusted for inflation to 1977 level.

between 1978 and 1982. Itemwise, expenses on commercial fertilizer declined the most (Table 6). Next to commercial fertilizer were expenses on seeds, bulbs, plants and trees, which declined by 19 percent. Agricultural chemicals were the only inputs in this group for which farmers spent more money in 1982 than in 1978.

An interesting development occurred in the labor input category. While expenses on contract labor employed within the period declined, expenses on hired labor rose by 14 percent. Total expenses on labor and rental of machinery and equipment in both years comprised 82 percent for hired labor, 7 percent for contract labor and 10 percent for rental of machinery and equipment. Overall, expenditures on these inputs increased by 7 percent during the period.

While total expenditures on labor and rental of machinery and equipment increased, expenditures on energy and fuel declined 14 percent. In spite of the overall decline in energy and fuel expenditures (Table 6), Upper East Tennessee Area farmers spent more money on diesel fuel in 1982 than in 1978. Following the same direction of change was LP gas, butane and propane gas, by 20 percent. Expenses on other energy and fuel items declined (Table 6).

In general, expenses on both fixed and variable inputs consumed on Upper East Tennessee farms declined for most of the input items. But comparatively, there was a greater decline in variable than in fixed input expenditures.

CHAPTER IV

CROP SITUATION

Introduction

The major crops grown in the Upper East Tennessee Area include corn, wheat, soybean, hay and tobacco. The minor crops were vegetables, sweet corn and melon and fruits. Sorghum and oats are of little importance in the area. During the study period, only 32 farms grew oats. Most of the farms, 19 out of 32, were in Greene, Loudon and Blount counties. Of the 21 counties in the area, only two reported income from oats. Altogether, the total was \$6,000.

Corn

Corn was the major crop grown in the area. A total of 371,165 acres of land was used to grow corn, wheat, tobacco, hay and soybean in 1978. Out of this, 43,313 acres, 12 percent were devoted to corn (Table 7). In 1982, the total area devoted to corn was 47,631 acres which was 25 percent more acreage than in 1978. Interestingly, fewer farms grew corn in 1982 than in 1978. The implication is that some farms expanded acreage of corn between 1978 and 1982.

While acres of corn increased in the area during the period under study, acreage for the state declined. In 1978, 615,553 acres of land were engaged in corn production in the state, but by 1982, the acreage had fallen to 563,467. Evidently, corn acreage declined in some of the counties of the state. Among these counties were

Table 7. Production of Major Crops, Upper East Tennessee Area, 1978 to 1982.

Crops	Unit	1978	1982	Percent Change 1978 to 1982
Corn	acres	43,313	47,631	25
Wheat	acres	7,741	11,757	52
Tobacco	acres	26,397	33,879	28
Soybean	acres	9,644	16,734	100
Hay	acres	284,070	277,665	2
Corn	bushels	3,143,158	3,962,265	26
Wheat	bushels	261,959	368,238	42
Tobacco	pounds	51,434,453	63,884,059	28
Soybean	bushels	250,268	489,919	96
Hay	tons	443,066	456,423	3

Cocke, Grainger, Hamblen, Sevier and Sullivan counties in the study area. For these counties, acreage devoted to corn declined by about 6 percent. But increase in the acreage of corn for other counties offset the decrease to allow for a general increase in the area. Table 8 shows the acreage and production of corn for the highest corn producing counties in the area. Changes in corn acreage for individual counties are shown on Table A-1 of the Appendix.

Wheat

More farms grew wheat in 1978 than in 1982. Although that was the case, there were more acres of wheat in 1982 than in 1978. During the period there was a rise in the quantity of wheat produced in the area. In 1982, 368,238 bushels of wheat were produced. This figure represented an increase of 42 percent from the 261,959 bushels produced in 1978.

Blount County emerged as the highest wheat producing county. Its wheat production increased from 75,677 bushels in 1978 to 119,097 bushels in 1982. Next to Blount was Jefferson County whose wheat production rose by approximately 36 percent. Table 9 shows the average wheat production for selected counties in the area. The output per acre for these counties increased by about 35 percent. For the entire area, wheat production per acre declined by about 7.4 percent.

Tobacco

The quantity of tobacco produced per acre in the area remained about the same during the study period. Similarly, acres of tobacco

Table 8. Corn Production for Counties with the Highest Production in the Area, During the Period 1978 to 1982.

Counties	Acres of Corn		Bushels of Corn	
	1978	1982	1978	1982
Blount	4,378	4,902	356,282	445,933
Cocke	3,423	3,280	295,115	268,592
Greene	6,609	7,696	396,688	594,391
Hawkins	2,982	3,325	196,096	225,411
Jefferson	3,739	3,595	280,323	342,978
Loudon	1,574	2,471	130,731	219,563
Sevier	3,839	3,612	289,168	296,484
Sullivan	2,390	2,319	192,700	202,776
Washington	3,983	4,818	237,990	375,376
Total	32,917	36,018	2,375,093	2,971,504
Area's Total	43,313	47,631	3,143,158	3,962,265

N.B. These counties produced more than the average output for the entire area.

Table 9. Wheat Production for Selected Counties in the Study Area, 1978 and 1982.

County	Bushels of Wheat		Average (1978 and 1982)
	1978	1982	
Blount	75,677	119,097	97,387
Greene	35,301	35,908	35,605
Hamblen	18,391	29,797	24,094
Jefferson	42,002	57,022	49,512
Loudon	42,002	57,022	49,512
Total	195,477	297,178	246,328

N.B. The average wheat production for each of the counties was above that of the area.

on farms remained about the same. The number of farms that grew tobacco, however, increased from 17,755 to 18,930. While acres of tobacco remained about the same, production of the crop rose by about 28 percent, from 52.43 million pounds to 65.88 million pounds (Table 7, p. 30).

In some counties, while the number of farms that engaged in tobacco production declined, acres of land in tobacco increased (Table A-2, Appendix). Similarly, output increased for each of the counties.

For the state, the number of farms that grew tobacco increased by 7.6 percent. This increase represents a higher increase than for the study area. Both acreage and output of tobacco for the state increased by approximately 23 percent. Yield per acre rose from 1,800 to 1,938 pounds, an increase of about 7.7 percent.

Soybean

More farms in the Upper East Tennessee Area grew soybeans in 1982 than in 1978. With the increase in the number of farms came a rise in the acreage planted. Acres of land planted in soybeans in the area rose from 9,644 to 16,734 acres (Table 10). During the same period, acres of farmland planted of soybeans declined slightly in the state, by 1.762 acres. While acreage declined, yield rose about 13 percent. Yield for the Upper East Tennessee Area also increased--in fact, almost doubled. Generally, farms that grew soybeans in the area constituted about 2 and 3 percent respectively in 1978 and 1982 of the total Tennessee soybean farms. Soybean acreage was less than 1 percent of total acreage in both years.

Table 10. Production of Soybean--State and Upper East Tennessee Area, 1978-1982.

Production	1978	1982
State:		
Number of farms	15,433	14,359
Acres of land	2,105,885	2,104,123
Total yield, bushels	49,101,186	55,353,433
Study Area:		
Number of farms	236	369
Acres of land	9,644	16,734
Total yield, bushels	250,268	489,919

Hay

Hay was an important crop from the standpoint of cash receipts and acreage. In 1978 the area farmers had 284,070 acres of hay, which fell by 6,405 or 2 percent in 1982. Nevertheless, the production of hay increased from 443,066 to 456,423 tons (Table 9).

Differences existed in the changes that occurred in the counties. Among the counties with an increase in hay production, Campbell had the highest increase of 20 percent, while Anderson and Roane counties experienced the lowest increase. On the other hand, production in Claiborne and Sevier counties declined by 17 percent each but declined by only 1 percent in Hawkins County.

Other Agricultural Crops and Products

This section covers three groups of crops and products:

1) vegetables, sweet corn and melon; 2) fruits and nuts; and 3) nursery and greenhouse products.

Vegetables and related crops were reported to be grown on 126 farms in the study area in 1982. These farms planted only 187 acres of vegetables, about 1.5 acres per farm. For the state, the acreage per farm of vegetables for commercial purposes was about 30 acres in 1982 and 32 acres in 1978, for the farms that grew vegetables.

In Tennessee, acreages grown of fruits and nuts in 1978 and 1982 were about half of those for vegetables. Nevertheless, acres of land grown of fruits and nuts increased from 6,590 to 7,433 acres. In contrast more acres of land were devoted to fruits and nuts than to vegetables in the study area. The per farm acreage was

approximately 4 acres in 1982 for the farms that produced fruits and nuts.

Nursery and greenhouse products were the least significant among the three groups of crops. That is in part because sufficient data were not available on this type of agricultural production. Fifteen out of the 21 counties in the area produced nursery and greenhouse products. Out of the 15 counties, however, only 6 reported the amount of land devoted to this type of production. Overall, 143 farms produced nursery and greenhouse products. According to the 1982 Census of Agriculture, 420,868 square feet of nursery and greenhouse crops were kept under glass or other protection and land area devoted to these crops in the open for the study area was approximately 255 acres.

Farms with sales of \$10,000 or more contributed most of the major crop production in the area (Table 11). This category of farms contributed more than 50 percent in both acreage and yield of the area's total production for each crop. An exception was tobacco whose share was 36 percent in 1978. In 1982, the total acreage for tobacco for this category of farms was 46 percent of the area's total. Nevertheless, yield of tobacco increased from 40 percent of the area's total in 1978 to 51 percent in 1982. During this period, yields for the major crops changed as follows: corn, 28 percent; wheat, 58 percent; tobacco, 65 percent; and soybean, 82 percent for farms with sales of \$10,000 or more.

Table 11. Production of Selected Crops for Farms with Sales of \$10,000 or More in Upper East Tennessee Area, 1978-1982.

Production	1978	Percent of Total Acreage in the Area Devoted to Each Crop		1982	Percent of Total Acreage in the Area Devoted to Each Crop	
Corn						
Acres of land	28,900	68		36,951	78	
Total bushels	2,251,174	72		3,212,721	81	
Wheat						
Acres of land	5,889	76		10,256	87	
Total bushels	204,304	78		322,293	88	
Tobacco						
Acres of land	9,556	36		15,885	46	
Total pounds	20,492,972	40		33,879,703	51	
Soybean						
Acres of land	7,950	82		13,437	80	
Total bushels	208,121	83		379,566	77	

Crop Sale

In 1982 the dollar value of all agricultural products sold in Tennessee was about \$1,260 million (Table 12). In 1978, total sales was approximately \$1,214 million. Both of these figures cover sales from livestock and crops. Crop and greenhouse products generated a total of \$572.5 million in 1978. That amount increased by 11 percent to \$638.2 million in 1982. In general, Tennessee experienced an increase in the value of crops and livestock sales per farm. The sales per farm were \$13,963 in 1978 and \$13,980 in 1982.

While sales per farm for the state increased, that of Upper East Tennessee Area declined. Sales per farm for the area was \$6,645 in 1978, and in 1982, it was \$7,332, a decline of about 4 percent. Total sales in the area constituted about 16 percent of the state's total in both 1978 and 1982. Like total sales, sales from crops and greenhouse products in the area accounted for an important part of the state's sales from these products. The area's share of sales of the products was 14 percent in 1978 and 15 percent in 1982. During the period, sales from these products in the area rose from \$79.3 million to \$96.4 million.

Revenues from grains in the area accounted for only 1 percent in 1978 and 2 percent in 1982 of the state's total sales from grain. Nevertheless, in the area, revenue from the sale of grains increased by 54 percent.

In the study area revenue from corn constituted the highest share of total grain sales, \$3.45 million, in 1982. Next to corn

Table 12. Value* of Agricultural Products Sold, Tennessee and Upper East Tennessee Area, 1978 and 1982.

Item	1978	1982
-----Million Dollars-----		
Tennessee:		
Total Sales	1,213.5	1,260.0
Crops including Nursery and Greenhouse Products	572.5	638.2
Livestock, Poultry and their Products	641.0	627.8
Upper East Tennessee Area:		
Total Sales	193.1	206.6
Crops including Nursery and Greenhouse Products	79.3	96.4
Livestock, Poultry and their Products	113.8	110.2

* Dollar adjusted for inflation to 1977 level.

was soybean which generated approximately \$1.63 million in sales. However, tobacco was the most important of all the crops, generating about \$57 million and \$60 million in sales in 1978 and 1982, respectively.

Table 13 presents the income from crops in 1978 and 1982. With regard to corn, wheat and soybean, no statistics were reported for the 1978 census year. In terms of increase or decrease in sales, the greatest change occurred with nursery and greenhouse products, whose dollar value increased by about 95 percent. Other changes in sales between 1978 and 1982 were: tobacco, 5.6 percent; hay and silage, -38.3 percent; vegetables, sweet corn and melon, -92.5 percent; and fruits, nuts and berries, -88.3 percent.

Table 13. Sales for Selected Crops, Upper East Tennessee Area, 1978 and 1982.

Crops	1978	1982
	-----Million Dollars-----	
Corn	--	3.45
Wheat	--	0.58
Soybean	--	1.68
Tobacco	57.13	60.31
Hay and silage	5.23	3.32
Vegetables, sweet corn and melon	3.05	0.23
Fruits, nuts and berries	0.94	0.11
Nursery and greenhouse products	3.09	6.02

* Dollar adjusted for inflation to 1977 level.

CHAPTER V

LIVESTOCK AND LIVESTOCK PRODUCTS, DISTRIBUTION AND CHANGES

Introduction

Livestock production is an important enterprise in Tennessee. This is shown by the number of farms that engage in livestock enterprises and the income generated. Even in the western part of the state, where crop production is very important, the production of livestock has shown significant strength.

Tennessee generated a total of about \$627.8 million (adjusted for inflation) from livestock and livestock products in 1982. This revenue accounted for 49 percent of total revenue generated from all agricultural products sold. Based on 1977 dollar value, the revenue generated in 1978 exceeded 1982 revenue by \$14 million.

The Upper East Tennessee Area generated more revenue from livestock and related products in 1978 than in 1982. The total market value of livestock and livestock products sold in 1978 exceeded the 1982 revenue by 3.6 million. In addition, the revenue generated in 1978 accounted for a higher proportion, 59 percent, of total sales from all agricultural products.

Cattle and Calves

Sales of cattle and calves produced more revenue than other types of livestock in the study area, generating approximately \$41

million in 1982 and \$49 million in 1978. Table 14 shows the number of farms producing different kinds of livestock and the number inventoried in 1978 and 1982. Between 1978 and 1982, the number of farms that produced cattle and calves increased. Similarly, cattle and calves increased numerically from 455,083 in 1978 to 525,133 in 1982. In spite of the increase, the number of cattle and calves sold in 1982 was less than in 1978. This decline in the number of cattle and calves was reflected in the revenue generated from sales which fell by about \$8 million (Table 15).

Cattle used for beef (beef cows) increased during this period. In 1982, 205,397 beef cows were kept by the area's farmers. This number amounted to an increase of 23,217 from the 182,180 beef cows on farms in 1978. On per farm basis, the number of beef cows in each year was 14.

Milk cows on farms were less than beef cows in both years. In 1978 and 1982 beef cows out-numbered milk cows by 126,587 and 149,307 respectively. Roughly 1,734 farmers kept from 1 to 9 heads of milk cows per farm while only 2 farmers had 500 or more milk cows in 1982.

According to the 1982 Census of Agriculture, 1,390 farms sold dairy products in 1982 and revenue from sales totaled \$46,782,143 in the same year. The number of farms which sold dairy products was 1,670 in 1978 compared to 1,390 in 1982. Although that was the case, revenue generated from dairy products was higher for 1982 than for 1978. Total revenue from dairy products for 1978 was \$44,051,376

Table 14. Livestock Inventory, Upper East Tennessee Area, 1978 and 1982.

Production	1978	1982
Cattle and Calves:		
Farms	16,629	18,284
Number	455,083	525,133
Hogs and Pigs:		
Farms	2,871	1,927
Number	58,191	45,733
Sheep and Lamb:		
Farms	90	115
Number	1,495	1,863
Poultry:		
Farms	3,293	2,675
Number of broilers	340,703	655,292
Number of 3 months old or older chicken	123,366	702,243
Number of turkey	1,243	1,731
Horses and Ponies:		
Farms	3,678	3,955
Number	9,998	12,652

Table 15. Livestock Sold, Upper East Tennessee Area, 1978 and 1982.

Production	1978	1982
Cattle and Calves:		
Farms	15,400	15,907
Number	242,583	229,537
Total Sales	\$49,426,613	\$40,542,759
Dairy Products:		
Farms	1,670	1,390
Total Sales	\$44,051,376	\$46,782,143
Hogs and Pigs:		
Farms	1,864	1,057
Number	117,294	92,833
Total Sales	6,508,065	6,226,897
Sheep and Lamb:		
Farms	65	100
Number	775	1,352
Total Sales	29,036	51,724
Poultry:		
Farms	520	465
Number	---	---
Total Sale	7,657,258	3,257,931
Horses and Ponies:		
Farms	418	434
Number	962	1,276
Total Sales	555,645	884,138

Dollar adjusted for inflation to 1977 level.

and revenue per farm selling livestock products were \$26,378 in 1978 and \$33,656 in 1982.

Hogs and Pigs

In terms of sales, hogs and pigs were next in importance to cattle and calves in Upper East Tennessee. As presented in Table 14, the number of farms that kept hogs and pigs declined during the period. Similarly, hogs and pigs inventoried fell from 58,191 to 45,733. The decline affected total sales which fell by \$281,168 or 43 percent.

In Both 1978 and 1982, Loudon County farmers sold more hogs and pigs than farmers from any other county in the area. In 1982, they sold more hogs and pigs than farmers from 13 other counties in the area combined. The revenue, \$2,970,000, generated from hogs and pigs in this county alone constituted about 48 percent of total revenue from hogs and pigs in the area. Jefferson County ranked second, contributing \$795,000 to the area's total sales. Blount County contributed \$720,000 and was ranked third. In absolute dollar terms, 11 counties in the area increased their revenues from hogs and pigs between 1978 and 1982 and only 7 counties (Anderson, Blount, Campbell, Cocke, Jefferson, Union and Washington) had more than 30 percent increase in revenue from sales of hogs and pigs.

Sheep and Lamb

Sheep and lamb as a livestock group ranked lowest in generating revenue from livestock sales in the area. Horses and ponies

ranked next to lowest, but even so, the revenue generated from horses and ponies in 1978 was about 19 times that of sheep and lamb. In 1982, the ratio was 17 to 1 in favor of horses and ponies. Nevertheless, the number of farms that kept sheep and lamb during the period increased. Similarly, the number of sheep and lamb reported in inventory increased.

More sheep and lamb were sold in 1982 than in 1978. The increase in the number of sheep and lamb sold was 577 or 74 percent. The bulk of the sales in the area in 1982 was concentrated in Johnson, Knox, Loudon and Roane counties.

Poultry

Poultry was divided into chicken production and turkey production. Chicken production comprised the production of 3 months old or older chicken and the production of boilers and meat type chicken. The number of farms that had poultry in the area fell from 520 to 465 between 1978 and 1982. Nevertheless, poultry generated more revenue than sheep and lamb or horses and ponies. As shown on Table 15, sales from poultry were \$7,657,238 in 1978 and \$3,257,931 in 1982.

During the period, the inventory of broilers fell from 655,292 to 340,703, a decline of 314,589 or 48 percent. Similarly, the number of broilers sold declined by 45 percent.

The inventory of 3 months old or older chicken in the area declined by 82 percent. Except for Johnson County, all counties experienced a decline in inventory. In 1978, only 10 out of the

21 counties in the area reported their stock of poultry sold and the number totaled 398,552, much higher than the number (39,968) sold in 1982.

Turkey as a poultry product contributed \$37,931 in sales in 1978 and \$66,290 in 1982. The revenues accounted for about 1 percent of total area sales in 1982 and about 9 percent in 1978.

Horses and Ponies

In both 1978 and 1982, more farms in the area kept horses and ponies than kept hogs and pigs, poultry or sheep and lamb. Approximately 9,998 and 12,652 horses and ponies were reported in inventories in 1978 and 1982, respectively. The area farmers sold 962 horses and ponies in 1978 and 1,276 in 1982. The revenue generated from the sales in 1982 was 59 percent higher than for 1978 (Table 15).

CHAPTER VI

CHARACTERISTICS OF OPERATORS, TENURE AND TYPES OF ORGANIZATION

Introduction

To completely present the changes that occurred in Upper East Tennessee agriculture, changes in types of organization, tenure and characteristics of farm operators were also measured.

This aspect of the area's agriculture is presented by sections in this chapter. The first section is concerned with the changes in the characteristics of farmers, measured by age and sex. The second section presents adjustments in tenure of operators, specifically the form of farm ownership, for example, full ownership, part ownership, tenants or combination of these. The third section shows the adjustments in types of organization, namely, individual or family held farms, partnerships, corporate farms, and others.

Operators Characteristics

The average age of Tennessee farmers was 52 years in 1978 and 52.3 years in 1982. Roughly, 1,992 Tennessee farmers were under 25 years of age while 20,244 farmers were 65 years or over. The largest number of farmers were between the ages of 55 and 64.

For the Upper East Tennessee Area, the average age of farmers was slightly higher than for the state. Between 1978 and 1982,

the average age of farmers for the area was approximately 53 years.

The number of farms controlled by females in this area between 1978 and 1982 increased slightly. Male farmers controlled 24,301 farms in 1982 and female farmers controlled 2,520. For females in 1982, the average acre per farm was 63 acres, while for males it was 75 acres.

Tenure of Operators

The number of farms operated by full owners rose by about 1 percent between 1978 and 1982 (Figure 3). However, acres of land under this type of tenure fell by about 1 percent (Figure 4).

Claiborne, Greene and Hawkins counties had a higher percentage of full owners than the other counties. Of the total acreage of 1.3 million for the area, these three counties had about 30 percent of the acres owned by full owners.

Unlike full owners, part owners operated more acres of land in 1982 than in 1978. Overall, they operated 4,911 farms in the study area in 1982. This number was an increase of 11.5 percent from the 1978 figure. For this group of farmers, acres of land harvested increased by 12 percent.

Tenants operated the least number of farms among the three groups of operators. Nevertheless, there was an increase of 256 tenant operated farms in the area from 1978 to 1982. Most of these farms were in Claiborne, Cocke, Greene, Hawkins, Knox, Sullivan and Washington counties.

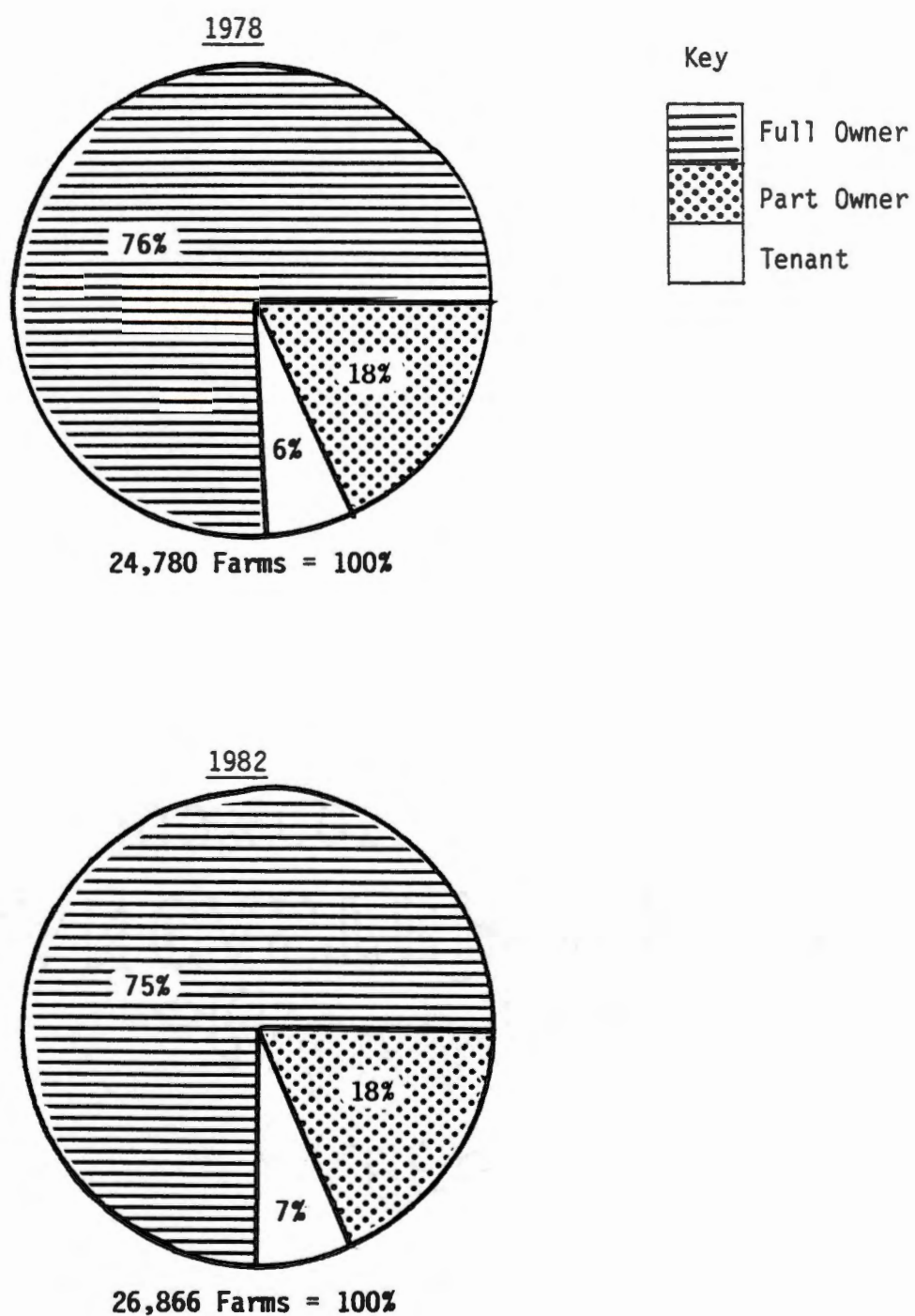


Figure 3. Farms by Tenure, 1978 and 1982.

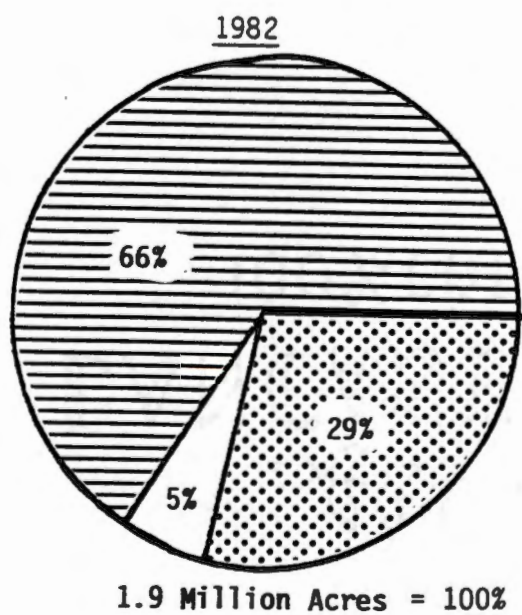
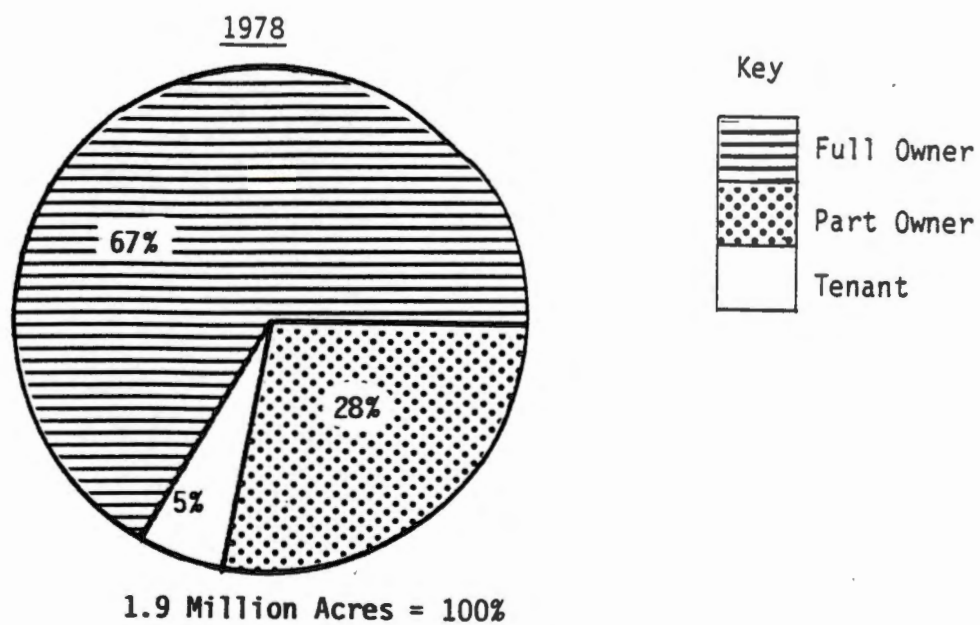


Figure 4. Acres of Land by Tenure, 1978 and 1982.

In general, more operators practiced farming as a principal occupation in 1982 than in 1978. However, more operators worked part of the time off farms than worked solely on farms. Table A-3 of the Appendix shows operators by days worked off farms for counties in the study area.

Types of Organization

In both 1978 and 1982, individuals or families operated the largest number of farms in the study area. Over the period, the number of farms operated by this group rose by approximately 8.9 percent, although the acreage changed very little (Table 16). The number of farms under partnership increased; however, acreage of land under partnership control declined.

There were more family held than non-family held corporate farms in the area. However, over the 1978-1982 period, the number of family held corporate farms declined by 27, whereas non-family held corporate farms increased by 16.

For the state as a whole, there was an increase in farms operated by each of the types of organization except corporations. There appeared to be a minor shift from family held to non-family held corporate farms. While family held corporate farms declined by 123, non-family held corporate farms increased by 44 (Table 17).

Table 16. Changes in Number of Farms and Acreage Operated---According to Type of Organization for Upper East Tennessee Area, 1978 to 1982.

Types of Organization	Number of farms		Percent Change 1978-1982	Acres of Land		Percent Change 1978-1982
	1978	1982		1978	1982	
Individual or family held	22,195	24,183	8.9	1,651,045	1,663,296	0.7
Partnership	2,424	2,511	3.6	180,773	257,284	-8.4
Corporation						
Family held	95	68	-28.4	8,593	3,459	-57.7
Non-family held	13	29	123.0	0	4,376	--
Cooperative estate or trust, institutional, etc.	33	75	127.2	6,117	10,456	71.0
Total	24,760	26,866		1,946,528	1,939,871	

Table 17. Changes in Number of Farms and Acreage Operated--According to Type of Organization for Tennessee, 1978-1982.

Types of Organization	Number of farms		Percent Change 1978-1982	Acres of Land		Percent Change 1978-1982
	1978	1982		1978	1982	
Individual or family held	77,317	80,881	4.6	10,282,364	10,069,981	-2.6
Partnership	8,868	8,910	0.5	2,047,590	2,052,586	0.2
Corporation						
Family held	529	406	-23.3	20,478	234,663	14.5
Non-family held	61	105	72.1	62,930	85,641	36.0
Cooperative estate or trust, institutional, etc.	135	263	94.8	83,047	61,666	-25.7

CHAPTER IV

SUMMARY

One fact about the adjustments that occurred in Upper East Tennessee agriculture is that there were significant changes between 1978 and 1982.

For the most part, there were interesting changes in the various land distributions and land use. The number of farms increased. Similarly, land in farms increased by about 5 percent. However, the average size of farm in the area and the state declined. This adjustment is in contrast to the expected trend, given the pattern of change during the last three decades. The number of irrigated farms in the area also declined. Although this happened, farmers in the area expanded their irrigated acreage. The bigger farms in the area, that is farms with sales of \$10,000 or more, accounted for the largest share of total land available. For these farms, land in farm, acreage of irrigated land, total cropland and total acreage of cropland harvested increased.

In terms of inputs, Upper East Tennessee farmers also made substantial adjustments. The value of land and building per farm in the area declined from \$83,002 to \$76,159. However, the area's farmers used more machinery and equipment which resulted in an increase of \$2.32 million for these inputs. For the area, the number of each machine or equipment item on farms was higher in 1982 than in 1978. The area farmers spent more money on hired labor than on contract labor during the period.

More money was spent on fuel and energy in 1978 than in 1982. During the period expenses for petroleum products fell by 14.3 percent. Gasoline and gasohol cost more in 1978 than in 1982. While this occurred, expenses for diesel fuel, LP gas and propane and natural gas increased.

The Upper East Tennessee Area engaged in the production of diverse crops during the 1978 to 1982 period. The major crops were corn, wheat, tobacco and soybean. It also produced other crops like hay and silage, vegetables, fruits and nuts and greenhouse products. Output for each of the major crops increased during the period. Specifically, corn production went up by 26 percent; wheat, 42 percent; tobacco, 28 percent; and soybean, 96 percent. The production of vegetables declined and more land was devoted to fruits and nuts.

Farms with sales of \$10,000 or more contributed the largest amount to total crop production in the area. For this category of farms, output for each of the crops increased between 1978 and 1982.

Sales from agricultural products in the area rose from \$193.1 million in 1978 to \$206.6 million in 1982 with tobacco accounting for the highest share. Revenue from this crop was 5.6 percent more in 1982 than in 1978.

In 1982, the inventory of cattle and calves was higher than in 1978. More sheep and lamb and horses and ponies were also inventoried in 1982 than in 1978.

Revenue from cattle and calves declined by 18 percent between 1978 and 1982. Similarly, revenue from hogs and pigs declined. However, revenue generated from horses and ponies increased.

The average age of Upper East Tennessee farmers was about 53 years during the study period. Most farmers in the area were 65 years or over and females operated more farms in 1982 than in 1978. In spite of that, males operated much more farms in comparison.

The number of farms under partnership increased and there were more family held than non-family held corporate farms in the area.

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REFERENCES

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APPENDIX

TWENTY-THREE POND

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Table A-1. Changes in Acres and Output of Corn for the Counties of the Study Area, 1978 to 1982.

County	Acres of Corn		Percent Change 1978 to 1982	Bushels of Corn		Percent Change 1978 to 1982
	1978	1982		1978	1982	
Anderson	153	420	175.0	8,355	34,296	310.5
Blount	4,378	4,902	12.4	356,282	445,933	25.2
Campbell	415	573	38.1	29,339	50,798	73.1
Carter	442	552	24.9	29,453	46,876	59.2
Claiborne	1,589	1,832	15.3	123,677	137,390	11.1
Cocke	3,423	3,280	-4.2	295,115	268,592	-9.0
Grainger	1,080	948	-12.2	66,957	78,091	16.6
Greene	6,609	7,696	16.4	396,688	594,391	49.8
Hamblen	1,984	1,776	10.5	136,966	151,623	10.7
Hancock	1,014	929	-8.4	79,811	66,527	-16.6
Hawkins	2,982	3,325	11.5	196,096	225,411	14.9
Jefferson	3,739	3,595	-3.9	280,323	342,978	22.4
Johnson	1,161	1,601	37.9	118,018	181,289	53.6
Knox	1,574	1,758	11.7	115,403	155,698	34.9
Loudon	1,574	2,471	57.0	130,731	219,563	68.0
Roane	534	716	34.1	41,793	49,845	19.3
Sevier	3,839	3,612	-5.9	289,168	296,484	2.5
Sullivan	2,390	2,319	-3.0	192,700	202,776	5.2
Unicoi	189	149	-21.2		12,492	-----
Union	261	359	37.5	18,293	25,836	41.2
Washington	3,983	4,818	21.0	237,990	375,376	57.7

Table A-2. Production of Tobacco, Upper East Tennessee Area, 1978 to 1982.

County	Number of Farms		Acres of Farm		Pounds of Tobacco	
	1978	1982	1978	1982	1978	1982
Anderson	110	143	139	187	219,660	310,509
Blount	303	363	405	672	753,131	1,265,873
Campbell	305	322	358	513	683,242	902,266
Carter	659	678	965	1,022	1,660,513	1,911,213
Claiborne	1,417	1,501	2,265	2,889	4,638,853	5,821,576
Cocke	957	1,034	1,685	2,045	3,055,391	3,573,908
Grainger	1,077	1,065	1,517	1,792	2,923,324	3,444,357
Greene	2,838	3,126	4,648	6,442	9,603,744	12,802,090
Hamblen	708	738	1,010	1,165	1,974,260	2,287,849
Hancock	716	749	1,150	1,331	2,319,815	2,622,960
Hawkins	1,719	1,878	2,383	3,145	4,644,570	6,270,082
Jefferson	978	997	1,445	1,564	2,824,025	3,109,397
Johnson	849	900	1,146	1,463	2,367,667	2,884,043
Knox	393	431	553	800	1,014,285	1,447,780
Loudon	330	410	469	719	853,156	1,400,595
Roane	146	185	209	318	331,801	551,671
Sevier	709	743	1,102	1,363	2,016,159	2,634,158
Sullivan	1,161	1,249	1,390	2,013	2,702,360	3,834,485
Unicoi	316	319	397	592	759,484	1,162,233
Union	516	526	857	866	1,567,691	1,608,993
Washington	1,548	1,573	2,304	2,978	4,521,322	6,035,021

Table A-3. Operator by Days Worked Off Farm, Upper East Tennessee Counties, 1978 and 1982.

County	1 to 49 Days		50 to 99 Days		100 to 149 Days		150 to 199 Days		200 Days or More	
	1978	1982	1978	1982	1978	1982	1978	1982	1978	1982
Anderson	29	24	16	20	12	19	22	14	234	270
Blount	74	75	26	22	28	44	44	40	492	585
Campbell	40	17	11	10	11	16	27	36	203	224
Carter	53	39	36	30	18	35	39	60	450	433
Claiborne	151	112	51	72	59	80	94	111	631	629
Cocke	94	73	39	49	15	40	44	74	465	490
Grainger	69	91	47	32	37	50	68	72	579	540
Greene	202	246	117	106	120	119	189	194	1,523	1,716
Hamblen	47	51	24	22	21	27	45	52	404	453
Hancock	87	98	35	34	47	27	61	36	218	222
Hawkins	146	135	48	60	73	63	90	74	947	1,021
Jefferson	82	78	35	40	31	44	52	54	633	655
Johnson	76	48	36	31	17	34	41	87	415	398
Knox	60	60	47	36	41	42	43	57	642	714
Loudon	49	33	14	23	13	18	24	32	355	392
Roane	33	36	12	15	9	23	17	25	266	313
Sevier	76	65	33	35	30	28	65	53	481	520
Sullivan	77	88	30	30	32	27	62	71	804	818
Unicoi	19	30	81	11	11	4	18	21	172	156
Union	40	39	31	22	21	25	35	51	288	273
Washington	123	125	54	50	59	59	94	100	843	893

VITA

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