Types of Farming in Texas

TYPE-OF-FARMING AREAS IN TEXAS

1. Northern High Plains
2. Canadian Breaks
3. Southern High Plains
4. Rolling Plains and Prairies
5. Mountains and Basins
6. Upper Rio Grande Valley
7. Edwards Plateau and Central Basin
8. South Texas Plain
9. Lower Rio Grande Valley
10. Coastal Bend
11. West Cross Timbers
12. Grand Prairie
13. Blackland
14. East Texas Farming
15. East Texas Timber
16. Post Oak
17. Coast Prairie

THE AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS
TEXAS AGRICULTURAL EXPERIMENT STATION
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FOREWORD

This publication is a revision of Texas Station Bulletin 544, "A Description of the Agriculture and Type-of-farming Areas in Texas." Drastic changes have taken place in Texas agriculture since 1937, when Bulletin 544 was published.

The number of Texas farms has declined 4 percent since 1937, the farm population is less than half, the average size of the farm unit has doubled and there has been a substantial change in the scale of production and in the methods of operation of the various crop and livestock enterprises.

Some of the more important forces contributing to these changes have been the development of power and machinery to make possible the mechanization of practically every farm operation; the adaptation of airplanes for distributing seed, fertilizers, insecticides and herbicides; hybrid plants and animals combine varieties of grain sorghum; artificial drying of crops; improvements in feed conversion; improvements in fertilizers and insecticides, fungicides and other agricultural chemicals; greater use of electricity and refrigeration; many more farm-to-market roads; greatly increased employment opportunities off the farm; and the shifting of many processing and marketing functions from the farm to urban centers.

This bulletin reports the results of a study of the differences in Texas agriculture which arise from the efforts of farmers and ranchmen to adapt their operations to natural conditions of land and climate and to economic conditions reflected in costs and prices. By studying these differences and relating them to the forces operating to produce them, we learn much about the agricultural problems of each area and, consequently, of the total agriculture of the State.

The objectives of the study were to provide (1) background information for more detailed farm management research, (2) limits within which generalizations from other research may be made safe, (3) a basis for orienting persons with Texas agriculture, (4) information needed by agricultural and business firms for planning purposes and (5) help for teachers in acquainting their students with the nature and variety of management problems confronting farmers and ranchmen.

For these purposes, Texas has been divided into 17 major areas, 8 of which are divided further to give a total of 29 areas and sub-areas. The physical, biological and economic factors that help to determine types of farming are discussed. The distribution and trends of each of the various alternative uses of agricultural resources are reviewed, and each of the 29 areas and sub-areas is described as to its resources, the use of land, trends in the use of land, types of farming and probable future developments. Numerous maps, charts and pictures are used to give a better understanding of Texas agriculture.
Types of Farming in Texas

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Texas agriculture involves the production of a great variety of crops and livestock. This diversity is related directly to wide differences in soils, climate and topography over the State. These factors largely determine the broad uses of land—cropland, woodland and pasture—and greatly influence the crops grown and the kinds and numbers of livestock kept.

Biological influences, such as genetics, insect pests and diseases, are linked closely to these purely physical factors and modify their effects. The choice of production lines under these environmental limitations is influenced also by numerous economic factors, including transportation facilities, labor, available capital or credit and relative prices and costs, which determine the profits of an enterprise or combination of them.

The individual producer's aptitudes, personal preferences and circumstances determine, within limits, the choice of production lines on an individual farm. But for an area as a whole, these factors are not so important as the physical and economic factors.

Changes in demand also cause changes in the different crops grown and the animals produced. For example, the substitution of vegetable oils for animal fats has caused substantial modifications in the dairy and hog enterprises.

Government programs have played a large part in determining crop and livestock patterns during the past 25 years. The expansion of industry in some areas also has changed farming types substantially.

Adapting production and production methods to the natural environment and to economic and social factors is a continuous process. Physical limitations at any given time may be offset partly or entirely at some future date. For example, lack of rainfall may be overcome through the development of irrigation.

Other limitations may be removed by improving the drainage, by land leveling, by clearing or by adding fertilizer. Technological developments which increase yields, improve quality or reduce the cost of a product often lead to readjustments in land use and in production practices.

The most important development which has revolutionized Texas agriculture during the past 30 years is mechanization, which includes the all-purpose tractor, mechanical harvesting equipment, improved irrigation pumps and motors, the use of airplanes to distribute seed, fertilizers, insecticides and herbicides, plus the general availability to farmers of electricity and refrigeration. In addition, hybrid plants and animals, combine varieties of grain sorghum, artificial drying of crops, better quality commercial fertilizers, improvements in feed utilization, improvement of farm-to-market roads and more opportunity for off-farm employment all played a part.

This publication is a revision of Station Bulletin 544, "A Description of the Agriculture and Type-of-farming Areas in Texas." Presented herein are graphic illustrations of Texas agriculture supplemented by sufficient discussion to give the reader a broad understanding of the varied lines of agricultural production in the State. The major factors that have influenced the development of Texas agriculture are first presented by graphics with explanatory discussions. This provides the background for a series of charts with a discussion of the present geographic distribution and trends in production of the various crop and livestock enterprises. Then the State is divided into areas within each of which physical resources, farming systems and production practices are highly uniform. A brief description and explanation of each area is given with emphasis on the type or types of farming prevailing in it.

1954 Trends Have Continued

The trends described herein have continued since 1954. According to the 1959 Agricultural Census, the number of farms in Texas decreased 22.5 percent, or a total of 66,000 of which 15,000 resulted from a change in the census definition of a farm. Farms have become larger, more specialized and more dependent on off-farm sources of income than in 1954. The average size increased from 498 to 630 acres. Farms reporting cattle decreased 25 percent, milk cows 50 percent, hogs 30 percent, chickens 40 percent, turkeys 50 percent and cotton 35 percent. Associated with a 60 percent increase in the average value of farms, the number of owner and tenant-operated farms decreased, while part-owners and managers increased in relative importance. Forty-three percent of all farms had more off-farm than on-farm income, as compared with 38 percent in 1954.
FACTORS INFLUENCING TEXAS AGRICULTURE

Physical Factors

Soils, topography and climate are the three physical factors that have the greatest effect on agricultural production in Texas. The size of the State (168,648,320 acres - 263,514 square miles—and an approximate span of 800 miles between its east and west and north and south extremities) produces wide variations in these factors.

Soils

Soils affect the types of farming mainly through their influence on the physical adaptation of crops. Because of specific biological characteristics and habits of growth, some crops are affected particularly by the depth and texture of the soil, by its plant food content, by its water holding capacity or by the height of the water table. It is a question, however, of relate

GENERALIZED SOIL MAP OF TEXAS
SOIL CONSERVATION SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE
In Cooperation With
TEXAS AGRICULTURAL EXPERIMENT STATION
1959

Figure 1. Texas is subdivided naturally into 14 geographic areas on the basis of differences in surface features, related soil types and native vegetation. These 14 areas are further divided into 45 sub-areas in which the soil series are closely related and adapted to similar use.
rather than absolute adaptation. Almost any crop will make some growth on any type of soil, provided ample soil moisture is available, but certain crops do better on a particular type of soil and for this reason are grown in preference to others. For example, rice production in Texas is concentrated on the flat, slowly permeable soils of the Coast Prairie. Winter grains and short-season crops are grown rather than cotton and other long-season crops on the shallow clays and clay loams in North Central Texas. On the light sandy soils of West Texas, grain sorghum is grown in preference to wheat or cotton since the latter are destroyed frequently during the spring by wind-blown sand. A grain sorghum crop, however, can be planted and will mature after the end of the windy season.

In parts of the Lower Rio Grande Valley, a high water table may bring salt into the root zone and injure or destroy citrus trees and affect seriously the production of other salt-sensitive crops.

A soil may be low in fertility, but if it has characteristics favorable to the use of commercial fertilizers it may be highly prized for the production of some specialty crop such as peanuts or watermelons.

The wide range in types of soil in Texas (Figure 1) has had a marked influence on types of farming,
Figure 3. Average annual rainfall in Texas, 1931-55, ranged from more than 50 inches in Southeast Texas near the coast to less than 10 inches at El Paso. Adapted from Texas Agricultural Extension Service-Texas Agricultural Experiment Station Leaflet 232.

as will be pointed out in the discussion of the agriculture of each area.

Topography

The character of the surface of the land also affects the type of farming followed. The character of the surface may determine, to a considerable extent, the amounts of inter-tilled crops grown. Rapid run-off on sloping land results in the loss of valuable moisture and top soil and may force a particular type of cropping or increased terracing to minimize water loss and the effects of erosion.

Aside from the question of moisture and erosion control, there is the additional problem of utilizing the non-tillable land that results from an uneven or broken topography or from inadequate drainage. Large amounts of non-tillable land in a particular area force some farms to include livestock production in their systems of land use. This in turn also may affect the use of the tillable land on these farms.

Elevation is associated closely with topography. Texas generally slopes to the south and east at the rate of 5 to 6 feet per mile. All main streams flow in these general directions. The elevation rises from sea level on the coast to more than 4,000 feet in the northwestern part of the Panhandle, and to more than 5,000 feet west of the Pecos River, Figure 2.

The mechanization of agriculture has increased greatly the importance of topography as a factor that affects types of farming. Mechanization also has greatly increased the use of smooth, open prairies and plains rather than the more rolling, hilly and wooded portions of the State for crop production. Consequently, cash crop production has become more and more concentrated in these open areas, while farm operators in the other areas have turned to the production of livestock and livestock products and off-farm employment.

Climate

Climatic factors, particularly rainfall and temperature, largely determine the range of crops that may be grown successfully in a given area. Rainfall somewhat affects the choice of cropping systems, but in total amount and in its seasonal distribution. The amount of rain which falls during the critical growing season is important in determining whether certain crops will be grown in many sections of Texas. Year-to-year variations in rainfall also are important.

Average annual rainfall in Texas ranges from more than 50 inches in the southeastern part near to Louisiana and the Gulf of Mexico to less than 10 inches in the extreme western part, Figure 3. In general, the amount of rainfall decreases gradually and the variation from year to year becomes greater from the north and east to the south and west. For example, at Longview, where the average annual rainfall is more than 43 inches, the variability is 12 percent, whereas at Big Spring the rainfall averages about 18 inches and the variability is almost 40 percent.

Rainfall affects crops by its seasonal distribution, by the rate of evaporation and by the amount of runoff. The rate of evaporation, especially in the southern and western parts of the State, is so high that much of the summer rainfall is only slightly effective. The amount of runoff is determined by the nature of the topography, by the texture of the soil and by the vegetative cover. In years of average or above-average rainfall, much of the precipitation may come during one or two torrential-type storms. At such times, a large part of the moisture is lo
in runoff. Occasionally the rainfall from one storm equals the annual average of that locality.

Production limitations because of insufficient rainfall or its poor seasonal distribution may be overcome by irrigation, provided water can be obtained at reasonable cost.

Temperatures affect crop production in many ways, but mainly through the length of the growing season, Figure 4. The average frost-free period ranges from more than 300 days in the Lower Rio Grande Valley to about 180 days in the northwestern part of the Panhandle. In the former area, a great variety of crops is produced, ranging from citrus fruits and winter vegetables to cotton, corn and grain sorghum. In the latter, the choice is limited for the most part to winter wheat and grain sorghum. Very little cotton is grown where the frost-free period averages less than 190 days. The relationship between elevation and length of frost-free periods is shown clearly in Figures 2 and 4.

The average date of the last killing frost in the spring at Brownsville in the southernmost tip of the State is January 30, Figure 5, and the first in the fall is December 26, Figure 6. In the northwestern part of the Panhandle, the average date of the last killing frost in the spring is April 15 while the average date of the first in the fall is October 20. The dates of the last and first killing frosts and the length of the growing season vary greatly. For example, there is a difference of 112 days between the shortest and the longest growing season reported at Brownsville. At the same station, the latest killing frost reported in the spring was 6 weeks later than the average and the earliest in the fall almost 6 weeks before the average date. This wide variation in the occurrence of the first and last killing frosts and in the length of the growing season is one of the greatest hazards to cold-sensitive crops. Often, early spring vegetables are destroyed or their maturity delayed by late frosts. Along the northern fringes of the cotton belt, the quality of cotton may be lowered substantially by an early frost, and a prolonged period of below-freezing temperatures may be disastrous. Such was the case in 1951 when an unusually hard freeze in the Lower Rio Grande Valley destroyed 85 percent of the citrus trees and 98 percent of the citrus crop.

**Biological Factors**

Insect pests, parasites and diseases affect the character of agriculture through their effects on yields and costs. Insects may completely destroy a crop or reduce yields below profitable levels during some seasons, if not controlled. The cost of controlling insects, parasites or diseases may discourage the production of a particular crop or class of livestock.

The development of a new variety or strain of a crop with higher yield, greater disease resistance or better adaptation to mechanical harvesting may result in a great increase in the acreage of this crop at the expense of others. Grain sorghum is a good example. The development of combine types and the recent introduction of hybrids have resulted in making grain sorghum the principal feed crop of Texas and the Southwest. New varieties of cantaloupe have made that crop important in the Lower Rio Grande Valley and other parts of South Texas in recent years. The use of antibiotics and hormones to improve feed conversion in poultry and livestock plus the growing use of artificial insemination of livestock also have caused marked changes in the relationship of these enterprises to each other and to cash-crop production.

Figure 5. There is a difference of almost 3 months in the average date of the last killing frost in the spring between the northwest and the southernmost part of the State (U. S. Weather Bureau).

Figure 6. Average date of the first killing frost in the fall comes about 9 weeks earlier in the Texas Panhandle than it does in the Lower Rio Grande Valley (U. S. Weather Bureau).
Economic and Sociological Factors

Soils, topography and climate establish the physical limits within which a crop or type of livestock may be grown. Whether the crop actually is grown or the extent to which it is grown depends on a number of factors the effects of which are felt largely through prices and costs. Market demands took precedence over home needs, and relative costs and returns became primary factors that influenced the choice of farm enterprises as agriculture changed from a self-sufficient home industry into a highly commercialized undertaking.

Important economic forces that help to explain the kinds of agriculture found in various parts of the State include the size and nearness of markets, transportation facilities, availability of labor and capital, size of farms and land tenure arrangements.

Markets

A rapidly growing population and industrial growth and a related decline in the farm population have resulted in greatly enlarged local markets for farm products. The total population of Texas was estimated by the United States Bureau of the Census to be 9,493,000 on January 1, 1959. This represents an increase of 3,668,000 since 1930. The rate of population growth has been increasing in recent years, probably stimulated by World War II and postwar developments. Between 1930 and 1940, the increase was 10 percent and from 1940 to 1950, it was 20 percent. The present trend suggests that the total population increase from 1950 to 1960 will be approximately 25 percent. A continuation of the present rate of increase would mean a total population for Texas of approximately 12 million by 1970.

While the total population has increased, the number of people living on farms has decreased by more than half since 1940. In 1930, about 40 percent of the Texas population lived on farms while the present farm population is about 11 percent of the total. This trend is referred to sometimes as "the rise of the cities." It has been accompanied by many changes in the production and marketing of farm products. Production has become more specialized while processing and marketing functions formerly done on the farm have been shifted to the towns and cities. This shift is so great that a large part of the economic activity of these population centers now is based on products originating or destined for use on farms and ranches. Added to these functions are many new services that center around food products which formerly were home activities, such as fruit and vegetable canning and pre-cooked food.

Approximately two-thirds of the Texas population is located in that part of the State which recei ves 30 or more inches of rainfall, and represents less than one-third of its total area, Figures 7 and 3. In 1950, the population in this area was 60 persons per square mile, as compared with 15 people per square mile in the rest of the State. A large portion of our natural resources, such as timber, oil, gas, sulphur, water and iron, are in this more densely populated part. Industries also develop most rapidly and the principal markets are located here. It is in this portion also that most of our perishable products are produced. See also Figures 28, 29, 32, 36, 37 and 38. In general, bulky and perishable products of relatively low unit value tend to be produced closer to markets than bulk yarn, the products which can be shipped cheaply long distances without loss in quality. This tendency has been overcome to a large extent in recent years through improvements in transportation facilities and methods of food preservation.

Transportation

The development of transportation facilities has contributed greatly to Texas agricultural progress. In the early history of Texas, agricultural produce moved to primary markets by crude river craft or overland by animal power. For example, wheat and cotton grown in North Texas were moved by ox team to Jefferson and thence to New Orleans by water.

The cattle drive was an important link in the chain of transportation development in Texas. Grazing numbers of cattle had accumulated during and immediately following the Civil War. Practically the only market for cattle was for their hides and tallow. In the search for markets, cattle were driven as far west as California, as far east as Alabama, and as far north as Montana. While the drive was important in the total movement of cattle for only about 5 years, it is credited with saving the State from bankruptcy and with stocking the ranges of the Great Plains.

Railroad construction started in 1851 and, except for the interruption by the Civil War during the early 1860's, it spread rapidly to serve much of the State.
Farming spread out from the main streams to the interior with the development of the railroad systems and in response to broadening markets. However, cattle were being trailed out of Texas across Indian Territory to shipping points in Kansas and to ranches on the Northern Great Plains as late as 1890.

Truck transportation accompanied by highway improvement added flexibility to the transportation system and reduced the time products are enroute to markets. Rapid means of conveyance supplemented by refrigeration have broadened markets for perishables and greatly improved the quality of the products reaching the market. Truck transportation over good highways has brought about many important changes in livestock marketing and lessened marketing costs in some areas.

All-weather roads are more important to some types of farming than others. They are especially important to products which must be picked up or delivered regularly and promptly, such as fluid milk, poultry, eggs and fresh vegetables.

**Labor**

The labor supply is an important factor that affects the nature of farming. The availability of low-cost labor in South Texas and across the Rio Grande in Mexico had much to do with the development of winter vegetable production in that part of the State. The relatively high ratio of population to land and the lack of other types of employment in the timbered portions of the State tended to limit those areas to small-scale, intensive types of cotton, vegetable and fruit production.

The available supply of farm labor was greatly reduced by the demands for military manpower with the outbreak of World War II and increased employment in expanded industrial centers. This demand for industrial labor continued during the postwar period and provided job opportunities for many under-employed farm people.

Farm wage rates increased by more than 500 percent during this time, while prices paid for all commodities used in production, including machinery, increased about 100 percent. The effects on agriculture have been spectacular. There are now less than half as many people on Texas farms, more part-time farming and a greater dependence of farmers on outside sources of income. In 1954, more than half the farm families in the timbered portion of East Texas and in the highly industrialized portion of the Cost Prairie received more than half of their income from sources other than the sale of farm products. As people left the farms and farm labor became relatively high priced and scarce, the remaining farmers shifted land to less intensive uses or substituted machinery and other forms of capital for labor. Machines are now used to a large extent for practically every farm operation. It is expected that these trends will continue. Large amounts of seasonal labor are used for weed control and cotton harvesting. As such labor becomes scarce and relatively more expensive, more machinery and chemicals will be used in these operations. An important factor contributing to the rising cost of seasonal labor is the activity of the United States and Mexican governments on behalf of the Mexican Nationals who cross the Rio Grande each year for employment on Texas farms. There also is growing concern over the social conditions surrounding all transient workers and their families. Solution of these problems will tend to decrease the number of transient workers and increase wage rates.

**Land Tenure**

A noticeable relationship exists between tenure groups and types of farming. It is not always clear which is cause and which is effect. A number of historical developments have had a significant influence on land tenure in Texas. Early land policies that featured large grants of land to individuals, corporations and institutions resulted in the establishment of many large ranches and landed estates. Although many of these tracts have been broken up into smaller ranches and farms, some of them remain.

Fifty-two percent of Texas farms in 1954 were owner-operated, 21 percent partly owner-operated, 26 percent tenant-operated and less than 1 percent were operated by hired managers. Fifty percent of all the land in farms and ranches was owner-operated. Some of these owner-operators leased additional land which gave this group control of 72 percent of all the land in farms.

The importance of tenantry in Texas has paralleled closely the rise and decline of the acreage planted to cotton. Both reached a peak around 1930 when tenants operated more than 60 percent of all farms and a third of all farmland. Tenants in 1954 operated less than 18 percent of the land in farms and ranches. Tenants are most numerous today in the principal cotton-producing areas such as the High and Rolling Plains and the Blackland.

The amount of land operated by managers also reached a peak about 1930 and has declined since. In 1954, managers operated less than 11 percent of all land in farms and ranches, as compared with 16 percent in 1930.

Agricultural adjustment programs, rapid industrial progress providing off-farm employment, numerous technological changes, particularly in the field of farm machinery, and the related increase in capital requirements for farming contributed to these changes in tenure. Rent payment by a share of the crop is the common method on farms producing cotton, wheat and general field crops. Cash rentals are most common on grasslands and on lands that feature dairy production or specialty crops such as rice, peanuts and tomatoes. With the drop in cotton acreage and tenancy generally on the decline, both types of arrangements have decreased. Share leasing has declined much more than cash leasing. In 1930, share rent was paid on 71 percent of the tenant-operated...
Figure 8. Tractors on farms in Texas, 1954 (U. S. Census). The distribution of tractors is almost identical to the distribution of harvested cropland (Figure 14.) Tractors and trucks have almost completely displaced horses and mules as the motive force on Texas farms.

land, while in 1954 this type of payment was made on only 56 percent of such land.

Number and Size of Farms

Changes in the number and size of farms have been associated closely with the changes in tenure. Farm numbers decreased by more than 200,000 during 1930-54, from about 495,000 to about 293,000. During this same period, tenant farms, including croppers or half-hands, decreased from 301,000 to 76,000 and manager-operated farms from 3,300 to 1,900. The number of owner-operated farms remained about the same, while part-owners increased from less than 38,000 to more than 63,000.

The average farm size increased in all tenure groups, the owner group by 21 acres, part-owner by 386 acres, manager-operated by 1,700 acres and tenant

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<th>Economic class</th>
<th>Number of farms</th>
<th>Acres land in farms</th>
<th>Acres cropland harvested</th>
<th>Acres per farm</th>
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</table>

Value of products sold (1) $25,000 or more. (2) $10,000-$24,999. (3) $5,000-$9,999. (4) $2,500-$4,999. (5) $1,200-$2,499. (6) $1,199, provided the operator worked off the farm less than 100 days or provided the family’s income from outside sources was less than the value of farm products sold.
Equal 100,000

Figure 11. Cash paid for machine hire on Texas farms, 1954 (U. S. Census). Machine hire includes custom operations which in turn include substantial amounts of labor.

In 1954, less than 5 percent of all farms sold products valued at $25,000 or more, while 76 percent reported sales of less than $5,000. About half of the latter group were part-time or residential farms and all of them sold less than $1,200 worth of farm products in 1954.

The close relationship between physical size and the volume of sales is shown in Table 1. The three groups with sales of $5,000 or more made up only 31 percent of the farm number and had control of 70 percent of the land resources, whereas all other farms, including part-time and residential, had at their disposal the remaining 30 percent. Part-time and

residential farms accounted for 38 percent of all farms and operated only 7 percent of the farmland and 3.5 percent of the harvested cropland.

Capital

Capital requirements for farming in Texas rose sharply during and after World War II. Rising land values, larger farms and increased dependence on machinery and other forms of capital account largely for the increase.

Figure 12. Cash paid for fuels and oils on Texas farms, 1954 (U. S. Census). Farmers are large users of fuels and oils. Petroleum products are the source of the greater part of power used on Texas farms.

Figure 13. Cash paid for commercial fertilizers on Texas farms, 1954 (U. S. Census). Commercial fertilizers were used on more than 4.5 million acres of crops in 1954. Principal crops fertilized are hay and pasture crops, cotton, corn, rice, fruits and vegetables.
The value of land and buildings per acre more than trebled during 1940-54, and the value per farm increased from approximately $6,000 to more than $29,000. For commercial farms, the average value of land and buildings was more than $42,000 in 1954. This excludes part-time and residential farms.

Data are not available to show the amount invested in machinery and other forms of capital, but the number of tractors rose from approximately 99,000 in 1940 to about 277,000 in 1954, Figure 8. Motor trucks increased from 57,000 to 190,000 and all types of machines increased in size, complexity and unit cost.

The combined annual expenditures for hired labor, feed, fuel and fertilizer in 1954 was $585 million, as compared with $121 million in 1940. Figures 9, 10, 11, 12 and 13. All indications point to a continuation of these trends since 1954. The increase in capital requirements has resulted in a higher degree of specialization in the production of most agricultural products. Specialization reduces the number of machines needed and permits the farmer to make more efficient use of the machinery owned. A growing number of farmers have kept down their investment in machinery by employing others to perform some operations on a custom basis, Figure 10.

High capital requirements partly explain the recent growth of owner and part-owner operation of farmland and the shift away from tenancy.

LAND USE IN TEXAS

The 1954 census shows 145,812,733 acres, or 86.5 percent of the total land area of Texas, are in farms and ranches. The remainder is woodland not in farms, parks, military land, highways, cities and stream beds.

Approximately 25 percent of the farmland, or 36,659,302 acres, is classed as cropland, 73 percent as pastureland and less than 1 percent as woodland not pastured. The balance of slightly more than 1 percent is in farmsteads, farm roads and wasteland.

Approximately two-thirds of the land classed as cropland was harvested in 1954, about one-fifth was used only for pasture, and the balance was neither harvested nor pastured (idle, fallow or crop failure).

Eighteen percent, or about 4.5 million acres of the harvested cropland, was irrigated in 1954, Figure 14. An additional 200,000 acres of pasture land also were irrigated.

Crop production is concentrated largely on the smoother portions of the plains, the prairies and the larger river bottoms, Figure 15. This concentration has grown with increased use of irrigation and with the trend toward large scale, mechanized farm operations.

Distribution of Cropland

Cotton

Cotton continues to be the leading cash crop in Texas, despite a greatly reduced acreage since 1930. The value of cotton and cottonseed has exceeded the value of all other crops sold during the past several years. It also has exceeded the value of all livestock

Figure 14. Distribution of irrigated land in Texas, 1954 (U. S. Census). The acreage of irrigated land increased from 798,000 in 1930 to 4,707,000 in 1954. Most of this increase was from ground water on the High Plains and in the Trans-Pecos region.

Figure 15. Distribution of the harvested cropland in Texas, 1954 (U. S. Census). There has been a pronounced shift of the acreage of harvested crops from the naturally wooded sections to the more fertile open prairies and plains and from dryland to irrigated land.
and livestock products sold. Cotton accounted for 30 percent of the total acreage of crops harvested in 1954. The greatest concentration of cotton acreage is on the High and Rolling Plains, the Blackland, the Coastal Bend and the Lower Rio Grande Valley, figure 16. After World War II, the acreage and production of cotton increased in the irrigated areas and decreased in the dryland areas. The shift in production locations has been more pronounced because of the relatively higher per-acre yields of irrigated cotton. For example, the three areas that had a large part of the irrigated cotton acreage produced 33 percent of the Texas crop in 1954, as compared with 26 percent in 1944. During this same period the shift in acreage was from 24 percent of the total in 1944 to 33 percent in 1954. Drought and the lifting of acreage allotments during the war and postwar periods also were important factors in these shifts.

After the Civil War, the cotton acreage rose almost continuously until 1914, leveled off during World War I and then rose sharply to its all-time peak of almost 18 million acres in 1926, Figure 17. Since this period, the trend generally has been downward. Agricultural adjustment programs, the scarcity of farm labor during the war and prolonged periods of drought have been important contributing factors. The change in this country from a debtor to a creditor position after World War I was the basic cause. Because of this change, dollar exchange became scarce in foreign countries which made it difficult for them to purchase our surplus cotton. The strong competitive position of cotton relative to other field crops is indicated by the extent to which the acreage rebounds when acreage allotments are suspended. Note particularly 1937, the late 1940's and during 1951-53.

From the 4-year period (before acreage control programs), 1929-32, to the recent 4-year period of acreage control programs, 1954-57, the average of the cotton acreage harvested annually in Texas decreased 36 percent while production dropped only 15 percent. Some 995,000 farms reported the production of 170,000 bales of cotton in 1929. In 1954, with only 120,000 farms reporting cotton, the production was 158,837 bales. Thus less than one-third as many farmers produced almost as much cotton in 1954 as was produced in 1929. The production per farm averaged 9.6 bales in 1929 and 28.2 bales in 1954, an extremely dry year. Per-acre yields have doubled since 1929. This resulted from the selection of the best lands for cotton, from using more fertilizer, from irrigating more cotton land and from the shift of cotton production to more productive areas. For example, the cotton acreage in 24 Northeast Texas counties in 1958 was less than 5 percent of the 1928 acreage, whereas in the Lower Rio Grande Valley, Texas 18 percent and on the High Plains 135 percent of the 1928 acreage.

The extent of irrigated land increased from less than a million acres in 1929 to 4,700,000 acres in 1954. Much of this increase occurred on the High Plains where cotton is the principal crop irrigated.

Wheat

Wheat ranks next to cotton and grain sorghum in importance in Texas cropping systems. In 1954,
wheat occupied about 13 percent of the harvested cropland. In addition to providing cash income from the sale of grain, wheat makes a substantial contribution to livestock production by providing fall and winter grazing for cattle and sheep.

The wheat acreage is concentrated largely on the clay and clay loam soils of the High and Rolling Plains, Figure 18. A minor concentration exists on the Grand Prairie and on the northwestern part of the Blackland. Most of the wheat produced in Texas is grown in the northwestern part of the State where the average annual rainfall is below 30 inches and varies sharply from year to year and during a given year. As a consequence, much of the acreage is not harvested some years. The average amount not harvested during 1948-57 was 40 percent of the total seeded acreage. Production ranged from 14 million bushels in 1955 to about 90 million bushels in 1949.

During a period of almost 50 years before World War I, the wheat acreage harvested in Texas exceeded a million only three times. During and following World War I, it more than doubled. The trend in wheat acreage harvested generally was upward from the middle 1920's until 1950 when acreage allotments and drouth greatly reduced it, Figure 17. Many factors contributed to the increased importance of wheat. Wheat is a low labor-requirement crop to which growers turn quickly during wartime periods when prices are high and labor scarce and costly. The introduction of small combines and the improvement in tractors and other machinery after World War I greatly improved the competitive position of wheat and resulted in its rapid expansion in the high-risk areas. The peak of both acreage and production occurred in 1947 when 7,300,000 acres and 124 million bushels of wheat were harvested.

Rice

Almost 28 percent of the 1945-54 rice crop in the United States was produced in Texas. Rice production is confined almost entirely to the flat Coast Prairie lands where slowly permeable subsoils and readily available water resources permit economical irrigation, Figure 19.

Although production is highly specialized, it is part of a broad rotation system involving pasture and cattle. Generally speaking, rice is grown 1 or 2 years...
then the land is pastured 2 to 4 years before it is returned to rice. During this time, cattle benefit from the carry-over effects of the fertilizers applied to rice. Often one operator grows the rice while another does the ranching.

Rice production in Texas is largely a development of the Twentieth Century. The 1890 Census of Agriculture lists 178 acres of rice scattered through 13 East Texas counties ranging from Wood county on the north to Jefferson county on the south. These acreages apparently were experimental and most of the counties listed no longer grow rice. By 1900, the rice acreage increased to about 9,000. From 1909 through 1936, rice was harvested from 150,000 to 250,000 acres, production being limited by the supply of irrigation water. Since 1935, the area in rice rose almost constantly until it reached an all-time peak of 637,000 acres in 1954, Figure 20. This period of expansion resulted from the increased demand for American-grown rice caused by wartime disturbances in the Orient and to increased supplies of irrigation water from streams and wells.

In addition, there have been some significant technological developments such as drying and bulk handling, improvements in fertilization and weed control methods, improved varieties, the development of self-propelled combines which permit harvesting in wet fields and the adaptation of airplanes for distribution of seed, fertilizer, insecticides and herbicides. The reinstatement of acreage allotments in 1955 reversed the trend, and by 1959 the harvested rice acreage was only 417,000, or about 66 percent of the 1954 acreage.

Corn
Corn occupied about 7.5 percent of the harvested cropland in 1954. Most of the crop is grown on the Blackland, the Coast Prairie and on the sandy lands to the east of the Blackland, Figure 21. Very little corn is grown west of the 30-inch rainfall belt. In 1954, almost two-thirds of the corn crop was fed on farms where grown.

The corn acreage harvested rose steadily with the cotton acreage until 1900 when it leveled off at about 5 million acres, Figure 17. It fluctuated near that level until the beginning of World War II when combine-type sorghum was introduced. Since the war, the corn acreage has dropped steadily despite the use of corn hybrids. The acreage harvested in 1957 was the smallest since 1875, and was only a third of that normally harvested before World War II.

The displacement of animal power by mechanical power, the greater drouth resistance of grain sorghum, plus the lower cost and greater ease of harvesting, have contributed to this trend. Sorghum is harvested with the same machines used in the harvesting of small grains, whereas a special machine is required to harvest corn mechanically. The extra operation of shelling is necessary when corn is grown as a cash crop.

Figure 21. Distribution of corn acreage harvested for grain in Texas, 1954 (U. S. Census). Most of the corn is grown in that part of the State having more than 30 inches of rainfall.

With the recent introduction of sorghum hybrids there appears to be little chance that corn may regain its former position as the leading feed grain crop in Texas.

Grain Sorghum
Sorghum harvested for grain, accounting for 22.5 percent of the harvested cropland in 1954, has replaced corn as the State's principal feed grain crop. It has become also an important cash crop. Almost 89 percent of the 132-million-bushel crop reported in 1954 was sold from the farms where produced.

Grain sorghum production is highly concentrated on the High Plains and in the Coastal Bend, Figure 22. It is increasing in importance on the Rolling Plains, the Blackland and in the Lower Rio Grande Valley.

Grain sorghum was introduced to Texas just before the turn of the Twentieth Century. The first mention of the crop is found in the 1900 Census of Agriculture where 19,576 acres were reported as harvested in 1899. The early history of the crop is closely related to the development and expansion of crop farming in West Texas. In 1919, almost 1.5 million acres were harvested for grain. Production rose slowly until the early 1940's when combine types that permitted the complete mechanization of the crop were introduced, Figure 17. The introduction of hybrids after 1954 has further improved the competitive position of grain sorghum.

Grain sorghum is the principal alternative use of diverted cotton acreage and, to some extent, of diverted wheat acreage. Figure 17 shows the inverse relationship between cotton and grain sorghum acres from 1949 to 1957. There were no restrictions on cotton acreages in 1949 or during 1951-53. As long
Most of the oat crop is grown on the more shallow clay and clay loam soils in North Central Texas, with the greatest concentration on the Grand Prairie and in the northwestern part of the Blackland where it outranks wheat among the close-seeded crops, Figure 23. Oats also are an important crop in the eastern parts of the Rolling Plains and the Edwards Plateau.

Oats and wheat followed about the same trend and were harvested from about the same number of acres until the mid-1920's when the small combine and the all-purpose tractor were introduced and the great expansion of wheat production on the High Plains began. With few exceptions, the oat acreage harvested for grain has fluctuated between 1 and 2 million since World War I, Figure 17. During this time, the acreage harvested has never been as much as 2 million and has been below 1 million only five times, four of which occurred during and after World War II. The trend after World War II has been slightly downward, mainly because of insect damage and drought.

Barley

The barley acreage harvested has seldom exceeded 1 percent of the total harvested cropland. In 1954, barley was harvested from 129,000 acres. It is grown in the same general areas as wheat and oats, that is on the clay and clay loam soils of northwestern and North Central Texas, Figure 24. The acreage fluctuates widely from year to year with moisture conditions and with acreage restrictions on wheat. On the High Plains, it is used primarily as a catch crop on land diverted from wheat or land on which wheat has failed because of the lack of fall and winter moisture. Some wheat producers prefer barley to grain sorghum since land on which it is grown may be returned to wheat in the fall. Interest in barley has increased in the area adapted to small grains, probably because of the introduction of new and better adapted varieties and to restrictions on wheat and cotton acreage, Figure 22.

Peanuts

Peanuts were harvested for nuts from 234,000 acres or slightly less than 1 percent of the harvested cropland in 1954. All peanuts grown in Texas are of the Spanish type. Peanut production is restricted largely to the light sandy soils which receive 25 inches of rainfall or more. The more important production areas are in the West Cross Timbers and the South Texas Plain south and west of San Antonio, Figure 25. In addition to the acreage harvested for nuts, some 50 to 60 thousand acres of peanuts were grown for other purposes. The vines from more than 90 percent of the acreage harvested for nuts in 1954 were saved for hay. Most peanut growers use hogs to salvage nuts left in the field in harvesting operations or when yields are too low to be harvested profitably.

Except during World War I, the acreage of peanuts harvested in Texas remained below 100,000 until 1927. Since then it has not dropped below the figure. The acreage rose steadily to more than 300,000

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**Figure 22.** Distribution of grain sorghum acreage harvested in Texas, 1954 (U. S. Census). The main sorghum areas are the High and Rollings Plains, Blackland and the Coastal Bend.

**Figure 23.** Distribution of oat acreage harvested in Texas, 1954 (U. S. Census). Oat production is largely concentrated on the Grand Prairie and Blackland.
just before World War II. During the period 1942-48, an average of 786,000 acres were harvested. Since that period, which included the war and the immediate postwar period, the harvested acreage has declined to near the prewar level. The average acreage harvested during 1954-58 was 290,000, or about 37 percent of the average acreage of the 1942-48 period. The return to acreage allotments and drought have been the most important factors in bringing the acreage back to near peace time levels.

Peanut growers turned to combine harvesting during World War II in response to rapidly rising labor costs. This served to improve the competitive position of peanuts in relation to the other crops that are adapted to the light sandy soils.

Forage Sorghum
Texas farmers harvested 1,784,000 acres of forage sorghum in 1954, or 7.2 percent of all harvested cropland. About 11 percent of this acreage was used for silage and the rest for dry forage. Sorghum is the principal forage crop throughout the western and southern parts of Texas, Figure 26. It is important also in the southern part of the Grand Prairie and the Blackland.

The use of sorghum for forage has decreased since the beginning of World War II. The rising cost of labor, failure to mechanize the handling of coarse forage, the ease of harvesting sorghum for grain after the introduction of combine-type varieties and the trend toward specialized production of many farm products have contributed to the decrease in forage sorghum production.

The use of sorghum for forage reached its peak in 1940 at more than 4 million acres, Figure 20. The present acreage seems to have leveled at about 2 million. The improvement of pastures through clearing, seeding and fertilizing is meeting part of the forage needs. Hay production has increased and large amounts of hay are shipped into Texas to meet some of the forage needs.

Hay
Texas farmers harvested about 1,500,000 acres of hay other than sorghum or annual legumes in 1954. Hay accounted for 6.2 percent of the harvested crop-
Important crop is peanut hay made from the vines as the peanuts are harvested.

With the development of the pickup baler and other labor-saving equipment, hay has increased in importance on Texas farms, Figure 20. The acreage harvested did not exceed a million until 1933, the first year of the agricultural adjustment program. Although fluctuating widely with weather conditions, the acreage harvested has remained well above 1 million for the past 25 years. The average acreage during 1955-58 was 1,857,000.

Fruits and Nuts

The acreage of fruits and nuts is largely in citrus, pecans, peaches, plums and pears. Citrus production is located mainly in the Lower Rio Grande Valley, pecans along the streams in Central Texas and peaches on the sandy soils of Northeast Texas and the Wet Cross Timbers, Figure 28. The 1954 acreage of fruits and nuts was less than half of the 1949 acreage. The 5-year interim between these dates was a disaster for fruit and nut trees. The extremely hard freeze in 1951 and the continuing drought of the early 1950's greatly reduced the numbers of all types of trees. The number of pecan trees decreased one-third and citrus trees 60 percent between 1949 and 1954. The full extent of the damage to the citrus industry is reflected in production. The combined production of oranges and grapefruit was only 500,000 boxes in 1954, as compared with the peak production of 28,800,000 boxes in 1945. Recovery has come slowly. A crop of 6,500,000 boxes is indicated for the 1958-59 season.

Some benefits resulted from this great disaster in the citrus industry. Producers took advantage of the opportunity to replant their orchards with better varieties. It also permitted the shift of orchards to more favorable locations. Citrus growers are rebuilding the industry on a sound physical base.

Vegetables

Texas farmers harvested and sold $30 million worth of vegetables from slightly more than 400,000 acres in 1954. These figures include all vegetables other than Irish and sweet potatoes. Listed in the order of acres grown, the more important vegetable crops were watermelons, tomatoes, dry onion, green peas, carrots, cantaloupes, cabbage, lettuce, spinach and snap beans. Most of the vegetable acreage is in South Texas with the greatest concentration in the Lower Rio Grande Valley where practically every type of vegetable is grown, Figure 29. Other important centers of vegetable production are the Winter Garden area southwest of San Antonio and the Coastal Bend. There is a significant scattering of vegetable production, mainly watermelons, tomatoes, southern peas (blackeye) and peppers on the sandy-land portions of Northeast Texas. Sweet potato production is concentrated in the same part of the State.
The acreage of vegetables harvested in Texas increased fairly steadily until World War II, then rose sharply during the war and decreased moderately since the war's end, Figure 20. However, the amount of land used for vegetables has remained well above the pre-war acreage. It is expected to resume an upward trend with the increase in population and the employment of more of the population in more sedentary occupations.

*Pasture*

Counting cropland used only for pasture, almost 78 percent of all land in farms and ranches in Texas is pasture land (118 million acres in 1954). A large amount of grazing is obtained from stubble fields and from winter grains. The relatively large amount of pasture has made Texas the leading state in the production of cattle, sheep and goats.

Native pastures differ greatly in types of vegetation and in carrying capacity. In addition to many kinds of grasses, Texas pastures contain a large amount of woody vegetation. The 1954 Agricultural Census lists almost 19 million acres of woodland pasture. The Soil Conservation Service estimates that more than half of all native pasture is infested by mesquite. Oak brush, particularly the live-oak and chin-oak on the Edwards Plateau and Grand Prairie, provides valuable browse for all types of grazing livestock, but serves mainly as the basis for the Angora goat enterprise from which more than 95 percent of the mohair in the United States is produced. Mesquite and other types of noxious brush have spread gradually and thickened until its eradication and control has become a major problem on many ranches.

Carrying capacity of a pasture is related closely to rainfall. About 75 percent of the native pastureland is in that part of the State receiving less than 30 inches of rainfall. About two-thirds of all cropland pasture is in the more humid part of the State.

Until recently there has been little effort toward pasture improvement despite the importance of grazing in the agriculture of Texas. Past efforts, such as the cross fencing of ranches and the addition of watering places, have been aimed at obtaining more complete utilization of existing forage. Since World War II, more effort has been directed toward pasture improvement. Research by the Texas Agricultural Experiment Station indicates that production from pastures can be increased substantially by improving grazing practices, by controlling noxious plants, by water development, by fertilizing where rainfall warrants and by reseeding with superior varieties of native forage plants.

The growing scarcity and cost of farm labor has led to increased interest in the State's grazing resources. Increasing the productivity of these resources represents one of the better opportunities for improving farms income in Texas.

**Distribution of Livestock and Production Trends**

Livestock plays a large part in land use in Texas. In 1954, almost 80 percent of the land in farms and ranches was grazed or used for the production of forage crops. When the acreage devoted to feed grain production is included, livestock directly or indirectly utilized more than 85 percent of the land in farms and ranches.

Livestock accounted for one-third of the value of farm and ranch products sold in 1954. Normally they account for about 40 percent of all sales except during wars when livestock sales are about equal to crop sales. As might be expected from the predominance of grass and forage in the available supply of feed, grazing types of livestock account for more than three-fourths of the sale of livestock and livestock products.

**Beef Cattle**

Beef cattle are the most important and the most widely distributed of all classes of livestock. The sale of cattle and calves normally makes up more than half of the total sale of livestock and livestock products. Beef production is predominantly a grazing enterprise in Texas. Although generally distributed, the areas of greatest concentration of beef cattle are the Coast Prairie and adjacent areas, Figure 30.

In general, the number of cattle other than milk cows and heifers decreased with the expansion of the cotton and wheat acreage from 1890 to 1930, Figure 31. Each peak in the cattle cycle was lower than the previous one. After 1930, the trend generally was...
upward, probably as the result of changes in land use growing out of attempts to adjust cotton and wheat acreages. This upward trend in numbers has been accompanied by a steady improvement in the quality of cattle kept for beef production. Price cycles and drouth have caused wide fluctuations within the general trend. Changes in land use have resulted in rapid expansion of cattle numbers in East Texas while the persistent drouth of the 1940's and 1950's depleted the range and reduced numbers of beef cattle in the western part of the State. Cattle numbers probably will continue to rise with the growth of population, recovery of western ranges from the effects of drouth and a continuation of land use adjustments, although still following price cycles.

**Dairy Cattle**

The sale of dairy products ranks next to the sale of cattle in making up total livestock and livestock products sales. Dairy products constituted more than 7 percent of the value of all farm products and 16 percent of the value of livestock and livestock products during 1953-57. The dairy enterprise also contributes substantially to cattle sales in the disposal of culled cows and other surplus animals.

Milk cows are distributed lightly over most farming areas with heavier concentration of numbers near the large population centers, Figure 32. Three-fourths of the milk cows were in the third of the State's area in which two-thirds of the human population is concentrated, as reported in the 1954 census.

The number of milk cows increased gradually from about a half million in 1880 to a peak of 1,600,000 at the end of World War II, Figure 31. By January 1, 1958, the number of milk cows had been reduced sharply to half of this peak number.

The trend is toward large commercial dairies that sell their product as whole milk. Between 1951 and 1954, milk sales increased from 168 to 204 million gallons while butterfat sales decreased from more than 20 to less than 3 million pounds. During this same period, the number of farms that reported the sale of milk decreased from 42,000 to 14,000, and those reporting butterfat sales from 55,000 to 10,000. Further evidence of this trend is the decrease during 1950-54 from 67 to 55 percent in farms reporting milk production.
cows and the decrease from 9,593 to 8,351 in the number of farms on which the sale of dairy products made up 50 percent or more of the value of products sold. These specialized dairy farms reported 8 more cows per farm in 1954 than in 1950. Factors that contributed to this trend in the number of cows have been the decrease in farm population and in the number of farms, the trend toward specialization in all lines of agricultural production, increased capital requirements and the scarcity and cost of labor.

The trend toward fewer and larger dairies is expected to continue as the number of farms and farm people decrease and as bulk handling of milk and artificial insemination are more generally practiced in the dairy industry.

Sheep

The sale of sheep and wool normally makes up 8 to 10 percent of the value of sales of livestock and livestock products.

Sheep are concentrated largely on the Edwards Plateau, but also are found in substantial numbers on the southern part of the Grand Prairie and the Rolling Plains and in parts of the Trans-Pecos area, Figure 33. The sale of lambs and wool is an important source of income in all of these areas. Most of the land on which sheep graze is high and dry, shallow and stony, has a broken topography and a vegetative cover of grass, palatable weeds and brush. Sheep commonly are combined with cattle and Angora goats for the most effective utilization of these grazing resources. The proportion of each in the combination varies with the vegetation from ranch to ranch and from year to year with changes in price relationships. Relatively few sheep or goats are found in the Central Basin which centers in Llano county and extends into seven other counties. The predominantly sandy soils, scarcity of browse and prevalence of needlegrass, speargrass and grass burs in the vegetative cover provide a less favorable environment for sheep and goats than for cattle.

Sheep numbers stayed between 2 and 2.5 million from 1900 to World War I, Figure 31. After World War I, the number of sheep rose rapidly from less than 2.5 to more than 10 million by 1943. A long period of drouth beginning in 1943 and sharp breaks in the price of wool and lambs in 1951-52 resulted in an even more rapid drop in numbers. By 1957, the number of sheep on Texas farms and ranches fell below 5 million for the first time since 1928. A substantial recovery in sheep numbers is expected with the recovery from drouth and as a result of range improvement programs.

Angora Goats

Most of the Angora goat population is in the southern and eastern parts of the Edwards Plateau and in the brush-covered portions of the Grand Prairie and West Cross Timbers, Figure 34. Goats help control vegetation that otherwise would be wasted or become a nuisance on the range, since they feed largely on the leaves of woody vegetation.

The Angora goat in Texas is the source of 95 percent of all mohair produced in the United States. There is some demand for goat meat which originates largely with the Spanish-American population. The market centers in San Antonio.

Goats were first counted in the 1900 Census of Agriculture. Texas was credited with 627,000 goats at that time. Judging from the number of fleeces

![Figure 33. Distribution of sheep in Texas, 1954 (U. S. Census). Sheep are concentrated mainly on the Edwards Plateau, the Grand Prairie and in the Trans-Pecos.](image)

![Figure 34. Distribution of Angora goats in Texas, 1954 (U. S. Census). Goats are concentrated largely in the more rough, broken and brush-covered portion of the Edwards Plateau and Grand Prairie and to a lesser extent in the wooded sections of the West Cross Timbers.](image)
reported, probably not more than half of this number were Angora. By 1924, more than 2 million goats were being clipped. The number of Angora goats in Texas has fluctuated between 2 million and 4 million in response to changes in weather conditions and prices. Drought seems to have been the most important factor influencing the trend in goat numbers. The number reached a peak in 1931 and then decreased during the dry middle 1930's. Another peak in numbers occurred during the early 1940's and was followed by a drop to slightly more than 2 million during the extremely dry early 1950's. Since then, the number of goats has steadily increased. The place of goats in the livestock systems in those parts of the State where browse is available seems assured because of their feeding habits.

There also were more than a quarter million other (slick) goats in Texas in 1954. They are used for milk and meat and for brush control and are most numerous in the oak-covered portions of the State.

**Hogs**

Hogs rank slightly below sheep as a source of cash income on Texas farms and ranches. Hog sales during 1955-57 accounted for 2 to 3 percent of the total marketing of farm commodities in Texas. Most of the hog population is in the humid part of the State where the average annual rainfall is 30 inches or more and where corn is the principal feed crop. Figure 35. An area of minor importance which has great potential, however, is the High Plains, particularly the irrigated portions where much sorghum grain is produced each year.

The number of hogs on Texas farms on January 1 of each year stayed well above 2 million from 1926 until 1928, Figure 31. Since then the trend generally has been downward, except during World War II when the number rose to more than 3 million on January 1, 1944, for the only time on record. By 1958, the number of hogs on farms dropped below 1 million.

Like most other livestock enterprises, pork production changed greatly during the past 15 to 20 years. With agriculture in general, this enterprise has become more commercial and specialized. Sixty percent of all farms in 1940 reported hogs, while less than 37 percent reported them in 1954. With less than 40 percent as many hogs on farms in 1954, almost 70 percent as many pigs were produced as in 1940. The number of pigs saved per farm in 1954 was double the number in 1940. Hogs have been kept primarily for home use, to utilize mast and other natural foods found in woodlands and to salvage waste in peanut-producing areas. They will be used to a more limited extent in the future for these purposes and the trend to fewer farms with more hogs per farm will continue.

**Poultry**

The sale of poultry and poultry products in Texas averaged $141 million during 1955-57, or slightly more than the receipts from the sale of dairy products during the same period. Eggs made up 15 percent of poultry sales; the sale of chickens, meat broilers, 42 percent; and turkeys, 12 percent. Egg production is more generally distributed over the State than are other forms of poultry production. Figure 36. Although there is a distinct trend toward
large specialized units, many farms still maintain small flocks to supply eggs for home use. Almost three-fourths of all farms reported chickens in 1954, but less than half of them sold eggs. About 6 percent of the farms reporting accounted for 37 percent of the total egg sales. As is the case with most farm enterprises, the trend is toward fewer and larger flocks and increased production per hen.

Broilers presently constitute about 95 percent of the value of chickens sold. The production of broilers is concentrated largely in three widely separated areas, Gonzales county, McLennan county and a large area centering in Nacogdoches and Shelby counties in Central East Texas near the Louisiana state line, Figure 37. Broiler production is a highly specialized enterprise which was started during the depression years in the early 1930's and currently markets more than 100 million birds per year. The enterprise is almost completely integrated with the feed mixing and distributing business which, in conjunction with some outstanding developments in poultry feeding and breeding, account for its phenomenal growth.

Turkey production is concentrated in Central Texas around the Blackland area, Figure 38. The production trend generally is similar to that in chicken production—fewer farms, larger flocks and more intensive methods. Before World War II, most turkeys were produced under range conditions and usually were incidental to other farm enterprises. In 1910, 72,000 farms reported an average of less than 50 birds raised per farm, whereas in 1954, 25,000 farms produced an average of 112 birds. Since the war, there has been a pronounced shift from light to heavy breeds and from range methods of management to confined and intensified methods. There also are indications of a gradual shift of production to the eastern and northern parts of the State. There are indications that turkey production, like broiler production, is nearing complete vertical integration with feed companies and hatcheries.

**Horses and Mules**

Horses and mules are concentrated in the eastern part of the State where small farms and low farm incomes prevail and on the large ranches in the western and southern parts.

Horse and mule numbers increased steadily during the early development of farming in Texas, Figure 38. They reached a peak of 2,300,000 in 1920, held up well until 1926 when a steep downward trend began which has continued to the present time. The number of horses and mules on Texas farms by January 1, 1959, had dropped to an estimated 232,000. It is not a mere coincidence that 1926 also was the year that all-purpose tractors became available to Texas farmers. The tractor, motor truck and automobile, with their greater speed, flexibility and durability, have made animal power obsolete on commercial farms.
Figure 39. Type-of-farming areas in Texas. Texas is divided into 17 areas of which 8 are subdivided to give a total of 29 areas and sub-areas. In some cases, these type-of-farming areas are given the names applied to land resource areas published in L-400. In such cases, the delineations do not necessarily coincide. It simply means that the land resources described in L-400 are predominant in the type-of-farming area.

1. Northern High Plains.
   a. Wheat, sorghum and livestock.
   b. Wheat, sorghum, livestock and vegetables.
   c. Cotton, sorghum and wheat.
2. Canadian Breaks—cattle ranching.
   a. Farming—cotton and grain sorghum.
   b. Ranching—mainly cattle.
4. Rolling Plains and Prairies.
   a. Cotton, grain sorghum, wheat and livestock.
   b. Small grains and livestock.
5. Mountains and Basins—cotton and ranching.
   a. Large ranches—cattle, sheep and goats.
   b. Small ranches—cattle, sheep and goats.
   c. Central Basin—cattle.
8. South Texas Plain.
   a. Vegetables and cattle.
   b. Livestock, peanuts and truck crops.
   c. Cotton, flax and livestock.
   d. Livestock and cotton.
10. Coastal Bend—cotton, grain sorghum and vegetables.
   a. Small grains, cotton, dairy products and livestock.
   b. Livestock, small grains and cotton.
   a. Cotton and livestock.
   b. Poultry, dairy products, cattle and cotton.
15. East Texas Timber—timber products, poultry and livestock.
16. Post Oak—cotton and livestock.
17. Coast Prairie.
   a. Rice, cattle and dairy products.
   b. Cotton, rice and cattle.
TYPES OF FARMING AND TYPE-OF-FARMING AREAS

The preceding discussion has been concerned with the various forces that operate to shape the agriculture of Texas, with the geographic distribution of crops and livestock and with significant current trends.

The remainder of this bulletin will be concerned with the manner in which farm and ranch operators have combined crop and livestock enterprises to form the types of farming that clearly characterize various areas of the State.

Types of Farming

Farms were classed as to type in the 1949 and 1954 Census of Agriculture reports. The classification was based on the relationship of sales from particular sources to the total value of all products sold from the farm. To be classified as a certain type, sales of a product or group of products had to represent 50 percent or more of the total value of products sold. Only commercial farms were classed as to type. Other farms or non-commercial farms include a few abnormal ones mainly institutional, large numbers of residential farms—those reporting sales of less than $250—and part-time farms or those with sales of farm products of $250 to $1,199 where the operator worked 100 or more days off the farm during the census year or where the non-farm income of the operator and members of his family was greater than the value of products sold. These non-commercial farms represented 38 percent of the total number of farms in 1954.

Nearly 27 percent of all commercial farms were classed as cotton farms, Table 2. Livestock farms, other than dairy and poultry, were next at 16.4 percent. Other types in order were: general, 5.7 percent; cash grain, 4.9 percent; poultry, 3.0 percent; dairy, 2.9 percent; other field crops, vegetable and fruit and nut farms together made up only 2.1 percent of all farms.

Commercial farms representing less than 62 percent of the number of farms controlled 93 percent of all land in farms and 96 percent of all cropland harvested in 1954.

The various types of farms differed greatly in their use of land. Cotton farms accounted for only 15 percent of the land in farms, but reported 51 percent of all harvested cropland. Cash grain farms also were big users of cropland, reporting almost 20 percent of the harvested cropland and less than 7 percent of the land in farms. Livestock farms reported almost 64 percent of the land in farms but only 12 percent of the harvested cropland. These three types alone accounted for 86 percent of the land in farms and almost 83 percent of the harvested cropland.

Type-of-farming Areas

Based on the foregoing information, the State has been divided into 17 major areas within each of which agricultural resources are highly similar and certain types of farming predominate. Eight of the areas are subdivided into 20 sub-areas in recognition of certain variations within the major areas.

A delineation of these areas is shown in Figure 39. A great many counties lie within two or more areas. Only county data are available for describing the agriculture of these areas. In assembling data by areas, a county had to be included arbitrarily in the area in which the principal type of farming most closely resembled the dominant type within the county. Consequently, the descriptions cannot be as clear cut as they would be if the data were more closely related to the land resources which characterize the various areas. For example, many of the counties included in area 13a lie partly in adjoining areas, Figure 39. Thus the description of the area is affected by the adjoining areas. Something of the effect of including parts of these adjoining areas in

<table>
<thead>
<tr>
<th>Type of farm</th>
<th>Number of farms</th>
<th>Acres land in farms</th>
<th>Acres cropland harvested</th>
<th>Acres per farm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash grain</td>
<td>14,414</td>
<td>9,853,913</td>
<td>4,981,422</td>
<td>684</td>
</tr>
<tr>
<td>Cotton</td>
<td>78,424</td>
<td>21,729,964</td>
<td>12,735,127</td>
<td>277</td>
</tr>
<tr>
<td>Other field crops</td>
<td>3,427</td>
<td>737,742</td>
<td>270,308</td>
<td>215</td>
</tr>
<tr>
<td>Vegetable</td>
<td>2,126</td>
<td>521,556</td>
<td>152,657</td>
<td>245</td>
</tr>
<tr>
<td>Fruit and nut</td>
<td>689</td>
<td>106,172</td>
<td>42,526</td>
<td>154</td>
</tr>
<tr>
<td>Dairy</td>
<td>8,378</td>
<td>2,442,991</td>
<td>478,947</td>
<td>292</td>
</tr>
<tr>
<td>Poultry</td>
<td>8,940</td>
<td>1,257,895</td>
<td>298,993</td>
<td>141</td>
</tr>
<tr>
<td>Livestock</td>
<td>48,048</td>
<td>93,393,059</td>
<td>3,102,554</td>
<td>1,944</td>
</tr>
<tr>
<td>General</td>
<td>16,622</td>
<td>5,675,702</td>
<td>2,072,889</td>
<td>341</td>
</tr>
<tr>
<td>All commercial</td>
<td>181,668</td>
<td>135,718,894</td>
<td>24,045,423</td>
<td>750</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>112,084</td>
<td>10,364,547</td>
<td>971,659</td>
<td>92</td>
</tr>
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</table>
the statistics for area 13a may be illustrated by comparing the percentage of commercial farms that are classed as cotton farms in four counties entirely within the area with the percentage of such farms in the area as a whole and in the adjoining areas. Seventy-two percent of the commercial farms in Collin, Delta, Ellis and Rockwall counties were classed as cotton farms, as compared with 58 percent for the entire area 13a and 5 percent, 30 percent and 40 percent, respectively, for areas 12b, 14 and 16. The counties included in each area are shown in Figure 40. This is a type-of-farming map with area boundaries following county lines.

The relative numerical importance of the various types of farming in each area and sub-area is shown in Figure 41. Only those types are shown that represent 3 percent or more of the total number of commercial farms. Any type that makes up less than 3 percent of commercial farms is included in all other. Two or more types of farming are found in every area and in a few areas almost every type of farm is represented. Some of this variation within areas is due to the effect of counties lying in more than one area, some is caused by the influence of large population centers on local production and some to differences in resources on the individual farms or in the personal circumstances, aptitudes and preferences of farm operators.

Differences between areas in land use are shown in Figure 42 and in livestock production in Figure 40.

Figure 40. Type-of-farming areas in Texas following county lines.
PERCENT OF COMMERCIAL FARMS

COTTON
VEGETABLES
CASH GRAIN
FRUITS AND NUTS
OTHER FIELD CROPS
DAIRY
ALL OTHER

PERCENT OF LAND IN FARMS

COTTON
SMALL GRAIN
Sorghum
Hay and Forage
GRAIN CROPLAND
PASTURED
WHEAT
SOYBEANS
WHEAT
GRAIN SORGHUM
ALL OTHER CROPS
MAINLY PASTURE

Figure 41. Relative importance of the various types of farming in each area and sub-area (adapted from 1954 U.S. Census).

Figure 42. Relative importance of the various land uses in each area and sub-area (adapted from 1954 U.S. Census).


<table>
<thead>
<tr>
<th>Type-of-farming area</th>
<th>Field crops</th>
<th>Vegetables, fruits and nuts, and horticulture specialties</th>
<th>Livestock other than dairy and poultry</th>
<th>Dairy products</th>
<th>Poultry and poultry products</th>
<th>Forest products</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>49.0</td>
<td>49.6</td>
<td>.9</td>
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<tr>
<td>2</td>
<td>66.7</td>
<td>27.8</td>
<td>2.4</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>91.5</td>
<td>7.2</td>
<td>.8</td>
<td>.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>35.1</td>
<td>61.9</td>
<td>1.7</td>
<td>1.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>95.4</td>
<td>3.3</td>
<td>.5</td>
<td>.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>47.7</td>
<td>46.9</td>
<td>1.5</td>
<td>2.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>73.8</td>
<td>22.5</td>
<td>2.0</td>
<td>1.5</td>
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<td></td>
</tr>
<tr>
<td>8</td>
<td>41.0</td>
<td>49.3</td>
<td>5.0</td>
<td>3.6</td>
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<td>72.1</td>
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<td>18.6</td>
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<td>82.2</td>
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<tr>
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<tr>
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<tr>
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<td>17b</td>
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<tr>
<td>33</td>
<td>63.0</td>
<td>3.1</td>
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<tr>
<td>State</td>
<td></td>
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</table>
whereas others, such as sheep and goats, livestock are distributed generally over the State, differences among areas in enterprise combinations. These combinations will be treated in more detail in discussions of the individual areas. Figure 41 further emphasizes among the various type-of-farming areas is found in the relative value of the products sold, Table 1. Differences in sources of income were considered fully in placing each county in its respective area or sub-area. The distribution of the total sales value of farm products is shown in Figure 44. A concentration of sales is shown in the irrigated portions of the High Plains and in the Lower Rio Grande Valley and the Coastal Bend. These three areas accounted for more than a third of all sales in 1954.

**Area 1. Northern High Plains**

The Northern High Plains comprise a large part or all of each of the 18 most northern counties in the High Plains. It includes also small parts of areas the 18 most northern counties making up area 2 which divides area 1 into two parts.

The soils are primarily dark brown and reddish brown clays and clay loams. An exception is Dallam and Hartley counties where lighter colored sandy soils predominate. The almost flat surface of the High Plains is pitted by many playa lakes which are except during rainy seasons. Much of the natural drainage of the area is into these lakes. A few streams that reach into the area and help form the headwaters of the Brazos, Red and Canadian rivers provide the rest of the drainage. The elevation of the area is 3,000 to 4,500 feet and slopes gently to the southeast.

The climate is subhumid. The average annual rainfall ranges from 18 inches in the west to about 22 inches in the east. The rainfall varies greatly from year to year. Over a period of 60 years a Amarillo, it ranged from 11 inches in 1910 to 32 inches in 1923.

The area has the shortest frost-free period of any part of the State, ranging from an average of 180 days in the northwest to 200 days in the southeast. There has been a difference of more than 80 days between the shortest and longest frost-free period.

A low and erratic rainfall coupled with a short growing season and long distance from large markets limit the alternative uses of the land and cause high risk in the area, especially for dryland agriculture.

In recent years, irrigation from wells has been practiced in parts of the area to offset the low and variable rainfall. Almost 1.75 million acres of irrigated land were reported in the area in the 1954 Census. More than 80 percent was in that part designated in Figure 39 as sub-area 1c.

Sub-area 1a, lying north of the Canadian River Breaks, has large scale, highly specialized grain and beef cattle production. In addition to the regular herds of cattle, many sheep and cattle are moved into sub-areas 1a and 1b to graze on wheat fields during the winters when growing conditions permit. Texas farms average about 2,000 acres in size, with 82 percent cultivated. Less than 4 percent of the cropped land is irrigated. The value of products sold was divided about evenly between field crops and livestock. Harvested crops were divided between grain and long
sorghum and small grains, mainly wheat. Practically no cotton is grown because of the short growing season.

Ninety-two percent of all farms in this sub-area in 1954 were classed as commercial. Types of farming mainly were cash grains, 60 percent, and livestock, 35 percent. Minor types include general, 3 percent, and dairy, 1.5 percent.

Sub-area 1b is similar to sub-area 1a in soils, in the percentage of the land cultivated and in the principal crops grown. It differs in that vegetables (mainly potatoes, carrots, onions and lettuce) are fairly important and a small acreage of cotton is grown. Approximately 17 percent of the cropland is irrigated. Livestock accounted for about one-third of the value of products sold and crop sales two-thirds. Farms averaged 1,212 acres and 86 percent were classed as commercial.

About 71 percent of the commercial farms were classed as cash grain and 16 percent as livestock farms. Other types included general, 4.5 percent; dairy, 3.8 percent; and cotton, 3.6 percent.

Sub-area 1c is much more intensively farmed than the rest of the area. With almost the same amount of land in farms as in sub-area 1b, the value of farm products sold in 1954 was 3 1/2 to 4 times the value of the products sold in 1b. Similarly, with 1,290,000 acres of farmland less than sub-area 1a, the value of farm products sold was more than five times the value of the products sold in 1a.

The difference may be explained by a somewhat longer growing season, by 70 percent of the land being cultivated, as compared with 42 percent in the other sub-areas, and by the greater extent of irrigation (62.5 percent of the cropland) in this sub-area. The development of irrigation from wells has permitted the extension of cotton production northward 30 to 40 miles, greatly increased production per acre and reduced the risk resulting from low, variable rainfall.

The average farm size in 1954 was 530 acres, or less than half the average size in sub-area 1b. Crop sales made up 92 percent of the total value of all products sold. Sorghum grain, small grain and cotton made up 94 percent of the harvested cropland. Individual crops occupied about 46, 25 and 23 percent, respectively, of the harvested cropland. The remainder was largely in forage and hay crops. Alfalfa makes up a large part of the hay acreage.

Almost 94 percent of the farms were classed as commercial. Fifty-six percent of the commercial farms were cotton farms, 32 percent cash grain farms, 6.5 percent general farms and 5 percent livestock farms. Dairy and poultry farms together accounted for less than 1 percent of the commercial farms.

Future developments in area 1 seem to center around the question of water for irrigation. The area has a large underground reservoir from which high quality irrigation water is obtained. Unfortunately, the rate of recharge of the reservoir is hardly more than 1 percent of the rate of withdrawal. This means that the supply of water available for irrigation eventually will be exhausted. The water-holding materials vary greatly in thickness, density and in distance from the surface. This means that some farms will be without irrigation water much sooner than others. It also means that because of the great depth to water, the cost of developing water resources in parts of the area may become prohibitive. The latter problem is associated with a short growing season that results in the lack of a high income crop in sub-areas 1a and 1b and explains much of the difference that exists between these parts of the area.

Without irrigation, there would be little cotton produced and no commercial vegetable production in area 1. Wheat, sorghum and cattle again would dominate the agriculture in sub-area 1c.

Because of the large amounts of grain produced, area 1 has a high potential for livestock production. If this potential were realized, the development probably would be in large scale, highly specialized commercial feedlots. More than 90 percent of the sorghum grain is now sold from the farms on which it is produced. The stability of feed production in this area depends largely on irrigation.
Figure 45. Cattle ranching is the only important enterprise on the broken lands along the Canadian River (area 2). Courtesy, Soil Conservation Service.

**Area 2. Canadian Breaks**

The rough, broken lands along the Canadian River occupy a large part of the five counties comprising this area. The breaks also make up small parts of seven other counties. A small portion of each of five counties is on the High Plains where the type of farming is similar to that in area 1.

Cattle ranching is the only important enterprise in the breaks. The High Plains portion of these five counties are devoted almost entirely to cash grain production. Small grains and sorghum together accounted for 95 percent of the harvested crops. Livestock sales, primarily beef cattle, made up almost two-thirds and crop sales one-third of the total value of the farm products sold in the five counties in 1954.

Three-fourths of the farms were classed as commercial. Livestock and cash grain farms were about equal in numbers and together made up 84 percent of all types of commercial farms. Minor types included dairy, 6 percent; general, 5 percent; cotton, 2 percent; and poultry, 2 percent.

Except for a small amount of dairy and poultry production around the cities, large scale ranching should continue to be the only use for these rough, broken lands of the Canadian River basin. Because of the short growing season, low annual rainfall and limited crop alternatives, farms in the High Plain portions of these five counties probably will continue to follow a cash grain type of farming.

**Area 3. Southern High Plains**

This area includes all or large parts of 18 counties in the southern parts of the High Plains. The soil range from clay loams to fine sands but are predominantly sandy. The average annual rainfall vary from about 20 inches in the northeastern part to about 15 inches in the southern and western pan. The rainfall varies greatly from year to year. One period of 50 years at Lubbock, the smallest amount, less than 9 inches, came in 1917, while more than 26 inches were recorded in 1941. These wide fluctuations around a low average rainfall make dryland farming a risky business.

The length of the growing season also varies widely. The average frost-free period ranges from less than 200 days in the north to more than 230 days in the south. A difference of about 90 days occurred between the shortest and longest frost-free period.

With ground water available, irrigation from wells has been developed to counteract these erratic climatic forces. In 1954, 27 percent of the cropland or 1,169,000 acres, were irrigated.

Topography of the area is like that of area 1—flat, sloping gently to the southeast and pitted with numerous depressions or playa lakes. All physical characteristics of the area are conducive to large scale, extensive types of farming. The area is divided into two sub-areas based on the relative importance of farming and ranching.

The agriculture of sub-area 3a is predominantly farming. Crop sales in 1954 made up more than 95 percent of the total value of farm products sold. Almost 60 percent of the farmland was cultivated and the average farm size was 573 acres.

In contrast with area 1, the sandy soils and the longer growing season favor cotton production over wheat and other small grains. Some of the lighter sandy soils are subject to severe erosion, making it difficult to establish and maintain stands of wheat or cotton. Where cultivated, these soils are limited mostly to crops such as grain sorghum and Sudan grass.

Cotton occupied 45 percent of the harvested cropland and grain sorghum, 47 percent, in 1954. Minor crops included forage sorghum, 4.2 percent, and small grains, mostly wheat, 2.2 percent. Thirty percent of the harvested cropland was irrigated.

Thirty percent of the cotton produced in Texas during 1954-58 came from sub-area 3a. During the same years, areas 1 and 3 together produced almost 43 percent of all cotton grown in the State.

The sale of livestock and livestock products accounted for less than 5 percent of the value of all products sold. Dairy and poultry sales together made up about 25 percent of the value of livestock sales.
slightly more than 1 percent of the value of all products sold.

About 93 percent of all farms were classed as commercial and 90 percent of the commercial farms were cotton farms. Other types were cash grain, 2.8 percent; livestock, 3.3 percent; general, 2.3 percent; and dairy and poultry, each 0.7 percent.

Sub-area 3b is primarily a ranching area. Less than 2 percent of the land in farms is cultivated and less than 10 percent of the cultivated land is irrigated. Farms average about 500 acres and ranches about 25,000 acres. The farming practiced is similar to that of sub-area 3a.

Fifty percent of the 1954 harvested cropland was in cotton, 25 percent in grain sorghum and 23 percent in forage crops, mainly sorghum. Normally the value of livestock and livestock products account for about two-thirds and crops one-third of all products sold.

There are less than 400 commercial farms and ranches in sub-area 3b. Fifty-five percent of these were classed as cotton farms. Livestock farms or ranches accounted for 36 percent, the remainder included poultry and dairy farms serving the needs of Midland and Odessa.

The Southern High Plains have about the same water problems as area 1—a much faster rate of water use than of well recharge, declining well yields and increasing cost of water. These problems are somewhat more acute in area 3 because of a thinner layer of water-bearing material and of generally lower well yields. However, the production of cotton and grain sorghums probably will continue as the principal use of the land whether dry farming or irrigation is practiced.

Poultry and dairy production likely will increase with the growth in population. The large quantities of sorghum grain and cottonseed by-products give the area a high potential for livestock production. More than 90 percent of the grain is now sold from the farms on which it is produced. As in area 1, the potential for livestock production is most likely to be realized through large commercial feedlots.

**Area 4. Rolling Plains and Prairies**

Wide differences are the rule rather than the exception in the soils and topography of area 4. The area lies mainly on the Rolling Plains and North Central Prairies, with soils ranging from deep fertile dark clays and clay loams to loose sands, sandy loams and shallow drouthy clays and clay loams. The area is cut sharply by many rivers and their tributaries. Portions of the divides between these streams are flat to gently rolling and usually are cultivated. Most streams have formed deep valleys with narrow strips of bottomland. Most of the land between these areas is rolling and broken and is used primarily for grazing. Some of the largest ranches in the State are found in this area.

The climate is sub-humid. The average annual rainfall ranges from about 28 inches in the east to 22 inches in the west. As on the High Plains, the rainfall is variable from year to year and within a given year, making it difficult for farmers to follow systematic rotation of crops. Cotton and sorghum may be planted in the spring if moisture conditions are favorable. If rains are delayed until midsummer, a late sorghum crop may be the only alternative. The next opportunity to plant may come with late summer and fall rains when small grains are the only alternative. The situation is complicated since fall-seeded crops do not follow good crops of cotton or grain sorghum successfully. Except in the case of crop-failure, land planted to these crops cannot be returned to fall-seeded crops until it has been left idle or fallowed for a year. Good quality water for irrigation is not available except in very limited portions of the area. Less than 2 percent of the cropland was irrigated in 1954.

Area 4 has been divided into two parts. Sub-area 4a, the most western and dryer part of area 4 mainly follows cash-crop types of farming. Although

![Figure 49. Stripping is the common method of harvesting cotton on the High Plains after frost has desiccated the plants.](image1)

![Figure 50. Less than 2 percent of the land in sub-area 3b is devoted to crops. Courtesy, State Highway Department.](image2)
only about one-third of the land in farms is cultivated, the sale of crops, primarily cotton, sorghum and wheat, made up almost 75 percent of the total value of farm products sold in the drought year of 1954. Cattle sales accounted for most of the remainder.

Cotton occupied 46.5 percent of the harvested cropland; grain sorghum, 23.5 percent; small grains, 19 percent; and forage sorghum and hay, about 10 percent. Beef production is the only important livestock enterprise.

Dairy and poultry production are limited to the needs of the small urban population. Sheep are fairly important in two or three counties in the extreme southern part of the area, which includes remnants of the Edwards Plateau, Figure 33.

Eighty-four percent of the farms were classed as commercial. Cotton farms accounted for 71 percent; livestock farms, 14 percent; general farms, 6 percent; cash grain, 5 percent; and dairy and poultry farms together, less than 3 percent of all commercial farms.

The number of cotton farms exceeded the number of every other type of commercial farm in each of the 22 counties making up sub-area 4a. Cotton farms also constituted a majority of the commercial farms in all but one of the 22 counties.

In sub-area 4b, ranching or stock farming is the principal farm enterprise. The sale of livestock and livestock products made up 58 percent, and crop sales, 42 percent, of the value of all farm products sold. Cattle sales alone exceeded crop sales. More than 80 percent of the land in farms is pastured.

Small grains, principally wheat, made up 62 percent; cotton, 18 percent; sorghum grain, less than 4 percent; and sorghum forage and hay, 1 percent of the harvested cropland. Cotton production is mainly on the bottomlands of the Pease and Brazos rivers and the deep, smooth and more productive sandy loam soils. Wheat for the most part is grown on the more dense and shallow clays and clay loam, which are too dry for the production of crops that mature during the hot and dry summer.

As in 4a, beef cattle are by far the most important type of livestock. However, in 1954, there were 50 percent more cattle per 1,000 acres of farmland in 4b than in 4a. This higher rate of stocking is a result of the higher rainfall on more pasture and forage crops, and of the added grazing provided by the preponderance of winter grains in the cropping system. Sheep are of minor importance except in the two southernmost counties, Brown and Coleman. Dairy and poultry production are minor enterprises but less so than in 4a.

Only 69 percent of the farms were classed as commercial. The commercial farms broken down into type were 40 percent livestock, 25 percent cash grain, 15 percent cotton, 12 percent general, 5 percent dairy and 3 percent poultry. Livestock and cash grain farms together constitute most of the commercial farms in all but one of the 16 counties making up sub-area 4b.

With so much of the land adapted to grazing only and with a low and variable rainfall coupled with a very limited supply of water for irrigation, it is expected that extensive types of farming will continue to dominate area 4.
Area 5, Mountains and Basins

In addition to Loving and Ward counties, this area includes most of the land lying south and west of the Pecos River. Area 5 has a wider range in elevation than any other part of the State. In "The Soils of Texas," Carter refers to it as the region of "mountains and basins," but it now is more commonly called the Trans-Pecos. Numerous mountain ranges traverse the area with some peaks rising to more than 8,000 feet. Between these ranges are flat plains or basins which vary from 2,500 to 5,000 feet in elevation. Parts of these basins where irrigation water is available are highly productive. There is no dryland farming in the area. Most irrigation water is now obtained from wells. It formerly came from large springs and from the Macmillan Reservoir in New Mexico.

The average annual rainfall ranges from less than 10 inches in the western part of the area to more than 15 inches in the Davis Mountains.

More than 97 percent of the land in farms is grazed. Because of the low carrying capacity of the pasture land, the ranches are very large. The average size in 1954 was around 25,000 acres. Less than 2 percent of the land in farms is cultivated and more than a third of the cropland was idle in 1954. This cultivated land is in relatively small, widely scattered communities. Much of the idle cropland results from a loss of water supply or from the effects of low quality water. Cotton is practically the only cash crop grown. It occupied about 69 percent of the harvested cropland in 1954. When acreage restrictions are in effect on Upland cotton, some of the diverted acreage is planted to American-Egyptian cotton. Most other crops supplement the livestock enterprises. Hay, mainly alfalfa, made up 14 percent of the harvested cropland. Other crops of some importance are grain and forage sorghum and small grains. In addition to harvested crops, 8 to 10 percent of the cropland is used for annual pasture crops.

Cattle and sheep are the principal types of livestock. There are a few Angora goats lightly scattered over the southern half of the area. Having the thinnest population of any area in the State, less than 2 persons per square mile, dairy and poultry production are at a minimum.

Despite the fact that crops were harvested from only 1 percent of the land in farms, crop sales amounted to more than 72 percent of the value of all farm products sold. This is partly the result of high yields of high quality cotton. During 1954-58, the average yield was 966 pounds of lint per acre.

Eighty-four percent of the farms and ranches were classed as commercial. These in turn were classed 47 percent cotton farms, 46 percent livestock farms or ranches and 3 percent general. No other type accounted for as much as 2 percent of the number of commercial farms.

As in most arid or semi-arid areas, future development in the area will depend largely on irrigation water. With the limited supply of water, the main use of land in the area will continue to be an extensive type of grazing.
crops. No other crop used as much as 1 percent of the harvested cropland.

As in area 5, a substantial acreage of American Egyptian cotton is grown when acreage restriction are in effect on Upland cotton. Cotton averages about 1.5 bales per acre. Yields, staple length and grade are among the best in the State. Alfalfa yields in this area are also the highest in the State, averaging 3 to 4 tons per acre.

A total population of about 200,000 in El Paso county makes dairying the most important livestock enterprise. The sale of dairy products in 1954 accounted for about 19 percent of the value of all farm products sold. Livestock feeding and slaughtering also have become important enterprises in the area. These livestock enterprises, in addition to outlying ranches, provide the market for the large quantities of alfalfa hay grown in the area.

The overwhelming importance of cotton in the agriculture of the area is indicated by the fact that 92 percent of all commercial farms received cotton or more of their income from cotton. Other types of farms were livestock, 4.6 percent; dairy, 1.4 percent; and vegetable, 1 percent, of all commercial farms. Part-time, residential and abnormal farm made up 28 percent of the total number of farms in the area in 1954.

Because of its isolation, this area seems destined to continue cotton production to the limit permitted under adjustment programs. A growing population suggests that there will be a need for more dairying and other livestock enterprises. This in turn will serve to expand the local market for alfalfa hay.

Area 6. Upper Rio Grande Valley

This area comprises a narrow strip of alluvial soils extending about 75 miles along the Rio Grande above and below El Paso. The climate is arid and all crops are irrigated. The average annual rainfall is less than 10 inches. The principal source of water is the Elephant Butte Reservoir in New Mexico. Although the average elevation of the area is 3,000 to 4,000 feet, the average frost-free period is about 240 days.

The great distance to large central markets has greatly influenced the character of farming in this area. Because of high transportation costs, only products of high value per unit or those that can be disposed of locally are grown.

Crop sales made up 67 percent of the value of all farm products sold in 1954, while livestock and livestock products accounted for 33 percent. Cotton occupied 64 percent and alfalfa 31 percent of the harvested cropland. Barley and oats accounted for 1.5 percent and vegetables 1 percent of the harvested cropland. Barley and livestock products accounted for 33 percent. Cotton occupied 64 percent and alfalfa 31 percent of the harvested cropland. Barley and oats accounted for 1.5 percent and vegetables 1 percent of the harvested cropland.

Because of differences in physical resources the area is divided into three sub-areas.

Area 7. Edwards Plateau and Central Basin

Area 7 comprises more than 24 million acres spread over 30 counties and includes most of the Edwards Plateau and the Central Basin. The physical characteristics of the area are such that most of it can be used only for grazing. These include a rough, broken topography, shallow stony clay loam soil and a low annual rainfall ranging from 30 inches in the east to 15 inches in the west. A wide range of vegetation consisting of grasses, forbs and live oak and shin oak brush permits a diversified system of grazing involving cattle, sheep and Angora goats.

The combination of these three types of livestock varies with the range and with changing price relationships. On the rougher, more broken and brush-covered range, the number of goats is large compared with the number of cattle and sheep. On the smooth open grasslands, cattle and sheep are keen competitors for the range with relative prices playing a important part in determining the combination in a particular time. On the intermediate type of range, all three types of livestock are found in important numbers, with sheep usually predominant in the combination.

Because of differences in physical resources the area is divided into three sub-areas.
In the more western and drier part, designated as sub-area 7a, the ranches are large, averaging 10 to 12 sections. Aside from protein supplements, they depend mainly on the range for feed. Only 3 percent of the land in farms and ranches is cultivated and crops were harvested from only half of the cultivated land in 1954. Most of the farming is done on the portions of the plains areas which spill over into some of the counties making up sub-area 7a. The cropping systems closely resemble those of the Rolling Plains. Cotton made up 39 percent; grain sorghum, 25 percent; small grains, 9 percent; and hay and forage crops, 25 percent of the harvested cropland. More than 30 percent of the cropland was used for pasture only.

Eighty percent of the farms were classed as commercial. Of these, 75 percent were livestock farms or ranches, 16 percent cotton farms and 3 percent poultry farms. As further evidence of the importance of livestock in the area, the sale of livestock and livestock products accounted for 86 percent of the value of all agricultural products sold. At least 95 percent of the value of livestock and livestock products sold was from range livestock, cattle, sheep and goats.

Sub-area 7b receives more rainfall, and small ranches and livestock farms dominate the agriculture. The average size ranch or stock farm is little more than 2 sections. The native range is supplemented by cropland pasture and by the production of feed crops, including a substantial proportion of small grains which, in addition to grain, provide green grazing during the late winter and early spring. Almost 14 percent of the land in farms is cultivated, but crops were harvested from only 40 percent of the cultivated land in 1954. Thirty-five percent was used for pasture only, while 25 percent was idle or in crops that failed. Cash crops, such as cotton and peanuts, used less than 5 percent of the cultivated land, whereas feed crops and annual pastures together used more than 70 percent.

Figure 59. There is a good balance between grass and browse in the central part of the Edwards Plateau. Cattle, sheep and goats are found on most ranches. Courtesy, Soil Conservation Service.

Figure 60. The vegetation in the northwestern part of the Edwards Plateau is mainly grass, and cattle and sheep are practically the only types of livestock. Courtesy, Soil Conservation Service.

Sub-area 7c is made up largely of the Central Basin. In elevation, it ranges from 500 to 1,000 feet below the surrounding Edwards Plateau. Originally a part of the Plateau, the Central Basin was formed by erosion of the overlying limestone. The soils are predominantly sandy, although remnants of the Edwards limestone give the area some of the characteristics of the Edwards Plateau. The vegetation on the sandy soils includes much needlegrass,
speargrass and grass burs, which make an unfavorable environment for sheep and goats. Very little browse is available. Sheep and goats are kept to utilize some of the vegetation on the remnants of the Plateau.

Livestock dominate the agriculture more completely than in any other part of the area. The sale of livestock and livestock products in 1954 made up 96 percent of the value of all products sold. Cattle and calves sold accounted for more than half of all products sold.

Ranches on the more typical Basin lands averaged two to three times the size of ranches on the adjoining Plateau. Like the adjoining area, the lease of hunting rights is an important source of income to local ranchmen.

Less than 4 percent of the land in farms and ranches is cultivated and less than half of the cultivated land produced harvested crops in 1954. More than a third of the cultivated land was used for pasture only. Peanuts occupied 35 percent of the harvested cropland and cotton 12 percent. Hay and other forage crops accounted for another 40 percent.

Almost 81 percent of the farms and ranches in sub-area 7c were classed as commercial farms, of which 89 percent were livestock, 4 percent dairy, 4 percent general and 3 percent cotton and peanut farms.

Because of the nature of its land resources, area 7 probably will be used continuously for grazing. As nearby urban populations build up, the area will be used increasingly for recreation and related activities. The amount of rainfall and its distribution will continue to cause fluctuations in the rates of stocking the range. Within the limits set by differences in the vegetative cover, price relationships among range livestock and livestock products will determine the combinations of cattle, sheep and goats utilizing the range.

**Area 8. South Texas Plain**

The South Texas Plain comprises 21 of the southernmost counties in the State, including a large part of the Rio Grande Plain. It is moderately dissected, gentle rolling and brush covered. The soils range from dark clays and clay loams to sand loams and sands. The average annual rainfall ranges from 20 to 30 inches, but its effectiveness is lowered by year-to-year extremes in its amount and distribution and by a high rate of evaporation. In the driest western and southern parts of the area, some of these limitations are overcome with irrigation. Differences in soils and rainfall have resulted in sufficient differences in types of farming to justify dividing the area into four sub-areas.

Sub-area 8a, sometimes called the Winter Garden centers in three of the driest and most western counties. The soils are mainly clay loams and sandy loams. Cattle ranching and irrigation farming characterize the agriculture of this sub-area. Irrigation water is obtained from wells and from the Nueces River. Less than 9 percent of the land in farms is cultivated and crops were harvested from only 40 percent of the cultivated land in 1954. Cropland pasture, some of it irrigated, accounted for 6 percent of the cultivated area. More than 90 percent of the land in farms and ranches is pasture.

In 1954, almost one-fourth of the harvested cropland was in cotton. Onions, spinach, carrots and tomatoes made up 34 percent and feed crops accounted for the remainder, mainly corn and grain sorghum (15 percent) and hay and other forage (25 percent).

Crop sales accounted for 56 percent of the value of farm products sold. Almost half of it came from the sale of vegetables, fruits and nuts and horticultural specialties.

Livestock and livestock products account for 44 percent of the value of all products sold. Cattle are the only important type of livestock. The sale of cattle and calves make up more than 85 percent of the value of all livestock and livestock products sold.

Seventy percent of the farms in this subarea were classed as commercial farms. These were classed as livestock farms or ranches, 45.6 percent; vegetable, 17.9 percent; cotton, 13.6 percent; general, 9.2 percent; dairy, 5.5 percent; poultry, 5.3 percent; and fruit and nut farms, 2.7 percent.

Trends in sub-area 8a have been toward more crop production and more cattle. There was almost four times as much cropland, more than twice as much harvested crops and more than three times as many beef cows in this sub-area in 1954 as there were in 1930.

The cropping systems also changed substantially. Vegetables accounted for 60 percent of the harvested crops in 1930 and only 34 percent in 1954. Spinach and onions made up 86 percent of the vegetable acreage in 1930 and only 47 percent in 1954. Other vegetables which have increased in importance are lettuce, tomatoes and carrots. Irrigated cotton has become an important cash crop since World War II.

![Figure 62. Onions are one of the principal vegetable crops in the Winter Garden, sub-area 8a.](image)
Another significant change has been the irrigation of annual pastures and increased production of forage crops. Both of these developments are reflected in the increase in beef production.

Sub-area 8b includes all or parts of seven counties. The soils are mostly sandy, but range from dark clays to light sands. Slightly more than 30 percent of the land in farms is classed as cropland, but less than half of it was harvested in 1954. More than a third of the cropland was used for pasture only. In contrast with sub-area 8a in which 55 percent of the cropland was irrigated, only 4 percent was irrigated in 8b. The agriculture of this sub-area is affected somewhat by its nearness to markets in San Antonio. There are relatively more dairy and poultry farms than in the rest of the area. Less than 60 percent of the farms were classed as commercial. Almost 60 percent of the commercial farms were livestock farms or general farms. The rest of the farms were widely distributed among other types: poultry, 9.7 percent; peanuts and flax, 8.9 percent; dairy, 7.8 percent; cotton, 6.5 percent; cash grain, 19 percent; vegetables, 3.3 percent; and fruits and nuts, 1 percent.

A wide range of truck crops are grown. Peanuts, watermelons and peas are the principal crops on the light sandy soils. Cotton, flax and row feed dominate the cropping systems on the heavier soils.

Cash crops, mainly peanuts, cotton, vegetables and flax, account for only 34 percent of the acreage of harvested crops. Feed crops, about equally divided between grain and forage, account for the remainder.

Livestock and livestock products made up almost 70 percent of the value of farm products sold in 1954. Cattle alone constituted almost half and dairy products a third of the value of the livestock and livestock products sold.

The trend appears to be away from cash crops and toward more livestock production. As the urban population centering around San Antonio increases, this trend is expected to continue.

Sub-area 8c is primarily a dryland area. Less than 1 percent of the cropland is irrigated. The soils are predominantly dark clays and clay loams with small areas of sandy soils intermixed. The annual rainfall averages 25 to 30 inches and is variable. More than three-fourths of the farmland and about one-fourth of the cropland are pastured.

Slightly more than one-fourth of the farmland is classed as cropland. Sixty-eight percent of the 1954 cropland was harvested. Harvested crops included cotton, 22 percent; corn, 20 percent; grain sorghum, 20 percent; forage sorghum, 14 percent; and flaxseed, 12 percent. Other crops of some importance were hay, 4 percent, and vegetables, mainly watermelons and onions, 2 percent. Sixty-two percent of the State's 1954 flax acreage was reported in sub-area 8c.

As might be expected, with more than three-fourths of the farmland used for pasture only, livestock loom large in farming systems. The sale of livestock and livestock products accounted for more than half of the value of farm products sold in 1954. Cattle sales alone accounted for almost 30 percent and dairy and poultry sales made up more than 20 percent.

Almost 73 percent of the farms in this sub-area in 1954 were classed as commercial, being livestock, 31 percent; cotton, 30 percent; general, 16 percent; poultry, 7 percent; cash grain, 6 percent; dairy, 4 percent; and other field crops, mainly flax, 4 percent. No other type represented as much as 1 percent of the commercial farms.

Sub-area 8c is located strategically between the San Antonio and Corpus Christi markets. A substantial part of the milk and poultry products consumed in these two cities is produced in this sub-area. As these communities continue to grow, expanded production of these products may be expected. Otherwise, in view of climatic conditions and limited water resources, only extensive types of farming will be practiced, with emphasis on beef cattle and on such crops as cotton, corn, grain sorghum and flax.
Sub-area 8d represents more than half of area 8. Very extensive systems of production prevail except for a few favored communities where irrigation is practiced.

Some of the largest ranches in the State are in sub-area 8d. More than 95 percent of the land in farms is used for pasture only.

Less than 5 percent of the land in farms and ranches is cultivated and only slightly more than half of the cropland was in harvested crops in 1954. About 8 percent of the cropland is irrigated. Eighty percent of the irrigated land is in the three counties bordering the Rio Grande. Most of the dryland farming is done in the eastern part of 8d where rainfall is somewhat greater than in the rest of this sub-area.

Although most of the land is grazed, the sale of crops made up more than one-third of the value of products sold in 1954. Cotton and vegetables were the principal crops sold. Cattle sales made up more than half of all livestock sales and the sale of dairy products accounted for most of the remainder.

Only 61 percent of the farms in 8d in 1954 were classed as commercial. Of these, 41 percent were cotton; 40 percent livestock; 7 percent dairy; and 5 percent vegetable farms. No other type represented as much as 3 percent of the commercial farms.

The average farm size in 1954 was almost two and one-half times the average size in 1930. Other trends include a drop in cotton acreage and an increase in vegetable production, feed crops and livestock. Because of its limited supply of irrigation water and the low and erratic rainfall, ranching and other extensive types of farming will continue to dominate the agriculture of the South Texas Plain.

Area 9. Lower Rio Grande Valley

The lower Rio Grande Valley comprises the three southernmost counties in Texas—Cameron, Hidalgo and Willacy. The soils range from light sands in the north to very dense clays along the Rio Grande. These soils are highly productive when properly managed. From the northwest part of the area, where the surface is gently rolling, it gradually flattens to the south and east.

The climate is semi-tropical with an average frost-free period of more than 300 days. The average rainfall averages approximately 25 inches, but varies greatly from year to year and from season to season within each year. The rainfall and its effectiveness decline from east to west. A substantial part of the cropland in the northwest part of Hidalgo county and in the eastern parts of Willacy and Cameron counties is dry-farmed.

About 55 percent of the farmland in the area is classed as cropland. Crops were harvested from about 80 percent of the cropland in 1954. A large part of the pastureland is concentrated on the sandy soils in northern Hidalgo county and on the marshy and semi-marshy lands in eastern Cameron and Willacy counties. More than half of the cropland and two-thirds of the harvested acreage were irrigated in 1954. The acreage irrigated was below normal because of a shortage of irrigation water brought on by the drought of the early 1950's.

The long growing season and the availability of water for irrigation permit the production of a wide range of crops. Cotton and grain sorghum are the principal crops on dryland, while cotton, vegetables and citrus fruits occupy most of the cropland on irrigated farms. Cotton is decidedly the main crop product and accounted for 54 percent of the acreage of harvested crops in 1954. The other crops of major importance are vegetables, 8 percent; grain sorghum, 17 percent; and citrus fruits. Double use of some croplands is permitted by the long frost-free period and the large number of short-season vegetables grown.

Before and during World War II, citrus was the principal cash crop. Hard freezes in 1949 and 1951 destroyed 85 percent of the citrus orchard. Hardly more than half of this citrus acreage has been replanted and much of it is not of bearing age at this time. Because of the loss of nursery stock, the shortage of irrigation water for several years following 1951, rising development costs and the need for a ready source of income, the recovery of the citrus industry has been slow. Cotton semi

Figure 65. Most of the citrus groves in the Lower Rio Grande Valley had to be replanted after the destructive freeze of January 1951. Courtesy, State Highway Department.

Figure 66. Citrus, vegetables and cotton are the principal products in the Lower Rio Grande Valley. Courtesy, Soil Conservation Service.
to have filled this need during 1951-53 when nearly three-fourths of the cropland was planted to this crop. With the return of acreage allotments in 1954, the search for profitable alternatives was renewed. The production of vegetables had saturated the market at about 150,000 acres. The seriousness of the situation is indicated by the big increase in grain sorghum, a low-income crop. The 1954 acreage of grain sorghum at 142,000 was seven times the 1949 acreage. The present acreage is about double the 1954 acreage.

Despite the great loss in citrus production, crop sales accounted for more than 94 percent of the value of all sales in 1954. Cattle sales, 3.6 percent, were next in importance. Dairy and poultry sales together accounted for only slightly more than 2 percent of all sales.

Almost 81 percent of the farms in area 9 were classed as commercial. These commercial farms controlled 98 percent of the land resources. Commercial farms were 85 percent cotton, 4 percent vegetable and 3.5 percent fruit and nut farms. In 1949, prior to the disastrous freeze, more than 14 percent of the farms were fruit farms. Minor types included general farms, 2.3 percent; livestock farms, 2 percent; and dairy farms, 1.7 percent. No other type represented more than 1 percent of the commercial farms.

Future developments in the area seem to depend on the availability of a dependable supply of good quality irrigation water. This must come, for the time being at least, from conservation of the flood waters of the Rio Grande. Much depends on the recovery of citrus production. If the Lower Valley regains its former position in citrus production, some of the pressure on the vegetable market would be released. It also would take up some of the slack caused by decreasing cotton acreage allotments. In an area with an average growing season of more than 300 days, there always is the possibility that a new crop may be introduced. The avocado is receiving the most attention at this time. It has good market possibilities and about the same cold resistance and development costs as citrus. The Lower Valley is probably the one remaining area in the United States with a good potential for avocado production.

Area 10, Coastal Bend

The Coastal Bend comprises all of four counties and parts of three others. The soils are predominantly dark colored clays and clay loams and are highly productive. The annual rainfall, which averages about 30 inches, is sufficient most years for high yields of cotton and grain sorghum.

Less than 3 percent of the crops harvested in 1954 came from irrigated land. The Robstown water district, which involves about 4,500 acres subject to irrigation, has water available at the discretion of the city of Corpus Christi which has prior rights to Nueces River water. Extended periods of drought

Figure 67. Flat land and mile-long rows encourage large scale cotton and grain sorghum production in the Coastal Bend (area 10). These two crops account for more than 90 percent of the harvested cropland.

on the Nueces watershed usually mean cutting off water to the district. Small streams and reservoirs supply a very limited amount of water. Some ground water is used for irrigation, but much of it is considered too poor in quality for continuous use.

The area has an average frost-free period of about 300 days, but there is a range of more than 100 days between the longest and shortest.

Physical characteristics of the area are especially favorable to the use of large-scale, multi-row equipment. Its flat surface, large farms, large fields and mile-long rows make efficient operation possible. It was in this area that the all-purpose tractor was tested and first distributed. Before acreage control programs were initiated in 1933, the Coastal Bend was a highly specialized cotton-producing area with more than 80 percent of the cropland in cotton. By 1954, cotton occupied only 36 percent of the harvested cropland while sorghum grain accounted for 55 percent. Flax made up 3.5 percent, hay and forage 4 percent and winter vegetables 3 percent, principally onions and cabbage. The vegetable acreage, which has been reduced greatly in recent years, usually is double-cropped with either cotton or grain sorghum. Since 1954, the cotton acreage has been further reduced and the grain sorghum acreage increased.

The Coastal Bend is primarily a cash crop area. The sale of crops made up 93 percent of the value of all products sold in 1954 and field crops, almost entirely cotton and grain sorghum, accounted for about 99 percent of all crop sales.

Cattle are the only type of livestock of major importance. Cattle sales accounted for almost three-fourths of the value of livestock and livestock products sold. Most of the poultry and dairy products consumed in the area are brought in from adjoining areas.
Although cotton represented only 36 percent of the harvested cropland and grain sorghum 55 percent, more than 78 percent of the commercial farms were classed as cotton and only 8 percent as cash grain farms. Minor types included livestock, 5.6 percent; general, 4 percent; and poultry farms, 2.3 percent.

Trends in the area are toward fewer and larger farms, less cotton and vegetables and more grain sorghum and beef cattle. The average farm size has more than doubled since 1930. The 1954 cotton acreage was about half that of 1930, while grain sorghum increased from less than 8,000 to 332,000 acres.

Farmers of area 10 probably will continue to plant as much cotton as permitted, with grain sorghum still the principal user of cropland.

The area has a large potential for winter vegetable production. During World War II, a peak of more than 70,000 acres was reached, but in the face of slackening demand and drought, it declined to about one-fourth of this amount by 1954. Should the demand warrant and winter moisture permit, the acreage planted to vegetables again would increase substantially. Realization of this potential would be furthered by the development of an adequate and reliable supply of good quality water for irrigation. This, in turn, would make the area a reliable source of vegetables for the market. The chance for such a development seems remote in view of the rapidly growing need of water for domestic

and industrial consumption. This area, however, would present a favorable situation if an economical process of converting salt water could be developed.

Area 11, West Cross Timbers

The West Cross Timbers includes large parts of eight counties and small parts of several others. The soils range from sands to sandy loams and are low in natural fertility and highly erosive. Minor extensions of the Grand Prairie are found in most of the counties included in this area. Much of the small grains and cotton reported from these counties is grown on prairie land.

The surface ranges from gently rolling to rolling with large amounts of rough, stony land in some parts of the area. The native vegetation consists mainly of bunch grasses, oak trees and brush.

Area 11 lies at the western limits of the humid region with an average annual rainfall of about 9 inches. The frost-free period averaged about 22 days.

Almost 85 percent of the land in these eight counties is in farms, but only slightly more than one-fourth of the farmland is classed as cropland. More than a third of the cropland was used for pasture only in 1954. Altogether about 80 percent of all land in farms is grazed.

Area 11 is primarily a livestock area. More than 80 percent of the value of the 1954 farm products sold was accounted for by livestock and livestock products. Cattle sales alone account for almost 60 percent; dairy products, 24 percent; poultry and poultry products, 10 percent; and hogs, 5 percent of the value of product sales. The Fort Worth and Dallas markets draw large quantities of milk and eggs from the area. Hogs are kept primarily to save manure in the woodlands and waste in peanut fields.

Peanuts are the only important cash crop grown on the more typical sandy soils. They occupied 2 percent of the harvested cropland in 1954. The balance of the sandy cropland is used for grazing and harvested forage crops. Cropping systems on the prairie soils in these eight counties closely resemble those on the adjoining Grand Prairie. They are based mainly on small grains, grain sorghum and cotton.

Less than 60 percent of the farms in this area were classed as commercial in 1954. The commercial farms were 48 percent livestock, 14 percent dairy, 13 percent peanut, 12 percent general and 7 percent poultry farms. Minor types were cotton farms, 5 percent, and cash grain, 2 percent. A few vegetable crops, mostly watermelons, and fruit farms, mostly peaches and pecans, also are found in this area.

Before World War I, area 11 was an important cotton producing area. Cotton was the principal source of income. Today practically no cotton is grown on the typical Cross Timbers soils. More than 13,000 acres were reported in the eight counties in 1958 as compared with more than 300,000 acres in 1929 and more than 500,000 acres in 1924. No 

Figure 68. Much of the land in the West Cross Timbers is eroded badly and is used only for grazing. Courtesy, Soil Conservation Service.

Figure 69. Peanuts are the principal cash crop in area 11. They are grown mostly on the light sandy soils. Courtesy, Soil Conservation Service.
factory substitute cash crop has been found, although many different crops have been tried. During and immediately after World War II, the demand for peanuts encouraged greatly expanded production of this crop, but the acreage has since declined to pre-war levels. Farmers remaining on the land have turned to livestock production and to off-farm employment. There were more than three times as many beef cows in the area in 1954 as in 1929, and five to six times as much milk was sold. Almost 57 percent of the farm operators did off-farm work in 1954. Forty-five percent had outside income which exceeded their farm income and 38 percent worked 100 or more days off the farm. Indications point to a continuation of these production patterns, with livestock production increasing slowly and cash crop production decreasing.

Area 12. Grand Prairie

The Grand Prairie lies directly west of the Blackland and comprises a large part of 10 counties and small parts of 12 other counties. It is divided into two parts by the Brazos River. The soils are primarily clay and clay loams which range from highly productive bottomlands and gently rolling prairie to shallow, stony soils on steep slopes. A large part of the latter is covered with live oak and shin oak brush.

The average annual rainfall is 30 to 35 inches and the average length of the growing season is 225 days in the north and 240 days in the south part of the area.

Sub-area 12a, sometimes called the Fort Worth Prairie, lies to the north, and has mainly open and gently rolling to rolling land.

Large markets provided by the metropolitan areas of Fort Worth and Dallas have encouraged the production of livestock products. The sale of livestock and its products make up about two-thirds, and the sale of crops one-third, of the total value of farm products sold.

Forty-two percent of the land in farms is classed as cropland. Crops were harvested from about 73 percent of the cropland while another 20 percent was used for pasture only. Fifteen percent of the 1954 harvested cropland was in cotton. Cotton is grown mainly on bottomland and on the deeper and more productive prairie soils, but more intensively on the small acreages of Blackland which spills over the eastern boundaries of four counties.

The rest of the harvested cropland is devoted to the production of grain and forage crops. Corn and grain sorghum together occupy less than 10 percent of the harvested cropland. About 44 percent was in small grains of which more than two-thirds was in oats. The small grains are especially adapted to the more shallow and dry land soils since they usually mature in the spring before the hot, dry summer. They also provide winter grazing for livestock. Hay and sorghum forage accounted for 26 percent of the harvested crops.

Figure 70. Native pasture, small grains and forage crops occupy 90 percent of the land in farms and serve as a basis for important beef and dairy enterprises in sub-area 12a. Courtesy, Soil Conservation Service.

The cropping system described and the large amount of native pasture adequately complement the livestock systems of the area. Dairying is by far the most important livestock enterprise. The value of dairy products made up more than 29 percent of the value of all farm products sold and 45 percent of the value of all livestock and livestock products sold. Cattle sales alone accounted for 34 percent of the livestock and livestock product sales. Since more than one-third of all cows on farms and ranches in sub-area 12a are dairy cows, a substantial part of cattle sales may be credited to the dairy enterprise.

Less than 53 percent of the farms in 12a were classed as commercial in 1954. These commercial farms were well distributed as to type of farming. Twenty-six percent were livestock farms, 19 percent dairy, 16 percent general, 14 percent cotton, 13 percent cash grain, 8 percent poultry, 3 percent other field crops, mainly peanut farms located in the East Cross Timbers portion of these counties, and 1 percent vegetable farms.

Figure 71. Beef cattle, sheep and Angora goats utilize the rough, stony, brush-covered lands on the stock farms and small ranches in sub-area 12b. Courtesy, State Highway Department.
Trends in the agriculture of sub-area 12a reflect the growth of the urban population. Cropland has decreased 23 percent and row crops 61 percent since 1929, while close-seeded crops, including cropland pasture, increased almost 60 percent. There were almost five times as many beef cows, while milk sales were three times such sales in 1929. Other types of livestock either decreased in importance or, as in the case of poultry, barely maintained 1929 levels of production.

Ready access to the large markets provided by rapidly growing Dallas and Fort Worth indicates that sub-area 12a will make further shifts from cotton and cash grain production to more livestock with special emphasis on dairy and poultry production.

Sub-area 12b lies between the Brazos and Colorado Rivers and comprises the main portions of six counties and parts of six others. It represents the more rolling, broken, stony and brush-covered portion of the Grand Prairie. It is sometimes referred to as the Lampasas Cut Plain.

Livestock production dominates the agriculture in sub-area 12b even more than it does in 12a. The sale of livestock and livestock products made up almost 85 percent of the total value of agricultural products sold in 1954. However, the greater distance from large city markets has resulted in much less intensive production systems. Although 12b has almost 50 percent more land in farms and ranches than 12a, the total value of agricultural products sold was only 60 percent of the value of such products sold in 12a. The value of crop sales was only 30 percent and the value of livestock and livestock products sales was 80 percent of the value of such sales in 12a. As compared with 12a, it had the same value for poultry products, one-tenth the value for its dairy products and about 50 percent more for other livestock and livestock products, mainly cattle, sheep, goats, wool and mohair.

Because of the type of grazing available in sub-area 12b, sheep and goats make up a large part of the livestock population.

About 85 percent of the land area is in farms and ranches of which only 23 percent is classed as cropland. Crops were harvested from less than two-thirds of the cropland in 1954. About one-fourth of the cropland was used for pasture only. The same crops are grown as in sub-area 12a, but in different proportions.

Small grains, mainly oats, made up 47 percent; cotton, 12 percent; corn, 11 percent; grain sorghum, 8 percent; and forage and hay crops, 18 percent of the harvested cropland.

Further evidence of the smaller influence of the large city markets, including off-farm job opportunities, in this part of the area is found in the greater proportion of the farms classed as commercial. Where-as only slightly more than half the farms in 12a were classed as commercial, almost three-fourths of the farms in 12b were so classed.

Classification of the commercial farms as to type confirms the importance of livestock production in the agriculture of the area. Livestock farms other than dairy and poultry account for 67.5 percent: general farms, 12.5 percent; poultry, 6.7 percent; and dairy, 2.8 percent of all commercial farms. All other types, mainly cotton and cash grain, made up only 10.5 percent of commercial farms.

The trend in the agriculture of sub-area 12b has been toward more extensive types of farming. Cropland decreased 24 percent and harvested cropland 47.5 percent during 1929-54, while the amount of land grazed increased more than 12 percent. The cotton acreage decreased 84 percent, corn, 67 percent, and small grains, 23 percent. Only grain sorghum and forage crops increased during this period. The acreage in these crops is about double the 1929 acreage.

The trends in livestock reflect the decline of 80 percent in the numbers of farms since 1929. Milk cows decreased 61 percent and hogs 33 percent. The tendency has been to increase the beef cattle, sheep and Angora goats, while poultry, although somewhat specialized, has held closely to the 1929 levels of production.

The trend toward larger farms and more extensive systems of production is expected to continue in sub-area 12b. There will be less cash crop production while the production of forage crops and many types of livestock may be expanded further.

**Area 13, Blackland**

The Blackland area comprises all or parts of 25 counties. Several have entirely Blackland soil, but most of them also have portions of shallow soils characteristic of the Grand Prairie on the west and light sandy soils typical of adjoining areas on the east. The type of farming tends to conform to these different soils.

Since the county is the smallest unit for which agricultural statistics are available, the overall description of the area is modified by these differences. For example, farms on the Grand Prairie are larger, use much less land in cultivation, produce more small grains, much less cotton and much more livestock than farms on the Blackland. On the sandy soils to the east of the Blackland, farms are smaller, more of the land is grazed, there is more production of specialty crops, such as watermelons, tomatoes and peanuts, and much less cotton.

On the true Blackland, there are soil differences which also affect the land use. The area is cut by many streams. On the more sloping land, rapid drainage has removed much of the top soil, making the land more subject to drought. Much of this land is used for the production of winter grains or for crops to be grazed. In 1954, more than a million acres of cropland in area 13 were being used for some type of pasture. The smoother, deeper soils on the divide bottoms along streams are heavily cropped to cotton.
and row feed crops, such as corn and grain sorghum. In cases where individuals could control sufficient land, farm adjustments on this type of land have been toward large-scale cash-crop production.

The gray lands which lie along the east side of the Blackland generally are less rolling, less subject to erosion and not as well drained as other Blackland soils. These lands are being shifted rapidly to grazing, to feed crops and to livestock production.

Area 13 is naturally divided into two main parts. The sub-area 13a, the larger part, comprises all or parts of 21 counties of which 82 percent, or 9,392,000 acres, is in farms. About 57 percent of the farmland is in cultivation. Only 73 percent of the cropland was harvested in 1954. More than two-thirds of the remainder was in annual pasture or in the process of development for use as permanent pasture. Since 1930, there has been less than 2 percent reduction in the amount of land in farms while the amount of cropland declined about 21 percent. During this same period, the cropland harvested was reduced 38 percent.

Cotton is still the principal user of cropland and the main cash-crop in sub-area 13a. In 1954, cotton occupied almost 29 percent of the cropland, corn, 13 percent; small grains (mostly wheat and oats, 11 percent); hay and forage sorghum, 12 percent; and grain sorghum, 6 percent. Since the introduction of hybrids, grain sorghum has increased to an acreage about equal to that of corn.

The trend in crop production has been away from the row crops and toward the production of close-seeded crops, such as small grains, hay and grazing crops. The combined cotton, corn and grain sorghum acreage in 1954 was less than half the acreage of these crops harvested in 1930. A further substantial reduction in the cotton acreage has occurred since 1954. Less than 20 percent of the cropland was in cotton in 1958. If the land taken out of cultivation and presumed to be in pasture is included, about 3.7 million acres, or more than half of the cropland in 1930, has been shifted to close-seeded crops such as small grains and hay or to pasture crops.

These shifts in land use form the basis for a strong trend toward beef cattle production. The number of cows kept mainly for beef has increased to almost 11 times the number in 1930. Milk cows, however, have decreased to about 61 percent of the 1930 number. Hogs have decreased only slightly. Egg sales have decreased in about the same proportion as milk cow numbers, while chicken sales have increased to four times the 1930 number. Half the chicken sales occurred in McLennan county, an important broiler area.

The decline in milk cow numbers and in egg sales seems to be related closely to the decrease of 51 percent in the number of farms since 1930 and to the trend toward more specialization in dairy and egg production. A substantial increase in the production per cow and the loss of the butter market to vegetable oils also have influenced the decrease in the number of milk cows.

Despite declines in crop production, crop sales accounted for 65 percent and all livestock and livestock products sales only 35 percent of the value of farm products sold in area 13a in 1954. However, this represents a substantial shift since cotton and cottonseed alone made up 95 percent of the value of farm products sold in that area in 1930.

Fifty-eight percent of all commercial farms in 1954 were classed as cotton farms, 16 percent livestock, 10 percent general, 5 percent cash grain and 6 percent dairy and poultry farms combined.

Sub-area 13b comprises parts of four counties. A substantial part of each county is sandy, oak-covered land. About 89 percent of the land area is in farms, but only 27 percent of the farmland is in cultivation. Most of the oak-covered land in these counties is in pasture.

Cotton is the only important cash crop. It occupied a fourth of the harvested cropland in 1954, but had been reduced to less than 15 percent by 1958. Forage crops (sorghum and hay) made up another fourth of the harvested crops while corn and sorghum grain were harvested from the major part of the remainder.

Sub-area 13b is located strategically between two large markets, Houston and San Antonio. With most of their land in pasture and feed crops, farmers have naturally turned to intensive systems of livestock production. The sale of livestock and livestock products made up more than two-thirds of the value of all farm products sold in 1954. Poultry and eggs alone accounted for a third of all sales while dairy products and cattle sales made up most of the remaining third.

The oldest broiler area in Texas centers in Gonzales county. Emphasis in the other three counties is on egg and dairy production. The sub-area as a whole has the densest cattle population of any part of the State.
By increasing the size of their farms and by shifting cropland to improved pastures, area 14 farmers have been able to develop beef production as a major enterprise. Courtesy, Soil Conservation Service.

Despite the emphasis on livestock production, there are more cotton farms than any other type. Cotton farms comprised 39 percent of all commercial farms in 1954. Other important types were general farms, 22 percent; livestock, 19 percent; poultry, 13 percent; and dairy farms, 5 percent. No other type represented as much as 1 percent of the commercial farms. In both sub-areas 13a and 13b, commercial farms represented 69 percent of all farms in 1954.

Trends in sub-area 13b have been away from cash crop production and toward more grazing and forage crops and more livestock. The 1954 cotton acreage was only one-fourth of the 1929 acreage and the acreage of hay and coarse forage was almost double the 1929 acreage. During the same period, all types of livestock increased substantially. These trends are expected to continue in response to the growing markets in Houston and San Antonio.

Area 14. East Texas Farming

The East Texas farming area comprises 24 counties and includes about half of the region known as the East Texas Timberlands. Pine timber inter-spersed with hardwoods cover much of the land not in cultivation and persistently encroaches on cultivated area. The surface of this area is rolling. Its typically sandy soils are infertile, but respond well to fertilizers. It developed as a small farm area with small irregular shaped farms on which small, simple machines were used.

Because of its physical characteristics, migration and other technological developments have adopted more slowly than in other areas. However, a number of significant trends are taking place. People have left the farm and many others have left part-time employment in response to better employment opportunities that began with the opening of the East Texas oil fields in 1930 and continued with wartime activities and postwar industrial development. The reduction in the number of farms familiar in surplus farm labor has contributed to substantial changes in the agriculture of the area. There is a trend toward larger farms, a shift of cropland to pasture and the use of the additional pasture for production and commercial dairying. Operation of small farms have turned strongly to broiler production. Rural electrification and farm-to-market roads have contributed to increased opportunities in dairy and poultry production. Industrial development and high-level employment within the area and in surrounding areas around Dallas, Houston and Beaumont have provided a strong market for these products.

The number of farms in the area decreased 1 percent during 1930-54. Of the farms remaining in 1954, 68 percent were classed as part-time residential, while 55 percent received more than half their income from other than farm sources.

The commercial farms were classed as follow: cotton farms, 30 percent; livestock, 28 percent; general field crops (mostly peanuts and sweet potatoes), 11 percent; poultry, 11 percent; dairy, 9 percent; and vegetable, 4 percent.

Despite the loss in number of farms and the drop in farm population, the overall population of the 24 counties increased during 1930-50. Six counties, which the larger towns are located gained 93,000 people, while the other 18 counties declined 65,000 in population during this period. Oil production and processing and the accompanying industrial development have served to hold people in the area.

Sixty-five percent of the land area of these counties is now in farms. A large part of the land not in farms is forestland. Approximately one-third of the farmland is classified as cropland. Only 37 percent of the cropland was harvested in 1954. This represents a decrease of more than 20 percent in harvested crops since 1930. Slightly more than half of the cropland was used for pasture. More than two-thirds of the land in crops in 1930 has been shifted in about equal amounts to temporary and permanent pasture.

Even more drastic changes are taking place in crop production. Harvested cropland decreased by 3,287,000 acres in 1929 to 911,000 in 1954. Practical
all of this decrease was in cotton and corn acreage. The decrease in the combined acreage of these two crops exceeded the decrease in the acreage of harvested crops. The difference was made up by increases in small grains, hay and forage crops and in vegetable production. The continuance of these trends is indicated by further decreases in the cotton acreage since 1954. In 1958, only 101,000 acres of cotton were harvested in the 25 counties. This is less than 5 percent of the 1929 acreage, as compared with 11 percent in 1954. More than half of the 1958 cotton acreage was in four counties, Red River, Hopkins, Van Zandt and Houston, which have some Blackland or bottomland soils on which cotton is grown.

Some of the land in this area is being returned to pine trees. Approximately 60,000 acres were contracted under the conservation reserve during 1956-59. The Texas Forest Service distributed almost 90 million pine seedlings for planting during 1949-58 which is sufficient to plant 100,000 acres. Many of these seedlings have not survived, but the magnitude of the plantings indicate the amount of interest in reforestation.

Livestock production expanded as crop production declined. Beef cow numbers increased more than 12 times during 1930-54. Commercial dairying and poultry production also increased. Both of these enterprises have become highly specialized. The decrease in farm numbers has been accompanied by a loss in the number of milk cows and chickens kept for home use. Whole milk has replaced butter and butterfat as the principal product sold. The trend in poultry production has been toward market egg production in some cases and to broiler production in others. The leading broiler area in Texas centers in Nacogdoches and Shelby counties. Most of the broilers are produced under contract with feed dealers. There has been some contracting of turkey production in this area in recent years. Hogs, a minor enterprise in the area, have tended to decline in numbers with very little tendency toward specialization. Increased interest in livestock production has led to a decided increase in the quality and productivity of all types of livestock in the area.

The sale of livestock and livestock products in 1954 made up 65 percent and crop sales only 35 percent of the value of all farm products sold. Crop sales probably will decrease in importance in farm income. Crop production may be limited to specialty crops, such as watermelons, tomatoes, peppers and okra, and to feed crops (mostly forages) grown in support of livestock production. Increasing industrialization may draw more people from farms or provide outside employment for farmers and members of their families. Cotton production may disappear completely as the few remaining gins deteriorate from lack of business and are abandoned. The less favorably located land may be planted to trees or be permitted to return to forest naturally. The lands that

![Figure 75. Another adjustment taking place in the agriculture of area 14 is the planting of old fields to pine forests. Courtesy, Soil Conservation Service.](image)

are typical of this area seemed destined mainly for use as pasture or forest and perhaps as both in some cases.

**Area 15. East Texas Timber**

The East Texas Timber area, comprising 12 counties, lies entirely within the pine-covered portion of Southeast Texas. The soils are sandy except for small isolated prairies and the river bottoms where heavier soils predominate. Most of the cotton produced in the area is grown on these prairies and in the river bottoms. The humid climate is favorable to rapid growth of the timber which covers 75 to 80 percent of the land area.

This is a minor area from the standpoint of agriculture. In 1954, about one-third of the land area was in farms, 80 percent of which was in woodland or permanent pasture. More than half of the land classed as cropland was used for pasture. Most of the land not in farms is held in large tracts by lumber interests. These lands have provided free range for the production of cattle and hogs. Lumber and oil production and related activities provide the

![Figure 76. Timber production and processing are major activities in area 15. Courtesy, Soil Conservation Service.](image)
main sources of income to the people of the area. Agriculture mainly serves to hold a supply of labor in the area for use in these activities. Almost three-fourths of all farms were classed as part-time or residential in 1954. The interest in agriculture tends to increase or decrease with changing employment opportunities.

Slightly more than 40 percent of the commercial farms in this area were classed as cotton farms, 27 percent as livestock, 17 percent as poultry, 7 percent as dairy and 7 percent as general farms.

Present farming resembles that of the East Texas farming area. Cotton, corn and forage crops, mostly hay, dominate the cropping systems. There is little production of specialty crops. The area also grows a small, widely distributed acreage of peanuts and vegetables. The trend in crop production has been sharply downward. The total cropland has decreased only 20 percent since 1930, but harvested cropland has decreased 66 percent. Most of the unharvested cropland is being converted to pasture. The decrease in the combined cotton and corn acreage exceeded the decrease in harvested crops. The difference was made up by increases in the forage crops, mainly hay. The continuance of these trends is indicated by the fact that the cotton acreage has been reduced by more than 50 percent since 1954.

Cattle and hog production has come mainly from the free range supplied by the forests of the area. Under these conditions, there has been little incentive to improve individual herds, and a low quality product has resulted. There has been increased interest in herd improvement during recent years and a trend away from the free range to confinement on individual ranches. There has been an increase of almost 60 percent in farmland, a decrease of 24 percent in farm numbers and a decrease of 66 percent in harvested crops since 1930. Most of this change has taken place since World War II. For example, the number of farms of 1,000 acres and more increased 74 percent while the acreage of these large farms increased 90 percent during 1945-54.

A considerable acreage in this area (most is not in farmland) is being reforested. The Forest Service alone distributed approximately 1 million pine seedlings for planting during 1949-53, number sufficient to plant 100,000 acres. Pine interests in this area have added many more million of seedlings to the reforestation effort. Less than 4,000 acres were contracted under the conservation reserve program during 1956-59.

Accompanying these changes, beef cow numbers in 1954 increased to almost three times the number on farms in 1930. Milk cows decreased about in proportion to the decrease in the number of farms. Specialized commercial dairies increased in number and size, however, as in other parts of the State.

The most drastic changes have been in hog and poultry production. The number of hogs on farms decreased almost 60 percent during 1930-54. This decline is attributed to the loss of interest in range-type hog and to the small production of concentrated feeds in the area.

Poultry increased substantially both for egg production and for meat production. Here again the trend is toward specialization. In 1954, more than 60 percent of the eggs sold came from farms on which poultry made up 50 percent or more of the total sales of farm products. The average flock size on the farms suggests the probability that a large number of the egg producers are part-time farmers.

Nearly 23 times as many chickens were sold from the farms of this area in 1954 as in 1930. The norther and eastern counties contribute substantially to the production of the East Texas broiler area, which centers in area 14. The production of broilers concentrated on 3 to 4 percent of the area's farms.

The sale of livestock and livestock products made up almost 75 percent of the value of all farm products sold in 1954. The sale of broilers accounted for 53 percent; dairy products, 15 percent; and other livestock, mainly cattle and hogs, 27 percent of the sales of products sold.

This area seems destined for lower crop production, particularly cotton, less livestock on free range, more land in forests and moderate increases in pasture production and commercial dairying.

Area 16, Post Oak

This area consists of nine counties and lies with the oak-covered portion of the East Texas Timberrands. Scattered through the area are minor flatland prairies with fairly productive soils. Some rivers, including the Trinity, Brazos and Colorado, cross or border the area, and the better drained bottomlands along these streams are very productive. Two typical soils are sandy and of two main groups: one of deep sand with porous subsoils and the other of shallow sandy loams with dense, slowly permeable subsoils. These sandy soils are low in natural

Figure 77. Newsprint in the raw state. Pulpwood ready for delivery to the rapidly growing paper industry in area 15. Note the chain saw to the right of the driver. Courtesy, Soil Conservation Service.
utility and those with dense subsoils are subject to rapid and extreme changes in soil-moisture relationships.

In addition to the loss of more than half of the number of farms since 1930, this area also has declined in total population. Brazos county, in which the A&M College of Texas is located, gained over 16,000 people during 1930-50. Population losses in the other eight counties, however, totaled 48,000 during the same period.

Only 55 percent of the farms in the area were classed as commercial in 1954. Forty percent of these were cotton farms, 35 percent livestock, 12 percent general, 6 percent poultry and 3 percent dairy farms. Most of the cotton produced in the area is grown on the bottomlands and prairies. Some watermelons, peas, tomatoes and peanuts are grown on the deep sands, but most of this land and practically all land with dense subsoils is grazed.

Eighty percent of all land in area 16 in 1954 was in farms, but only 28 percent was classed as cropland. Forty-eight percent of the cropland was harvested in 1954. More than 60 percent of the land in farms other than cropland is classed as woodland, most of which is used for pasture. Despite the fact that census enumerators found about 25 percent more farmland in 1954 than in 1930, there was 20 percent less cropland in 1954. Harvested cropland decreased 55 percent during the same period.

Although the acreage of cotton harvested was less than 23 percent of the 1930 acreage, it made up almost 40 percent of the harvested crop acreage in 1954. The acreage of corn and grain sorghum together equaled the cotton acreage. These three crops accounted for more than three-fourths of all harvested crops. Aside from a small acreage of vegetables and peanuts, most of the remaining harvested crops were hay and forage crops.

The trend in land use has been to shift cropland from row crops to pasture and to close-seeded forage and hay crops. Eighty-two percent of the cropland was in row crops in 1950, as compared with less than 35 percent in 1954. If we assume that the land no longer classed as cropland was returned to pasture and add the cropland which was used only for pasture in 1954, we find that 687,000 acres, or 56 percent of the land that was in crops in 1930, have been returned to pasture. We believe that this acreage would be much larger had the census of 1930 been more complete. During the same period, forage sorghum and hay rose from 30,000 to 91,000 acres. In addition to shifting land from cash crops to pasture, grazing resources are being increased substantially by clearing, seeding, fertilizing and other forms of pasture improvement.

The changes in land use are reflected in the changes in livestock production. The number of beef cows in 1954 was more than six times the number in 1930. Milk cows decreased in numbers, but not in proportion to the decrease in farm numbers. As in other parts of Texas, commercial dairying has increased as milk cow numbers declined with the farm population.

Hogs are a minor enterprise in the area and the number in 1954 was not significantly different from the number in 1930. A high percentage of the hogs are kept to utilize the acorns and other natural food in this area's woodlands.

Poultry, like dairying, reflects the trend toward specialization. The trend is toward broilers and turkeys in the northern part of the area and toward egg production in the southern part.

In 1954, the return from farm products was about evenly divided between crop sales and the sales of livestock and livestock products. Cattle and hogs (mainly cattle) account for 60 percent of livestock and livestock products sold.

The trends reported appear to continue. For example, the cotton acreage in the area decreased another 50 percent during 1954-58. An increasing proportion of the cotton acreage is being concentrated in the river bottoms and irrigated. The minor prairies are slowly moving toward a grazing economy. It seems inevitable that all upland, both sandy and prairie, eventually will be devoted to pasture and forage crops. An exception may be the continued use of limited acreages of deep sands for the production of specialty crops. The bottomlands will continue to produce cotton to the extent permitted. With continuing restrictions on cotton production, the use of these lands also will trend toward some system of livestock production.

Area 17. Coast Prairie

The Coast Prairie comprises a strip of low lying, practically flat land bordering the Gulf of Mexico and extending northeastward from the Guadalupe River to the Louisiana line. Wide differences in soil type, rainfall, conditions of drainage and in industrial development have resulted in mixed types of farming.

The soils that have agricultural significance are roughly classed into three groups: dark clays and clay loams, light colored sandy soils and the alluvial soils.
laid down by the Brazos, Colorado, Trinity and other streams which flow through the area. The average annual rainfall ranges from 35 inches in the west to more than 50 inches in the east. Until systematic drainage is provided, large portions of the area can be used only for grazing.

Irrigation is practiced extensively in this area, but it has been limited mainly to rice production. The drouth years of the early 1950's and the placing of restrictions on rice acreage in 1955 were followed by a lively interest in the irrigation of cotton and other crops. The principal source of irrigation water is the streams that cross the area. However, about 25 percent of the irrigated acreage is watered from wells. Water conservation and the regulation of flow on the main streams through the construction of dams have added substantially to the amount of irrigation water available.

Industrial growth and the accompanying population increase provide a large and rapidly expanding market for farm products.

For more complete description, the area is divided into two parts.

Sub-area 17a includes seven counties in the high rainfall (45 to 50 inches) portion of the area from Galveston, Harris and Waller counties east. Only 62 percent of this portion of the area is in farm. There is a large acreage of marshy lands which serve mainly as a wildlife refuge and provide scant grazing for livestock.

Forty-three percent of the farmland is classified as cropland, but only 41 percent of the cropland was harvested in 1954. Most of the unharvested cropland is associated with rice production and is grazed when not in rice. This is what is generally known as the rice-pasture rotation. The acreage of cropland harvested in 1954 was more than twice the acreage of rice harvested. This rice-pasture rotation accounts for more than 82 percent of the available cropland. Cotton and corn together used less than 5 percent of the cropland, while hay and sorghum forage used 6 percent. No other crops used as much as 1 percent of the cropland.

Despite the emphasis on pastures, the sale of crop (mostly rice) accounted for almost 74 percent of livestock and livestock products 26 percent of the total value of farm products sold in 1954. The sale of dairy products made up almost half, and cattle sales more than a third of the total value of livestock and livestock products sold.

Only 35 percent of the farms in 17a were classified as commercial. These were: cash grain (rice), 3 percent; livestock, 26 percent; dairy, 13 percent; cotton, 12 percent; poultry, 8.5 percent; general, 5 percent; and vegetable farms, 5 percent.

Despite the restrictions on crop production during the past 25 years, both the acreage of cropland and of cropland harvested have been expanded in 17a. This is the result of rapid expansion in rice production during and after World War II. The record of rice production was one of almost continuous expansion during the war and postwar period, resulting mainly from the disruption of production and distribution of rice in the Far East. This expansion of rice production ended with the return of allotments in 1955. The rice acreage in 1958 was only 60 percent of the peak acreage reached in 1954.

Since 1930, the trend in land use in this area has been toward more rice, pasture and forage crops at greatly reduced cotton and corn production. This also has been intensified by production methods —more fertilizers and insecticides, and other forms of capital. In addition to restrictions on cotton acreage, rapidly growing industries have competed for land. The main part of industrial development on the Coast Prairie has been in this part of the area. The population has more than doubled since 1930. The has not been, however, a corresponding increase in the production of truck crops and other perishables which usually accompany a rapid population growth.

Accompanying these changes in land use, beef cattle have doubled their numbers and commercial dairying has expanded. There has been little change...
in poultry production, while egg and pork production have decreased. The demand for these products and for a large part of the milk consumed is met by shipments from other areas.

There has been a slight decrease in the number of farms since 1930. Almost two-thirds of the farms reported in 1954 were part-time or residential farms. More than half of all farms received more than half of their income from off-farm sources.

In view of its natural features and the influence of rapidly expanding industry, the rice-pasture rotation probably will continue to dominate the agriculture of this part of the Coast Prairie.

Sub-area 17b includes all or parts of nine counties. It differs from sub-area 17a in that the average annual rainfall is less (35 to 45 inches), the drainage is somewhat better and agriculture plays a much more important role in the economy of the area. As in sub-area 17a, agriculture has expanded since 1930.

Almost 86 percent of the land is in farms, with about one-third of the farmland in cultivation. About 62 percent of the cropland is harvested.

Although more than half of the Texas rice crop was produced in 17b, rice occupied only one-third of the harvested cropland. Most of the cotton produced on the Coast Prairie is grown in 17b. It accounted for 17 percent of the cropland, as compared with 20 percent in rice. Corn, grain sorghum, hay and other forage crops make up most of the balance of the harvested cropland. The rice-pasture rotation uses more than half of the cropland. There is some shifting of rice land to row crops and vice-versa. The production of cotton and other row crops tends to be concentrated on the dark clays and clay loams and on bottomlands. Rice is grown on any of the typical upland soils where irrigation water is available.

The trend in land use has been from permanent pasture to cropland and from row crops to the rice-pasture rotation. The cotton acreage decreased about 17 percent and the corn acreage 25 percent during 1934-1954. An increase in the grain sorghum acreage more than made up for the decrease in corn acreage. The rice acreage expanded to almost six times that of 1930, while hay and forage increased about 50 percent. A further decrease in the cotton acreage of about one-third has occurred since 1954. The rice acreage is down about 40 percent, but the grain sorghum acreage (probably in response to the introduction of hybrids, and to restrictions on rice and cotton production) has increased to about four times the 1954 acreage and is now the leading feed grain crop in the area.

Beef cattle have more than doubled in number. Poultry and hog production have held their own, while the decrease in milk cows has been proportionately greater than the decrease in number of farms. Commercial dairying has increased, judging from the sale of whole milk.

Figure 81. Row crop production centering around cotton constitutes the major use of the better drained dark clay and bottomland soils in sub-area 17b. Coast Prairie farmers have had more experience with mechanical cotton pickers than any other group in Texas.

The value of farm products sold in 17b in 1954 was almost twice that of 17a. Crop sales made up almost 80 percent of the sale value of all farm products. The sale of livestock other than poultry and dairy products (mostly cattle) was about three-fourths of the total value of all livestock and livestock products sold.

The extent to which agriculture dominates the economy of 17b is reflected in the very slow population increase since 1930. The nine counties had gained only 46,000 people by 1950. About half of this increase was in Brazoria county and reflects its nearness to the Galveston-Harris county industrial complex. In contrast with 17a, almost 71 percent of the farms in 1954 in 17b were classed as commercial. About 59 percent of these commercial farms were cotton farms; 20 percent, livestock; 9 percent, cash grain or rice; 6 percent, general; and 4 percent, poultry farms.

This part of area 17 has long been considered to have the greatest potential of any part of Texas for rice, cotton and beef production. Tremendous amounts of any one or all of these commodities could be produced if the need arose. Proper drainage and irrigation would greatly enhance the area's productivity. Further rapid industrial growth probably will develop because of its great mineral and water resources and its favorable location with respect to transportation. Competition for labor will remain keen. This will tend to favor the rice-pasture rotation to the extent the demand for rice will permit. If we assume mechanical harvesting of cotton, the same reasoning would apply to cotton. Therefore, it is concluded that agricultural developments in 17b will depend largely on what happens to the demand for rice and cotton. Rice, cotton and cattle will continue to be the main products of the area, while the production of milk, poultry, eggs and truck crops will continue to be limited by industry's competition for labor.
IMPLICATIONS FOR THE FUTURE

It is certain that the agriculture of Texas will continue to change. The forces that caused so much change, during and since World II, are still operative. A large amount of adjustment is still to be made. Research and social and economic change throughout the world constantly releases new forces which will result in further adjustments in Texas agriculture.

As these changes occur, rural and urban economic and social activities become more closely integrated. Increasing population, industrial growth providing competition for farm labor, highway development, rural electrification, consolidation of schools and churches and improvements in communication already have tended to minimize or erase cultural differences and bring rural and urban interests closer together.

These trends will result in a somewhat smaller farm population, more specialization, fewer and larger commercial farms, more part-time farming and rural residents, more off-farm employment for farm operators and members of their families and more integration of production and marketing functions.

This concentration of people and economic social functions in urban centers made possible marketing through super-markets. This, in turn leads to the standardization of products in line with the qualities demanded by the consumer.

As in the past, success and even survival in farming will depend to a large extent on the ability of farm operators to keep themselves informed of market changes and to adjust their operations accordingly. Adjustments will not be easy because of the rapid rate of change in the forces affecting agriculture and to the difficulties involved in transferring labor and capital from one farm enterprise to another or from agricultural to non-agricultural uses.

These continuing adjustments will change the relative importance of the various types of farming within Texas and within the type-of-farming area. Because of wide differences in physical characteristics, the delineations of the areas should remain relatively constant.
State-wide Research

The Texas Agricultural Experiment Station is the public agricultural research agency of the State of Texas, and is one of the parts of the A&M College of Texas.

Organization

The Texas Station is conducting about 400 active research projects, grouped in 25 programs, which include all phases of agriculture in Texas. Among these are:

- Conservation and improvement of soil
- Conservation and use of water
- Grasses and legumes
- Grain crops
- Cotton and other fiber crops
- Vegetable crops
- Citrus and other subtropical fruits
- Fruits and nuts
- Oil seed crops
- Ornamental plants
- Brush and weeds
- Insects

In the main station, with headquarters at College Station, are 16 subject matter departments, 2 service departments, 3 regulatory services and administrative staff. Located out in the major agricultural areas of Texas are 21 substations and 9 field laboratories. In addition, there are 14 cooperating stations owned by other agencies. Cooperating agencies include the Texas Forest Service, Game and Fish Commission of Texas, Texas Prison System, U. S. Department of Agriculture, University of Texas, Texas Technological College, Texas College of Arts and Industries and the King Ranch. Some experiments are conducted on farms and ranches and in rural homes.

Operation

Research results are carried to Texas farmers, ranchmen and homemakers by county agents and specialists of the Texas Agricultural Extension Service.

Today's Research Is Tomorrow's Progress