TEXAS AGRICULTURAL EXPERIMENT STATION

A. B. CONNER, DIRECTOR

COLLEGE STATION, BRAZOS COUNTY, TEXAS

BULLETIN NO. 568 JANUARY 1939

DIVISION OF FARM AND RANCH ECONOMICS

IN COOPERATION WITH THE BUREAU OF AGRICULTURAL ECONOMICS,
UNITED STATES DEPARTMENT OF AGRICULTURE

An Economic Study of Farm Organization and Operation in the High Plains Cotton Area of Texas

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS

T. O. WALTON, President

A detailed study of farm organization and operation was made in the High Plains Cotton Area during the five-year period 1931-1935 to provide information needed in the formulation of agricultural production programs adapted to the area. This bulletin, the first of a series, contains a description of the agriculture and agricultural resources of the area and an analysis of variations in farm earnings during the period of the study. Later publications will pertain to farm credit and to agricultural adjustments in the area.

The number of farms studied each year ranged from 127 to 141, or an average of 137. The average operator's earnings per farm amounted to $223 in 1931, $124 in 1932, $1,808 in 1933, $254 in 1934, and $980 in 1935. These year-to-year variations in average earnings were caused primarily by differences in yields and crop-land organization, in farm prices paid and received, and in payments received for participation in Agricultural Adjustment Administration programs in 1933, 1934, and 1935.

The range in earnings on individual farms during each year of the study was wider than was the range in average earnings as between different years. An analysis of these differences in earnings of individual farms during 1931 and 1932 showed that six factors accounted for 63 per cent of the variation during those years. These factors listed in order of their importance were (1) yield of cotton per acre; (2) percentage of farm land in cotton; (3) returns per $100 of feed fed to produce livestock; (4) productive man work days per man, excluding harvesting labor; (5) size of farm; and (6) number of produce animal units per 100 acres of farm land. When the farms were grouped according to the number of these factors in which they were above the average it was found that operator's earnings were progressively larger on farms with an increasingly large number of factors above average accomplishment. Operator's earnings ranged from a loss of $487 on farms that were below average in all factors to a gain of $1,099 on farms that were above average in all six factors.

CONTENTS

AN ECONOMIC STUDY OF FARM ORGANIZATION AND OPERATION IN THE HIGH PLAINS COTTON AREA OF TEXAS[1]

B. H. Thibodeaux,[2] C. A. Bonnen,[3] and A. C. Magee[4]

TEXAS AGRICULTURAL EXPERIMENT STATION, DIVISION OF FARM AND RANCH ECONOMICS, AND BUREAU OF AGRICULTURAL ECONOMICS, DIVISION OF FARM MANAGEMENT AND COSTS, UNITED STATES DEPARTMENT OF AGRICULTURE, COOPERATING.

The High Plains Cotton Area of Texas is located in the central-western part of the State and includes all or part of fourteen counties in the southern portion of the High Plains. (Figure 1.) Eight counties are almost completely within the area, namely, Lamb, Hockley, Lubbock, Bailey, Lynn, Dawson, Terry, and Martin Counties. This area, comprising approximately 5.5 million acres, is the most recently developed cotton-producing section in the United States. Within the last 20 years, a widespread shift has been made from extensive cattle grazing to a type of farming in which cotton and grain sorghums are now the main crops. This development is similar in direction to the developments that occurred previously in the more level portions of the Rolling Plains region immediately to the east and northeast in Texas and Oklahoma.

The rapid change from cattle ranching to crop farming created many problems of adaptation and adjustment. These problems center around the choice of a combination of crop and livestock enterprises on farms and the adoption of production practices adapted to the physical and climatic conditions in the area. The problem of adjusting these combinations of enterprises and production practices to changing economic conditions is a continuous one. In order to facilitate and lend direction to this process of adjustment, this farm-management study was conducted in the area with the purpose of providing information that will be useful to farmers and farm leaders in planning suitable production programs for the area as a whole and for individual farm units within the area.

Method of Obtaining Data

During the five-year period 1931-35, an average of 137 farmers, rather evenly distributed in Dawson, Lynn, Lubbock, Hockley, and Lamb Counties were assisted by a field man in keeping detailed financial records
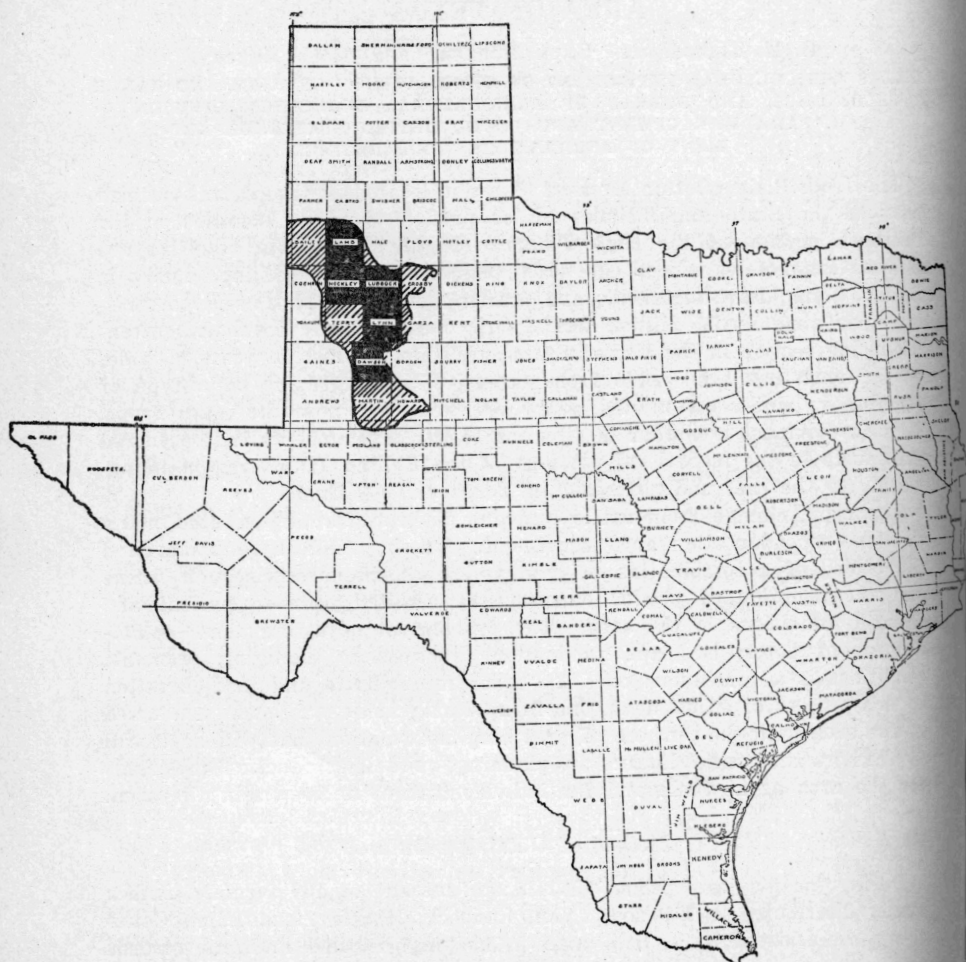
Fig. 1.—The location of the High Plains Cotton Area is indicated by the shaded area. The black portion shows the counties in which farm records were obtained.

of their farm businesses. These records included detailed inventories of land, improvements, equipment, feed, materials, and livestock; farm sales and expenses; quantities and values of farm-raised products used in the home; the value of unpaid family labor; and the cash cost of board for hired help.

The financial records kept by the cooperating farmers were supplemented for each farm with data pertaining to the practices used in the production of the various crop and livestock enterprises. This supplementary practice information was obtained from cooperating farmers by the field man in the course of five or six periodical visits spaced at intervals during each year so as to follow as closely as possible the series of field operations and the livestock-feeding practices performed during the different seasons. For crops, this practice information included data as to the acreage planted to each crop; the operations performed in preparing seed beds, planting, cultivating and harvesting; the types and sizes of machines used; the accomplishment per day for various operations according to the kind of power and size of machinery employed; the kinds and amounts of materials used; and the yields obtained. Data pertaining to livestock were obtained on changes in numbers of animals from month to month, the kinds and amounts of feed fed by three-month seasonal periods, the production and disposal of products, and other details pertaining to the management of livestock. A total of 141 usable farm records covering all phases of the study were obtained in 1931, 138 in 1932, 127 in 1933, 139 in 1934, and 138 in 1935.

In 1936, arrangements were made with the United States Soil Conservation Service to prepare maps showing the soils, slopes, and degrees of erosion on the farms studied in 1935. Supplementary information was then obtained for these farms on the relation of yields of various crops to differences in physical situations, and on the economic merits of various soil- and water-conservation methods practiced in the area.

Presentation of Results of Study

Preliminary reports were prepared at the end of each year of the study in order to inform cooperating farmers of the results obtained from their current farm-business operations. The data presented in these reports pertained primarily to the financial results obtained each year, and were so arranged as to furnish the individual operator with a statement of the organization, operation, and earnings on his farm in comparison with the other farms included in the study. These comparative data were supplemented in the different reports with other information pertinent to the current situation in the area, such as the influence of home-produced food and feed in decreasing cash expenses, the kinds and amounts of various feeds fed to different classes of workstock, the farm power and machinery situation, and the importance of maintaining feed reserves to provide against drought hazards.

This bulletin is the first of a series of three printed publications summarizing the results of the study. The information contained in this

first publication is primarily introductory in nature in that it describes the general farm situation in the area and the financial conditions during the period of study, and *serves to point out and evaluate the chief factors that affected farm profits in the area during a specified period.*

A second bulletin being prepared, entitled "Planning for Adjustments in Farming in the High Plains Cotton Area of Texas," will deal more specifically with the practices used in the production of various crops and classes of livestock, with methods of soil and water conservation, and with the influence of these various practices on efficiency in production as reflected in physical and monetary costs and returns. An important phase of this second bulletin will be the evaluation of alternative systems of farming under varying conditions of relative prices, costs, and returns. A third bulletin in process of preparation, entitled "Farm Credit in the High Plains Cotton Area of Texas," will deal with the use of credit on farms in the area.

DESCRIPTION OF AREA

Topography, Soils, and Native Vegetation[5]

The High Plains Cotton Area may be described as a tilted plain ranging in altitude from about 3,700 feet above sea level in the northwestern part to 2,500 feet in the southeastern part. The surface is almost flat except in small areas in the western and northwestern part, where the sandy soil has been blown into ridges or small knolls. The separation between the High Plains Cotton Area and the Rolling Plains Area immediately to the east is sharply defined by a steep escarpment of several hundred feet in height, locally known as the "cap rock." This escarpment protects the eastern boundary of the High Plains Cotton Area from destructive erosion such as is found in many parts of the Rolling Plains.

Most of the rainfall in the area is absorbed by the soil or drains into depressions or shallow lakes that have no outlets. These lakes usually remain dry for long periods of time, but during seasons of heavy rainfall, run-off water drains into them where it is absorbed or lost by evaporation. Only a small proportion of the rainfall drains out of the area through draws running in a southeasterly direction.

Most of the soils of the High Plains Cotton Area are naturally fertile, and high crop yields are obtained when climatic and other conditions are favorable. From the standpoint of crop production, the important soil types in the area may be grouped into three main classes—(1) fine sandy loams, (2) loamy fine sands, and (3) loams, clay loams, and clays.

The fine sandy loams are the most important soil type in the area. The topsoil is sandy, absorbs water readily, and is underlain at 8 to 15 inches by a heavy clay or clay-loam subsoil in which moisture is stored

---

and made readily available for plant use. When well saturated, these soils will support plant growth despite prolonged drought. Unless carefully handled, however, the fine sandy loams are subject to wind erosion, particularly during the late winter and in the spring. As a result, young crops may be covered up or cut off by wind-blown sand. These soils are particularly well suited to the production of cotton and grain sorghums. Some small grains and corn are also grown, but relatively are of minor importance.

The loamy fine sands are distinguished from the fine sandy loams chiefly because of their sandier and deeper topsoil. Water is readily absorbed by the topsoil and stored for ready plant use in the heavy sub-soil. These soils are difficult to handle, however, because of their high susceptibility to wind erosion. Although cotton is grown to some extent on these soils, it is difficult to establish a stand because of wind erosion. Corn and grain sorghums, both of which can be planted later than cotton and after the worst wind hazards are past, are the principal crops grown. Furthermore, these crops are not affected so adversely by blown sand as is cotton. Small grains are seldom grown on this type of soil.

The loams, clay loams, and clays constitute the heavier soil types of the area, and are generally referred to as "tight land." Crops on these soils are not so drought-resistant as those on the lighter or sandy soils, because of the lower capacity of the heavy soils to absorb water rapidly and make it readily available for plant use. Consequently, crop yields are more erratic on "tight land" than on sandy land. The "tight land" contains more humus, however, and usually is more productive in years of heavy rainfall than the sandy soils. The heavy soils also have the advantage of being more cohesive and hence more resistant to wind erosion. Wheat frequently partially replaces cotton as a cash crop on "tight land," but the extent to which this is done depends largely on the relative prices of the two crops. Grain sorghums are the principal feed crops grown. Corn is seldom found on the heavier soils.

In its virgin condition, the High Plains Cotton Area is treeless. The sandy loams and heavier soils are covered with a sod of grama and buffalo grass. A course bunch grass frequently replaces grama and buffalo grass on the light soils. A scattered growth of dwarf mesquite, catclaw, and bear grass is found on the fine sandy loams. Shin oak is common on the loamy fine sands, which also have a more abundant growth of bear grass and weeds than the sandy loams and heavier soils.

A large proportion of the land in the area is tillable. It is estimated in the soil survey report for Lubbock County that approximately 97 per cent of the total land area in the county could be put into cultivation. The proportion for the other counties may be somewhat less. Raw land is put into cultivation with relatively little or no difficulty. Plowing the native sod is often the only step necessary except on certain of the sandy loam soils on which a small amount of grubbing is necessary to dispose of the scattered growth of dwarf mesquite and catclaw.

Climate

Data on normal precipitation and on the annual precipitation during each of the five years of the study are shown in Table 1. The amount and seasonal distribution of rainfall are the most important factors affecting crop yields in the area. Although the average annual rainfall is usually adequate to provide for satisfactory yields of the crops grown, occasionally a drought may result in partial or complete crop failures over large parts of the area. For example, during the 25-year period 1912-1936 the rainfall from September through August was 25 per cent

Table 1. Precipitation at five United States Weather Bureau Stations in the High Plains Cotton Area

Station	County	Number of years in precipitation record	Normal annual precipitation (inches)	Annual precipitation (inches)				
				1931	1932	1933	1934	1935
Lubbock..	Lubbock...	24	18.53	19.36	24.16	10.31	9.72	17.29
Lamesa...	Dawson....	23	18.45	19.59	33.36	12.28	8.91	27.62
L t lefield.	Lamb......	8	19.50	22.83	19.66	13.57	12.05	14.36
Muleshoe.	Bailey.....	14	18.04	21.05	17.33	13.55	15.21	14.90
Tahoka...	Lynn......	8	18.90	15.33	25.29	15.56	15.16	18.75

or more below average for six years, or 24 per cent of the time. During these low-rainfall years, cotton yields at the experiment substation at Lubbock were 55 per cent below the average yield obtained during the 25-year period. The yields during two of these years represented almost complete crop failures, whereas the highest yield obtained during the six years was 33 per cent below the 25-year average. It is also common, in years of normal rainfall and crop production in the area as a whole, for scattered localities and individual farms to receive insufficient amounts of moisture and to suffer partial or complete crop losses.

The annual average rainfall of approximately 18 to 20 inches is usually so distributed throughout the year as to be most effective in crop production. The heaviest rainfall normally occurs in the spring and during the growing season. (Figure 2.) The autumns are usually relatively dry and favorable for harvest.

The amount and distribution of rainfall in 1931, the first year of the study, were approximately normal. (Figure 2.) In 1932, rainfall was above normal, with unusually heavy precipitation occurring in the southern part of the area. Crop yields in the area as a whole were at high levels during these two years. In 1933, on the other hand, the average rainfall was only 10.31 inches at Lubbock in the central part of the area and 12.28 inches at Lamesa in the southern part. There was a marked difference, however, in the monthly distribution of rainfall, which had an important influence on the crops grown in the two parts of the area. Almost three inches of rain were received at Lubbock in May, permitting the timely planting of cotton and feed crops. Additional moisture received during the growing season resulted in fairly high

yields in the northern part of the area except for certain restricted localities. In the southern part of the area, sufficient moisture to germinate seed was not obtained before the middle of July, when it was too late to plant cotton. The feed crops planted after that date produced yields at fairly high levels.
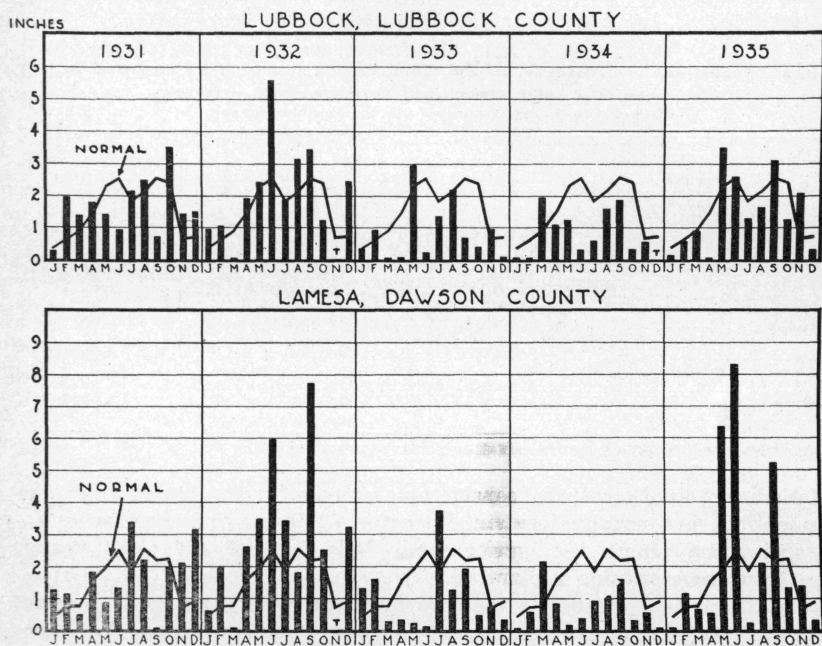
Fig. 2.—Comparison of monthly and normal precipitation at two weather stations in the High Plains Cotton Area, 1931-1935.

The precipitation in 1934 was inadequate for successful crop production and the yields of all crops on the farms studied were approximately 74 per cent below the average yields obtained on these farms during the five-year period 1931-1935. Complete crop failures were not uncommon. Pasture conditions also were unusually poor throughout the year. The amount and monthly distribution of precipitation in 1935 were approximately normal at Lubbock and above normal in the southern part of the area. The crop yields in 1935 approximated the average yields obtained during the five-year period of the study.

As indicated for Lubbock in Table 2, the average length of the growing season in the area is approximately 200 days. The last killing frost in the spring usually occurs about the middle of April, and the first killing frost in the fall during the first week in November. For example, assuming a continuation of weather conditions in the future such as prevailed during the period of the climatic record, it may normally be

expected that the last killing frost at Lubbock during 68 per cent of the years will occur sometime between March 31 and April 26. Likewise, in only 5 per cent of the years will the last killing frost occur earlier than March 18 or later than May 9. These ranges are indicated in Table 2. Similar interpretations may be used in connection with the ranges of dates of the first killing frost in the fall, and hence for the ranges in the number of days in the growing season.

Table 2. Annual and average dates of last killing frost in spring, first killing frost in fall, and length of growing season, and deviations from averages, Lubbock, Lubbock County. (U. S. Weather Bureau.)

Period	Date last killing frost in spring	Date first killing frost in fall	Number of days in growing season
1931	April 10*	November 22	226
1932	April 11*	October 26	198
1933	April 15	November 8	207
1934	March 27*	November 22	240
1935	March 12*	November 5	238
Average (22 years)	April 13	November 4	205
Range within which would fall			
68% of years	March 31-April 26	Oct. 25-Nov. 14	182–228
95% of years	March 18-May 9	Oct. 15-Nov. 24	159–251

*No killing frost reported; last freezing temperature in spring.

Hailstorms occasionally do considerable damage in the late spring and summer, but are usually local in character. Heavy wind movements in the spring may cause the lighter sandy soils to drift and cover young crops, thus necessitating replanting.

Rainfall and temperature in the area affect production not only through their direct effect on the kinds and varieties of crops grown, but also indirectly through their limiting influence on insects and diseases, which usually are not important in their effect on crop yields and production in the area. The cotton bollworm caused serious crop damage in only one year, 1928. Cotton leaf worms occasionally are present late in the season, but usually are of minor importance. Cotton flea hoppers are present and potentially are a menace, but the reported damage has been slight. No damage from the cotton boll weevil is reported. Beginning in April, 1928, various parts of the area have been under quarantine regulations at times because of reported infestations of the pink bollworm, and to prevent the spread of the insect from points of reported infestation. The parts of the area affected were classed as only slightly infested, however, and free movement of cotton and cotton products was permitted when these products were treated according to regulations to prevent danger of spreading the insect.

Historical Development

An impression of the rapidity of the shift from cattle ranching to crop farming, and of the changes in the amounts and proportions of crop

land in different crops during the period from 1899 to 1929 in the High Plains Cotton Area may be noted from Figure 3. The total area in crop land in 1934 is also indicated in the chart. The data upon which the chart is based are from the United States Census and pertain to the eight counties that are almost entirely within the area. These data are also representative of the portions of the area that lie within six other counties, and for which no separate statistical information for units smaller than counties is available.

MILLIONS
OF
ACRES
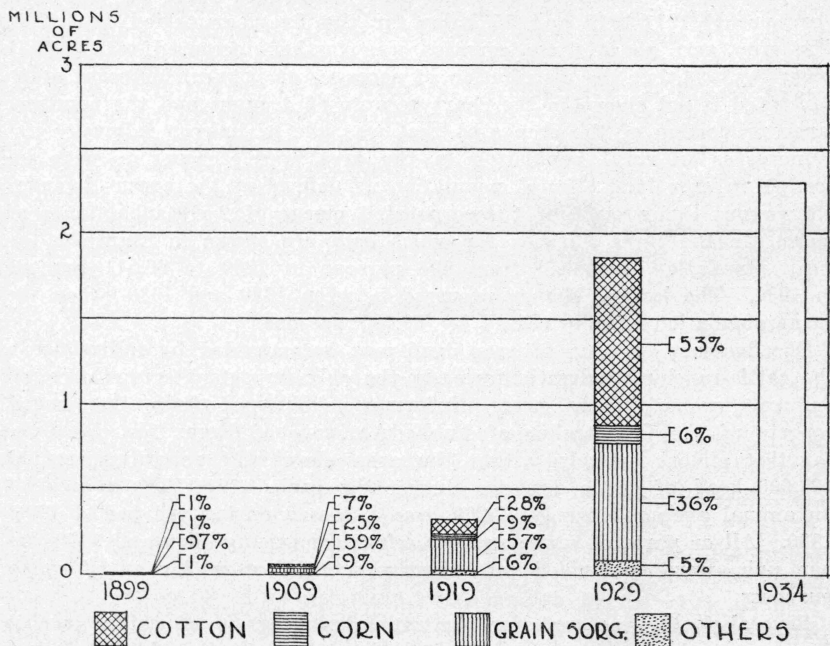
Fig. 3.—Changes in the acreages and proportions of crop land in different crops in eight counties in the High Plains Cotton Area. The eight counties for which data are shown are Lamb, Lubbock, Hockley, Lynn, Dawson, Bailey, Terry, and Martin Counties. The distribution of the crop acreage as between individual crops in 1934 is not shown because of the dislocating effects of the drought of that year.

In 1899, the High Plains Cotton Area was utilized almost exclusively for cattle grazing. The area devoted to harvested crops in the eight counties for which data are shown was increased from approximately 3,159 acres in 1899 to 50,463 acres in 1909, principally for the production of feed on ranches, or on small farms for sale locally to ranchers. The first really significant increase in the harvested crop area occurred in the decade from 1909 to 1919. The area in harvested crops in 1919 amounted to 333,681 acres, an increase of 561 per cent over that in 1909. The proportions of the harvested crop land in different crops was also radically changed. Cotton occupied 28 per cent of the total crop land harvested in 1919, as compared with 7 per cent of the total area harvested

in 1909; and grain sorghums had increased more rapidly, proportionately, than corn. Both cotton and grain sorghums had proved to be well adapted to the climatic conditions in the area.

The agricultural development of the area was further accelerated during the decade of the 1920's, so that by 1929 the area in crop land amounted to 2,009,487 acres. Cotton occupied 53 per cent of the crop land harvested that year. Cotton production in the eight counties under consideration had increased to an annual average of 281,104 bales during the five-year period 1928-1932, as compared with 16,410 bales for the five-year period 1911-1915 and 75 bales for the five-year period 1901-1905. The crop acreage in these counties was further increased to 2,301,771 acres by 1934, but the distribution of acreages as between different crops harvested is not shown in the chart because of drought and the resulting large proportion of the crop area that was idle or in crop failure.

Increases in rural population in the area were concurrent with increases in crop land. Rural population as defined in the census includes all persons living outside of incorporated places of 2,500 inhabitants or more. In the eight counties for which data are shown in Figure 3, the rural population increased from 806 persons in 1900 to 80,511 persons in 1930. The largest change occurred between 1920 and 1930, when the rural population was increased by 59,195 persons.

The increase in area of crop land was accompanied by a decline in the cattle-ranching industry, formerly the only important source of agricultural income in the area. Information obtained from the annual reports of the Comptroller of Public Accounts of Texas for the eight counties almost entirely within the area show an annual average of 168,600 head of cattle assessed during the period 1916-1920 as against an annual average of only 72,200 head assessed during the period 1926-1930. All or parts of cattle ranches, often comprising thousands of acres per unit, were subdivided into relatively small units for crop-farming purposes.

Several factors account for the rapid breaking up of cattle ranches for crop production in the area. It had been demonstrated early, under farm conditions, that cotton and grain sorghums could be grown successfully. It was further demonstrated on these farms and at the State experiment substation, established in Lubbock County in 1911, that these crops possessed drought-resistant qualities that made them superior to other crops that could be grown in the area. Associated with this was the westward movement of settlers eager to acquire land, and the building of transportation facilities. The factor that caused the heaviest influx of settlers was the high price of cotton during the war and post-war period and, in the early 1920's, the high cotton prices and relatively low cattle prices. During the four-year period 1922-1925, producers in Texas received cotton prices that averaged 102 per cent above their 1910-1914 level, while cattle prices averaged 4 per cent below their level for the same period and 39 per cent below their average for the five-year period 1916-1920. This relative price situation served as an induce-

ment for ranchers to sell their land and for farmers to buy it for crop production.

These conditions undoubtedly account for the early influx of farm settlers in the area, but the continuation of the movement and the establishment of the area as an important source of raw cotton can be explained primarily in terms of physical conditions of land and climate favorable to the adoption of large-scale, low-cost production methods. In adapting production methods to the physical conditions in the area, there has been a pronounced trend towards the use of large machinery. The developmental stages of farming in the area before 1920 were based largely on the use of one-row horse-drawn machinery brought in by settlers from the older cotton sections of the State or other parts of the South. However, the rapid increases in crop acreage that occurred during the latter part of the decade of the 1920's were associated with the development and adoption of two-row horse-drawn equipment, and later, tractor-drawn equipment. Since the introduction of the all-purpose tractor in the High Plains Cotton Area in 1926, tractors have been increasingly important, and at present are the most common source of farm motive power in the area.

Present Agriculture

On the basis of census data for the eight counties completely within the area, it is estimated that 79 per cent of the 5.5 million acres of land in the area was in farms in 1929. Of the farm land, approximately 54 per cent was in crop land. Cotton is the most important crop in the area, occupying in 1929 approximately 53 per cent of the harvested crop land. The other major crops and the proportion of the harvested crop land occupied by each were as follows: sorghums for grain, 21 per cent; sorghums for forage, 15 per cent; corn, 6 per cent; and other crops, 5 per cent. Cattle constituted the most important class of livestock in the area, an average of 3 animal units being maintained per 100 acres of farm land in 1929.[6] The other major classes of livestock and the number of animal units in each class per 100 acres of farm land that year were as follows: workstock, 1.9; hogs, .2; chickens, .2; and sheep and lambs, .1.

Farms are classified in the 1930 census according to the source from which 40 per cent or more of the total cash sales plus the value of home-use products was derived. On the basis of this classification, 77 per cent of the farms in the area in 1929 were classified as cotton farms, 6.8 per cent as cash-grain farms, 3.9 per cent as general farms, .9 per cent as stock ranches on which beef cattle constituted the main enterprise, and 6.6 per cent were unclassified. Because of the large average size of the stock ranches, however, this relative situation is changed when the farm groups are classified according to the proportion of total farm land occupied. On this basis, cotton farms occupied 58 per cent of the farm land in 1929, stock ranches 27 per cent, cash-grain farms 6 per cent, unclassified farms 3.7 per cent, and general farms 3 per cent. Thus there is considerable land in stock ranches in the area, a large

---

[6]See footnote to Table 6, for definition of animal unit.

proportion of which eventually will probably be used for crop production. Census data show that the crop acreage in the eight counties included in the area was increased by almost 15 per cent from 1929 to 1934. Assuming that the same rate of increase occurred in the parts of the six other counties included in the area, it is estimated that the crop area amounted to approximately 2,777,000 acres in 1934.

The further expansion of the acreage in crops and in cotton in the area will depend upon the level of prices of farm products, upon the relative prices of cotton and of beef cattle, and upon the amount of land still available for crop production. A committee of soil and crop specialists at the Texas Agricultural Experiment Station estimated that a total of approximately 3,000,000 acres of land in the area was well suited for cotton production. This acreage compares with the estimated 2,777,000 acres of all types of crop land in 1934 and with an estimated 1,198,539 acres in cotton in 1929.

Tenure. Census reports for the eight counties included entirely within the area show that 60 per cent of the farm operators in 1934 were tenants, 39 per cent were owners and part owners, and 1 per cent were managers. Third-and-fourth share tenants, cash renters, share croppers, and all those who rent under other conditions or types of agreements are classed as tenants by the census. Of the farmers in this study who rented crop land, 95 per cent leased on a third-and-fourth crop share basis and 4 per cent paid cash. The remaining 1 per cent had special or unusual lease arrangements.

Lease arrangements between third-and-fourth share tenants and their landlords were generally uniform in the area. The tenant furnishes the labor and management, workstock and equipment, seed, and other materials necessary for crop production. Various cash operating expenses such as cotton ginning, threshing grain sorghums, or combining grain are divided between landlord and tenants in the same proportion that the crops are shared. The tenant gives as rent one-fourth of the cotton and one-third of the other crops grown. The tenant usually owns all the livestock and receives all livestock products. The landlord contributes the land, residence for the tenant, space for a garden, and facilities for keeping some livestock additional to workstock. Landlords usually furnish, rent free, some native pasture or the land for a small acreage of sudan pasture.

Share tenants of the third-and-fourth type usually do not depend on the landlord for credit and receive little or no supervision in the High Plains Cotton Area. The organization and operation of their farm business is similar to the farms operated by owners, hence the farms operated by these two groups are not treated separately in this study.

Farm owners frequently increase the size of their business by renting additional land on the same basis as third-and-fourth share tenants. An average of 33.6 per cent of the cooperating farmers followed this practice during the period of the study. The fact that only 4 per cent of the cooperators who leased farm lands paid cash rent indicates that this

type of tenure is not used extensively by the farmers in the area. However, it is common to pay cash rent for ranch land.

Labor. Hired labor on farms in the High Plains Cotton Area may be classed into two main groups—seasonal and regular. Seventy-three per cent of the total cost of hired labor on the farms studied was for seasonal employees and 27 per cent for regular employees.

Of the total expense for seasonal labor, 83 per cent was used on a contract basis for harvesting cotton and feed, and for hoeing. The remainder, or 17 per cent, was for seasonal labor employed by the day, primarily for hoeing crops and for harvesting feed. Cotton harvesting is usually the largest item of labor cost on farms in the area. Most farmers harvest very little cotton with family labor and depend on hiring transient labor, largely Mexican and Negro, on a contract basis.

Of the total expense for regular labor, 43.8 per cent was in the form of part-cash and part-crop payment, 44.6 per cent in the form of crop-payment entirely, and 11.6 per cent was paid as monthly cash wages. The laborers who received both cash and crop payments were paid a small cash monthly stipend in addition to the production from a comparatively small acreage of crops, usually cotton. If paid entirely by crop, the laborer received no cash but was given the production from a larger acreage of crops. In some cases where the laborer was paid entirely by crop, the farm operator made cash advances that were repaid from the proceeds of the laborer's crop.

Under both of these plans of payment, both the operator and the laborer work on the entire farm unit from the beginning of the crop year until harvest time. The laborer has no cash expense on the crop previous to harvest. Such cash expenses as ginning, binding, and threshing, incurred in connection with the laborer's crop, are paid by the laborer. This type of laborer may work for a landowner or a share tenant and is dependent on the operator for all supervision.

Share croppers, as the term is generally used throughout the Cotton Belt, are seldom found in the High Plains Cotton Area. Although a total of 683 farm records were obtained during the five-year period of the study, only 11 share croppers were employed by cooperators. Eight of these were reported prior to 1933, and only one was reported after that year. Croppers generally furnish all of the labor and one-half of certain cash operating expenses, principally ginning, in return for one-half of the crops they produce.

For the purpose of this study, all laborers receiving crop payments or crop shares, including share croppers, were assigned wages equivalent to the net proceeds from their crops plus any cash received.

Transportation Facilities. The Panhandle and Santa Fe Railway and the Fort Worth and Denver City Railroad extend through the area, with feeder branches reaching to various local points. The system of roads and highways gives farmers access to local markets and shipping points. Only the main highways are paved. However, the lateral roads are well

graded and are easily passable at all times except in periods of unusually heavy rainfall. These railroads, together with the trucking facilities that are available, provide adequate transportation for the area.

FARM ORGANIZATION, OPERATION, AND EARNINGS

Land Organization and Disposal of Crops

The most common-sized units of purchase during the period of rapid settlement in the area were the quarter-section of 160 acres, and the *labor*, a Spanish measure of approximately 177 acres. Later purchases and the leasing of land brought the average size of the farms studied to 276 acres, as indicated in Table 3. These farms ranged in size from 81 to 964 acres, with 64 per cent falling within the size interval of 160 to 320 acres.

Land Organization. During the five-year period of 1931-1935, 231 acres, or 84 per cent of the total land area per farm studied, were utilized in the production of harvested field crops. (Table 3.) Of the remainder of the farm land, from one to two acres were in farmstead, home garden and feed lots, and the balance was used for pasture. Most of the native pasture on farms was tillable.

Cotton and feed crops accounted for an average of almost 95 per cent of the crop acreage on the farms studied during the five years. Considerable variation existed in the proportion of the crop land planted to cotton from year to year during the five-year period. These variations resulted primarily from the effects on farm organization of the Agricultural Adjustment Administration programs during the last three years of the study, the widespread and disastrous drought of 1934 and local droughts in other years, and the changes in prices of commodities sold and purchased.

Cotton occupied an average of 40 per cent of the crop land in the farms studied during the five-year period, the yearly proportions ranging from 53 per cent in 1933 to 27 per cent in 1934. An increase in the acreage planted to cotton in 1933 was caused by the abundance of feed supplies on hand at the beginning of the year, by the relatively low feed prices as compared with cotton prices obtained for the crops of the previous year, and by the necessity of producing a larger amount of prospectively low-priced cotton in order to provide the means for meeting financial obligations. Before the 1933 cotton crop was harvested, however, an average of 46 acres of cotton per farm was plowed under as a result of the cotton-acreage reduction program of the Agricultural Adjustment Administration. In 1934 and 1935, the acreage planted to cotton was held at low levels because of participation in cotton adjustment programs of the Agricultural Adjustment Administration. During these two years, per-farm averages of 42 acres in 1934 and 41 acres in 1935 were entered under contract with the A.A.A. and planted to crops other than cotton. The Cotton Act of 1934 (generally known as the "Bank-

head Act") also influenced farmers to reduce cotton acreage in 1934 and 1935 because of the tax penalty incurred for cotton ginned in excess of a specified quota per farm. The inability to obtain a stand of cotton in many cases and the numerous crop failures caused by the widespread drought in 1934 were additional important factors causing restriction in cotton acreage that year.

Table 3. Organization of farm land and of crop land per farm, and five-year average

Items	1931	1932	1933	1934	1935	Five-year average
Number of farms..............	141	138	127	139	138	137
	Acres	Acres	Acres	Acres	Acres	Acres
Farm land....................	290	288	271	263	268	276
Crop land....................	237	241	218	235	222	231
Native pasture, farmstead and other....................	53	47	53	28	46	45
Cotton......................	104	107	116*	63	72	92
Milo........................	52	45	32	36	56	44
Kafir.......................	16	18	9	12	14	14
Hegari......................	19	19	16	19	29	20
Cane........................	8	8	12	9	9	9
Sudan.......................	18	16	18	19	24	19
Corn........................	6	11	5	5	6	7
Small grains†................	13	14	8	11	10	11
All other crops..............	3	6	3	5	4	4
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Per cent of farm land in crops....	81.7	83.7	80.4	89.0	82.8	83.7
Per cent of crop land in:						
Cotton......................	43.9	44.4	53.2	26.8	32.4	39.8
Milo........................	21.9	18.7	14.7	15.3	25.2	19.0
Kafir.......................	6.8	7.5	4.1	5.1	6.3	6.1
Hegari......................	8.0	7.9	7.3	8.1	13.1	8.7
Cane........................	3.4	3.3	5.5	3.8	4.1	3.9
Sudan.......................	7.6	6.6	8.3	8.1	10.8	8.2
Corn........................	2.5	4.6	2.2	2.1	2.7	3.0
Small grains†................	5.5	5.8	3.7	4.7	4.5	4.8
All other crops.............	1.3	2.5	1.4	2.1	1.8	1.7

*Includes 46 acres in cotton plowed up in cooperation with the 1933 cotton acreage reduction program of the Agricultural Adjustment Administration. Thirty-three acres of the plowed-up cotton land was planted to late feed crops.
†Includes some double cropping.

Milo is the leading feed crop in the area, occupying an average of approximately 19 per cent of the crop area on the farms studied. Other feed crops, in order of importance, are hegari, sudan, kafir, small grains, cane, and corn. Wheat is the most important small grain, and is grown largely for winter and spring pasture. The acreage planted to wheat is governed largely by moisture conditions at seeding time, the acreage tending to be larger when fall moisture is favorable. Threshing of wheat may or may not be done, depending on whether or not the grain produced justifies the expense of harvesting. Wheat is grown as a major commercial enterprise on a relatively few farms, usually situated on the "tight" clay-loam soils in the area. Corn is not so drought-resistant nor so high-yielding as are the grain sorghums, hence is grown in limited quantities chiefly for the purpose of finishing hogs for slaughter and for home consumption. The acreages in wheat and corn were

reduced somewhat in 1934 and 1935 on the farms on which these two crops were of sufficient importance to permit participation in the Agricultural Adjustment Administration wheat and corn-hog programs.

Crop yields. For the area as a whole, the average yields obtained during individual years are largely influenced by the total amount and seasonal distribution of rainfall. The average yields obtained on the cooperating farms during each year of the study are shown in Table 4. The influence of the amount and distribution of rainfall on yields during individual years of the study was noted in the discussion of climatic conditions in the area, beginning on page 10. A composite measure of the differences in average yields as between the several years of the study may be noted from the *crop yield index*, which expresses, in this case, the percentage that the average yields for each year are of the average yields for the five-year period.[7] Thus, with the average yields on all farms studied during the five years expressed as 100 per cent, the crop yield indexes for individual years, beginning in 1931, were 138, 125, 114, 23, and 100 per cent, respectively. It should be kept in mind, furthermore, that wide differences occur in the yields on individual farms or groups of farms within a single year as well as between years. These variations in yields within a single year are caused in many cases by low rainfall or by hail damage in localities even when climatic conditions and yields are generally favorable in the area.

Table 4.   Yield per acre of crops on farms studied, 1931-1935, and five-year average

Crop	Yield unit	Yield per acre in					
		1931	1932	1933	1934	1935	Five-year average
Number of farms..		141	138	127	139	138	137
		Number	Number	Number	Number	Number	Number
Cotton lint.......	Pound	245	226	235	39	177	184
Cotton seed.......	Pound	371	363	352	57	267	282
Milo heads........	Pound	1,789	1,593	1,240	212	1,087	1,184
Kafir heads.......	Pound	1,652	1,263	1,721	32	1,474	1,228
Corn.............	Bushel	17	16	14	1	15	13
Wheat...........	Bushel	14	10	1	6	6	7
Hegari bundles....	Ton	1.86	1.88	1.41	0.37	1.47	1.40
Cane bundles.....	Ton	1.87	2.19	1.32	0.25	1.84	1.49
Crop yield index	Per cent	137	124	113	26	100	100

Production, purchases, and disposal of crops. There is shown in Table 5 a summary of the average amounts of the principal crops produced per farm during the five years of the study, and the average amounts that were purchased, sold, and used per farm. Cotton lint and cottonseed were the major items sold, an annual average of 31.9 bales of 500 pounds, gross weight, and 10.1 tons of cottonseed being sold per farm. The

---

[7]The crop yield index is also used to measure the percentage that the yields on an individual farm or group of farms are of the average yields on all farms studied during a single year or other period. The method used in computing the crop yield index is explained on page 74.

unusually large average amount of lint cotton on hand at the beginning and ending of the year was due to the ownership of cotton posted as collateral with the Government for the obtaining of loans of 8 and 10 cents per pound of lint in 1933, and of 11 and 12 cents per pound in 1934. The lower loans each year were obtained on cotton that was classed as less than 7/8-inch middling. Averages of 9.6 bales and 4.9 bales per farm were held as loan collateral at the beginning of 1934 and 1935, respectively. Under ordinary circumstances, there is very little cotton lint on hand at the beginning of the farm year. In 1931 and 1932, before the initiation of the government loan program, there was an average per farm of only 20 pounds and 233 pounds of lint cotton, respectively, on hand at the beginning of these two years.

Table 5. Average annual production, purchases, and disposition of crops per farm, 1931-1935
(Average, 137 farms)

Crops	Unit	On hand beginning of year	Production	Purchased	Used on farm	Sold	On hand end of year
		Number	Number	Number	Number	Number	Number
Cotton lint.	Pound	1,561*	16,237	. . . .	. . . .	15,946	1,852*
Cotton seed	Ton	3.1	12.4	.5	2.9	10.1	3.0
Milo heads	Ton	13.4	25.7	1.7	14.8	10.3	15.7
Kafir heads	Ton	2.1	4.4	0.2	1.9	2.3	2.5
Corn	Bushel	39	86	22	86	18	43
Wheat	Bushel	4	30	12	21	21	4
Hegari bundles. . . .	Ton	13.3	23.4	1.6	17.1	5.0	16.2
Cane bundles.	Ton	5.9	15.5	0.3	10.5	2.7	8.5

*At the beginning of the year, an average of 1147 pounds of lint cotton per farm was held by the Federal Government as security for loans. At the end of the year, an average of 1417 pounds of lint cotton was so held.

Although the bulk of the feed produced was used at home, significant amounts, particularly of milo heads and hegari bundles, were sold. In addition to the average amounts of feed on hand and produced each year, it was found necessary to spend an average of $115 per year for feed purchases, principally for commercial poultry feeds and protein-feed supplements for cattle and hogs.

Livestock Organization and Disposal of Livestock Products

Livestock organization. The data in Table 6 show that there was an average of 6 horses, 6 cows, 1.2 brood sows, 3 sheep and 135 chickens maintained per farm during the period of the study. These average numbers were computed by adding the number of each kind of livestock on hand each month and dividing the totals by 12. The total number of all livestock kept amounted to an average of 18 animal units per farm, or approximately 7 animal units per 100 acres of farm land. As explained in the footnote to Table 6, the term animal unit is used to express different kinds and sizes of livestock in equivalents of a mature, average-sized horse or cow in the area.

The average number of work animals per farm was decreased after

1934. Breeding activities were stimulated in 1932 and 1933 as a result of low feed prices and relatively high workstock prices, but it is significant to note that the average number of colts per farm was inadequate to provide for replacements. In 1931, only slightly more than three per cent of the horse stock and less than two per cent of the mule stock on the farms studied were less than two years old, whereas the age of the mature workstock averaged above 11 years. In 1934 and 1935, there was an appreciable increase in the number of tractors on the farms studied, indicating a strong tendency on many farms to meet the farm-power question by the adoption of mechanical power.

Table 6. Kinds and number of livestock per farm, 1931-1935, and five-year average

	1931	1932	1933	1934	1935	Five-year average
Number of farms..........	141	138	127	139	138	137
	Number	Number	Number	Number	Number	Number
Workstock:						
Horses and mules.........	6	6	6	6	5	6
Colts....................	.3	.3	.6	.9	.7	.6
Cattle:						
Cows....................	6	7	8	6	5	6.4
Heifers..................	2	2	2	2	1	1.8
Calves..................	4	5	6	4	3	4.4
Bulls....................	.4	.5	.6	.4	.3	.4
Other cattle............	1	1	1	1	.3	1
Swine:						
Sows....................	1.2	1.8	1.5	.7	.7	1.2
Market or meat hogs	2.2	4.1	5.1	3.4	1.7	3.3
Pigs....................	3.6	5.3	5.1	2	2	3.6
Boars..................	.2	.2	.2	.1	.1	.2
Sheep..................	2	2	4	4	1	3
Poultry.................	140	147	149	132	106	135
Animal units*						
Total..................	18.1	20.2	21.8	17.4	13.1	18.1
Per 100 acres farm land...	6.2	7.0	8.0	6.6	4.9	6.6

*An animal unit is the equivalent of a mature, average-sized horse or cow in the area. In expressing other livestock in terms of animal units, the equivalents used were two colts; two heifers, or four calves of less than one year; 1000 pounds of hogs, live weight; and 100 hens.

The number of produce livestock, i. e., livestock other than work-stock, was increased in 1932 and 1933, chiefly in response to low prices of feed relative to prices of livestock, and to the necessity, induced by low cash incomes in 1931 and 1932, of producing food on the farm for home consumption. This upward trend in livestock numbers was sharply reversed by the drought in 1934, to which reference has previously been made. The low production of feed in 1934 together with sharply increased feed prices during the second half of 1934 and the first half of 1935 forced farmers to dispose of their surplus livestock and, in some cases, to reduce their breeding herds. Farmers disposed of their cattle in 1934 largely through the drought-emergency cattle-buying program of the United States Government. Forty-five of the farms studied participated in the 1934 and 1935 corn-hog programs of the Agricultural Adjustment Administration, but the number of pigs raised per farm gives evidence that

the drought and consequent shortage of feed forced greater reductions than were required under the terms of the program contracts. The average production per head of specified produce livestock is shown in Table 7.

Production, purchases, and disposal of livestock products. There is shown in Table 8 a summary of the average physical transactions in produce livestock and livestock products during the five-year period of the study. As in the case of feed crops, significant quantities of live-stock and livestock products were sold in excess of the quantities needed to supply farm and family needs. A more detailed account of the average amounts of farm-produced livestock and livestock products used in farm homes in the area during each of the five years of the study is given in Table 13.

Table 7. Produce livestock, per farm, and production per head, 1931-1935

Items	1931	1932	1933	1934	1935	Five-year average
Number of farms..........	141	138	127	139	138	137
Cows milked per farm.......	5.2	5.8	6.1	4.9	4.0	5.2
Gallons of milk per cow.....	486	611	548	522	563	546
Litters of pigs per farm......	1.5	2.9	2.4	.7	1.1	1.7
Pigs per litter...............	6	5.6	5.7	5.8	6.4	5.9
Hens per farm..............	116	105	104	99	84	102
Eggs per hen...............	94	114	115	113	121	111
Ewes per farm.............	1.4	1.5	2.5	2.5	1.2	1.8
Lambs raised per ewe.......	0.9	0.8	0.5	0.4	0.3	0.6

Farm Investment

The average annual investment per farm during the period of the study amounted to $10,238, or an average of $37.09 per acre of farm land. The values of the items and groups of items comprising the farm investment, and the percentage that each is of the total, are shown in Table 9. The amount of investment was determined by averaging the values of the various items on hand at the beginning and the end of each year. The relatively small investment in livestock other than workstock indicates the predominant importance of crop production on farms in the area.

In estimating the investment in the farm business, land values were maintained at constant levels as between years, and as between farms with similar grades of land during individual years. Crop land and tillable land of a grade that was about average for the area was valued at approximately $25 per acre. Unimproved land was valued at $10 to $20 per acre, depending upon its physical condition and on the grade of land. Buildings, improvements, machinery and equipment were estimated at replacement cost minus depreciation. Values of workstock and of breed-ing herds of produce livestock originally on hand were maintained at or close to their 1931-1932 levels after making allowance for depreciation or appreciation due to changes in age. Livestock for sale and breeding

stock raised or purchased were valued at current farm prices, as were crops held for sale, and feed, seed, and supplies used currently in production.

Table 8. Average annual production, purchases, and disposition of produce livestock and livestock products per farm, 1931-1935
(Average, 137 farms)

Livestock and products	Unit	On hand beginning of year	Production (not including deaths)	Purchased	Used on farm	Sold	On hand end of year
		Number	Number	Number	Number	Number	Number
Cattle	Animal unit	9.3	2.4	.7	.3	3.7	8.4
Butterfat (or equivalent)	Pound		908		318	590	
Pork (live weight)	Pound	871	2,031	234	737	1,482	917
Chickens	Head	121	123	*	47	78	119
Eggs	Dozen		827	1	199	627	

*100 baby chicks were purchased.

Table 9. Investment per farm and per acre, and percentage of total investment in each item, 1931-1935

Items	1931	1932	1933	1934	1935	Five-year average
	Number	Number	Number	Number	Number	Number
Number of farms	141	138	127	139	138	137
Acres per farm	290	288	271	263	268	276
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Investment per farm:						
Land	7,185	7,137	6,730	6,566	6,674	6,858
Buildings and improvements (excluding residence)*	1,225	1,128	1,045	969	931	1,060
Machinery and equipment	834	736	705	837	997	822
Workstock	394	384	431	439	379	405
Cattle	411	381	359	249	225	325
Swine	56	51	43	29	42	44
Poultry	97	75	66	66	69	75
Other livestock	6	13	18	17	15	14
Feed, seed and supplies	378	344	780†	978†	695†	635†
Total investment	10,586	10,249	10,177	10,150	10,027	10,238
Investment per acre	36.50	35.59	37.55	38.59	37.41	37.09
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Percentage of total investment in:						
Land	67.9	69.6	66.1	64.7	66.6	67.0
Buildings and improvements (excluding residence)	11.6	11.0	10.3	9.5	9.3	10.4
Machinery and equipment	7.9	7.2	6.9	8.2	9.9	8.0
Workstock	3.7	3.8	4.2	4.3	3.8	4.0
Cattle	3.9	3.7	3.5	2.5	2.2	3.2
Swine	.5	.5	.4	.3	.4	.4
Poultry	.9	.7	.7	.7	.7	.7
Other livestock	.1	.1	.2	.2	.2	.1
Feed, seed and supplies	3.5	3.4	7.7	9.6	6.9	6.2

*The average value per farm of the residence for each of the five years of the study, beginning in 1931, was $1415, $1221, $1187, $1106, and $1081.
†Includes value of cotton held by the Federal Government as security for loans. At the end of 1933, 1934, and 1935, the inventoried values of this cotton were $294, $348, and $260, respectively, or an average of $180 for the five-year period.

Gross Farm Income

The gross farm income includes cash receipts, increases in inventories at the end of the year over those at the beginning of the year, and the value of home-grown products used in the home. The average gross farm income per farm studied during the five-year period amounted to $2,898, or an average of $10.50 per acre of farm land. (Table 10.) Of this average gross income, 85 per cent was derived from cash receipts, 7 per cent from increases in inventories, and 8 per cent from the value of farm-grown products used in the home. If benefits received for participation in the Agricultural Adjustment Administration programs are credited to the particular commodities affected, the average proportion of the cash receipts from major sources during the period of the study were as follows: cotton, 64 per cent; grain sorghum and other crops, 9 per cent; cattle and dairy products, 9 per cent; poultry and eggs, 5 per cent; and hogs, 3 per cent.

The average gross incomes per farm during each of the five years of the study, beginning in 1931, were $2,442, $2,204, $3,939, $2,374, and $3,532, respectively. These variations in incomes as between the different years of the study reflected the wide differences that prevailed in yields and production, in the prices received for products sold, and in the cash benefits obtained for participating in the government agricultural adjustment programs in 1933, 1934, and 1935. The average annual yields of crops and production of livestock have been discussed in connection with Tables 4 and 7, respectively. Table 11 shows the average prices received for products sold on the farms studied.

Cash receipts. In 1931 and 1932, years of high average production and low average prices, the total cash receipts per farm studied averaged $2,175 and $1,973, respectively. The cash receipts from cotton sales during these two years constituted 67 and 68 per cent, respectively, of the total cash receipts.

The 1933 season was characterized by high average yields, a rapid increase in prices over those that prevailed in 1931 and 1932, and by government benefit payments for participating in the cotton plow-up program of that year. The total cash receipts of $2,790 per farm in 1933 were 34 per cent higher than the average cash receipts per farm obtained in 1931 and 1932. In 1933, receipts from the sale of cotton lint and seed accounted for 45 per cent of the total cash receipts. This proportionate decrease in receipts from cotton as compared with 1931 and 1932 was offset by government benefit payments accounting for 22 per cent of the total cash receipts.

The main factors that influenced farm receipts in 1934 were the disastrous drought of that year, the reduction in farm production, and the higher prices received for products sold. Benefits obtained for participation in the Agricultural Adjustment Administration program constituted 38 per cent of the total cash receipts and were the largest single source of cash income that year. The receipts from the sale of the cotton

Table 10.   Gross income from cash receipts, increases in inventories, and farm-grown products used in the home, per farm and per acre, and percentage of cash receipts derived from various sources, 1931-1935

Items	1931	1932	1933	1934	1935	Five-year average
	Number	Number	Number	Number	Number	Number
Number of farms	141	138	127	139	138	137
Acres per farm	290	288	271	263	268	276
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Gross income per farm:						
Cash receipts:						
Cotton, lint and seed	1,454	1,336	1,266	180	1,526	1,152
AAA payments, cotton program			629	344	350	265
Loans*				288	289	115
Certificates (Bankhead Act)				191	129	64
Grain sorghums	144	114	159	150	199	153
Other crops	53	33	91	100	86	73
AAA payments, corn-hog program				2	2	1
AAA payments, wheat				4	5	2
Poultry and eggs	132	99	103	138	146	124
Cattle	97	69	91	155	65	95
Dairy products	145	124	133	142	135	136
Hogs	68	64	85	59	55	66
AAA payments, corn-hog program				35	14	10
Other livestock	25	60	116	217	139	111
Miscellaneous	57	74	117	155	129	106
Total, cash receipts	2,175	1,973	2,790	2,160	3,269	2,473
Increases in inventories			948			190
Value farm-grown products used in home	267	231	201	214	263	235
Total, gross farm income	2,442	2,204	3,939	2,374	3,532	2,898
Gross income per acre	8.42	7.65	14.53	9.03	13.18	10.50
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Proportion of cash receipts from:						
Cotton, lint and seed	66.9	67.7	45.4	8.3	46.7	46.6
AAA payments, cotton programs			22.5	15.9	10.7	10.7
Loans				13.3	8.8	4.6
Certificates (Bankhead Act)				8.8	3.9	2.6
Grain sorghums	6.6	5.8	5.7	7.0	6.1	6.2
Other crops	2.4	1.7	3.3	4.6	2.6	3.0
AAA payments, corn-hog program				.1	.1	.0
AAA payments, wheat program				.2	.2	.1
Poultry and eggs	6.1	5.0	3.7	6.4	4.5	5.0
Cattle	4.5	3.5	3.3	7.2	2.0	3.8
Dairy products	6.7	6.3	4.8	6.6	4.1	5.5
Hogs	3.1	3.2	3.0	2.7	1.7	2.7
AAA payments, corn-hog program				1.6	.4	.4
Other livestock	1.1	3.0	4.1	10.1	4.3	4.5
Miscellaneous	2.6	3.8	4.2	7.2	3.9	4.3

*Government cotton-option payments were credited to the year when received, and farm inventories adjusted according to the remaining equity in the cotton. Other government loans were credited to the year when the loan cotton was sold, and farm inventories adjusted accordingly.

crop amounted to only 8 per cent of the total cash sales in 1934, as compared with an average of 60 per cent for the three preceding years. Relatively large receipts from "other crops" were largely for feed carried over from 1933 and sold at favorable prices before it became evident that the 1934 feed crop would be reduced below farm needs. The proportionate receipts from livestock were also relatively high as compared with the preceding three years because of drought-emergency sales. The net effect of these influences resulted in an average 1934 cash income that was 23 per cent lower than in 1933, and at the approximate level of incomes obtained in 1931 and 1932.

Table 11. Prices received for crops, livestock, and livestock products sold, 1931-1935

Items	Unit	Price per unit in				
		1931	1932	1933	1934	1935
		Dollars	Dollars	Dollars	Dollars	Dollars
Crops:						
Cotton lint	Pound	.051	.053	.090	.109	.101
Cotton seed	Ton	11.60	7.00	13.80	31.60	30.00
Milo heads	Ton	6.20	4.00	9.40	15.06	9.20
Kafir heads	Ton	5.60	4.40	8.20	13.14	8.03
Corn	Bushel	.25	.19	.38	.51	.31
Wheat	Bushel	.37	.27	.57	.86	.94
Hegari bundles	Ton	4.40	2.00	4.00	8.74	5.40
Cane bundles	Ton	4.20	2.20	5.60	9.78	3.40
Livestock and livestock products:						
Beef (live weight)	100 pounds	2.64	1.66	1.84	2.43	3.95
Butterfat	Pound	.25	.19	.19	.25	.30
Chickens (live-weight):*						
Hens	Pound	.10	.06	.05	.05	.08
Broilers	Pound	.13	.08	.09	.06	.08
Eggs	Dozen	.14	.11	.11	.16	.19
Pork (live weight)	100 pounds	6.00	4.00	3.00	4.00	8.90

*Mostly light chickens.

In 1935, yields were at levels that approximated the five-year average on the farms studied, and prices were slightly higher than in 1933. The average cash receipts per farm amounted to $3,269, of which receipts from the sale of cotton lint and seed comprised 47 per cent.

The seasonal nature of cash receipts in the area is indicated in Table 12. The data in the table show by months the average percentages of the cash receipts from each major commodity and from the farm as a whole. These data pertain to 30 farms for the three-year period 1931-1933. Seventy-one per cent of the total cash farm receipts on these farms were obtained during the four months from October to January, inclusive. Cotton was the most seasonal enterprise in terms of income, with 75 per cent of the cash receipts from its sale being obtained in the two months of October and November. The most evenly distributed receipts were from the sale of dairy products.

Increases in inventories. Changes in inventories reflect the differences in quantities and in prices of farm investment items at the beginning and end of each farm year. Prices of items other than market com-

Table 12.   Percentage of cash farm receipts from individual sources and from all sources during each month of the year (average for 30 farms), 1931-1933

Items sold	Cash receipts per farm, average	Percentage of total cash receipts in											
		March	April	May	June	July	August	Sept.	October	Nov.	Dec.	January	February
	Dollars	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Cotton...........	1,268	.0	.2	.3	.0	.1	.1	3.6	35.5	39.2	10.7	7.3	3.0
Other crops.......	232	14.9	10.0	3.5	3.0	3.0	6.0	3.8	7.1	8.2	10.3	12.1	18.1
Poultry and eggs..	126	11.8	11.1	9.3	7.5	8.4	5.8	5.5	5.2	8.7	7.8	10.5	8.4
Cattle...........	74	9.6	10.5	8.4	4.6	3.2	5.2	4.3	11.7	11.0	8.0	15.1	8.4
Dairy products...	179	8.4	8.7	8.8	7.5	8.0	7.9	9.1	8.5	8.6	9.2	7.7	7.6
Hogs............	85	18.4	15.0	12.4	9.6	4.9	6.8	4.0	4.3	5.5	4.9	8.9	5.3
Other livestock....	69	15.2	10.6	8.9	2.4	2.0	....	7.3	5.0	20.7	5.9	12.5	9.5
Miscellaneous.....	14	.8	3.2	5.7	1.8	9.7	11.7	7.0	30.9	10.3	3.3	7.8	7.8
Total......	2,047	4.8	4.1	3.2	2.1	2.1	2.3	4.4	24.8	27.9	9.8	8.6	5.9

modities were held at rather constant levels after allowing for depreciation or appreciation. Changes in inventory values resulted largely from changes in the quantities and prices of market livestock, and of feed, seed, and supplies used up in current production, and from the sale or purchase of other investment items. During the period of the study, 1933 was the only year in which net increases in inventories contributed to gross farm income. Approximately 67 per cent of the net increase in inventories that year was attributable to equities in cotton on which 10-cent loans had been obtained from the Government.

Farm-grown products used in the home. The data in Table 13 show that operators on the farms studied produce a large part of the food consumed in their homes. Small flocks of poultry sufficient to provide for family needs and some surplus for sale are maintained largely with feed that would otherwise be wasted in the feed lot. Cattle and hogs are major commercial enterprises on relatively few farms, but are commonly kept even on specialized cotton farms for the contributions that they make to the family requirements for dairy products and meat. Small gardens are irrigated with little or no additional cash expense from the windmill-operated water systems that are common to the area. These gardens produce seasonal vegetables in quantities sufficient to meet current home needs, with some surplus for canning. More difficulty is encountered in propagating fruit trees, and home orchards are found only occasionally.

Table 13. Average amounts and value of farm-produced livestock and livestock products, and value of home garden and orchard products used per farm, 1931-1935

Items	Unit	1931	1932	1933	1934	1935	Five-year average
Number of farms..	....	141	138	127	139	138	137
		Number	Number	Number	Number	Number	Number
Whole milk.......	Gallons	581	622	587	534	540	573
Cream...........	Gallons	8	1	2	3	2	3
Butter...........	Pounds	151	131	91	77	85	107
Eggs.............	Dozens	239	221	202	161	172	199
Poultry..........	Head	51	53	52	48	35	48
Beef, live weight...	Pounds	398	345	382	239	181	309
Pork, live weight...	Pounds	642	975	913	639	484	731
Value, livestock and livestock products	Dollars	218	166	173	193	218	194
Value, garden and orchard products.	Dollars	48	62	28	21	45	41
Total value, farm-produced food...	Dollars	266	228	201	214	263	235

In 1931 and 1932, there were small differences in the average values of farm-produced food shown in this table and in the average values of all farm-grown products used in the home shown in Table 10. These differences are accounted for by the use, on some farms, of low-priced feed, principally milo heads, for home fuel during these two years. The effects of the 1934 drought were reflected in decreased quantities

of farm-produced food used in the home in 1934 and 1935 as compared with the first three years of the study.

Gross Farm Expenses

The gross farm expenses incurred per farm and the proportion of the cash expenses for various items are shown in Table 14. Gross farm expenses include cash expenses, decreases in inventories, and the value of unpaid family labor. The average proportions of the gross farm expenses comprised by each of these three groups of expenses during the five years were 83, 11, and 6 per cent, respectively.

Table 14. Gross farm expenses for cash items, unpaid family labor, and decreases in inventories, per farm and per acre, and proportion of cash farm expenses for various items, 1931-1935

Items	1931	1932	1933	1934	1935	Five-year average
	Number	Number	Number	Number	Number	Number
Number of farms...........	141	138	127	139	138	137
Acres per farm.............	290	288	271	263	268	276
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Gross farm expenses:						
Cash expenses:						
Hired labor............	389	362	442	129	403	345
Miscellaneous crop expense..............	346	321	257	103	299	265
Machinery and equipment...............	177	188	334	482	490	334
Feed purchases........	93	39	71	201	171	115
Other livestock expenses.	86	125	178	129	144	133
Improvements (excluding residence)...........	18	26	42	44	40	34
Taxes.................	131	105	88	83	83	98
Miscellaneous farm expenses	1	1	1	1	....	1
Total cash expenses...	1,241	1,167	1,413	1,172	1,630	1,325
Unpaid family labor......	111	94	107	71	104	97
Decrease in inventories....	232	204	....	268	216	184
Total, gross farm expenses	1,584	1,465	1,520	1,511	1,950	1,606
Gross farm expenses per acre.	5.46	5.09	5.61	5.75	7.28	5.82
Portion of cash farm expenses for:	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Hired labor..............	31.3	31.0	31.3	11.0	24.8	26.0
Miscellaneous crop expense	27.9	27.5	18.2	8.8	18.3	20.0
Machinery and equipment	14.3	16.1	23.7	41.1	30.1	25.2
Feed purchased..........	7.5	3.3	5.0	17.2	10.5	8.7
Other livestock expense...	6.9	10.7	12.5	11.0	8.8	10.0
Improvements (excluding residence).............	1.4	2.3	3.0	3.8	2.4	2.6
Taxes...................	10.6	9.0	6.2	7.1	5.1	7.4
Miscellaneous farm nses................	.1	.1	.1	....	....	.1

During the period of the study, farm expenses did not vary so widely as did farm incomes. The average gross expense per acre for the five years was $5.82, with the yearly averages ranging from a low of $5.09

per acre in 1932 to a high of $7.28 per acre in 1935. The farm unit usually is organized to undertake a given volume of production, and it cannot be readily adjusted to meet sharp changes in prices or in production conditions. Expenses for taxes, equipment maintenance, real estate maintenance, and other items of an overhead nature may be deferred for a time, but ultimately must be met. Furthermore, expenses for seed, labor, and other items are always incurred before the levels of production and of prices are known.

Cash expenses. The relatively low farm expenses in 1931 and 1932 represent attempts to curtail costs to the minimum in keeping with the low prices of farm products that prevailed. In 1933, cash expenses were increased principally because of machinery purchases. Expenses for crop production that year were lower than the average for the preceding two years because of the cotton plow-up program of that year and the consequent reduction of harvesting and ginning expenses. With the exception of feed and other livestock expenses, cash farm expenses other than for machinery purchases were relatively very low in 1934 as a result of the drought-reduced production of that year. Machinery and equipment expenses, principally for the purchase of new tractors, constituted the largest item of expense that year. Twenty-nine new tractors were purchased in 1934 on the farms studied as compared with seven in 1933, two in 1932, and one in 1931. The increase in number of tractors in 1934 was continued in 1935, when 19 new tractors were purchased on the farms studied. The relatively large machinery purchases and the increased use of tractors during the latter part of the study were influenced by a combination of several factors. One of the foremost was the relatively large incomes in 1933 and the need for machinery and power replacements following the subnormal purchases in 1931 and 1932. The high average age of workstock in the area together with inadequate provisions for workstock replacement indicate that many farmers were faced with the alternative of purchasing younger work animals or shifting to mechanical power. Since the area is physically well adapted to the use of large equipment either with horse or tractor power, the choice of the latter alternative on many farms in 1934 and 1935 was largely influenced by high average prices of workstock and feed, as well as considerations having to do with increased efficiency of tractor operation and the greater ease in financing tractor purchases. Detailed consideration of the relative efficiencies and of the comparative costs under various price situations of using animal and mechanical power in the area will be dealt with in a later publication, now in process of preparation, entitled "Planning for Adjustments in Farming in the High Plains Cotton Area of Texas."

The average cash expenses in 1935 were highest of any year studied. Yields and production were approximately at average levels, but wages and prices of goods and services purchased had increased to relatively high levels. (Table 15.)

The usual proportion of major items of cash farm expense and of the

total cash farm expenses incurred by months are shown in Table 16. These data pertain to the three-year period 1931-1933 and were obtained on the same thirty farms for which the proportionate monthly distribution of cash receipts is shown in Table 12. As shown in the last line of Table 16, approximately two-thirds of the total cash farm expenses were incurred in October, November, December, and January. The major items of expense during that period were hired labor used in harvesting crops, principally cotton, and cotton ginning. Relatively little labor is hired previous to harvesting. Expenses for machinery and equipment were incurred principally during the land-preparation and crop-cultivation seasons.

Table 15. Prices paid for labor, materials, and services used in production, 1931-1935

Item	Unit	Prices paid in				
		1931	1932	1933	1934	1935
		Dollars	Dollars	Dollars	Dollars	Dollars
Wage labor, without board........	Day	1.00	.85	1.00	1.15	1.25
Contract work:						
Harvest seed cotton:						
Pick......................	100 lb.	.45	.45	.65	*	.70
Snap......................	100 lb.	.30	.30	.45	.80	.50
Binder crew and outfit..........	Acre	1.00	1.00	1.00	1.00	1.00
Combine small grain...........	Acre	1.50	1.50	1.50	1.50	1.50
Ginning, lint cotton:						
Picked cotton.................	100 lb.	.90	.65	.70	.95	.90
Snapped cotton...............	100 lb.	1.10	.95	.95	1.30	1.00
Sledded cotton................	100 lb.	1.20	1.05	*	*	1.25
Bags and ties..................	Bale	1.00	1.00	1.00	1.25	1.25
Binder twine..................	8 lb.	.95	.65	.60	.70	.70
Feed purchased:						
Cottonseed meal..............	100 lb.	1.25	.95	1.10	2.00	1.85
Cottonseed hulls..............	Ton	*	*	4.20	9.00	15.00
Tankage.....................	100 lb.	2.50	2.00	1.75	2.10	2.50
Chick feed...................	100 lb.	2.95	2.10	2.25	2.65	3.00
Laying mash.................	100 lb.	2.25	1.75	2.00	2.50	2.60
Bran........................	100 lb.	1.00	.75	1.00	1.25	1.50
Shorts......................	100 lb.	1.15	1.10	1.10	1.65	1.65
Planting seed purchased:						
Cotton......................	Bu.	1.10	.50	.35	.80	1.20
Grain sorghums†..............	100 lb.	4.00	2.00	1.75	2.25	3.50
Cane.......................	100 lb.	3.50	1.25	1.50	2.25	4.50
Sudan......................	100 lb.	6.75	.90	1.30	4.25	9.50
Corn.......................	Bu.	2.00	1.60	1.10	1.25	2.80
Wheat......................	Bu.	.90	.45	.40	.95	1.05
Tractor fuel:						
Gasoline (minus tax)...........	Gal.	.10	.09	.10	.08	.08
Kerosene....................	Gal.	.07	.07	.06	.06	.07
Distillate....................	Gal.	.05	.05	.04	.05	.06
Lubricating oil................	Gal.	.56	.40	.48	.48	.50
Grease......................	Lb.	.10	.11	.12	.11	.11

*Sample too small to be representative.
†Milo maize, kafir, and hegari.

It is significant to note from Tables 12 and 16 that the peaks of farm expenses and of farm receipts occur at practically the same seasons, i. e., in the fall and winter months. Farmers are thus enabled to finance their major expenses of cotton harvesting and ginning with the proceeds from the current sale of cotton lint and seed. Consequently, barring unusual circumstances, farmers in the area are able to operate with a minimum of production credit. The bulk of the short-term farm produc-

Table 16. Percentage of cash farm expenses for individual items and for all items incurred during each month of the year (average for 30 farms), 1931-1933

Items of expense	Cash farm expenses per farm, average	Percentage of total cash farm expenses incurred during											
		March	April	May	June	July	August	Sept.	October	Nov.	Dec.	January	February
	Dollars	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Hired labor........	304	.7	1.0	.8	1.4	2.1	1.2	4.5	31.3	31.5	10.4	7.6	7.5
Miscellaneous crop expense...	247	1.6	2.2	1.5	1.1	.5	1.4	5.8	31.6	32.8	10.3	6.7	4.5
Machinery and equipment......	164	8.9	12.3	6.7	7.4	5.7	8.9	7.4	9.3	5.1	7.8	11.5	9.0
Feed purchased...	71	9.0	11.2	7.3	8.5	6.4	3.7	3.4	7.0	7.7	17.1	11.6	7.1
Other livestock expenses........	118	9.7	10.6	5.8	4.2	2.0	1.9	6.3	6.2	10.9	12.8	17.9	11.7
Improvements (excluding residence)	27	6.9	9.1	8.0	4.1	1.8	5.0	13.3	4.8	10.6	4.1	14.0	18.3
Taxes............	89	......	......	......	......	......	......	.6	......	4.0	6.4	86.0	3.0
Miscellaneous.....	1	2.1	18.1	2.9	.8	3.2	11.5	3.0	1.5	37.1	14.2	.4	5.2
Total......	1,021	3.9	5.1	3.1	3.1	2.4	2.8	5.3	19.8	20.6	10.2	16.4	7.3

tion loans in the area are obtained from banks, from implement dealers, and more recently, from production credit associations operating under the sponsorship of the Federal Farm Credit Administration. Purchases of family-living items from merchants usually are on a cash basis or on a short-time, cash-price basis without interest charges.

Decreases in inventories. Decreases in inventories contributed significantly to gross farm expenses in every year of the study except 1933. In 1931 and 1932, inventory values decreased as a result principally of declines in prices of farm products. The drastic reduction of feed supplies and livestock numbers in 1934 resulted in decreased inventory values despite sha'rp increases in feed prices. Decreases in inventory values were narrowed in 1935, following the resumption of more normal production and the relatively favorable prices of that year.

Unpaid family farm labor. Unpaid family labor, contributed largely by school children, is commonly used to supplement the operator's labor during seasons of rush field work, and for chore work in connection with livestock maintenance. Schools in the area are commonly dismissed during the rush harvest period. This is done without lessening the amount of time that children attend school during the year. The number of days of unpaid family labor was converted to man-equivalent days and valued at current wage rates without board. During the five years of the study, an average per farm of 92 man-equivalent days, valued at $89, was contributed by unpaid members of the family. The average number of days of such labor per farm in each year, beginning in 1931, were 106, 114, 95, 66, and 77 days, respectively. The variation in the number of days of unpaid family labor per year was influenced largely by the volume of crop production and by the number of cultivations and other crop-production operations necessitated by climatic conditions in individual years.

Farm Financial Summary

The financial summaries shown in Table 17 reflect the situations in respect to farm investment, incomes, and expenses during individual years of the study. These items are described in detail in the preceding parts of this section, hence the discussion of this table is limited to a consideration of the net earnings obtained and to a brief summary of the principal factors causing differences in earnings as between different years of the study.

The net farm income, obtained by subtracting gross farm expenses from gross farm income, represents the amount left to the operator as joint payment for his labor and management, and for the use of his farm. If six per cent of the farm investment be regarded as adequate compensation for its use, the remainder may be considered as earnings of the operator's labor and management, or, as termed here, operator's earnings. If, on the other hand, the estimated value of the operator's labor be subtracted from the net farm income, the remainder may be regarded as capital earnings, or return on investment. The return on

investment, divided by the total investment, gives the percentage earned on investment. The three measures—net farm income, operator's earnings, and rate earned on investment—are widely used in comparing the relative profitableness of individual farms and groups of farms. In this study, the measure of operator's earnings was selected as being generally the most satisfactory.

Table 17. Farm financial summary, per farm and per acre, 1931-1935

	1931		1932		1933	
	Number		Number		Number	
Number of farms...............	141		138		127	
Acres per farm..................	290		288		271	
Items	Per farm	Per acre	Per farm	Per acre	Per farm	Per acre
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Total investment.................	10,586	36.50	10,249	35.59	10,177	37.55
Gross farm income...............	2,442	8.42	2,204	7.65	3,939	14.53
Gross farm expenses.............	1,584	5.46	1,465	5.09	1,520	5.61
Net farm income.................	858	2.96	739	2.57	2,419	8.93
Interest on investment at 6 per cent.	635	2.19	615	2.14	611	2.25
Operator's earnings...............	223	.77	124	.43	1,808	6.67
Value of operator's labor..........	238	.82	204	.71	224	.83
Return on investment.............	620	2.14	535	1.86	2,195	8.10
	Per cent		Per cent		Per cent	
Rate earned on investment........	5.9		5.2		21.6	

	1934		1935		Five-year average	
	Number		Number		Number	
Number of farms.................	139		138		137	
Acres per farm..................	263		268		276	
Items	Per farm	Per acre	Per farm	Per acre	Per farm	Per acre
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Total investment.................	10,150	38.59	10,027	37.41	10,238	37.09
Gross farm income...............	2,374	9.03	3,532	13.18	2,898	10.50
Gross farm expenses.............	1,511	5.75	1,950	7.28	1,606	5.82
Net farm income.................	863	3.28	1,582	5.90	1,292	4.68
Interest on investment at 6 per cent.	609	2.32	602	2.25	614	2.22
Operator's earnings...............	254	.97	980	3.66	678	2.46
Value of operator's labor..........	171	.65	253	.94	218	.79
Return on investment.............	692	2.63	1,329	4.96	1,074	3.89
	Per cent		Per cent		Per cent	
Rate earned on investment........	6.8		13.3		10.5	

Yields and production were at high levels in 1931 and 1932; but, despite strenuous efforts to reduce expenses, the low prices received during these two years resulted in operator's earnings that were insufficient to pay for the operator's labor at current wage rates, after allowing for other expenses and for interest on investment. As between the two years, the slightly lower earnings in 1932 were caused largely by yields that were

eight per cent lower and by somewhat lower prices for feed crops, live-
stock, and livestock products. (Tables 4 and 11.)

Production expenses in 1933 did not keep pace with increased com-
modity prices and incomes, and were not substantially above the expense
levels in 1931 and 1932. This widened differential between income and
expenses in 1933 resulted in average operator's earnings per farm of
$1,808 as compared with $223 in 1931 and $124 in 1932. This greatly
improved income situation in 1933 as compared with the two preceding
years is attributable primarily to increased prices in that average crop
yields, although favorable for the area as a whole, were 18 per cent
lower than in 1931 and 9 per cent lower than in 1932.

The average operator's earnings of $254 per farm in 1934 were far
less than the average in 1933 but were slightly above the returns obtained
in 1931 and 1932. As compared with the latter two years, the drought-
reduced production in 1934 was more than offset by increased prices for
the products sold, by the receipt of benefit payments for participation
in the Agricultural Adjustment Administration program, by the sale of
surplus ginning certificates issued under the terms of the Bankhead Act,
and by reduced operating expenses as a consequence of widespread crop
failures and low production.

Yields in 1935 approximated the average levels obtained during the
five-year period of the study, but the operator's earnings in 1935 amounted
to an average of $980 per farm as compared with an average of $678
per farm for the five years. The superior earnings in 1935 were caused
primarily by the relatively higher prices received that year as compared
with the average prices received during the five-year period.

Variations in Farm Earnings

The earnings on individual farms during a given year varied more
widely than did the average earnings of all farms during different years.
This may be noted from a comparison of Table 17 with Figure 4. There
is shown in the latter the operator's earnings on individual farms for
each year of the study. The percentage distribution of farms according
to operator's earnings is shown in Table 18. The causes of these varia-
tions in individual farm earnings are discussed in the following section.

In passing, it is of interest to note that earnings on individual farms
are not generally consistently high or low over a period of years. This
is indicated in Table 19 for 91 farms on which records were kept for
five years. The farms were arrayed on the basis of operator's earnings
obtained each year and a count made as to the number of years that
individual farms fell into the upper, middle, or lower one-third of earn-
ings. As shown in the table, on only one farm were the operator's earn-
ings classed as upper one-third for all five years of the study, and on
only two farms were the earnings consistently classed as lower one-third.
The largest number of farms fell into each earnings group for one and
two years.

Table 18. Variations in operator's earnings, 1931-1935

	1931	1932	1933	1934	1935	Five year average
Number of farms...............	141	138	127	139	138	137
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Proportion of farms with operators' earnings of:						
$ -501 and less................	7	13	5	7	1	6
-500-0.....................	23	29	5	35	6	20
1-500....................	46	35	9	26	22	28
501-1000.................	16	16	16	20	23	18
1001-1500................	5	5	12	7	25	11
1501-2000................	3	....	16	4	12	7
2001-2500................	....	1	11	....	9	4
2501-3000................	....	1	7	1	1	2
3001 and over............	....	....	19	....	1	4

Variations in farm earnings are also directly related to variations in costs of production, or to prices of farm products that would be necessary to pay costs. This is illustrated in Table 20, in which are shown the computed prices of cotton necessary to pay for various farm expenses on a cumulative basis, and to provide a wage of $500 for the operator's management on farms with different levels of earnings. In computing these prices, all farm receipts and expenses were credited to or debited against the cotton enterprise so as to demonstrate more clearly, in terms of one enterprise, the effect of differences in farm earnings on prices of farm products necessary to pay farm expenses. The data pertain to specialized cotton farms on which 40 per cent or more of the cash receipts were derived from the cotton enterprise. The study was limited to the years 1931 and 1932 in order to eliminate variations in earnings caused by participation in the Agricultural Adjustment Administration programs. Average yields and prices were fairly comparable as between these two years.

Table 19. Classification of 91 farms with five-year records according to the number of years in which earnings were in the upper, middle, or lower one-third of the farms arrayed on the basis of operator's earnings during each year, 1931-1935

Number of years	Farms with operator's earnings classed as		
	Upper one-third	Middle one-third	Lower one-third
5...	1	0	2
4...	7	3	3
3...	11	16	17
2...	30	33	25
1...	24	29	27
0...	18	10	17

The data are merely illustrative and, of course, pertain only to the situation that prevailed in the area during the two years specified. They do indicate, however, the wide range in production costs, and consequently the wide range in "necessary" prices of farm products that would be required to meet expenses, on farms in various earnings groups. That such variations also exist on the same farms in different years has been indicated in Table 19.
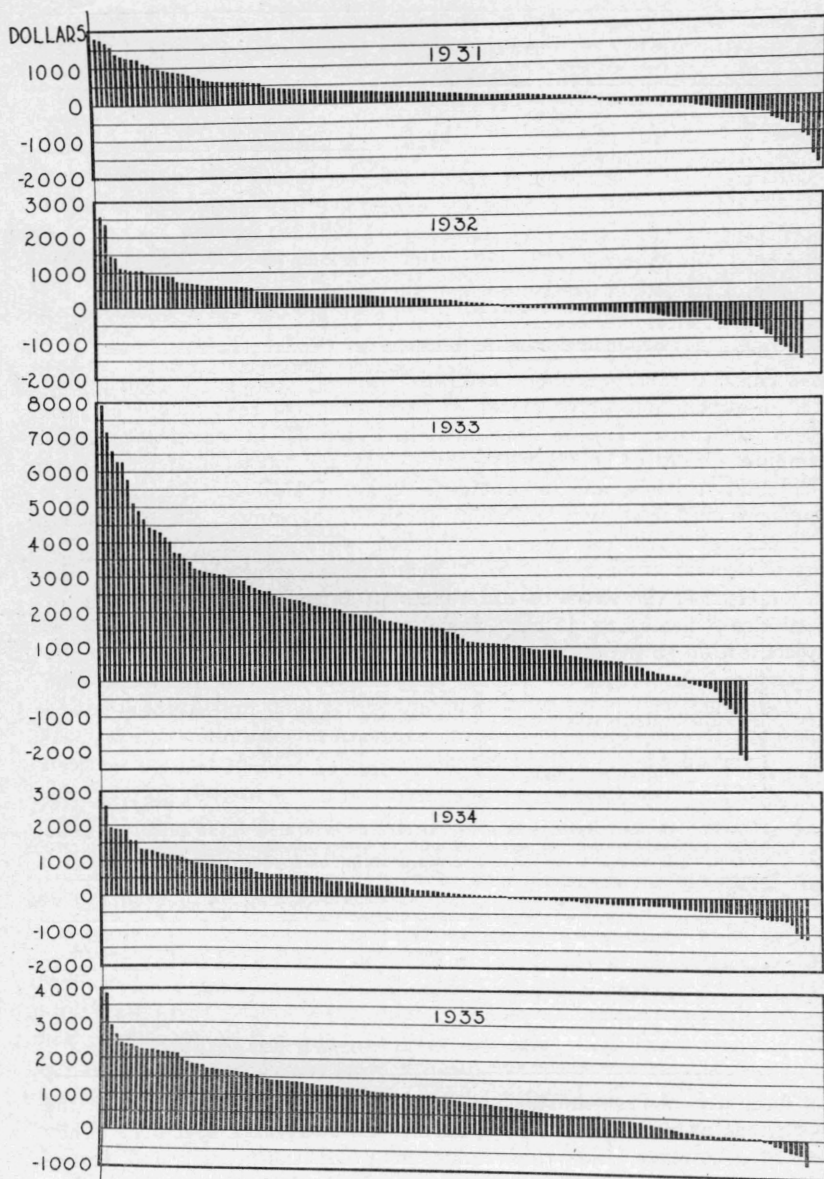
Fig. 4.—Variations in operator's earnings on farms studied during the five-year period 1931-1935.

Table 20.   Average prices of cotton lint necessary to meet various farm expenses on a cumulative basis plus a management wage of $500, on farms in different earnings groups, 1931-1932

Operator's earnings (1)	Number of farms (2)	Yield of lint cotton per acre (3)	Prices of lint necessary to pay for					
			Farm expenses (cash) (4)	Column 4 plus unpaid family labor (5)	Columns 4 and 5 plus inventory decrease (6)	Columns 4 to 6 plus value operator's labor (7)	Columns 4 to 7 plus interest on investment (8)	Columns 4-8 plus $500 management wage (9)
			Lint price per pound	Lint price per pound	Lint price per pound	Lint price per pound	Lint price per pound	Lint price per pound
Dollars	Number	Pounds	Cents	Cents	Cents	Cents	Cents	Cents
−301 and less., ...	35	140	5.20	5.80	7.90	8.90	13.00	15.40
−300-0.	33	200	4.00	4.60	5.90	7.00	9.80	12.40
1−300.	60	223	3.30	3.70	4.70	5.60	7.90	9.90
301−600.	53	267	3.10	3.40	4.00	4.80	6.70	8.50
601−900.	25	293	3.10	3.40	3.60	4.20	5.90	7.40
901 and over.	27	343	2.50	2.70	3.00	3.40	4.60	5.60
All farms.	233	241	3.30	3.70	4.50	5.20	7.40	9.10

THE INFLUENCE OF FARM ORGANIZATION AND OPERATION ON EARNINGS

The consideration of variations in individual farm earnings in the area logically leads into an inquiry as to their causes. The evaluation of certain of the major measureable farm-management factors that influenced individual farm earnings during a selected period of the study will be the primary consideration in the remainder of this bulletin.

Because of the impossibility of providing for comparability with any degree of precision as between the five years of the study, it was considered preferable to limit the analysis of factors affecting earnings on individual farms to the data obtained in 1931 and 1932. Farm organizations and receipts during this period were not affected by the government farm programs. Price and production conditions differed somewhat as between the two years, but generally were fairly comparable. Extreme variations in yields and earnings occurred because of climatic conditions on a small proportion of the farms. Differences in soils also caused variations in the kinds of crops grown and in the yields obtained. The available data do not permit measurement of the variations caused by climatic and soil factors, which were of some importance on all the farms studied. Moisture conditions are within the individual farmer's control, however, to the extent that water-conservation measures are effective. Conservation measures in turn are reflected in the kinds of crops grown, in crop yields, and in the net earnings obtained.

It is generally known that farm earnings under a given set of price conditions depend on the three major factors of (1) size of farm; (2) farm organization, involving consideration of the use of land, the kinds and numbers of livestock kept, and the physical facilities for production; and (3) farm operation, which has to do with efficiency in production and with the relation of costs to returns. These factors differ in their effect on farm earnings in different type-of-farming areas. Furthermore, individual elements within these composites differ in the relative importance of their effect on earnings in different areas. Thus each area requires individual study in order to determine the particular influence of various factors on earnings under a given set of conditions.

The individual factors, within the three influences listed above, that were found to be most closely associated with earnings in the High Plains Cotton Area during the period under consideration were (1) size of farm; (2) per cent of farm land in cotton; (3) number of produce animal units per 100 acres of farm land; (4) yield of cotton per acre; (5) returns per $100 feed fed to produce livestock; and (6) number of productive man work days per man, excluding harvesting labor. The manner in which certain of these and other factors in the analysis are computed is explained in the section beginning on page 74. It is suggested that the reader familiarize himself with the meaning of these factors at this point in order fully to understand their use in the analysis.

In the analysis that follows, each of these factors is considered separately in noting its effects on farm earnings. It should be understood,

of course, that the operation of these factors is joint rather than separate. The acreage or proportion of land in cotton, for example, is directly related to the acreage in feed or other crops, and in turn to the kinds and numbers of livestock kept. Furthermore, farm earnings are influenced not only by the organization of the farm, but also by crop yields and the production per unit of livestock, and by expenses for labor, power, machinery and equipment, and other items. All of these factors pertaining to farm organization and operation may be said to be linked in their effects on farm earnings. It is endeavored in the analysis to demonstrate for each of the above six factors (1) the variations in the occurrence of the factor on individual farms, (2) the influence of the factor on earnings, and (3) the manner in which the factor is associated with other factors in the organization and operation of farms. Following the analysis of individual factors, summaries are given of the combined influence and of the separate influence on farm earnings of all the factors studied.

The analysis used does not comprise a complete evaluation of all the factors that make for success in farming in the area. Reference already has been made to the effect of climatic and soil variations on farm organizations and yields, and hence on earnings. The segregation and evaluation of the major measurable factors influencing earnings furnish a background of understanding, however, that is invaluable in determining desired directions of agricultural adjustments in the area. It also furnishes a setting for an introduction to the basic information on farm practices and organization in the area that is contained in the other publications in the series pertaining to this study, and serves to guide the use of this information in effective planning of the farm business.[8]

Size of Farm

It is difficult to select any one measure that adequtely expresses the relative sizes of a number of farms unless the kind of farming done is highly similar. Some of the measures that are used, depending largely on the kind of farming followed, are acres in farm or in crop land, numbers of different classes of livestock, number of days of man labor, investment in the farm business, and others. Thus the average number of hens kept may be the best measure of the size of a specialized poultry farm, whereas the number of days of productive man labor may be the most desirable measure of the size of a specialized truck farm. The number of acres per farm, selected as the measure of size in this study, is generally satisfactory not only because of the fairly uniform natural resources and types of farm organization in the area, but also because of its general use as an indication of farm size by the farm operators in the area.

The farms[9] studied in 1931 and 1932 ranged in size from 88 to 964

---

[8]See page 8 in the introduction.

[9]Throughout the remainder of this bulletin the term "farm" means the record from one farm for one year.

acres. As shown in Table 21, 68 per cent of the farms were of 131 to 330 acres in size.

Relation of size of farm to operator's earnings. Size of farm usually is correctly regarded as one of the most important factors affecting earnings. The manner in which size affects earnings is conditioned by the margin of profit or loss in business operations, which in turn depends upon prices paid and received, upon climatic and other factors that affect volume of production, and upon efficiency in production. Thus if a profit is obtained on each acre operated, the larger the number of acres, the larger will be the total profits earned. On the other hand, a loss on each unit operated would result in larger total losses in increasingly larger sizes of business.

Table 21.   Number and proportion of farms distributed according to size, 1931-1932

Size groups (Acres in farm)	Number of farms	Per cent of farms	Size groups (Acres in farm)	Number of farms	Per cent of farms
81–130	16	5.7	531–580	5	1.8
131–180	72	25.8	581–630	2	.7
181–230	44	15.7	631–680	9	3.2
231–280	35	12.5	681–730	1	.4
281–330	39	14.0	731–780	1	.4
331–380	22	7.9	781–830	3	1.1
381–430	8	2.8	831–880	1	.4
431–480	15	5.4	881–930	2	.7
481–530	3	1.1	931–980	1	.4

The general effect of size of farm on earnings may be noted from the third column of Table 22, in which is shown the average operator's earnings on farms classed according to acres per unit. The average loss of $154 per farm in the largest-size group as compared with the positive earnings of $260 and $231, respectively, in the successively smaller-size groups indicates that the operation of farms of over 400 acres in size was relatively unprofitable in the area in 1931 and 1932. The smaller average difference in earnings on farms averaging 176 acres and 314 acres in size indicates, however, that the influence of size on earnings is strongly affected by other factors associated with size. This is readily seen when the farm-size groups are further sub-sorted on the basis of gross return per $1 of gross expense as shown in the last six columns of the table. On the 86 farms on which only $1.35 or less was obtained per $1 of gross expense, the average operator's earnings were —$406 per farm. An average loss resulted from each unit of production on these farms, hence the larger the size of farm the heavier were the losses incurred. The average operator's earnings on the small-sized farms were —$224 as compared with —$269 on the medium-sized farms and —$858 on the large-sized farms. This relative earnings situation was reversed, however, on the farms with gross incomes of more than $1.35 per $1 of gross expense. In each of the two groups shown, the progressively larger margin of profits obtained was associated with larger total net earnings

Table 22. Relation of size of farm to operator's earnings on all farms and on farms grouped according to gross returns per $1 of gross expenses, 1931-1932

Size Groups (Acres in farm)	All farms			Gross returns per $1.00 of gross expense					
				$1.35 and less		$1.36–$1.75		$1.76 and over	
	Number of farms	Average Size of farm, acres	Operator's earnings	Number of farms	Operator's earnings	Number of farms	Operator's earnings	Number of farms	Operator's earnings
81–240............................	142	176	$ 231	38	$ −224	49	$ 229	55	$ 548
241–400...........................	89	314	260	25	−269	45	287	19	889
401 and over.....................	48	577	−154	23	−858	22	428	3	*
All farms..................	279	289	$ 174	86	$ −406	116	$ 293	77	$ 649

*Number of farms too small for significant average.

on the larger farms. Thus even in a period of low prices such as prevailed in 1931 and 1932, large operating units with low costs per unit of gross income returned the largest average operator's earnings. The reasons why size of farm is so closely related to earnings are discussed in connection with Table 23.

Table 23. Relation of size of farm to farm organization and operation, 1931-1932

Items	Ave., all farms	Size groups (Acres in farm)					
		81– 160	161– 240	241– 320	321– 400	401– 480	481 and over
Farms studied.....................................number	279	55	87	62	27	20	28
Size of farm.......................................acres	289	143	197	295	358	451	666
Farm Organization Factors							
Proportion of farm land in crops.....................per cent	83	88	88	86	88	85	68
Proportion of farm land in cotton...................per cent	36	38	37	42	39	42	26
Animal units of produce livestock per 100 acres farm land*...number	4.4	8.3	5.5	4.0	3.1	2.8	3.6
Proportions of produce animal units that were—							
Cattle..per cent	77	78	76	78	77	75	83
Swine..per cent	9	9	11	10	10	14	6
Poultry......................................per cent	12	12	13	12	13	11	6
Investment per 100 acres farm land—							
Land and improvements.......................dollars	2885	3102	2972	2886	2826	2942	2715
Power and equipment..........................dollars	406	537	466	434	363	438	277
Other..dollars	314	502	383	300	249	269	238
Man equivalents per farm (excl. harvesting)..........number	1.81	1.42	1.54	1.90	2.16	2.46	2.50
Power per 100 crop acres—							
Total, horse equivalents......................number	3.3	4.2	3.6	3.4	2.9	3.2	2.8
Proportion of total power furnished by—							
Horses......................................per cent	79	86	89	79	76	66	68
Tractors, in horse equivalents†..............per cent	21	14	11	21	24	34	32
Farm Operation Factors							
Crop yield index.................................per cent	100	111	102	98	104	101	88
Yield of cotton per acre..........................pounds	235	267	238	224	262	231	212
Returns per $100 feed fed produce livestock.........dollars	185	205	190	186	172	186	162
P. M. W. D. (excl. hvt.)‡—							
Per 100 acres in farm.........................number	82	130	99	89	75	65	52
On crops, per 100 acres in crops...............number	55	67	56	60	53	48	45
On produce livestock, per animal unit............number	6	7	7	7	7	6	5
Per man equivalent............................number	131	131	128	138	126	119	137
Proportion of P. M. W. D. (excl. hvt.) by—							
Operator....................................per cent	53	70	64	50	44	36	37
Family......................................per cent	24	19	24	27	27	24	20
Hired.......................................per cent	23	11	12	23	29	40	43
Proportion of cotton harvesting by—							
Operator and family..........................per cent	13	12	24	9	6	10	9
Hired labor.................................per cent	87	88	76	91	94	90	91
Expenses on buildings and improvements—							
Per farm acre...............................dollars	.31	.37	.37	.32	.26	.34	.21
Per crop acre...............................dollars	.37	.42	.42	.37	.30	.40	.31
Expenses on power and equipment—							
Per farm acre...............................dollars	1.48	1.94	1.68	1.52	1.29	1.65	1.09
Per crop acre...............................dollars	1.80	2.20	1.92	1.76	1.48	1.94	1.60
Per P. M. W. D. (excl. hvt.)‡................dollars	1.81	1.49	1.69	1.72	1.73	2.55	2.11
Gross return per $1 of gross expense................dollars	1.50	1.60	1.57	1.52	1.53	1 41	1.36

*Includes small number of sheep.
†Conversions made on the basis of one tractor being equivalent to seven horses.
‡Productive man work days, excluding harvesting.

Relation of size of farm to farm organization and operation. The relation of size of farm to certain major elements in farm organization and operation is shown in Table 23. Differences in size of farm did not

affect materially the percentage of the farm area in crops or in cotton except on farms larger than 480 acres in size, on many of which a considerable proportion of the farm land was relatively unproductive and used for pasture. The number of different classes of produce livestock per 100 acres of farm land tended to decrease as size of farm increased, largely because of the greater dependence on pasture for feed on the larger farms. There was no significant difference in the relative numbers of different classes of produce livestock on farms in the various size groups.

From the standpoint of organization, the larger farms were in an advantageous position chiefly because of the lower investment per acre in land and improvements, and in operating capital, including power and equipment. It is significant to note also the tendency toward a smaller number of horse equivalents per 100 acres on the larger farms, reflecting a better adjustment of acres in farm to the power available. Larger machinery and equipment were found on the larger farms and proportionately more use was made of tractors, particularly on units of more than 240 acres in size. Trailers and trucks were found on only 47 per cent of the farms in the smallest-size group and on 82 per cent of the farms in the largest-size group.

The operation of the larger farms was characterized by relatively low operating expenses per acre for buildings and improvements, power and equipment, and labor other than for harvesting. From the standpoint of net earnings, this was offset in many cases by lower average crop yields, and by lower returns per $100 of feed fed than on the smaller farms. This resulted in a lower gross return per $1 of gross expense on the larger farms. Because of the smaller overhead and labor expenses per acre on the larger units, however, the larger farms on which production levels were comparable with those on the smaller farms gave much higher net earnings than those obtained on the smaller farms.

The relatively low average crop yields in the largest-farm group were caused chiefly by unfavorable soil and climatic conditions on some large farms located in the western part of the area. Lower average returns per $1 of feed fed were obtained on the larger farms principally because of the more extensive nature of livestock production on such farms.

Excluding harvesting labor, more productive man work days were used on the progressively larger farms, but there was a tendency for fewer days to be used per 100 acres in farm land and crop land, and per animal unit of produce livestock. There was no consistent relation between size of farm and the number of productive man work days per man. A smaller proportion of the farm labor other than harvesting was performed by the operator on the larger farms, and proportionately more labor was hired. With the exception of cotton harvesting, a large proportion of which is usually hired, farms of less than 160 acres in size usually are operated by one man with little use of family labor. The largest proportion of the labor other than harvesting that was contributed by members of the family was on farms of 241 to 400 acres in size.

There was no consistent relation between size of farm and the proportion of the cotton crop harvested by hired labor.

Farm Organization

The three predominant lines of agricultural production in the area are cotton, feed crops, and livestock. Usually, all three enterprises are found on the same farm, since relatively few individuals engage exclusively in any one specialty. A considerable variation exists, however, in the proportions in which these lines of production are combined on different farms even when the farms are of the same general size. On some farms, cotton is the only important source of cash income, with only sufficient feed produced to maintain livestock primarily for home and farm use. On other farms, more emphasis is placed on the production of feed for direct sale or to maintain livestock enterprises from which a large part of the farm income is derived. Furthermore, considerable variation exists in the kinds and relative numbers of different classes of livestock kept. These differences in organization reflect the judgment of operators as to the kinds and proportionate combinations of enterprises that give promise of the greatest net earnings, or may simply be evidence of the operator's likes and dislikes as between alternative adapted enterprises. Climatic conditions may also exert a strong influence on farm organizations in this area, as, for example, during years when insufficient rainfall may limit the acreage planted to cotton.

The problem of planning the farm organization has to do not only with the selection or expansion of a particular enterprise adapted to the area, but also with the size of the enterprise in relation to other enterprises or elements in the farm unit. A desirable production plan necessarily must take into consideration all of the elements in farm organization, including investment items, that are affected. A decision to go into or expand a dairy enterprise, for example, may require an addition to farm investment through the construction of housing facilities and the acquisition of equipment and animals. Furthermore, the operating needs of the enterprise such as for feed, labor, and other items should be foreseen and planned for. The operator's skill and ability also are important considerations in the selection of the enterprises contemplated for the farm.

The per cent of farm land in cotton and the number of animal units of produce livestock per 100 acres of farm land were selected to indicate the influence of major organization factors on the earnings and operation of the farm studied. The farm land not in cotton was mostly in feed crops and pasture, hence the relations associated with increases or decreases in cotton acreage have reverse application to increases or decreases in feed-crop acreages.

Per Cent of Farm Land in Cotton

An average of 36 per cent of the land in the farms studied in 1931 and 1932 was utilized for cotton production. As shown in Table 24, 65 per

cent of the farms had from 30 to 60 per cent of their land in cotton. On only 9 per cent of the farms was less than 10 per cent of the land in cotton, and on only 2 per cent of the farms was more than 70 per cent of the land so used.

Table 24. Number and proportion of farms distributed according to per cent of farm land in cotton, 1931-1932

Per cent of farm land in cotton	Number of farms	Per cent of farms	Per cent of farm land in cotton	Number of farms	Per cent of farms
0	9	3.2	41–50	80	28.7
1–10	16	5.7	51–60	38	13.6
11–20	19	6.8	61–70	13	4.7
21–30	35	12.6	71–80	4	1.4
31–40	64	22.9	81–90	1	.4

Relation of per cent of farm land in cotton to operator's earnings. Since receipts from the sale of cotton lint and seed constituted an average of 67 per cent of the total cash sales on the farms studied in 1931 and 1932, it is logical to expect that variations in earnings would be influenced strongly by the relative importance of the cotton enterprise on individual farms. The effect on operator's earnings of variations in the per cent of farm land planted in cotton is shown in Table 25. On the farms undifferentiated as to size, the farmers with the largest proportion of their farm land in cotton obtained the largest operator's earnings. This is indicated in the third column of the table. The low-cotton group suffered a net loss of $237 as compared with net earnings of $159 and $465, respectively, in the medium-cotton and high-cotton groups, or a range in average earnings from highest to lowest of $702. A more accurate picture of the influence the size of the cotton enterprise has on earnings may be noted when the effect of size of farm is removed by further sub-sorting the farms according to acres in farm land, as shown in the last six columns of the table.

There it is noted that the influence of the acreage in cotton on earnings becomes increasingly pronounced with increased size of farm. The range of average earnings from the low-cotton to the high-cotton farms within the small-farm group was $467 as compared with ranges of $678 and $1,072, respectively, in the medium-size and large-size farm groups.

Relation of per cent of farm land in cotton to farm organization and operation. Specialized cotton farmers generally are unable to devote much time to livestock enterprises during the rush seasons of planting, cultivation, and harvesting. As shown in Table 26, a large proportion of farm land in cotton tended to be associated with a small proportion of farm land in pasture and a small number of produce livestock per 100 acres.

Cotton requires more labor per acre than any other staple crop in the area, hence progressively larger proportions of farm land in cotton was associated with progressively larger numbers of productive man

Table 25. Relation of per cent of farm land in cotton to operator's earnings on all farms and on farms grouped according to size, 1931-1932

Per cent farm land in cotton	All farms			Size of farm					
				81–240 acres		241–400 acres		401 acres and over	
	Number of farms	Per cent farm land in cotton	Operator's earnings	Number of farms	Operator's earnings	Number of farms	Operator's earnings	Number of farms	Operator's earnings
25 and less......................	56	12	$ −237	26	$ −49	14	$ −175	16	$ −598
26–45	137	37	159	82	243	37	173	18	−249
46 and over....................	86	55	465	34	418	38	503	14	474
All farms..................	279	36	$ 174	142	$ 231	89	$ 260	48	$ −154

work days, excluding harvesting, per 100 acres of farm land and of crop land. There also was a tendency for high machinery and equipment expenses per acre to be associated with large proportions of farm land in cotton. There was no consistent relation of the proportion of farm land in cotton with size of farm nor with the number of productive man work days per man, excluding harvesting.

Table 26. Relation of per cent of farm land in cotton to farm organization and operation, 1931-1932

Items	Ave., all farms	Per cent of farm land in cotton					
		15 and less	16-25	26-35	36-45	46-55	56 and over
Farms studied...............................number	279	35	21	47	90	51	35
Size of farm.................................acres	289	381	318	266	260	288	285
Proportion of farm land in cotton..........per cent	36	7	21	30	41	50	63
Farm Organization Factors							
Proportion of farm land in crops.............per cent	83	70	68	80	86	88	92
Animal units of produce livestock per 100 acres farm land......................................number	4.4	5.0	4.4	5.7	4.3	3.8	3.2
Man equivalents per farm (excl. hvt.)..............number	1.81	1.74	1.71	1.65	1.83	1.98	1.86
Investment per 100 acres farm land.............dollars	3605	3410	3354	3819	3606	3660	3684
Land and improvements.......................dollars	2885	2747	2714	2947	2909	2934	2982
Power and equipment..........................dollars	406	326	328	477	402	441	438
Farm Operation Factors							
Crop yield index.............................per cent	100	91	109	97	97	106	105
Yield of cotton per acre..*...................pounds	235	201	222	227	219	251	255
Returns per $100 feed fed produce livestock.........dollars	185	172	186	186	190	190	185
P. M. W. D. (excl. hvt.)*—							
Per 100 acres in farm.....................number	82	60	75	86	89	85	89
On crops, per 100 acres in crops..............number	55	37	58	51	58	57	65
Per man equivalent..........................number	131	127	141	142	128	123	135
Expenses on power and equipment—							
Per farm acre..............................dollars	1.48	1.18	1.24	1.49	1.53	1.67	1.66
Per crop acre..............................dollars	1.80	1.71	1.82	1.85	1.76	1.87	1.79
Per P. M. W. D. (excl. hvt.)*..................dollars	1.81	1.94	1.66	1.72	1.71	1.96	1.87
Gross return per $1 of gross expense.............dollars	1.50	1.29	1.47	1.49	1.55	1.51	1.58

*Productive man work days, excluding harvesting.

The net result of the association of the proportion of farm land in cotton with these and other factors shown in Table 26 was that a high specialization in cotton was accompanied by a relatively large gross return per $1 of gross expense.

Produce Animal Units Per 100 Acres of Farm Land[10]

The number of produce animal units per 100 acres of land furnishes a measure of the intensity of the production of livestock other than workstock. An average of 4.4 animal units of produce livestock were maintained per 100 acres of farm land on the farms studied in 1931 and 1932, the range extending from none on one farm to 35 on one farm. A classification of the farms studied according to intensity of livestock production is shown in Table 27. Sixty-three per cent of the farms had from two to five animal units per 100 acres.

[10]For definition of terms, see page 74.

Relation of produce animal units per 100 acres to operator's earnings. The data for all farms, shown in the third column of Table 28, indicate that, in general, the farms with the lowest number of produce animal units per 100 acres obtained the highest net earnings. The lack of consistent relation with earnings as between the three groups indicates the possibility, however, that other factors associated with livestock production may obscure relations which would otherwise be apparent. The elimination of the size factor, as shown in the last six columns of the table, reveals more definitely the influence of livestock intensity on earnings. In the farm group of 240 acres and less, a large number of produce livestock per 100 acres was associated with relatively large average earnings. In the other two farm groups, however, the relation was reversed. In these larger farm-size groups, the operators with progressively more produce livestock per 100 acres obtained progressively lower earnings. The smallest earnings or largest losses occurred on the largest farms that were most heavily stocked with produce livestock.

Table 27. Number and proportion of farms distributed according to animal units of produce livestock per 100 acres of farm land, 1931-1932

Number produce animal units per 100 acres farm land	Number of farms	Per cent of farms	Number produce animal units per 100 acres farm land	Number of farms	Per cent of farms
0	1	.4	19–20	0	0
1–2	54	19.3	21–22	1	.4
3–4	100	35.8	23–24	1	.4
5–6	58	20.7	25–26	1	.4
7–8	37	13.2	27–28	0	0
9–10	14	5.0	29–30	0	0
11–12	4	1.4	31–32	0	0
13–14	5	1.8	33–34	0	0
15–16	1	.4	35–36	1	.4
17–18	1	.4			

As shown in the preceding section, the farmers with a large cotton acreage as compared with the acreage in feed obtained relatively high earnings during the period of the study. The number of produce livestock per farm and per 100 acres is closely related to the acreage in feed. It follows that progressively larger feed-crop and livestock enterprises on the larger farms were associated with progressively smaller net returns or larger net losses. (Table 28.) The relatively favorable returns associated with a large number of produce livestock per 100 acres in the small-farm group were attributable primarily to the large proportion of the livestock receipts obtained from eggs and butterfat. Prices of these products were higher, relatively, than were prices of beef and pork. Beef and pork production were the principal livestock enterprises on the larger farms that were heavily stocked with produce livestock. Furthermore, feed costs were relatively low on the small farms because of the utilization of feed, which would otherwise be wasted, to provide for a large part of the maintenance of small poultry,

Table 28. Relation of number of animal units of produce livestock per 100 acres of farm land to operator's earnings on all farms and on farms grouped according to size, 1931-1932

Produce Animal Units per 100 acres farm land	All farms			Size of farm					
				81–240 acres		241–400 acres		401 acres and over	
	Number of farms	Produce A. U. per 100 acres farm land	Operator's earnings	Number of farms	Operator's earnings	Number of farms	Operator's earnings	Number of farms	Operator's earnings
2 and less....................	55	1.8	$ 255	12	$ 171	22	$ 592	21	$ −51
3–6..........................	158	4.1	144	77	213	59	157	22	−133
7 and over...................	· 66	9.4	179	53	271	8	100	5	−680
All farms..................	279	4.4	$ 174	142	$ 231	89	$ 260	48	$ −154

hog or cattle enterprises sufficient to provide for home needs, with some surplus for sale. Unfavorable average earnings on the high-livestock farms as compared with the average earnings on the high-cotton farms occurred despite the relatively high prices of livestock and livestock products as compared with cotton prices during the period of the study. Prices of beef cattle, pork and poultry in 1931 and 1932 amounted to 85, 68, and 116 per cent, respectively, of their averages during the five-year period 1910-1914, whereas cotton prices were only 56 per cent of their average for the same period.

Relation of produce animal units per 100 acres to farm organization and operation. The major factors in the average organization of farms grouped according to the number of produce livestock per 100 acres of farm land may be noted in Table 29. The farms with a large number

Table 29. Relation of number of produce animal units per 100 acres of farm land to farm organization and operation, 1931-1932

| Items | Ave., all farms | Produce animal units per 100 acres | | | | |
		2 and less	3–4	5–6	7–8	9 and over
Farms studied...................number	279	55	100	58	37	29
Size of farm.......................acres	289	389	309	252	223	191
Animal units of produce livestock per 100 acres*.....................number	4.4	1.8	3.5	5.4	7.4	12.4
Farm Organization Factors						
Proportion of farm land in—						
Cotton.........................per cent	36	41	36	37	28	28
Feed crops.....................per cent	45	36	48	45	50	57
Proportion of produce animal units that were—						
Cattle.........................per cent	77	72	77	78	73	83
Hogs...........................per cent	9	11	9	9	9	8
Poultry........................per cent	12	17	11	11	11	8
Man equivalents per farm (excl. hvt.)...number	1.81	1.95	1.88	1.64	1.77	1.69
Investment per 100 acres farm land—						
Land and improvements...........dollars	2885	2824	2861	2907	2969	3069
Machinery and equipment.........dollars	406	381	382	426	446	528
Other..........................dollars	314	186	279	345	460	696
Farm Operation Factors						
Returns per $100 feed fed—						
All produce livestock*............dollars	185	202	172	185	192	191
Cattle..........................dollars	181	207	164	188	179	186
Hogs...........................dollars	115	102	106	122	118	134
Poultry.........................dollars	302	329	327	255	315	295
Crop yield index.....................per cent	100	99	101	97	105	103
Yield of cotton per acre.............pounds	235	239	231	232	243	245
P. M. W. D. (excl. hvt.)†—						
Per 100 acres in farm............number	82	63	77	83	109	142
Per animal unit, produce livestock..number	6	8	6	5	7	6
Proportion on produce livestock....per cent	35	23	30	35	45	56
Per man equivalent (excl. hvt.)....number	131	122	126	128	140	161
Expenses on buildings and improvements—						
Per farm acre...................dollars	.31	.27	.30	.34	.37	.32
Expenses on power and equipment—						
Per farm acre...................dollars	1.48	1.43	1.45	1.48	1.58	1.78
Per crop acre...................dollars	1.80	1.81	1.71	1.75	1.95	2.09
Per P. M. W. D. (excl. hvt.).......dollars	1.81	2.26	1.89	1.78	1.44	1.25
Gross return per $1 of gross expense....dollars	1.50	1.52	1.48	1.51	1.51	1.54

*Includes small number of sheep.   †Productive man work days, excluding harvesting.

of livestock per 100 acres were comparatively small, and had a relatively low proportion of their farm land in cotton. A small size of farm in turn was associated with a relatively high investment per 100 acres in the overhead investment items of real estate, power and equipment, and others. Cattle were the most important class of produce livestock in all the farm groups, and tended to be increasingly more important, compared with other livestock enterprises, on farms with a progressively high livestock intensity. From the analysis in the two preceding sections of the effects of size of farm and of the per cent of farm land in cotton on income, it is evident that the organization of farms with relatively large numbers of livestock was not conducive to favorable earnings during the period of the study.

The number of produce livestock per 100 acres was not consistently related with livestock efficiency as measured by the returns per unit of feed fed, nor with crop yields. A high livestock intensity was associated with a relatively large number of productive man work days (excluding harvesting) per man and per 100 acres of land, and a relatively high proportion of the labor was used on livestock enterprises. The use of large amounts of labor not involving machinery on the high-livestock farms resulted in a relatively low expense for power and equipment per productive man work day, excluding harvesting. Expenses per acre for these items and for buildings and improvements were relatively large on the high-livestock farms, however, because of the small average size of these farms. There was no consistent relation between the number of produce livestock per 100 acres and the gross return per $1 of gross expense.

Farm Operation

The third and last important group of considerations influencing farm earnings, following size and organization, is the efficiency with which the farm is operated. The three major factors of size, organization, and operation are interrelated in their effects on earnings, as shown in the preceding discussion, in that each tends to condition the effect of the others. A well-organized farm of suitable size must be efficiently operated in order that maximum net earnings may be obtained. Efficiency in production is measured by the net returns obtained from each unit of operation and from the farm as a whole. Thus under conditions of uniform climatic conditions and soils, the most efficient operators on farms of a given size and organization are those who obtain the highest yields of crops and the highest production per animal at the least cost. The most important measures of efficiency in farm operation in the area during the period of the study were (1) yield of cotton per acre; (2) returns per $100 feed fed to produce livestock; and (3) number of productive man work days per man, excluding harvesting.

Yield of Cotton Per Acre

Since the cotton enterprise is generally the most important source of farm income in the area, differences in farm earnings were influenced

to a large extent by the proportionate size of the enterprise, as discussed in a preceding section, and by the yields obtained. The yield of cotton was chosen as a measure of the effect of farm operation on earnings for this reason and also because high cotton yields were usually accompanied by high yields of other crops, and vice versa. The crop-yield index and cotton yields bore the same general relationship to earnings and to the other factors considered, but the association in the case of cotton yields was more pronounced.[11]

An average yield of 235 pounds of lint cotton per acre was obtained on the farms studied in 1931 and 1932. The yields on individual farms ranged from 0 to 531 pounds per acre, with 58 per cent of the farms having yields falling within a range of 151 to 300 pounds per acre. A classification of the farms according to the number and proportion falling within various yield groups is shown in Table 30.

Table 30. Number and proportion of farms distributed according to yield of cotton per acre, 1931-1932

Yield of lint cotton per acre (pounds)	Number of farms	Per cent of farms	Yield of lint cotton per acre (pounds)	Number of farms	Per cent of farms
0	1	.4	251–300	47	17.4
1– 50	5	1.9	301–350	37	13.7
51–100	10	3.7	351–400	22	8.1
101–150	26	9.6	401–450	9	3.3
151–200	65	24.1	451–500	1	.4
201–250	46	17.0	501–550	1	.4

It should be remembered that cotton yields during the two years under consideration were at relatively high levels as compared with the more nearly long-time average yield of 184 pounds per acre obtained on the farms studied during the entire five-year period. (Table 4.) It is the relative differences in yields that are important here, however, rather than the absolute levels that prevailed.

Variations in cotton yields as between localities and even as between adjoining farms during the same year may be caused in part by differences in the amount and timeliness of rainfall, in the extent of hail or wind damage, or by other climatic differences. Soil differences may also account for yield variations as between individual farms and localities. In general, however, variations in yields on a large majority of the farms in the area in 1931 and 1932 were influenced to an important extent by conditions within the individual operator's control, such as kind of seed planted, timeliness of planting and of production and harvesting operations, and others.

Relation of yield of cotton per acre to operator's earnings. The close association between the yield of cotton and the operator's earnings may be noted in Table 31. The average earnings for all the farms amounted

---

[11]For definition of crop yield index, see page 74.

Table 31.   Relation of yield of cotton per acre to operator's earnings on all farms and on farms grouped according to size, 1931-1932

Yield of lint cotton per acre (pounds)	All farms			Size of farm					
				81–240 acres		241–400 acres		401 acres and over	
	Number of farms	Yield of lint cotton per acre, pounds	Operator's earnings	Number of farms	Operator's earnings	Number of farms	Operator's earnings	Number of farms	Operator's earnings
180 and less.....................	78	128	$ −278	42	$ −66	21	$ −293	15	$ −850
181–280.........................	105	226	195	48	201	38	266	19	37
281 and over....................	87	346	618	51	505	25	799	11	735
All farms.................	270	235	$ 195	141	$ 231	84	$ 285	45	$ −88

to $195 per farm as compared with —$278 on the farms with yields of 180 pounds or less, $195 on farms with yields of 181 to 281 pounds, and $618 on farms with yields of 281 pounds and over.

On the farms further sub-sorted according to size, shown in the last six columns of Table 31, differences in cotton yields were reflected in increasingly wide differences in operator's earnings on progressively larger farms. In all three farm-size groups, the lowest-yield sub-groups were operated at a net loss. The losses were relatively less on the smaller farms because of the smaller scale of operations on these farms. In each size group, progressively higher yields were accompanied by larger earnings. However, differences in yields were associated with wider differences in earnings on the larger farms. The difference in average earnings from the low-yield to the high-yield sub-group within the small-farm group amounted to $564. Comparable differences within the medium-size and large-size farm groups were $1,067 and $1,635, respectively.

Relation of yield of cotton per acre to farm organization and operation. With the exception of the lowest-yield farm group shown in Table 32, differences in cotton yields were not consistently associated with differences in farm organization. (Table 32.) The smallest average yield of cotton was obtained in the farm group with the largest average size of

Table 32. Relation of yield of cotton per acre to farm organization and operation, 1931-1932

Items	Ave., all farms	Yield of lint cotton per acre (pounds)					
		130 and less	131– 180	181– 230	231– 280	281– 330	331 and over
Farms studied ....number	270	31	47	54	51	43	44
Size of farm ....acres	285	376	256	286	292	272	254
Yield of lint cotton per acre ....pounds	235	85	159	206	252	310	381
Farm Organization Factors							
Proportion of farm land in—							
Cotton ....per cent	38	29	39	44	38	37	40
Other crops ....per cent	45	48	48	43	45	46	43
Animal units of produce livestock per 100 acres farm land ....number	4.4	4.0	4.8	4.2	4.4	4.5	4.5
Man equivalents per farm (excl. hvt.) ....number	1.82	2.02	1.85	1.82	1.81	1.80	1.69
Investment per 100 acres farm land—							
Land and improvements ....dollars	2902	2724	2945	2967	2883	2928	2948
Power and equipment ....dollars	413	288	451	430	425	433	440
Other ....dollars	313	228	315	306	315	347	370
Farm Operation Factors							
Crop yield index ....per cent	100	57	85	90	103	127	147
Returns per $100 feed fed produce livestock ....dollars	187	174	188	189	173	196	198
P. M. W. D. (excl. hvt.)*—							
Per 100 acres in farm ....number	84	67	92	82	87	90	86
On crops, per 100 acres in crops ....number	56	51	54	53	60	59	57
On cotton, per 100 acres in cotton ....number	76	82	72	68	80	87	71
Per man equivalent (excl. hvt.) ....number	131	121	128	131	141	137	126
Expenses on power and equipment—							
Per farm acre ....dollars	1.50	1.00	1.48	1.56	1.55	1.68	1.74
Per crop acre ....dollars	1.80	1.31	1.70	1.79	1.87	2.02	2.09
Per P. M. W. D. (excl. hvt.)* ....dollars	1.79	1.50	1.40	1.90	1.78	1.87	2.03
Gross return per $1 of gross expense ....dollars	1.51	1.13	1.36	1.48	1.52	1.60	1.73

*Productive man work days, excluding harvesting.

farm and with the lowest average proportion of farm land in cotton. In this group, the acreage in other crops, primarily feed, was almost two-thirds larger than the acreage in cotton. Although the total number of produce livestock per farm in this small-yield group was larger, the number per 100 acres was the lowest of any of the groups. The situation in the lowest-yield group is attributable in a large degree to the location of some of the farms in communities in which climatic conditions and soils were not so favorable to high crop yields. For the farms generally, however, the factor of location was not so important in influencing yields and earnings as were other factors that are directly related to the farmer's ability and skill in the organization and operation of his farm business.

High cotton yields tended to be associated with high yields of other crops and with high returns per unit of feed fed to produce livestock. There were no consistent relations between differences in cotton yields and the use of labor. Expenses for power and equipment per acre of farm land and of crop land were comparatively high on the high-yield farms, but this was more than offset by the large gross incomes obtained. The operators of the high-yield farms obtained a relatively high gross return per $1 of gross expense.

Returns Per $100 Feed Fed to Produce Livestock[12]

In 1931 and 1932, receipts from the sale of produce livestock and livestock products constituted 19 per cent of the total cash income on the farms studied. The efficiency with which the produce livestock enterprises are conducted has an important bearing, therefore, on the level of net farm earnings.

Feed costs constitute the most important item of expense in livestock production, amounting to approximately 76 per cent of the operating expenses on produce livestock on the farms studied in 1931 and 1932. Thus the returns obtained in relation to the cost of feed used provides a good measure of the efficiency with which the livestock enterprises are conducted. Feed costs were computed by using the actual amounts paid for purchased feed and by assigning current farm prices to the farm-produced feed. Pasture costs were based on current rentals in the area, with prorations made to each class of livestock according to the number of days grazed. Returns from produce livestock include cash sales, the value of products used in the home, plus any increases or minus any decreases in the value of the livestock inventory.

The number and proportion of farms with varying returns per $100 of feed fed to produce livestock are shown in Table 33. For all the farms, an average of $185 was obtained per $100 of feed fed, the range extending from —$15 to $502. The returns per $100 of feed fed on 52 per cent of the farms ranged from $131 to $230.

Variations in returns per $100 of feed fed to produce livestock were not influenced so much by climatic differences as were variations in crop

---

[12]For definition of terms, see page 74.

yields. The variations in returns per unit of feed fed to produce live-
stock on the farms studied in 1931 and 1932 were caused principally by
conditions largely within the individual farmer's control, such as feeding
practices and the amounts of feed wasted, the kind and quality of
livestock kept, and the personal factor of the operator's ability in live-
stock management. Inefficient feeding resulted in considerable waste
on the many farms on which sorghum heads or bundle feed were fed
whole, and, consequently, much of the feed was trampled underfoot by
the livestock. The kind of livestock kept was important chiefly because
of the relatively lower prices obtained for beef and pork than for butter-
fat and eggs. The quality of livestock, reflected in the quantity of pro-
duction obtained per unit of feed fed as well as in the prices of the
products sold, varied considerably as between different farms. Of major
importance also was the personal factor in livestock management, or
the operator's skill and ability in feeding and handling livestock so as
to obtain the largest return possible per unit of expense.

Table 33. Number and proportion of farms distributed according to returns per $100
feed fed to produce livestock, 1931-1932

Returns per $100 feed fed to produce livestock	Number of farms	Per cent of farms	Returns per $100 feed fed to produce livestock	Number of farms	Per cent of farms
$-20–30	1	.4	$281–330	22	7.9
31–80	8	2.9	331–380	11	4.0
81–130	40	14.4	381–430	3	1.1
131–180	71	25.6	431–480	0	0
181–230	73	26.3	481–530	1	.4
231–280	47	17.0			

Relation of returns per $100 feed fed to earnings. There is shown in
Table 34 the operator's earnings on farms grouped according to returns
per $100 of feed fed to produce livestock. On the farms undifferentiated
as to size, shown in the third column of the table, it is seen that the farms
with large returns per $100 of feed fed also obtained large operator's
earnings. On the low-feed-return farms on which $150 or less were
obtained per $100 of feed fed, the operator's earnings averaged —$103.
This compares with average operator's earnings of $234 and $369, respec-
tively, obtained on the medium-feed-return and high-feed-return farms.

Significant relations between returns per unit of feed fed and net
earnings are also noted when the farms are further sub-sorted according
to size, as shown in the last six columns of Table 34. Net losses were
suffered in all size groups on the farms with returns from produce live-
stock of less than $150 per $100 of feed fed. Smaller losses were suf-
fered on the small farms. This was probably due to the fact that
poultry and hogs, which obtain a large part of their maintenance from
waste feed, made up a larger proportion of the total livestock on these
farms than on the larger farms. Associated with this were the smaller
number of production units on the small farms, and hence relatively

Table 34.   Relation of returns per $100 feed fed to produce livestock to operator's earnings on all farms and on farms grouped according to size, 1931-1932

Returns per $100 feed fed	All farms			Size of farm					
				81–240 acres		241–400 acres		401 acres and over	
	Number of farms	Returns per $100 feed fed	Operator's earnings	Number of farms	Operator's earnings	Number of farms	Operator's earnings	Number of farms	Operator's earnings
$150 and less....................	71	$ 113	$ −103	32	$ −11	20	$ −75	19	$ −287
151–250.........................	141	193	234	74	278	49	336	18	−228
251 and over....................	65	295	369	36	350	20	407	9	361
All farms.................	277	$ 185	$ 179	142	$ 231	89	$ 260	46	$ −137

smaller net losses during a period of unprofitable operations. With higher rates of returns over feed costs and with operations at a profitable level, however, the gains in income on the larger farms were greater, proportionately, than on the small farms. The difference in average earnings between the low-feed-return and high-feed-return farms in the small-farm group amounted to $361. Comparable differences in the medium-size and large-size farm groups were $482 and $673, respectively.

Relation of returns per $100 feed fed to farm organization and operation. As shown in Table 35, the returns per unit of feed fed to livestock were not consistently related to other factors in farm organization. In general, however, the lowest feed returns were obtained on the largest farms, on which a high proportion of the produce livestock were cattle used largely for beef production. There was a tendency for farms with progressively high feed returns to have relatively fewer cattle and hogs, and more poultry. This is significant in that poultry gave higher average returns per unit of feed fed than the other produce-livestock enterprises. The lowest returns per unit of feed fed were from the hog enterprise.

There was a tendency for farms with high feed returns to have a relatively large number of productive man work days, excluding harvesting, per 100 acres in farm land. Returns per unit of feed fed were not

Table 35. Relation of returns per $100 of feed fed to produce livestock to farm organization and operation, 1931-1932

Items	Ave., all farms	Returns per $100 feed fed					
		100 and less	101–150	151–200	201–250	251–300	301 and over
Farms studied...............number	277	22	49	79	62	41	24
Size of farm...............acres	286	356	299	290	267	263	273
Returns per $100 feed fed produce livestock...........dollars	185	83	126	175	220	269	360
Farm Organization Factors							
Proportion of farm area in—							
Cotton...............per cent	36	33	34	37	38	39	38
Feed crops...............per cent	46	47	49	45	46	42	44
Animal units of produce livestock per 100 acres farm land*...............number	4.5	3.8	4.5	4.5	4.8	4.7	4.0
Proportions of produce animal units that were—							
Cattle...............per cent	78	80	82	75	79	79	68
Hogs...............per cent	9	10	9	10	9	9	7
Poultry...............per cent	11	10	9	12	12	12	13
Man equivalents per farm...............number	1.81	1.78	1.72	1.88	1.75	1.86	1.82
Farm Operation Factors							
Average returns per $100 feed fed to—							
Cattle...............dollars	181	67	119	173	224	270	366
Hogs...............dollars	115	71	94	118	132	143	162
Poultry...............dollars	302	201	218	264	333	407	513
Crop yield index...............per cent	100	103	103	101	95	100	101
P. M. W. D. (excl. hvt.)†—							
Per 100 acres in farm...............number	83	71	75	85	88	88	86
Per animal unit, produce livestock...............number	6	6	6	7	7	6	6
Proportion on produce livestock...............number	35	31	37	35	37	34	30
Per man equivalent (excl. hvt.)...............number	131	139	131	133	133	125	122
Gross return per $1 of gross expense...............dollars	1.51	1.32	1.34	1.50	1.64	1.63	1.63

*Includes small number of sheep.   †Productive man work days, excluding harvesting.

consistently related, however, with efficiency in the use of labor nor with the investment in and expenses on improvements and machinery.

Productive Man Work Days Per Man, Excluding Harvesting Labor[13]

The value of hired labor and of unpaid family labor, excluding the operator's labor, was the largest single item of operating expense on the farms studied. This item amounted to 31 per cent of the gross farm expenses during the two-year period 1931-1932. The estimated value per farm of the operator's labor amounted to 46 per cent of the combined value of the hired labor and unpaid family labor during these two years. It is to be expected, therefore, that the extent to which the available labor is utilized in a productive capacity would influence in a strong degree the farm earnings obtained.

The labor force on a farm may consist of the operator's only, or the operator's labor may be supplemented with hired labor and unpaid family labor. In any case, it is to the operator's advantage to utilize all of the labor available as fully as possible in a productive way. The extent to which this was done on the farms studied is measured here by the number of productive man work days per man, excluding harvesting labor. Harvesting labor was excluded from the measure because of the large amounts of seasonal labor that are hired for this operation, principally on a contract basis. Furthermore, the amount of labor used in crop harvesting is largely determined by yields obtained rather than by efficiency in the use of labor.

As shown in Table 36, there was considerable variation in the number of days worked per man on the farms studied. An average of 131 productive man work days, excluding harvesting, was performed per man. The range extended from 47 days to 305 days. From 101 to 160 days of productive labor, excluding harvesting, were performed per man on 59 per cent of the farms.

Table 36. **Number and proportion of farms distributed according to productive man work days per man, excluding harvesting, 1931-1932**

P. M. W. D. per man (excl. hvt.)*	Number of farms	Per cent of farms	P. M. W. D. per man (excl. hvt.)*	Number of farms	Per cent of farms
41- 60	5	1.9	181-200	15	5.8
61- 80	10	3.8	201-220	8	3.1
81-100	33	12.6	221-240	4	1.5
101-120	48	18.4	241-260	5	1.9
121-140	63	24.1	261-280	0	0
141-160	42	16.1	281-300	1	.4
161-180	26	10.0	301-320	1	.4

*Productive man work days per man, excluding harvesting.

Relation of productive man work days per man, excluding harvesting, to operator's earnings. The operator's earnings on farms grouped according to the number of productive man work days per man, excluding harvesting, are shown in Table 37. The relations for all farms, shown in

[13]For definition of terms, see page 75.

Table 37. Relation of productive man work days per man, excluding harvesting, to operator's earnings on all farms and on farms grouped according to acres in crops, 1931-1932

P. M. W. D. per man (excluding harvesting)*	All farms			Acres in crops					
				170 acres and less		171–270 acres		271 acres and over	
	Number of farms	P.M.W.D. per man (excluding hvt.)*	Operator's earnings	Number of farms	Operator's earnings	Number of farms	Operator's earnings	Number of farms	Operator's earnings
110 and less.....................	66	88	$ 24	18	$ 209	25	$ 48	23	$ −146
111–150.........................	118	130	164	47	216	43	135	28	120
151 and over....................	77	183	310	28	333	23	232	26	356
All farms.................	261	131	$ 172	93	$ 250	91	$ 135	77	$ 120

*Productive man work days per man, excluding harvesting.

the third column of the table, indicate the strong influence efficiency in the use of labor has on earnings. The average operator's earnings on farms with 110 work days or less per man averaged $24 as compared with $164 and $310, respectively, on the farms with 111 to 150 work days and 151 or more work days per man.

As shown in the last six columns of Table 37, the relation between earnings and efficiency in the use of labor was most significant on the farms with the largest acreage in crops. The relation of labor efficiency to earnings was positive in all size groups, but the range in earnings was widest within the farm groups with the largest crop acreages. In the group with the smallest acreage per farm, the range in earnings amounted to $124 difference between farms with the lowest labor efficiency and farms with the highest labor efficiency. Comparable ranges in the medium-acreage and large-acreage groups were $188 and $402, respectively. Efficiency in the use of cost elements per unit of production on large farms is particularly important because of the large number of production units involved. Also, relatively more of the labor used on the large farms is hired, whereas the largest proportion of the labor on the small farms, excluding harvesting, is contributed by the operator. It will be remembered that the estimated value of the operator's labor is not included as an expense in the computation of the operator's earnings.

Relation of productive man work days per man, excluding harvesting, to farm organization and operation. As shown in Table 38, differences in the number of productive man work unit per man, excluding harvesting, were not consistently related with size of farm or with factors pertaining to farm organization. There was a positive relation, however, between the man work days per man and the amount of labor used per 100 acres of farm land and crop land, per animal unit of produce livestock, and per $100 of gross income. The farms with a large number of productive man work days per man also tended to have a relatively large acreage of farm land and crop land per man, and relatively low power and equipment expenses per man work day. The source of labor varied considerably as between the farm groups. A large proportion of the labor on the farms with high labor efficiency was performed by the operator, and relatively small proportions were performed by members of the family and hired labor.

Table 38. Relation of productive man work days per man, excluding harvesting, to farm organization and operation, 1931-1932

Items	Ave., all farms	P. M. W. D. per man (excl. hvt.)*					
		90 and less	91– 110	111– 130	131– 150	151– 170	171 and over
Farms studied. ...number	261	31	35	55	63	34	43
Size of farm...acres	283	303	330	274	228	307	305
P. M. W. D. per man (excl. hvt.)*...number	131	76	100	121	139	160	205
Farm Organization Factors							
Proportion of farm area in—							
Cotton...per cent	37	35	36	37	38	41	34
Other crops...per cent	46	44	45	47	50	42	47
Animal units of produce livestock per 100 acres of farm land...number	4.5	3.8	3.4	4.5	5.0	4.7	5.3
Man equivalents per farm...number	1.81	2.38	2.08	1.87	1.53	1.79	1.51
Power per 100 crop acres—							
Total, horse equivalents...number	3.3	3.2	3.2	3.4	3.5	3.3	3.2
Proportion of total power furnished by—							
Horses...per cent	79	73	72	87	78	80	79
Tractors, in horse equivalents†...per cent	21	27	28	13	22	20	21
Investment in power and equipment per 100 crop acres.dollars	502	493	522	510	498	527	463
Farm Operation Factors							
P. M. W. D (excl. hvt.)*—							
Per 100 acres in farm...number	84	59	63	82	94	93	101
On crops, per 100 acres in crops...number	55	45	47	53	57	65	60
Per animal unit, produce livestock...number	8	6	7	8	8	8	9
Per $100 of gross income...number	10	8	8	11	10	11	12
Acres per man (excl. hvt.)—							
Farm land...number	157	127	158	147	148	171	202
Crop land...number	130	101	128	123	130	142	163
Proportion of P. M. W. D. (excl. hvt.) by—							
Operator...per cent	53	39	46	50	65	55	66
Family...per cent	24	27	28	25	23	22	16
Hired labor...per cent	23	34	26	25	12	23	18
Power and equipment expenses per P. M. W. D. (excl. hvt)*...dollars	1.79	2.25	2.26	1.75	1.77	1.63	1.53
Crop yield index...per cent	100	94	99	94	101	100	110
Returns per $100 feed fed produce livestock...dollars	186	194	184	192	183	196	177
Gross return per $1 of gross expense...dollars	1.50	1.35	1.42	1.43	1.61	1.53	1.63

*Productive man work days, excluding harvesting.
†Conversions made on the basis of one tractor being equivalent to seven horses.

Summary of Relation of Farm Organization and Operation Factors to Earnings

The analysis to this point has served to demonstrate the relation of individual farm management factors to earnings during the two-year period studied, and to account for this relationship by showing the manner in which each factor was associated with other phases of the organization and operation of the farms studied. The factors analyzed were (1) size of farm; (2) percentage of farm land in cotton; (3) number of produce animal units per 100 acres of farm land; (4) yield of cotton per acre; (5) returns per $100 of feed fed to produce livestock; and (6) number of productive man work days per man, excluding harvesting labor. The remaining and final step is that of summarizing the relations expressed in these factors in terms of the farm as a whole, and of evaluating the relative importance of each of the several factors according to its net effect on earnings.

Combined Effect of Factors

The combined effect of the major farm-management factors on earnings was determined from the situation on farms grouped according to the number of factors in which each was above the average accomplishments on all the farms studied. This summary situation is shown in Table 39.

It will be noted from the table that relatively few of the farms were above or below average accomplishments in all of the factors studied. The bulk of the farms were above the average in two to four factors, with the largest individual group above the average in three factors. The relation between the number of factors in which groups of farms were above average accomplishments and the earnings on these farms during the period of the study may be noted from the last line of the table. It is seen there that the farms with the largest number of factors above average accomplishments also obtained the largest operator's earnings. The operator's earnings on farms that were below average accomplishments in all of the factors studied amounted to —$487, as compared with earnings of $1,099 on farms that were above average in all of the factors. The relation of cash receipts to cash expenses and of gross receipts to gross expenses in each group of farms may be noted in the second and third sections of the table.

Certain of the factors were more important than others in their effect on earnings. Since the groupings in Table 39 were made without regard to the relative importance of the various factors, there is no regularity in increases of operator's earnings in farm groups with additional factors above average. Because of personal preference or prospective returns, certain enterprises or phases of farm organization or operation sometimes are stressed more than others. On certain farms, for example, cotton production may occupy the primary interest of the operator, and only secondary attention may be given to other enterprises. On other farms, livestock production may be of paramount interest. In general, however, the progressively larger earnings on farms with an increasingly large number of factors above average accomplishments indicate that the operator with satisfactory performance in all of the various parts of his farm business usually is better off than the operator who obtains excellent results in only one or relatively few parts of his farm business and neglects the remainder.

Separate Effect of Factors

The six major farm management factors analyzed account for approximately 63 per cent of the variations in operator's earnings on the farms studied during the two-year period 1931-1932. The approximate effect of each factor on operator's earnings also was determined while simultaneously eliminating any variations in earnings caused by the other five factors studied. On the basis of the relative importance of their effects on farm earnings, the factors may be classed in the following order: (1) Yield of cotton per acre; (2) percentage of farm land in cotton;

Table 39.   The situation in respect to various factors and to earnings on all farms, and on farms grouped according to the number of factors in which the farms were above average, 1931-1932

Items	Average, all farms	Farms above average in						
		0 factor	1 factor	2 factors	3 factors	4 factors	5 factors	6 factors
Number of farms...	279	2	25	65	83	69	30	5
Proportion of farms..................................per cent	100	1	9	23	30	24	11	2
Area per farm......................................acres	289	174	240	255	290	295	384	296
Proportion of farm land in cotton....................per cent	36	16	18	28	38	43	43	54
Animal units of produce livestock per 100 acres farm land..number	4.4	6.1	7.4	5.8	4.1	3.6	2.9	3.5
Yield of lint cotton per acre...........................pounds	235	198	142	204	214	249	282	306
Returns per $100 feed fed to produce livestock..........dollars	185	75	153	175	184	212	207	222
P. M. W. D. per man (excl. hvt.)*.....................number	131	122	114	124	131	131	150	162
Cash receipts...dollars	2075	658	1134	1508	1978	2426	3389	3600
Cash expenses..dollars	1205	291	705	968	1121	1333	1999	1997
Cash receipts per $1 of cash expense....................dollars	1.72	2.26	1.61	1.56	1.76	1.82	1.70	1.80
Gross farm income....................................dollars	2384	871	1383	1838	2274	2720	3728	4244
Gross farm expense...................................dollars	1585	938	1147	1319	1539	1709	2281	2391
Gross income per $1 of gross expense...................dollars	1.50	.93	1.21	1.39	1.48	1.59	1.63	1.77
Operator's earnings..................................dollars	174	−487	−309	−40	103	377	657	1099

*Productive man work days per man, excluding harvesting.

(3) returns per $100 of feed fed to produce livestock; (4) productive man work days per man, excluding harvesting; (5) size of farm; and (6) number of produce animal units per 100 acres of farm land.

Under the conditions that prevailed during the two-year period studied, the farms in the most favorable earning position had a high proportion of farm land in cotton, high cotton yields per acre, and a high efficiency in the use of labor. The average net effect of an increase of one per cent in the proportion of farm land in cotton was to increase operator's earnings by $12.80. An increase of one pound in the yield of cotton per acre was associated with an average increase of $3.62 in operator's earnings. Each additional day of productive labor performed per man, excluding harvesting, was associated with an average increase of $3.15 in operator's earnings.

In general, a large number of produce livestock per unit of farm land was accompanied by a large acreage in feed crops, and hence with a relatively low proportion of farm land in cotton. It follows from this that the farms with a large number of produce livestock per unit of farm land tended to have relatively low operator's earnings. The operator's earnings were lowered by an average of $7.18 for each animal unit of produce livestock per 100 acres of farm land. The exception to this was on the farms on which feeding operations were conducted on a highly successful basis. An increase of $1 in the average returns obtained per $100 of feed fed to produce livestock was associated with an average increase of $1.67 in operator's earnings.

Size of farm generally was not closely associated with earnings on the farms studied. The net effect of adding one acre to the size of farm was to lower operator's earnings by an average of 54 cents. The conditions of operating efficiency under which a large size of farm was associated with relatively high operator's earnings were demonstrated in the section pertaining to the general influence of size of farm on earnings.[14]

The reader should be fully aware, of course, that the specific influence of individual factors on earnings is conditioned by the farm price and production conditions that prevailed during the two-year period to which the analysis pertains. A change in the relationships in these two sets of conditions would influence the relative effects of individual farm-management factors on earnings. This limitation holds true for the use of any analysis of the average production and financial situation found in an area as a basis for planning future programs. The analysis of the situation in the past must be qualified in terms of the situation likely to prevail during individual years in the future. Thus a prospective situation of favorable production and of relatively high prices of sales items in relation to prices of purchase items would indicate the economic desirability of operating a large farm business. Furthermore, the prices likely to prevail for different farm products would influence the relative returns from different enterprises. The use of farm records and a

knowledge of prospective price conditions are major essentials in interpreting past performance on individual farms in terms of conditions that are likely to prevail in the future. The use of farm records in this connection is discussed as a part of the following section. Information on prospective price conditions is available in current "outlook" reports prepared in the United States Department of Agriculture in cooperation with the state agricultural colleges.

Summary of Situation on Farms With Highest Earnings in Each Size Group

Of the major factors analyzed in this study, size of farm is often the one that is least susceptible to change by the farm operator. Additional land may not be available for purchase or rent at desirable terms, finances may be lacking, or the farmer himself may be able to manage a small business more successfully than he can a large one. On the other hand, the operator of a large farm is usually unable readily to reduce his size of business in keeping with prospective conditions and earnings. Such operators are interested not only in the income possibilities on farms larger or smaller than their own, but also in the situation on farms of a size similar to theirs. In order to permit such a comparison for the period of the study, there is shown in Table 40 a summary of the relative situations on all farms and on the one-third of the farms with the highest operator's earnings in each size group.

Table 40 is largely self-explanatory, but attention may be directed to several major points of difference as between the average-income and highest-income farms within size groups. The highest-income farms in all the groups had a larger proportion of their land in cotton, and had higher yields per acre in cotton than did the average-income farms. Higher returns also were obtained per $100 of feed fed to produce livestock on the highest-income farms, and more days of man labor, excluding harvesting, were used per unit of farm land, of crop land, and per man on these farms than on the average-income farms. These differences are in keeping with the conclusions from the analysis in the preceding sections. These summary comparisons within size groups give the average operator a more direct indication, however, of the manner in which he may better his income by a careful study of the more successful farms of a size similar to the one he operates.

In the small-farm group averaging 143 acres in size, it is signficant to note the more intensive methods on the highest-income farms and the greater use made of the labor force on these farms than on the average-income farms. The highest-income farms not only had a higher proportion of their land in cotton, but carried more produce livestock per 100 acres than did the average-income farms. A relatively large proportion of the livestock on the highest-income farms was poultry, which returned favorable earnings and utilized more labor per unit than did the other livestock enterprises. In other words, the most successful small farms had more high-income enterprises and provided more labor, total

Items	Size of farm (acres)									
	81–160		161–240		241–320		321–400		400 and over	
	All farms	Highest one-third	All farms	Highest one-third	All farms	Highest one-third	All farms	Highest one-third	All farms	Highest one-third
Farms studied....................number	55	18	87	29	62	21	27	9	48	16
Size of farm....................acres	143	143	197	200	295	296	358	356	576	525
Farm Organization Factors										
Proportion of farm land in—										
Crops..........................per cent	88	88	88	90	86	83	88	89	74	82
Cotton.........................per cent	38	46	37	44	42	49	39	52	31	39
Produce animal units per 100 acres farm land*....................number	8.3	9.1	5.5	5.7	4.0	3.7	3.1	2.8	3.4	2.9
Proportion of produce animal units that were—										
Cattle.........................per cent	78	75	76	81	78	76	77	77	78	80
Swine..........................per cent	9	9	11	7	10	10	10	5	9	10
Poultry........................per cent	12	15	13	12	12	12	12	18	8	10
Man equivalents per farm (excl. hvt.).number	1.42	1.31	1.54	1.66	1.90	1.89	2.16	2.24	2.48	2.21
Horse equivalents per 100 acres in crops number	4.2	4.3	3.6	3.6	3.4	3.2	2.9	2.9	2.9	3.1
Horse equivalents per man (excl. hvt.)..number										
Proportions of horse equivalents that were—										
Horses.........................per cent	86	78	89	85	79	92	76	66	67	70
Tractors†......................per cent	14	22	11	15	21	8	24	34	33	30
Investment per 100 acres farm land—										
Land and improvements........dollars	3102	3072	2972	2940	2886	2880	2826	2828	2789	2862
Power and equipment..........dollars	537	559	466	446	434	411	363	397	329	346
Other.........................dollars	502	580	383	359	300	318	249	231	248	278
Farm Operation Factors										
Yield of cotton per acre..........pounds	267	299	238	298	224	277	262	336	220	299
Return per $100 feed fed to produce live-stock—										
All produce livestock*..........dollars	205	229	190	225	186	189	172	195	169	177
Cattle.........................dollars	201	220	190	234	172	177	184	190	162	181
Swine.........................dollars	131	107	119	107	124	133	81	100	107	123
Poultry........................dollars	286	280	306	311	302	336	271	266	335	239
P. M. W. D. (excl. harvesting)‡—										
Per 100 acres in farm...........number	130	137	99	105	89	93	75	84	56	63
On crops, per 100 acres in crops...number	67	66	56	57	60	62	53	58	46	53
On produce livestock, per A. U...number	7	7	7	8	7	7	7	8	6	5
Per man......................number	131	149	128	128	138	145	126	146	129	145
Proportion of P. M. W. D. (excl. hvt.) by—										
Operator.......................per cent	70	76	64	60	50	52	44	41	37	44
Family.........................per cent	19	14	24	30	27	29	27	25	21	17
Hired labor.....................per cent	11	10	12	10	23	19	29	34	42	39
Expenses on buildings and improvements per farm acre ....dollars	.37	.29	.37	.32	.32	.37	.26	.29	.26	.29
Expenses on power and equipment per crop acre....................dollars	2.20	2.31	1.92	1.71	1.76	1.73	1.48	1.76	1.73	1.96
Operator's earnings.................dollars	266	615	210	703	225	776	338	1266	−154	822

*Includes small number of sheep.   †Conversions made on the basis of one tractor being equivalent to seven horses.
‡Productive man work days, excluding harvesting.

and per man, than did the average-income farms. In general, similar points of difference prevailed as between the average-income and highest-income farms in the group averaging 197 acres in size. Exceptions were that the poultry enterprise was relatively smaller on the highest-income farms than on the average-income farms in that size group, and no difference existed in the number of days worked per man.   •

In the three large-farm groups, the highest-income farms had relatively large proportions of their land in cotton and relatively small numbers of produce livestock per 100 acres. Higher returns were obtained per unit of feed fed, however, and a more intensive use was made of the labor force.

It should be understood, of course, that strict adherence to a given system of farm organization and operation such as practiced by the highest-income farm groups during the period of the study may not always be the most profitable procedure. Changes in yields and production methods or in the relative prices of sale and purchase items may affect unfavorably the earnings that may be obtained in the future. Furthermore, such things as the amount of family labor available, the financial resources and obligations of the farm operator, and his personal ability or preference, affect to an important extent the farmer's decision as to the production program that he may follow.

Farmers in the High Plains Cotton Area generally do not vary their farming systems widely from year to year, however, unless forced to by adverse weather conditions. It is usually more profitable to adopt a system of farming that gives promise of the largest average returns over a period of time, and to make only relatively minor adjustments from year to year to meet prospective changes in price and production conditions. Radical shifts in production should be made only after a careful determination that conditions indicating the desirability of the shift are to be sufficiently lasting that the change will be profitable.

The current adjustments needed in his farm business may be readily detected if the operator keeps farm records. Farm records serve to measure the financial progress of the farm from year to year and over a period of time. The individual operator would be particularly advantaged if he could compare the results obtained from his farm business with the results obtained on other farms in his community. This would permit comparison of the performance on his farm with the performance on the most successful farms, and thus indicate the phases of his farm business that need attention and improvement. A basis for such comparisons has been provided in this study. Current comparisons may best be made by groups of farmers keeping comparable records with the assistance of an extension specialist or other agent who can aid in the analysis and preparation of the material for discussion.

In addition to revealing the factors influencing earnings from the farm business as a whole as discussed in this bulletin, information from farm records may also be used to measure production methods and results for individual enterprises. Comparisons of the same enterprise on different farms indicate, in turn, the production systems that are relatively most

successful. For example, a group of farmers interested in dairying may learn valuable lessons by studying the organization and production methods used by the operators who are most successful with the enterprise. Standards of production and of production methods for various enterprises, as determined by a close study of the most successful operators, are contained in another publication in this series.[15]

SUMMARY AND CONCLUSIONS

The High Plains Cotton Area of Texas, comprising approximately 5.5 million acres, is located in the central-western part of the State. Approximately 79 per cent of the area was in farms in 1929, and 54 per cent of the farm land was in crops. Cotton and grain sorghums are the principal crops grown. Crop farming became of importance principally within the last 20 years, and displaced in large measure the extensive cattle ranching that formerly prevailed. This rapid development created many problems of adaptation and of adjustment of farm size, organization, and cultural practices to the conditions in the area. In order to facilitate and lend direction to this continuing process of adjustment, a farm-management study, covering an average of 137 farms was conducted in the area during the five-year period 1931-1935. This bulletin is the first of a series of three publications summarizing the results of the study. This first publication is introductory in nature in that it describes the general farm situation in the area and serves to point out and evaluate the chief factors that affected farm earnings during a selected period of the study.

The average operator's earnings per farm amounted to $223 in 1931, $124 in 1932, $1,808 in 1933, $254 in 1934, and $980 in 1935. These variations in average earnings as between individual years of the study were caused by differences in yields and production as affected by climatic conditions in the area generally, by farm prices paid and received, and by payments received for participating in the Agricultural Adjustment Administration programs in 1933, 1934, and 1935. The range of earnings on individual farms during each year of the study was wider, however, than the range in average earnings as between different years. The analysis to determine the causes of these differences in earnings on individual farms was restricted to the data obtained in 1931 and 1932, when price and production conditions were fairly comparable, and farm organization and receipts were not affected by the government farm programs.

The average size of the farms studied in 1931 and 1932 was 289 acres, of which 239 acres, or 83 per cent, were in crop land. Of the crop land, 44 per cent was in cotton, 6 per cent in small grains, and the remainder in feed crops, principally sorghums. Averages of 2.6 horses and 4.4 animal units of produce livestock, i. e., livestock other than workstock, were kept per 100 acres of farm land. The average investment per

---

[13]See page 8.

farm, excluding the operator's residence, was $10,418, of which 80 per cent was in land and improvements, 11 per cent in power, machinery and equipment, 5 per cent in produce livestock, and 4 per cent in feed, seed, and supplies. The operator's earnings per farm averaged $174, with the range among individual farms extending from a loss of $1,818 to a gain of $2,504.

The major factors that influenced farm earnings in 1931 and 1932 were (1) size of farm, (2) per cent of farm land in cotton, (3) number of produce animal units per 100 acres of farm land, (4) yield of cotton per acre, (5) returns per $100 feed fed to produce livestock, and (6) number of productive man work days per man, excluding harvesting labor. Approximately 63 per cent of the variations in farm earnings on the farms studied were caused by the operation of these factors, which are largely within the individual farmer's control. Thus the operator in the area can learn much that he may use to improve or maintain his earnings by studying the systems of farming that the most successful operators are practicing.

Sixty-eight per cent of the farms studied ranged from 131 to 330 acres in size. On the farms with an unprofitable level of operations, an average loss resulted from each unit of production; hence the larger the size of farm, the heavier were the losses incurred. Thus large farms are likely to lose more money or make larger earnings than small farms, depending upon whether price and production conditions are unfavorable or favorable. The average earnings on farms of over 400 acres in size during the period of the study were relatively low. Even in a period of low prices such as prevailed in 1931 and 1932, however, large operating units with low costs per unit of gross income returned the largest average operator's earnings. The larger farms were in an advantageous earning position chiefly because of the greater opportunities for a fuller and more economical utilization of power and equipment, labor, and improvements.

An average of 36 per cent of the land in the farms studied was in cotton in 1931 and 1932, with the range on 65 per cent of the farms extending from 30 to 60 per cent. Cotton production was more profitable than livestock production during the period of the study; hence the farms with a high proportion of land in cotton had higher average earnings than farms with a high proportion of land in feed and pasture and a relatively large number of produce livestock per 100 acres of farm land. The higher average earnings from cotton production occurred despite relatively high prices for livestock and livestock products as compared with the average prices of these commodities during the five-year period 1910-1914. In general, the element of risk is quite large on feed-livestock farms in the area. Because of the drought hazard, operators of such farms are faced with the occasional necessity of having to purchase relatively high-priced feed during years of drought-reduced production, or of selling livestock, sometimes at sacrifice prices, during such years. Favorable earnings from produce livestock during

the period of the study were obtained by operators who were above average in the feeding and handling of livestock. Favorable earnings from livestock also were obtained on farms with only sufficient livestock to provide for home needs, with a small surplus for sale. On farms of this latter type, livestock feeding was done largely on the basis of utilizing farm feed which otherwise would have been wasted.

An average of 4.4 animal units of produce livestock was maintained per 100 acres of land on the farms studied. Sixty-three per cent of the farms had from two to five animal units of produce livestock per 100 acres of farm land.

The farms with high cotton yields obtained relatively high earnings. The average yield per acre on the farms studied was 235 pounds, with 58 per cent of the farms having yields of from 151 to 300 pounds. Variations in cotton yields were due in part to soil and climatic differences as between localities and adjoining farms. However, variations in yields on a large majority of the farms studied in 1931 and 1932 were influenced largely by conditions within the individual farmer's control, such as kind of seed planted, timeliness of planting and of production and harvesting operations, and others.

A high efficiency in feeding produce livestock, measured by the returns per $100 of feed fed, was associated with relatively high operator's earnings. The average return per $100 of feed fed was $185, with the range on 52 per cent of the farms extending from $131 to $230. In general, the lowest returns per unit of feed fed were obtained on the larger farms, on which a high proportion of the produce livestock were cattle used primarily for beef production. There was a tendency for farms with progressively high feed returns to have relatively fewer cattle and hogs, and more poultry. Poultry gave higher average returns per unit of feed fed than the other produce-livestock enterprises. The lowest returns per unit of feed fed were from the hog enterprise.

Labor was the largest single item of expense on the farms studied. Efficiency in the use of labor, measured by the number of productive man work days per man, excluding harvesting, was closely associated with earnings. The farms with the largest number of work days per man obtained the largest earnings. This relation was most significant on the farms with the largest area in crops. Efficiency in the use of cost elements per unit of production on the larger farms is particularly important because of the large number of production units involved. There was an average of 131 productive man work days per man, excluding harvesting, on the farms studied. The number of days per man ranged from 101 to 160 on 59 per cent of the farms.

Relatively few of the farms studied were above or below the average in all six of the major factors analyzed. Seventy-seven per cent of the farms were above average in two to four factors. Because of personal preference or prospective returns, certain enterprises or phases of farm organization or operation sometimes are stressed more than others. Progressively larger earnings were obtained, however, on farms with an

increasingly large number of factors above average accomplishments. This indicates that the operator with satisfactory performance in all the various parts of his farm business usually is better off than the operator who obtains excellent results in only one or relatively few parts of his business and neglects the remainder.

DEFINITION OF TERMS

Operator's earnings. The sum of the cash receipts, increase in value of inventory, and value of farm products used in the home, minus the sum of the cash expenses, decrease in value of inventory, value of unpaid family labor other than the operator's labor, and interest on investment. The investment in and expenses for the operator's dwelling are not included in the computation of the operator's earnings.

Size of farm. The total number of acres in the farm.

Crop land. The land in cultivated crops, including sudan and other rotation pastures.

Crop yield index. The crop-yield index is a composite measure that expresses the weighted average yields of all field crops on a farm or group of farms as a percentage of the weighted average yields on all the farms studied. In computing the crop yield index for a farm, the average yield of each crop on the farm was divided by the average yield for that crop on all the farms studied. The resulting quotient for each crop was multiplied by the acreage in the crop on all the farms studied, and the sum of the products divided by the total acreage in the crops used in the computation. The end-product is the crop-yield index. An elaboration of the same procedure was used to compute comparative yield indexes for groups of farms, and for all farms as between different years of the study.

Produce livestock. Livestock, other than workstock, kept for the production of meat, milk, eggs and other products. The total number of acres in the farm was used in computing the number of produce livestock per 100 acres.

Animal unit. The equivalent of a mature, average-sized horse or cow in the area. In expressing other livestock in terms of animal units, the equivalents used were two colts; two heifers, or four calves of less than one year; 1,000 pounds of pork, live weight; and 100 hens.

Returns per $100 of feed fed to produce livestock. The gross returns obtained from produce livestock in relation to the value of feed used. The gross returns from produce livestock include cash sales, the value of products used in the home, plus increases or minus decreases in the value of the livestock inventory. Feed costs were computed by using the actual amounts paid for purchased feed and by assigning current farm prices to the farm-produced feed. Pasture costs were based on current

pasture rentals in the area, with prorations made to each class of livestock according to the number of days grazed.

Productive man work days, excluding harvesting labor. The equivalent of 10 hours of labor performed by an adult in the production of crops and livestock, and in work off the farm for wages or in trade. The productive man work days are the actual number of days used on the farms studied, including hired labor, unpaid family labor, and the operator's labor. Work performed by children was reduced to a man-equivalent basis. Contract labor was also converted to the equivalent number of days used, as estimated by the farm operator. Labor for harvesting was excluded from the measure primarily because of the use of large amounts of transient labor on a contract basis. The amount of such labor used is determined largely by yields obtained rather than by the operator's efficiency in the use of labor.

Number of men per farm, excluding harvesting labor. Computed from the amount of labor, excluding harvesting, used on the farms studied. A farmer who spent his entire time in the operation of his farm was considered a full-time man. Other labor was converted into man equivalents by dividing the number of days actually employed in productive farm work during the six-month period of March through September, by the 144 days estimated available for farm work during that period.

Productive man work days per man, excluding harvesting labor. The total number of productive man work days per farm, excluding harvesting, divided by the number of men per farm.

Power and equipment expense. Operating expenses and depreciation on workstock, machinery and equipment, tractors, trucks, and automobiles used for farm work. Operating expenses on workstock include feed, veterinary and medicine, and miscellaneous items. For machinery and equipment, tractors, trucks, and automobiles, operating expenses include fuel, oil and grease, and repairs.