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THE DUST BOWL: AGRICULTURAL PROBLEMS AND SOLUTIONS

A factual description of the changes in agriculture and the development of agricultural problems in the area now called the Dust Bowl, together with a description and evaluation of certain programs which work toward a solution of these problems.

July 15, 1940.

FOREWORD

The Regional Agricultural Council for the Southern Great Plains reports physical conditions in the Dust Bowl much improved. It reports that the acreage subject to wind erosion in the spring of 1940 was not as large as was feared in the fall of 1939; that dust storms did not occur with anticipated intensity.

Last winter many persons predicted trouble in the Dust Bowl because of the widespread drought in 1939 which dried out the soil, caused abandonment of a large acreage of fall-sown wheat, and generally put the land in a condition to blow. Soil blowing this spring was light. This was due in part to heavy winter snow, to relatively light spring winds, and in part to the wider use of methods of soil management that protect against wind erosion.

However, much must still be done in the Southern Plains to create a stable, independent, and permanently profitable agriculture. This seems an appropriate time to look at the agricultural problems of the Dust Bowl and to report the progress farmers have made, with the help of Government programs, toward solving these problems.

THE DUST BOWL: AGRICULTURAL PROBLEMS AND SOLUTIONS

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I. INTRODUCTION -- Description of the Dust Bowl Area.

Dust storms have long been known in the Southern Great Plains, but since the early 1930's they have occurred more frequently and with greater violence than ever before. In 1934 and 1935, when the storms were most intense, the wind whipped tons of earth into immense dust clouds which blackened the sun. These storms represented a serious form of wind erosion, spectacular enough to focus attention on the area and give it the name Dust Bowl.

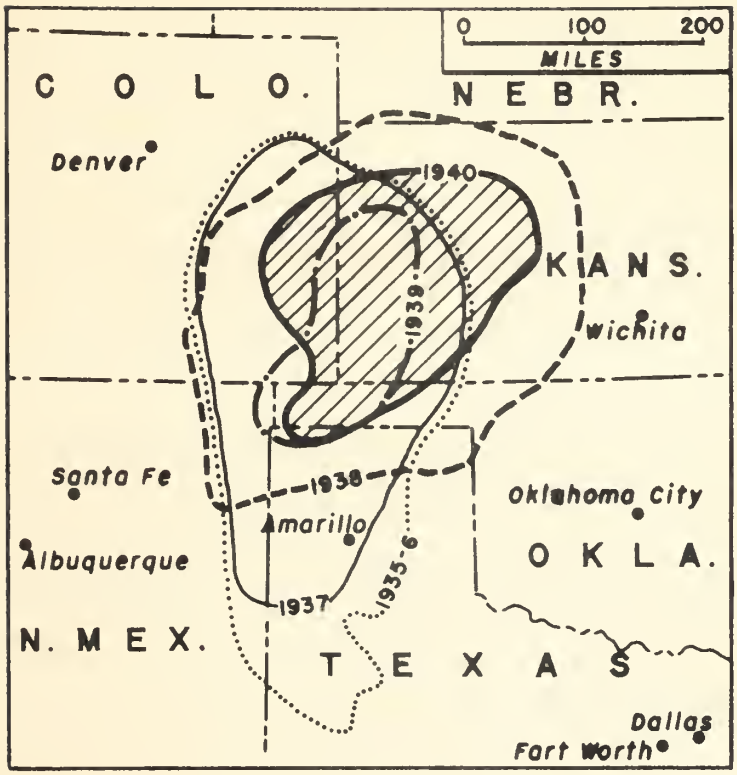
Although the Bowl has no fixed boundaries, its general location is the southwestern part of Kansas, the southeastern part of Colorado, the Panhandles of Oklahoma and Texas and the northeastern part of New Mexico. Experts say that 97,000,000 acres of the Southern Great Plains may be considered a potential wind erosion region.1/ The blow area, however, has never been much more than one-half of this size.

Dust storms or "black blizzards" are caused by high winds blowing over dry soil poorly protected by vegetative cover. The outline of the Dust Bowl tends to change from year to year. The Bowl reached its greatest size in 1935 and 1936, when it covered about 50,000,000 acres.

Through the years since 1935, the Bowl has tended to shift northeastward, concentrating in southwestern Kansas.

(See Fig. 1)

1/ Statement by H. H. Finnell - Washington Evening Star -- Dec. 8, 1939.



The map shows how the dust bowl area changed from 1935 to 1939. The shaded section shows its probable extent in 1940, according to soil conservation authorities.

From Washington Evening Star, Dec. 8, 1939.

Figure 1.

1. Topography and Cover

A large part of the Dust Bowl is a high plain sloping gradually from an elevation of 6,000 feet in northeastern New Mexico to an elevation of 2,000 feet at the southwest corner of the Texas Panhandle. 2/ The surface of the Dust Bowl is characteristic of the Great Plains region -- smooth to undulating and for most part treeless. The continuity of the land is broken by occasional sand hills, ridges, and small depressions.

2. Soils

The soils of the Southern Great Plains are generally fertile but vary greatly in texture, structure and depth. A soil map covering eleven counties in the heart of the Dust Bowl area shows nine distinct soil types ranging from deep heavy loam, to shallow structureless sands. In some cases all nine of these types occur in a single county. 3/

In spite of complex minor variations in soil type, the Southern Great Plains has only three major soil groups, the Chernozem soils, covering the eastern half of the area, the Southern Dark Brown soils, covering most of the western half of the area and the Brown soils which occur in eastern Colorado and northeastern New Mexico.4/ The soil most frequently cultivated in the Southern Great Plains is the deep heavy high plains clay loam extending through western Kansas, the Oklahoma Panhandle and the plains of Texas. This soil is very fertile and only moderately affected by wind erosion. It is a part of the Chernozem group. A second important cultivated soil is the medium depth sandy soil found mainly in Morton, Stevens, and Seward Counties in Kansas, a part of the Dark Brown soil belt. This type is easily controlled but subject to severe erosion if neglected. A medium depth high plains soil is cultivated in western Kansas and eastern Colorado. It occurs mainly in the Brown soil belt and is similar to the deep high plains clay loam except that it is much shallower and much more subject to erosion. 5/

3. Climate and Water

Winters in the Southern Great Plains tend to be severe. Summers tend to be hot. Variation between maximum summer and minimum winter temperatures is frequently well over 100° even in the southern High Plains of Texas. The average growing season ranges from less than 135 days in northern Colorado to more than 215 days in the southern part of the Texas Panhandle.6/ High winds occur regularly during the spring and early summer months.

2/ R. S. Kifer & H. L. Stewart "Farming Hazards in the Drought Area" GPO, 1938, p. 78

3/ "The Future of the Great Plains " Report of the Great Plains Committee. GPO, 1936. Fig. 8.

4/ R. S. Kifer & H. L. Stewart op. cit. p. 79

5/ See H. H. Finnell "Problem Area Groups of Land in the Southern Great Plains GPO,, 1939.

6/ R. S. Kifer & H. L. Stewart "Farming Hazards in the Drought Area" pp. 79 & 80

More precipitation is necessary for plant growth in the southern than in other parts of the Great Plains due to the rapid moisture evaporation which results from high summer temperatures, low humidity and strong winds. The Dust Bowl as a whole gets an average annual rainfall of about 16.8 inches.7/ Many crops cannot be grown by conventional practices with less than 20 inches a year.

The average of 16.8 inches would not be so serious if it could be counted on from year to year and from place to place in a given year. Annual rainfall averages from five Dust Bowl weather stations and for each of the years from 1916 through 1938 reveals a low of 9.58 inches in 1936 and a high of 25.29 inches in 1923.8/ For any given year, some parts of the Dust Bowl get more rain than other parts, the east usually getting more than the west.

"The whole problem of water supply in the Great Plains comes inevitably back to precipitation. Since that is deficient it follows that all sources dependent upon it (and all sources now known are thus dependent) will also be deficient." 9/ Most of the surface streams in the Southern Great Plains are dry several months each year, and the perennial streams such as the Arkansas and Canadian Rivers are subject to great fluctuations in volume from season to season.10/ Ground water supplies occur both near the surface and at considerable depth. But they are easily exhausted, because they are replenished only by a fractional part of an insufficient rainfall.

Aridity in the heart of the Southern Plains prevents a luxuriant vegetation. The natural cover is short grass of which buffalo and grama are the principal remaining varieties.

Dust storms in the Southern Plains have given the Dust Bowl its name and have determined its geographical extent, but they are not the major rural problem of the area. They are, in fact, merely one result of a major difficulty, -- a type of agriculture ill-adapted to natural conditions.

7/ See Appendix Exhibit 3.

8/ Ibid

9/ W. P. Webb "The Great Plains" — Ginn & Co. 1931 — p. 332

10/ "The Future of the Great Plains" -- Report of the Great Plains Committee - p. 33

II. GROWTH OF AGRICULTURAL PROBLEMS IN THE SOUTHERN GREAT PLAINS

Farming problems in what is now the Dust Bowl, were preceded by five eras -- early land use stability, the cattle kingdom, settlement of the Southern Plains from 1886 to 1910, false security of 1910 to 1930, and difficulties of the dpression years.

Continuous and comparable farm data for the Southern Great Plains are best found in the United States censuses of agriculture -- 1890 through 1935.

Data from the censuses of 1890 and 1900 have been obtained for 22 Southern Plains counties in southwestern Kansas, southeastern Colorado, and the Panhandle of Texas.1/ Beginning with the 1910 census, all information, except that pertaining to tenancy, 2/ has been obtained for 27 counties which include the original 22. (See Fig. 2.) The new counties are divided between the Oklahoma Panhandle and northeastern New Mexico. 3/

Also basic to the following discussion are rainfall data from climatological reports of the U. S. Weather Bureau 4/ and price data from various volumes of agricultural statistics.

Information from the basic sources is summarized in the statistical appendi

1. Land Use Stability

Before the coming of the white man, grasses covered the Southern Great Plains. The grasses were not overgrazed, were adapted to the climate, and were able to maintain themselves as a permanent protection to the soil. It was a period of land use stability with almost no wind erosion, and with plenty of feed for scattered buffalo herds which roamed the area.

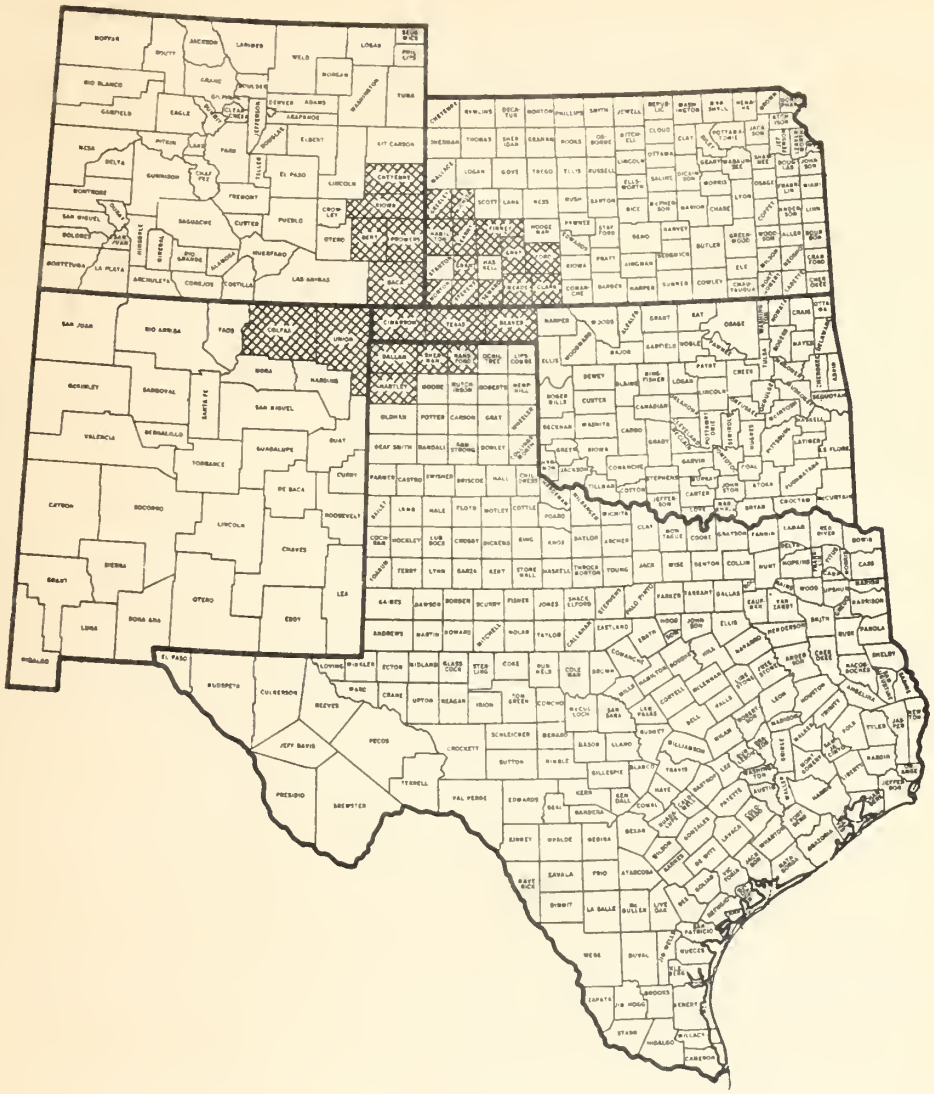
But with the coming of the white man, this land use stability was disturbed and finally destroyed.

1/ The names of the 22 counties follow: Clark, Finney, Ford, Grant, Gray, Greeley, Hamilton, Kearny, Meade, Morton, Seward, Stevens and Wichita in Kansas; Baca, Bent, Cheyenne, Kiowa and Prowers in Colorado; and Dallam, Hansford, Hartley and Sherman in Texas.

2/ See Appendix Exhibit 14.

3/ The 5 counties added to the previous list are: Beaver, Cimarron and Texas in Oklahoma and Colfax and Union in New Mexico. The area of Union County changed somewhat between 1920 and 1925 but not enough to injure the comparability of data.

4/ Rainfall data has been obtained for 5 Dust Bowl stations; Lakin in Kearny County, Kansas; Lamar in Prowers County, Colorado; Goodwell in Texas County, Oklahoma; Dalhart in Dallam County, Texas; Clayton in Union County. N. M.



Twenty-seven counties for which census data was obtained for 1910 through 1935. Census data for 1890 and 1900 was obtained for all counties except Colfax and Union in New Mexico; and Beaver, Cimarron and Texas in Oklahoma.

Figure 2

2. The Cattle Kingdom 5/

In the second decade of the 19th century, the cattle industry of the Spandiards extended as far north as the Nueces Valley, and the Mexicans, after obtaining their independence in 1821, were able to advance it no farther.

When Texas won her fight for freedom in 1836, she acquired the Mexican herds in the Nueces country. From then on, lack of care caused these cattle to become almost wild, and as they became wilder and hardier they multiplied more rapidly. By 1860, longhorn cattle had become so numerous in Southern Texas that they were actually a nuisance. A method of getting rid of more of them usefully had to be found.

After the Civil War the direction which this disposition should take was determined by market prices. Steers worth $3 and $4 a head in Texas brought $30 and $40 in northeastern markets. Beginning in 1866, cowboys braved untold hardships to drive thousands of tough rangy longhorns to railheads in Missouri and Kansas. From such towns as Sedalia, Abilene, and finally Dodge City the cattle were shipped to areas of high prices.

Not all of the cattle on the trail were destined for immediate shipment, however. Many herds of them branched off northward and westward to stock other ranges. Although the cattle industry received a setback during the panic of 1873, the stocking of the range was fairly complete by 1876. The cattle industry cradled in the Nueces Valley of Texas had spread in a surprisingly short time throughout the grasslands of the Southern and Northern Plains.

When the cattle industry first developed in the Southern Plains, land was legally free and unfenced. Actually, however, the individual cattleman possessed extralegal "range rights" which, partially protected him in the exclusive use of his water supply and its surrounding range. Single cattle outfits sometimes calimed "rights" over areas as large as the States of Massachusetts and Delaware combined. In the absence of fences, outfits, whether large or small, were often separated from one another by nothing more definite than a watershed divide. Cattle were branded so that ownership could be distinguished.

In 1876, the cattle business entered a period of prosperity. Prices rose steadily. From $7 a head range delivery in 1878, cattle had advanced to $9.50 a head by 1880. Tales of great fortunes being made in the West traveled eastward and even to England, Scotland, and Holland. A boom began which approximated a land rush, and would-be ranchers and foreign and domestic cattle syndicates flocked to the Southern Plains in great numbers. Outfits grew up so close together that disputes over title arose. Definite legal ownership became more desirable, and fencing became almost a necessity.

5/ For a large part of the information in this section the writer is indebted to W. P. Webb -- "The Great Plains" -- Ginn & Co., 1931.

Cattle companies constructed fences on a large scale. Two companies in Colorado enclosed one million acres apiece; other organizations in Colorado, New Mexico, and Kansas enclosed a quarter of a million acres each.6/ An English syndicate operating in the Texas Panhandle fenced an area larger than the whole State of Connecticut.7/

As new ranchers arrived in the Southern Plains they had to obtain cattle, and the increased demand sent prices higher. The boom assumed a dizzy speculative pace which could not last. The range became so overstocked that either a drought or a hard winter would bring disaster to the cattle industry. When drought actual occurred in 1883, thousands of cattle starved. The following year prices weakened and in 1885 they crashed. In 1885 also, Congress passed a law against large enclosures of the free range.8/ The severe winter of 1886 added the final touch and it seemed to cattlemen that their whole kingdom had tumbled into ruins.

So by 1886, large sections of the range were no longer free and open, and enclosed farms and ranches consisting of legally owned land were becoming more popular. Also by 1886, the grasslands were overgrazed and depleted. Although the cattle boom was over, the long period of land misuse in the Southern Plains had just begun.

3. Settlement of the Southern Plains -- 1886 to 1910

The period from 1886 to 1910 in the Southern Great Plains was marked not only by an increasing number of farms, but also by variations in the type of agriculture and in the size of the farm units.

By 1890, improved transportation, barbed wire fencing, the lure of free homesteads and the dissolution of the large enclosures had encouraged the growth of many small farms. But these were not dependable in an area adapted to large scale ranching. The drought of 1890 to 1895 caused crops and incomes to fail, and without funds or available credit, many small farmers abandoned their land. Most of the farmers and ranchers who remained in the area increased the size of their operating units and turned to beef production. By 1900, King Cattle had almost recaptured his former domain.

Between 1900 and 1910, however, farming conditions improved and, despite the lesson of the nineties, homesteaders gradually reentered the Southern Plains. By 1910 the settlement of the region was almost completed. Small farms were much in evidence. Crop farming was the order of the day although it was by no means fully developed.

6/ B. H. Hibbard "A History of the Public Land Policies." -- Macmillan, N.Y. 1924 - p. 477

7/ This syndicate received 3,000,000 acres of land in return for the $1,000,000 which it gave Texas to build a State house. The entire area was enclosed and the west fence was 275 miles long.

8/ B. H. Hibbard op. cit. p. 478

From 1890 to 1900, the area of cultivated land was small compared to total land area. But after 1900, plowing of range land began in earnest.

It should be noted, that settlement of the Texas panhandle was somewhat backward during the years 1886 to 1910 and farm units tended to be larger than units in the selected counties of Kansas and Colorado.

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Detailed information on the period 1886-1910 follows:

1886-1890

In 1890 there were 5,762 farms and ranches in 22 Southern Plains counties of Kansas, Colorado, and Texas. The size of many of these farms were determined by the homestead grant of 160 acres. In 1890, the average size of all farms in the 22 counties was only 256 acres. Included in this average are the farms and ranches of Texas not affected by Federal homestead legislation. Of the 5,762 farm units in the 22 counties only 56 contained more than 1,000 acres. Only 9.1 percent of the total land area had been enclosed in farms.

The average farm of 256 acres contained about 90 crop acres. Beef production had declined in importance and in 1890, cattle 9a/ averaged only 24 per farm.

Largely because settlement had not progressed very far in 1890, only 3.3 percent of the land in the 22 counties was improved. 9/ This meant that at least 96 percent of the range was still in grass. Although much depleted by past overgrazing, this grass cover afforded a great deal of erosion protection.

1890-1900

The farmers themselves were not so well protected. A homestead unit of 160 acres is well suited to the east, but it is not big enough in a region where rainfall may average only 9 or 10 inches in a dry year. As early as 1878, Major J. W. Powell stated in his Report on the Lands of the Arid Region of the West that the homsetead law was inadequate on the Plains, and that the farm or ranch unit should consist of not less than 2,560 acres. 10/

Southern Plains farmers learned the truth of Major Powell's words through bitter experience. In 1890 a five-year period of the most intense drought on record began, 11/ and the crops, which the homesteader depended on so largely, failed. Following the drought came a period of low prices. Incomes dropped. In those days credit facilities were not developed, nor could the Plains farmer expect any help from the Government. When his income faded he had to move.

9a/ Figures for cattle on farms include all calves, steers, bulls and cows.
9/ Improved land according to the census, includes all crop land, fallow or otherwise, and all land occupied by farm buildings.
10/ B. H. Hibbard - "A History of the Public Land Policies" - p. 420
11/ "The Future of the Great Plains" - GPO, 1936 - P. 27. See Also Webb "The Great Plains" - p. 357

Out of the ruins of the first serious attempts to homestead the Southern Plains, beef production emerged triumphant. Ranching over large areas could be made profitable even in dry years, and wholesale abandonment of farms gave livestock farmers a chance to purchase at low prices the extra land they needed. Grazing units of 2,560 acres were encouraged in the Panhandle of Texas by State legislation. 12/

Farms, which in census reports include ranches, increased in average size in the 22 selected counties from 256 acres in 1890 to 1,730 acres in 1900. Fourteen ranches in Hartley County, Texas averaged over 120,000 acres apiece. The whole number of farms in the area decreased from 5,762 in 1890 to 4,087 ten years later, but the number of farms containing over 1,000 acres increased from 56 to 630 in the same period. Because of the tremendous increase in farm size, acreage in farms and ranches jumped from 9.1 percent to 43.7 percent of total land area.

Beef production had become the dominant farm enterprise. The number of cattle per farm in the 22 counties rose from 24 in 1890 to 172 in 1900. The number of improved acres per farm also increased but at a less rapid pace.

The smaller number of farms so nearly offset the slight rise in the number of improved acres per farm that the amount of cultivated land increased little between 1890 and 1900. In 1900, about 95 percent of the land area of the 22 counties was still in grass.

1900-1910

After 1900, the pattern of farming in the Southern Plains began to change again, to emerge in 1910 as an agriculture similar to that which we know in the area today.

The year 1894 was one of the driest in the Southern Plains. After 1896, however, annual rainfall increased so markedly that the heaviest rainfall recorded for any ten consecutive years is for the period 1896 to 1906. 13/ This was also a period of renewed interest in homesteading, and in 1909 Congress passed the Enlarged Homestead Act which permitted the free entry of 320 acres on condition of settlement and the fulfilment of other requirements. 14/

All this meant an increase in the volume of settlement, a renewed emphasis on crop farming, and another decrease in the average size of farm units. Large scale ranchers again were forced to give way to small scale crop farmers who displayed more enthusiasm than wisdom in plowing up the range.

By 1910, the census reports 11,422 farms in the 22 selected counties, almost three times as many as in 1900. But the average farm unit had decreased in size from 1,730 acres in 1900 to 520 acres in 1910, and the total acreage in farms decreased from 43.7 percent to 36.7 percent of the land area.

12/ W. P. Webb "The Great Plains " - p. 427
13/ "The Future of the Great Plains" - p. 27
14/ W. P. Webb "The Great Plains " - p. 423

Between 1900 and 1910 emphasis in farming was placed on crops, and the number of improved acres per farm in the 22 counties rose from 148.1 to 195.6. At the same time cattle per farm dropped from 172 to 28.

With the rise in the number of farms and the amount of cultivated land per farm, grass land decreased from 95 percent of the total land area in 1900 to about 85 percent in 1910. A percedent for plowing up the range had been established.

Judging by succeeding years, tenancy was not prevalent in the Southern Plains in 1910. The value of all property per farm was low primarily because land was still cheap.

In 1910, settlement in the Southern Plains was almost completed, except in Texas where the number of farms and ranches remained small. Crop farming was intrenched, and it needed only the next two decades to become a great and increasingly maladjusted giant.

4. Two Decades of False Security - 1910 to 1930

In 1910, farming operations in the Southern Plains entered a period of great expansion. From 1910 to 1930, improved farm equipment and techniques, and reasonably adequate rainfall encouraged larger farm units and the increase of cultivated land, especially that used for the production of wheat and other cereals. During these years, the total number of farms in 27 selected Southern Plains counties remained fairly constant, although local variations did occur.

The growth of cereal farming meant less protective cover for soil better left in grass. Grasslands, decreased in area, but between 1910 and 1920 the number of cattle feeding on them increased. Overgrazing made severe dust blowing a certainty whenever a drought should occur.

The growth of cereal farming also meant too much emphasis on a single crop - wheat. When wheat failed, as it was likely to in a severe drought, single crop farmers were in danger of financial ruin.

Thus the growth of wheat farming during the period paved the way for soil wastage and financial collapse. Only drought was lacking to activate these latent dangers, and drought in the Southern Plains is bound to come sometime. It came during the thirties in the midst of a world-wide economic depression.

It is well to note that Dallam, Hansford, Hartley, and Sherman Counties of Texas deviated somewhat from the general pattern between 1910 and 1925. From 1910 to 1920, when cropping expanded in the Southern Plains as a whole, it decreased in the Texas Panhandle. During the five years after 1920, however, crop farming increased in northern Texas when it decreased slightly in other areas of the Southern Plains.

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Information on the period 1910-1930 follows in detail:

1910-1920

Between 1910 and 1920, several factors aided large scale cereal farming. Winter wheat was improved in drought resistance and yield per acre. Power machinery and combines made it physically possible and, through decreased costs per acre, financially desirable to expand farming operations. The value of farm implements and machinery in the 27 selected counties rose from $4,624,650 in 1910 to $16,693,924 in 1920.

The World War brought a tremendous demand for wheat and other cereals. Average wheat prices in Kansas, Colorado, Oklahoma, Texas, and New Mexico jumped from 91¢ a bushel in 1915 to $2.06 a bushel in 1917, remaining above $2.00 until 1920.

The average annual rainfall in the heart of the Southern Plains is but little more than 16.5 inches. Rainfall for five selected Southern Plains stations averaged only 12.92 inches in 1917, but it increased to 18.86 inches in 1918 and reached 21.20 inches in 1919.

Stimulated by steadily improving techniques, high cereal prices, and generally adequate rainfall, many Plains farmers put more and more land into crops, particularly wheat. The increased availability of credit made this transition even easier.

From 1910 to 1920, the number of farms in the 27 counties rose only from 21,939 to 22,820, but the average size of these farms increased from 465.5 acres to 771.4 acres. In 1910, 10,757 farms contained between 100 and 174 acres, but by 1920 the number of these small units had decreased to 3,760. On the other hand, the number of farms over 1,000 acres in size increased from 1,114 in 1910 to 2,535 in 1920. Parallel with the increase in the size of operating units, land in farms rose from 10,015,226 acres to 17,603,400 acres or from 38.9 percent to 68.4 percent of the total land area.

Improved acres per farm in the 27 counties expanded from 156 in 1910 to 20.5 a decade later, and cattle increased from 23 to 39 per farm in the same period. These figures relfect a rapid increase in cropping operations and a but slightly less rapid expansion of the livestock enterprise.

The pace for cropping operations was set by cereals. In 1910, corn, oats, wheat, barley, rye, and sorghums were harvested on 970,344 acres, but in 1920 these crops were harvested on 2,285,296 acres. Harvested wheat land expanded from 465,653 acres to 1,188,934 acres during the same period.

Plowed land included only 13.3 percent of the total land area in 1910 but 18.1 percent in 1920. This change meant a corresponding decrease in the amount of grass cover. In 1920, the number of cattle on the range in the 27 counties was 894,859 as compared with 506,583 ten years earlier. As grass cover decreased, the number of cattle using it for forage increased. Land use conditions were not improving.

Between 1910 and 1920 in Dallam, Hansford, Hartley and Sherman Counties in the Texas Panhandle the number of improved acres actually dropped from 365,582 to 196,842 or from 535 to 270 per farm.

High prices and adequate rainfall made cereal farming generally profitable in the Southern Plains from 1910 to 1920. Stimulated by inflated land prices, and larger farm units, the average value of all property per farm in the 27 counties rose from $7,915 to $18,827. The average mortgage debt grew with borrowing to finance larger holdings.

In spite of good incomes and available credit, some operators found it difficult to maintain or acquire ownership of the larger and more expensive farm units. Hence the rate of farm tenancy more than doubled between 1910 and 1920. Tenants are not often interested in conserving land which they do not own, and the increase in their number did not help an already difficult land use situation.

1920-1930

The growth of large scale farming in the Southern Great Plains almost stopped between 1920 and 1925. -- a combination of reduced agricultural prices and an overexpanded plant. The price of wheat in Kansas, Colorado, Oklahoma, Texas and New Mexico dropped from $2.04 a bushel in 1919 to 98¢ in 1921.

The number of farms operated in 27 selected counties decreased during the period from 22,820 to 21,887, 14a/ but operating units increased slightly in average size. Although cereal land harvested expanded by about 800,000 acres, the total acreage in crops did not vary much nor did the percent of the total land area in cultivation. The Texas Panhandle was the only area to increase crop acreage between 1920 and 1925.

The drop in prices between 1920 and 1925 contributed to a $4,000 decline in the average value of all property per farm in the 27 counties. Reduced income caused some operators to move out of the area and others to plunge more deeply into debt. Selected owners reported mortgages increasing from 22.4 percent to 37.8 percent of the value of their land and buildings.

By 1925, the period of stagnation in the Southern Plains had ended and expansion of large scale crop farming began again. As prices became fairly stable at a high level and as rainfall remained satisfactory, farmers regained their confidence. From 1925 to 1930, wheat prices in the Southern Plains States averaged over $1.00 a bushel. Annual rainfall reported by five weather stations was 17 inches or better from 1927 through 1930, and in two of these years exceeded 20 inches.

14a/ Part of this decrease is probably due to the failure of the 1925 census to make an accurate count of farms containing more than 175 acres - Journal of American Statistical Assn. Sept. 1937 pp. 446-447.

In this period, however, the chief impetus to expansion came from farm machinery. The value of implements and machinery reported in the 27 selected counties increased from $16,119,026 in 1925 to $36,006,178 in 1930. In 25 counties 15/ in southwestern Kansas 1,333 tractors were on farms in 1920, 3,501 tractors in 1925, and 9,727 tractors in 1930. Combines increased from 1,085 in 1925 to 6,083 in 1930.

During the years 1925 to 1930, the average size of farm units in the 27 Southern Plains counties rose from 780 acres to 812 acres, and the number of farms increased slightly. The acreage in farms grew from 69 percent of the total land area to 73.4 percent.

Crop acres per farm averaged 210 in the 27 counties in 1925. Only five years later this average had reached 292 acres. Although cattle per farm increased from 32 to 34 during the same short period, the livestock enterprise lost in relative importance.

Over the United States as a whole wheat acres harvested increased 22 percent from 1924 to 1929, and the increase was concentrated in what is now the Dust Bowl. By 1930, 64 percent of all Southern Plains farmers depended on cash grains for a living. As harvested wheat land in the 27 selected counties went up from 1,785,316 acres in 1925 to 3,276,307 acres in 1930, crop land became not only a large part of all farm acreage, but a larger part of the total land area than ever before. In 1930, plowed land was 26.4 percent of all land, an increase of 8 percent over 1920 and 1925.

More cultivated land meant less grass cover. In 1920, 25 counties in southwestern Kansas contained 5,344,000 acres of grass pasture, 16/ By 1930, only 4,356,000 of these acres remained in grass or 854,000 acres below the number adapted to grass. 17/

As the amount of pasture declined in the Southern Plains the number of cattle in the 27 selected counties increased from 698,322 in 1925 to 758,509 in 1930. Cattle were, however, fewer in number in 1930 than in 1920 although more numerous in 1930 than in 1910. Not only was a considerable amount of grass land plowed up between 1925 and 1930, but much of that which remained was overgrazed.

Land use conditions were not improved by the rise in the number of tenants from 25.6 percent of all operators in 1920 to 38.5 percent in 1930. Tenancy was again encouraged by more expensive farm property. Between 1925 and 1930, the average value of land and buildings per farm in the 27 counties increased from $12,352 to $16,311.

15/ In unpublished report by H. L. Stewart, (BAE) "Changes on Wheat Farms in Southwestern Kansas with Special Reference to the Influence of AAA Programs." "Original data from "Biennial Reports of State Board of Agriculture Kansas." The 25 counties are Barber, Clark, Comanche, Finney, Ford, Gove, Grant, Gray, Greeley, Hamilton, Haskell, Hodgeman, Kearny, Lane, Logan, Meade, Morton, Ness, Scott, Seward, Stanton, Stevens, Trego, Wallace, Wichita.

16/ Ibid

17/ Unpublished data "Regional Agricultural Adjustment Project", prepared by J. A. Hodges and C. R. Jaccard. Now filed at Kansas State College.

The period from 1910 to 1930 was one of false security. During those years, agriculture in the Southern Plains came to depend more and more upon cereal farming. But the success of cereals depended in turn upon steady and adequate rainfall in a region noted for its unpredictable but ever recurring drought. Cereal farming also needed prices as high as those of the 1920's.

5. The Depression Years

After 1930, false security became actual insecurity in the Southern Great Plains. The economic depression brought low prices, and in 1932 a long period of intense drought began. Low prices and drought brought to a climax all the evils latent in years of land and water misuse 18/, and over-expanded cereal farming.

In 1931 high yields drove low prices lower. Beginning in 1932, average yields per harvested acre declined but prices remained low. The Plains farmer with his predominance of cereal crops could not win in this period. To aid him the Federal Government later poured large amounts of relief and subsidy money into the area.

There was a time when the farmer, lacking income, would have abandoned his land, but during the thirties he had nowhere else to go. In the early thirties he continued to plow up more grass and plant more cereals in the vain hope of increasing his income. The census of 1935 showed that a larger acreage had been stripped of its protective grass cover than ever before. During a drought in the Great Plains this meant just one thing -- duststorms, a spectacular culmination to a long period of land misuse.

Drought, depression and too many acres planted to cereals caused incomes to shrink. Between shrunken incomes and poor land use, the net worth of farms and the value of assets declined. Although mortage debt did not increase, it became more serious. Tax rates and delinquency rose as local governments had an ever harder time to meet expenses. Tenancy and absentee ownership became more prevalent

* * * *

Detailed information on the depression years follows:

The economic depression, beginning in the latter part of 1929, spared no agricultural section. The total cash income from marketings in the United States as a whole was $10,479,000,000 in 1929, but it declined to a low of $4,328,000,000 in 1932. Wheat prices at Chicago averaged 46¢ a bushel lower in 1930 than in 1929, and Chicago corn prices dropped from 83¢ a bushel in 1929 to 36¢ in 1931. In the five Southern Plains States -- Kansas, Colorado, Oklahoma, Texas, and New Mexico -- wheat prices dropped from 99¢ a bushel in 1929 to 34¢ in 1931.

18/ Although appropriate statistics are not available, there is ample evidence that ground and stream water supplies had also been misused and wasted during the previous period.

Precipitation for five Southern Plains stations averaged below 12 inches a year from 1933 through 1937. In 1934, it was 10.04 inches and in 1936, only 9.58 inches. Because of the drought, yields in the Southern Plains States were cut in half after 1931. In 1928-1932 Kansas, Colorado, Oklahoma, Texas and New Mexico produced an average of 300,000,000 bushels of wheat a year. Between 1932 and 1936 average annual production in the same area dropped to 150,000,000 bushels. 19a/

Plains farmers could neither maintain a good production nor could they obtain a good price for what they did produce. In Baca County, Colorado, the value of crops produced declined from $3,202,971 in 1930 to $469,092 in 1935. 19/

Farmers in the Southern Plains did not move out of the area after 1930. In fact, between 1930 and 1935 their number increased in the 27 selected counties from 22,369 to 23,916. They had nowhere else to go and the Government helped them where they were.

The average size of all farm units remained about the same, but 3,423 farms in 1935 contained only 100 to 174 acres compared with 2,848 farms of this size in 1930. Between 1930 and 1935, the total acreage in farms in the 27 counties expanded from 73.4 percent to 78.4 percent of the total land area. According to county assessors' rolls in 25 counties 20/ in southwestern Kansas, farms were larger and more numerous in 1938 than in 1930 although somewhat smaller and less numerous in 1938 than in 1934.

Farmers not only remained in the Southern Plains but they put more of it into crops. Between 1930 and 1935, crop acres in the 27 counties rose from 292.2 to 344.3 per farm and from 26.4 percent to 33.2 percent 21/ of the total land area. Primarily because of the drought, cereals were harvested only on 2,070,260 acres in 1935 compared with 4,575,495 acres five years earlier. By 1935 cereals had failed to furnish adequate cover to more than 2 million acres of crop land in the 27 counties.

The number of cattle in the same area declined from 758,509 in 1930 to 637,042 in 1935. This decline was caused primarily by the lack of stock water and forage and indicated the depleted condition of the range. In 1935 a survey of the western range had this to say of part of the Southern Plains. "Forage in southeastern Colorado has lost 88 percent of its former value. The forage of about 13 percent of the entire short grass area has been extremely depleted, more than three-fourths materially or severely depleted, and only about 8 percent can be classed as being in reasonably good condition." 22/

19a/ R. I. Kimmel - N.Y. Times. Aug. 14, 1938.
19/ Unpublished data - Bureau of Agricultural Economics.
20/ H. L. Stewart op. cit. footnote 15
21/ This percentage based on 27 counties checks closely with estimates of relative amounts of cultivated land over the whole Southern Great Plains. According to R. I. Kimmel, the Southern Plains region contains about 97,000,000 acres of which 32,000,000 are cultivated -- R. I. Kimmel "A Long View of the Wind Erosion Problem." p.6. Also Kimmel "Planning for the Southern Great Plains." November, 1939 "Soil Conservation." p. 120
22/ From "The Western Range" - Senate Document 199, GPO, 1936. pp. 88-90. Quoted in "The Future of the Great Plains" p.50.

In 1934, overcultivation and overgrazing in the Southern Plains began to bear bitter fruit. The drought and strong spring winds caused such intense dust blowing that the area came to be called the Dust Bowl. The worst storms occurred in 1934 and 1935 over a region containing 50,000,000 acres. By 1937, 80 percent of the whole Southern Plains had felt the force of wind erosion, and 40 percent had sustained heavy damage. 23/

Inadequate incomes, soil depletion, and damage to property by the duststorms greatly impaired the financial condition of the farmers. In 27 counties, the average value of land and buildings declined from $16,311 in 1930 to $10,354 in 1935.

According to a farm management survey, the average net worth of 63 farmers in six southwestern Kansas counties 24/ declined 43 percent between 1931 and 1937. This decline was greater on small than on large farms. (See Fig. 3). This same survey reports a 34 percent decline in the average value of assets on the 63 farms. The assets of only six farmers increased, and they operated large farms and received high A.A.A. payments.

There is some indication that mortgage debt declined in the Dust Bowl during the ten year period 1929 to 1938, probably due to the increase in foreclosures. In Dallam County, Texas, for example, 25/, debt per acre in 1929 was $10.69, but by 1938 it had been reduced to $7.95 per acre. Although the mortgage debt was down 25 percent, productive value of the land had dropped 90 percent.

As farm values declined, it became more difficult for local governments to collect enough revenue. Higher tax rates were established to offset decline in property values and increase in delinquent tax payments. All this added to the financial difficulties of farming in the Southern Plains. In Baca County, 26/ land in 1920 was valued at $10,030,346 and the tax rate was 6.75 mills. In 1936, the valuation had dropped to $8,333,675 but the tax rate increased to 9.5 mills. After 1931, about 30 percent of the taxes levied each year in Baca County were delinquent.

Tenancy and nonresident ownership became real problems in the Dust Bowl during the thirties. Census data for 22 counties indicate that the number of tenants increased from 38.5 percent of all operators in 1930 to 42.4 percent of all operators in 1935. By 1935, non-residents owned nearly one-half of the privately owned land and three-fifths of the corporate owned land in Dallam County, Texas. 27/

Tragedy in the Southern Plains during the depression years, was based only in part on depressed prices. W. P. Webb says of the Plains, "The fact that stands out above all others is that there is still not enough water for the complete adaptation of the land to agriculture." 28/

23/ G. K. Rule "Crops Against the Wind on the Southern Great Plains" Farmers' Bulletin 1833, GPO. p.7.

24/ Unpublished report by H. L. Stewart (BAE) "Changes on Wheat Farms in Southwestern Kansas with Special Reference to the Influence of AAA Programs" Counties referred to are Clark, Finney, Ford, Grant, Gray, Meade.

25/ "Physical Basis for Tax and Mortgage Delinquency Dallam County, Texas" Mimeographed (BAE)

26/ Unpublished data - Bureau of Agricultural Economics.

27/ R.S. Kifer and H.L. Stewart "Farming Hazards in the Drought Area" p.100.

28/ W.P. Webb "The Great Plains" p. 374

Comparative Financial Situation of 63 Farmers in 6 Counties 1/ of S.W. Kansas 1931-1937.

Number of crop acres operated	Number farms	Average total assets 1931	Average total assets 1937	Average total debt 1931	Average total debt 1937	Average net worth 1931	Average net worth 1937
Under 300	5	18, 196	7,042	3,247	3,221	14,949	3,821
300 - 499	15	18,490	12,523	4,553	5,286	13,937	7,237
500 - 699	14	21,387	10,519	2,659	3,912	18,728	6,607
700 - 899	8	33,041	17,518	11,156	5,958	21,885	11,560
900 and over	21	34,904	27,981	8,929	8,294	25,975	19,687
All sizes	63	26,430	17,430	6,326	5,905	20,104	11,525

1/ Clark, Finney, Ford, Grant, Gray, Meade.
From unpublished report by H. L. Stewart (BAE) "Changes on Wheat Farms in Southwestern Kansas with Special Reference to the Influence of AAA Programs" Table 25.

Figure 3.

83-41-18

III. SOLUTIONS AND PROGRESS

1. The Problem and Suggested Solutions.

Complicated problems of the Southern Plains make treatment complex. For two decades before 1930, misuse of the land prepared for disaster, and the depression and drought after 1931 brought this disaster into being. By 1933 many Southern Plains farmers were faced with eroding lands, increasing debt, no income, and no financial reserve. Most ominous of these difficulties was damage to the land. It is bad to know that a farmer had no crop in 1933 but worse to know that his exhausted fields might never support a crop again.

A solution to these problems had to be found, and the Federal Government was asked to aid. But what sort of aid should be lent? The immediate answer in 1933 was simple. The Government had to provide the funds and food which many families needed to escape starvation.

Dust clouds rolling eastward from the Southern Plains in 1934 indicated that this simple answer was not a permanent solution. Although Southern Plainsmen needed food, they wanted to earn it themselves; they did not like to be continually dependent upon public support. It became evident that fundamental readjustments were needed in farming and farming conditions, and the Congress authorized the U. S. Department of Agriculture to help farmers, build a stable, a profitable and an independent agriculture in the Great Plains.

Basic elements in the Southern Plains disaster of the thirties were drought, depression and a type of farming ill-adapted to the natural conditions of the area. But although water can be conserved, nothing can be done to break a prolonged drought. Neither was it certain that economic depressions could be prevented. It seemed probable, however, that a type of agriculture better suited to the Plains climate might be developed.

What would constitute a stable type of farming in the Southern Plains? That was the question. Valuable suggestions were not lacking but most of them affected only a part of the problem or some localized area. As Glenn K. Rule has written:

> "Many well intentioned people have prescribed panaceas for the ills of the Plains. Some said that soil drifting could be controlled by tilling the soil in such a way as to provide clod and furrow barriers against the wind. Others said it was a mistake to plow any sod in the first place and that all the land should be purchased by the Government and retired from use. Not a few said the cultivated acres should be retired to grass. Some pinned all their faith on terraces to conserve rainfall. There were those who said 'all we need is rain' and there were others who urged the construction of huge dams in the few rivers that cross the Plains. Still others would solve the entire problem by increasing the land acreage under the operation of one man and his family.

"These ideas have merit. Each embodies, however, only a partial solution of a problem that is extremely complex. And the attempt to employ any of these single measures as a cure-all is no more feasible than the attempt to treat several human ailments with one drug." 1/

Finally, it began to appear that a proper combination of the so-called panaceas might be benefical. Southern Plains farmers had placed too much emphasis on wheat and in so doing had stripped from the land a great deal of needed grass cover. A grass livestock enterprise would encourage more pasture grass and discourage cropping except to grow supplement feed for the cattle. True, a livestock economy had failed in the Southern Plains in the 80's. This early failure was, however, largely due to an overgrazed range, and a repetition of such a disaster might be prevented if farm units were enlarged and the grazing carefully controlled.

It was recognized that grass livestock farming is not the only valuable instrument of soil conservation. It may be aided and in particular places rendered unnecessary by proper methods of water conservation, correct tillage practices and the growing of drought resisting and soil retaining crops.

Thus, through study and experience, farmers, the State Extension Services, and the U. S. Department of Agriculture came to stress a grass livestock and supplemental feed economy with larger units and proper water use and other conservation methods and practices which would be helpful by themselves or in combination with other remedies.

2. Progress Toward these Solutions. 2/

A. 1933-1937

(a) Money for the Dust Bowl -- Production Adjustment

Early in 1933, Congress voted authority and funds to help the farm families of the nation improve and stabilize their incomes. In the operation of these programs the families of the Southern Plains were not neglected.

Prominent among the new programs of 1933 were those for crop production adjustment under the Agricultural Adjustment Act of 1933. This program was designed to adjust the production of certain basic commodities in order to raise prices and buying power. Farmers earned payments by controlling their output of cotton, tobacco, wheat, corn, hogs, sugar beets and sugar cane in accordance with national plans of adjustment. In the Southern Plains, most A.A.A. payments were made for adjusting wheat acreages.

1/ G. K. Rule "Land Facts on the Southern Plains" Misc. Pub. 334, GPO, 1939, pp. 4 & 5.

2/ Although the present discussion is largely confined to activities of the U.S. Department of Agriculture, it should not be assumed that other Federal departments, State agencies, and the farmers themselves are not doing a great deal to rehabilitate the Southern Plains.

How did this first A.A.A. program affect the financial resources of participating farmers in the Dust Bowl? Did it encourage or discourage a shift from cereals to grass livestock? An attempt to answer these questions has been made on the basis of two farm management surveys, one conducted in 1931 and the other in 1937 on identical farms in six counties of southwestern Kansas. 3/

According to this analysis, production control payments improved the financial conditions of the farmers, thus making it possible for them to remain on their land and off relief rolls. A shift from cereals to grass livestock seems, however, to have been discouraged rather than encouraged. The A.A.A. program of 1933-36 paid farmers for reducing the acreage planted to certain basic crops, but the amount of the reduction was calculated from historical crop acre bases. Large bases were created by the acreage expansion of the 1920's and early 30's already noted. During the droughts of the thirties farmers were forced to sell their cattle. Thus, the early A.A.A. program tended to maintain large basic crop acreages and the drought forced farmers to reduce their livestock enterprises.

By 1937 large sums of relief money and A.A.A. benefit payments had gone into the Dust Bowl. Between 1933 and 1937, amounts per capita approached $1,000 in two southwestern Kansas counties and exceeded $500 in about 12 other counties in the heart of the Southern Plains. 4/ Farmers had not starved, but progress toward the permanent rehabilitation of the area had been slow. By 1937, after two very severe droughts, the proportion of grass cover had not increased, and livestock were even fewer in number than in 1933.

(b) Conservation Gains Prominence

Despite the lack of progress toward a grass livestock economy from 1933 to 1937, advances had been made in the adoption of other soil conserving methods. The first erosion demonstrations under the supervision of the Soil Conservation Service (then the Soil Erosion Service) were started in the Southern Plains in the fall of 1934 near Dalhart, Texas, and Colorado Springs, Colorado, and this program was extended under the Soil Conservation Act of 1935. By the end of 1935, work was under way on some twenty-five demonstration areas in the region. These demonstration areas were set up to point the way toward a coordinated program of soil and water conservation.

In January 1936, the Supreme Court invalidated the processing tax and production control provisions of the first Agricultural Adjustment Act. Later that year, under the Soil Conservation and Domestic Allotment Act, the Triple-A was reoriented to point primarily toward the encouragement of conservation practices.

3/ Unpublished report by H. L. Stewart (BAE) "Changes in Wheat Farms in Southwestern Kansas with Special Reference to the Influence of AAA Programs". The six counties are Clark, Finney, Ford, Grant, Gray, Meade.

4/ Unpublished data - Bureau of Agricultural Economics.

B. Present Efforts to Rehabilitate Southern Plains Agriculture

In 1937, the outlook for someday achieving a permanently improved agriculture in the Southern Great Plains was favorable. Experience, surveys and the study of the President's Great Plains Committee 5/ had given a better understanding of the existing maladjustments and how to correct them. Some valuable programs of public aid in land conservation were already in effect, although no one of these was more than a few years old.

It was evident by 1937 that about one-fifth of the cultivated land in the Dust Bowl region should be returned to grass. The partial return to a grass-livestock economy and the general application of soil and water conserving measures became definite objectives to be achieved, by the starting of new activities, by a reorientation of some of the older agricultural programs, and by increased cooperation between farmers and public agricultural agencies.

(a) Human Conservation

The principal object of all agricultural programs is human conservation and welfare. There would be no advantage in saving soil or water, or increasing farm incomes, or rehabilitating needy rural families if all these activities did not redound to the benefit of both present and future generations of farmers. Human life is our measure of the worth of all things. As Secretary Wallace has said:

> "Damage to the land is important only because it damages human lives. The whole purpose of conservation goes back to that fact. Soil saving is not an end in itself. It is only a means to the end of better living." 6/

Rural Rehabilitation

The rural rehabilitation program of the Farm Security Administration, financed by emergency relief legislation, is an important bulwark in the fight against rural poverty. This program provides credit and supervised farm management services to needy farm families, helping these families to obtain the best living possible from their land. In other words, it helps rural families to help themselves. County committees of farmers take an active part in guiding the program locally.

5/ "The Future of the Great Plains" - GPO, 1936.

6/ H. A. Wallace -- "The War at Our Feet" -- "Survey Graphic," Feb. 1940.

F.S.A. supervisors on each farm selected by the farmer committees for a rehabilitation loan help the borrowing families make plans for improving farming methods and living conditions, and to increase self-sufficiency. In the Southern Plains region of the F.S.A.7/ such plans had been put into effect on 41,738 farms by 1939 and by December 31, 1939, loans totaling $14,525,864 had been made.

In the wind erosion area, the F.S.A. has made loans to farmers -- who otherwise could not obtain the necessary money -- to do erosion control work. The security for the F.S.A. loans has been assignment of A.A.A. payments that will be earned by borrowers. The F.S.A. makes no loans to farmers who do not agree to diversify their farming.

Tenant purchase

Tenancy often causes not only a depressed standard of rural living but abuse of the soil as well. In the interest of farm security and soil conservation, the Farm Tenant Act of 1937 authorized a nation-wide project to promote ownership among farm tenants. The project is being administered by the F.S.A. and in the last three years has been extended to about one-fifth of the counties in the Southern Plains region.

(b) A Grass Livestock Economy Through Unit Reorganization.

The Unit Reorganization program

A grass livestock and supplemental feed economy is feasible only if farms are relatively large. To help farmers to develop units of the desired size, the Farm Security Administration is authorized to make loans to be repaid over a ten-year period. A conservation program for each reorganized farm unit is worked out by the farmer with the help of the Soil Conservation Service technicians. Payments earned by participating in A.A.A. programs make it possible for the farmer to establish grass forage on a large part of his land. The F.S.A. lends him additional money to purchase a foundation herd of livestock and helps him with his farm and home budgeting.

Unit reorganization is proceeding in a small way, but it is gaining rapidly in popularity. During the first year and a half of operations under the unit reorganization plan, 133 Southern Plains farms were enlarged from an average of 600 acres to an average of 2,500 acres. The average loan was $1,740. 8/ The F.S.A. reports that there are now 225 reorganized units in thirty counties in the Southern Great Plains.

7/ The Southern Plains region of the FSA does not cover exactly the same area as the Southern Plains region of the SCS. Both regions do, however, cover the section most affected by wind erosion.

8/ R. I. Kimmel - "Planning for the Southern Great Plains." November, 1939, "Soil Conservation" - p. 121.

Certain other programs and activities in a less direct way help farmers to carry out the objectives of unit reorganization. The F.S.A., for instance, lends money to farmers for the purpose of leasing and restoring to grass abandoned crop land damaged by wind erosion. The Federal Government purchases submarginal lands in the Southern Plains with the principal purpose of restoring them to grass and leasing the lands to farmers who need more grazing land.

The purchase and development of submarginal lands

Some cultivated areas in the Plains are definitely not suited to crop farming of any kind. Most of these lands are, however, suited to grass, but continued cropping and soil exploitation tends to destroy even this potentiality. To get these lands back into grass and trees as soon as possible is the purpose of the submarginal land purchase program in the Southern Plains, conducted there as elsewhere under authority of Title III of the Bankhead-Jones Act of 1935. This program, administered by the Soil Conservation Service, involves the formation of project areas which consist partly of Title III purchase land and partly of land owned by cooperating farmers.

The purchase of submarginal land has achieved promising results in the Great Plains. In the Southern Plains, project areas cover large sections of Morton County, Kansas; Baca County, Colorado; Cimarron County, Oklahoma; Dallam County, Texas; and Union County, New Mexico. The objective in these projects is to establish an adequate grass cover and then lease the land to local farmers who need more grassland in order to develop stock ranching. The work is conducted as a co-operative venture among farmers and Federal, State and local agencies.

(c) Other Aids in Conserving Land

Agricultural Conservation and Range Conservation Programs

In 1936 the Soil Conservation and Domestic Allotment Act made the soil conservation program the prime objective of the Agricultural Adjustment Administration. The objective was more firmly established by the Agricultural Adjustment Act of 1938. Most farmers in all rural areas take part in conservation programs for which they may earn A.A.A. payments.

Dust Bowl farmers may earn payments by following practices effective in preventing wind erosion. The following figures show the extent of some of these practices carried out in the Dust Bowl section of Kansas in 1938. On 562,039 acres, farmers left on the ground, stalks of sorghum and sudan grass; they contour furrowed 15,100 acres of non-crop land; about 1,436,000 acres of summer fallowed land were handled in ways to protect the land; natural vegetative cover or small grain stubble was left on 788,134 acres of crop land; and cover crops were planted on 133,564 acres.

Beginning in 1938 farmers in Sherman County, Texas and Greeley County, Kansas began, through their farmer AAA committeemen a modification of the AAA regulations to place even more emphasis on conservation practices.

Seeing the results in these counties, farmers in 10 southwestern Kansas counties and 7 Texas Panhandle counties this spring, voted to modify the general A.A.A. program along similar lines. The modified program calls for participating farmers to earn all of their payments by carrying out soil-conserving practices. Farmers in these counties have the same acreage allotments for wheat and other soil depleting crops as before. The total amount of money they can earn also remains the same, but no payment will be made solely for meeting acreage allotments. Every dollar of payment will go for carrying out a soil conserving practice approved for that area and for the particular farm concerned.

Under the restoration land provisions in the A.A.A. program, farmers receive payments for taking land out of cultivation and restoring it to grass. In 1938, in 23 counties of southwestern Kansas, more than 10 percent of the crop land reported in the 1935 census was established as a restoration land goal.

The range program of the A.A.A. offers farmers payments that will help them restore the range and safeguard livestock production in the western States by encouraging deferred grazing, artificial reseeding, and the building of improved stock water facilities. Under this program, in Kansas, Colorado, Oklahoma, Texas, and New Mexico, in 1938 deferred grazing gave old grass a chance on some 11,937,000 acres of range land, and 688,000 pounds of grass seed were used in an attempt to establish new forage.

A.A.A. conservation programs of 1938 affected most of the crop land and some of the range land of the Southern Plains. About 895,600 farmers in Kansas, Colorado, Oklahoma, Texas, and New Mexico took part in these programs, and the largest percentage participation was in areas affected by wind erosion. Participants in these five States received gross 1938 A.A.A. payments of $104,230,000.

Demonstration areas

The nation-wide program of erosion control demonstration projects, as administered by the Soil Conservation Service, provides a proving ground where farmers may observe land and water conservation practices and judge their effectiveness. Demonstrations may be conducted either on special project areas or on land immediately surrounding C.C.C. camps assigned to conservation work.

Twenty-six demonstration areas (projects and camps) in the Southern Plains cover 956,000 acres or about 1 percent of the total

land area of the wind erosion region.9/ Farmers in these areas are helped to carry out conservation plans outlined in cooperative agreements with the S.C.S. Soil and water conservation techniques recommended in plans for Dust Bowl farmers are terracing, strip cropping, the planting of erosion resisting crops and the seeding of grass. C.C.C. labor aids in applying these techniques both on camp areas and on demonstration projects located near camps.

Soil Conservation districts

Soil Conservation districts are local governmental subdivisions organized under State law, through which farmers may cooperatively exercise their own initiative in the conservation of soil resources, particularly in the control and prevention of soil erosion. The State districts legislation authorizes the formation of a State soil conservation committee. The State committee investigates petitions of farmers who wish to form districts, conducts public hearings and authorizes referenda. Before any district is formed it must receive a favorable vote in a referendum of operators and owners of land in the proposed district. When a district has been approved, a charter is issued and farmer supervisors are chosen.

Through the supervisors, district residents are able to enlist any necessary aid from Government agencies -- local, State, and Federal -- and other organizations. Federal Government aid may take the form of technical services, C.C.C. camp labor, special equipment, plant materials and loans. Subject to a memorandum of understanding entered into between the U.S. Department of Agriculture and a district, technicians of the Soil Conservation Service may be assigned to assist the district and may thus be available to work with representatives of any other cooperating agency.

In the Southern Plains, the districts are rapidly becoming focal points for public agricultural programs. Thirteen districts are now formed in 119 wind erosion counties in the heart of the Southern Plains, most of the districts being located in eastern New Mexico, and southeastern Colorado. All five Southern Plains States -- Kansas, Colorado, Oklahoma, Texas and New Mexico -- now have on their statute books laws enabling the formation of districts by farm owners and operators.

Surveys and research

Certain miscellaneous government activities have a distinct effect on land conservation in the Dust Bowl. As a guide to operations the S.C.S. conducts surveys. One of the most notable located the land use problem areas throughout the Southern Plains. 10/ The S.C.S. maintains its own nurseries for the production and collection of grass

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9/ "Wind erosion region" refers to the old Southern Plains region of the S.C.S. -- in existence to June 1939.

10/ See H.H. Finnell - "Problem Area Groups of Land in the Southern Great Plains" GPO, 1939.

seed and other needed planting materials. Various State and Federal agencies working in close cooperation with one another are investigating the technical problems involved in restoring grass cover on depleted and eroded soils.

(d) Water Conservation

Water facilities

On July 1, 1938 the water facilities program authorized by the Pope-Jones Act began operations. This program is designed to help farmers develop small water projects in the seventeen western States. Facilities such as water spreaders, small dams, stock ponds and wells cannot of course make up for inadequate rainfall in arid and semiarid regions, but they can increase the wise use of the water which is available. In any given area, farmers often need to use fully all of the water available if they are to employ the land according to its best capabilities.

Loans to finance the building of facilities are supervised by F.S.A. personnel, and a plan is drawn up for each participating farmer. The S.C.S. has charge of the actual construction phases of the work. From July 1, 1938 to February 29, 1940, 251 facilities costing $146,753 and benefiting 294 families were approved in the Southern Plains region.

Water and tillage

An extremely important element in water conservation in the Southern Plains is the use of proper tillage practices. Roughening the surface soil both to stop dust and to provide water pockets is one of the first steps in this direction. A second step is to cultivate on the contour so that each ridge thrown up by the cultivating machinery will hold water on the land. These two practices are recommended for all Plains soils, but on hard soils an additional step -- terracing -- is desirable. Terraces hold water for a long time and are effective the year around. Additional water saving practices are strip cropping, border planting, and the use of cover crops. 11/ Encouraged by both the S.C.S. and A.A.A. Southern Plains farmers have made progress in the adoption of these practices.

(e) Planning

Planning for Permanent Farming

In the last few years as has been reported, several land conservation programs -- Federal, State and local programs to help farmers save soil and water and improve incomes -- have been inaugurated in the Plains and elsewhere. To avoid waste and duplication of effort, it is necessary to plan carefully. Planning is done locally by county agricultural land use planning committees. These committees bring farmers and representatives of various State and Federal organizations together to draw up land use plans for the county. These general plans are helpful to the agencies in charge of the programs locally,

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10/ See H. H. Finnell- "Problem Area Groups of Land in the Southern Great Plains" - GPO, 1939.

11/ See Glenn Rule "Crops Against the Wind on the Southern Great Plains" Farmers' Bulletin 1833, 1933, pp. 20, 21, 31.

and they are essential to the Bureau of Agricultural Economics which is chiefly responsible for the over-all planning of the programs of the U. S. Department of Agriculture. County agricultural planning operates in some measure in every county of the Southern Plains.

3. Evaluation

A subcommittee of the Southern Plains Regional Council, comprising representatives of the State Colleges of Agriculture, State Experiment Stations, and Federal agencies, submitted a report to the Council on April 17, 1940. It said: ". . . conditions are materially improved, farmers are optimistic, and present facilities for wind erosion control are adequate in practically all of the region if properly utilized." 12/

The general improvement has been due, said the committee, to (1) a favorable winter with considerable snow and relatively little wind, (2) favorable soil conditions for spring tillage to prevent soil blowing, and (3) the fact that spring tillage has been practiced.

The blow acreage decreased after January from 5,397,984 acres to 3,739,000 acres in 102 counties in the Southern Plains area. In 1934 and 1935 some 50 million acres were subject to blowing. Thus, in terms of controlling wind erosion, real advances have been made throughout the Southern Plains area.

Nevertheless, progress toward certain fundamental readjustments in Southern Plains agriculture has been slow. Attempts are underway to increase farm size and adequate cover by leasing lands unsuited to wheat and restoring grass, and by public purchase of lands for lease to farmers who need more grass. But in this phase of adjustment little more than a start has been made toward the goal of attaining for the whole Southern Plains an agriculture adapted to the climate and the soil.

12/ "Report of the Twenty-fourth Conference of the Regional Agricultural Council for the Southern Great Plains States," Albuquerque, New Mexico April 17, 18 and 19, 1940.

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Report of the Twenty-fourth Conference of the Regional Agricultural Council for the Southern Great Plains. April 17, 18, 19, 1940. Mimeographed.

Appendix

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Price wheat per bushel - cents
Dec. 1 price to 1932; average price thereafter[1/]

Average price for Kansas, Colorado, Oklahoma, Texas and New Mexico 1909-14 inclusive and 1921-29 inclusive is $1.03 per bushel.

	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923
Kans.	96	71	91	74	79	95	89	164	198	199	215	130	93	98	91
Colo.	93	82	84	73	78	87	80	150	215	210	200	140	105	89	83
Okla.	101	87	92	75	82	92	89	167	194	210	205	135	86	98	93
Texas	111	98	100	93	94	99	107	173	210	215	200	172	100	110	103
N. M.	117	100	100	90	97	90	90	150	215	210	200	140	105	120	108
Averg.	104	88	93	81	86	93	91	161	206	209	204	143	98	103	96

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Kans.	128	148	119	117	94	100	56	33	31	71	84	89	100	101	53
Colo.	118	136	107	104	85	93	53	33	34	65	84	90	100	91	50
Okla.	124	147	118	120	100	99	59	33	30	68	81	86	100	96	58
Texas	129	155	120	121	110	105	70	36	31	74	78	84	100	96	58
N. M.	125	150	110	119	107	96	61	35	35	73	91	91	97	103	60
Averg.	125	147	115	116	99	99	60	34	32	70	84	88	99	97	56

1/From agricultural statistics.

Exhibit I.

Wheat yields per harvested acre - bushels[1/]

	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923
Kans.	12.9	14.1	10.7	15.5	13.0	20.5	12.5	12.0	12.2	14.1	13.8	15.4	12.2	12.6	10.1
Colo.	21.1	22.3	18.9	24.2	21.0	23.8	23.8	19.8	22.6	12.3	13.7	18.0	13.5	13.4	13.0
Okla.	11.9	16.3	8.0	12.8	10.0	19.0	11.6	9.7	11.5	12.6	14.0	16.0	12.5	9.5	11.0
Texas	7.8	15.0	9.4	15.0	17.5	13.0	15.5	11.0	12.0	10.0	16.5	13.0	10.0	8.0	10.5
N. M.	15.6	20.0	22.9	20.9	18.8	24.2	22.2	18.6	12.7	16.7	19.0	18.3	13.6	8.4	12.0

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Kans.	16.3	9.0	14.8	11.2	17.0	12.0	13.5	18.9	11.4	8.4	9.1	9.1	11.4	12.0	10.4
Colo.	14.4	11.8	12.7	14.2	13.9	12.9	14.9	12.0	9.8	10.7	8.8	11.8	12.5	13.3	14.5
Okla.	16.0	8.2	17.5	9.0	13.5	10.5	9.5	17.0	11.0	10.2	10.4	10.0	8.0	14.2	11.0
Texas	18.5	8.0	18.2	9.7	11.0	15.0	11.0	18.9	10.0	7.1	9.0	7.0	7.7	10.6	9.0
N. M.	14.2	6.2	22.7	10.4	11.0	18.8	9.3	18.2	7.0	6.0	5.6	8.3	7.0	11.6	10.1

1/ From agricultural statistics.

Exhibits II

83-41-34

Percipitation measured by selected stations in the Dust Bowl[1/]
(Average annual rainfall based on period 1916-33 inclusive 16.87 inches)

	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
Kans. - Lakin in Kearny Co.	12.77	11.56	18.45	14.42	14.20	16.15	14.14	24.29	13.77	13.64	12.47	16.84
Colo. - Lamar in Prowers Co.	13.88	11.93	14.96	17.11	- -	17.89	10.80	23.58	13.75	16.67	12.60	20.21
Okla. - Goodwell in Texas Co.	11.66	16.56	20.13	- -	14.79	16.91	- -	24.12	12.12	15.93	17.29	16.34
Texas - Dalhart in Dallam Co	14.36	10.79	18.25	26.25	20.78	20.03	19.93	33.40	15.32	20.68	17.17	17.52
N. M. - Clayton in Union Co	11.13	13.78	22.53	27.01	10.45	21.73	10.75	21.05	10.81	16.45	19.01	14.65
Average	12.76	12.92	18.86	21.20	15.05	18.54	13.90	25.29	13.15	16.67	15.71	17.11

	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	Deviation from normal through November 1934	1935	1939
Kans. Lakin in Kearny Co.	24.55	18.79	24.50	17.56	15.34	17.06	9.67	12.52	11.48	10.09	13.98	-5.46	-2.90	-8.02
Colo. Lamar in Prowers Co.	20.11	- -	18.33	7.73	12.35	12.67	9.22	8.97	11.27	7.67	17.69	-	-	-4.97
Okla.- Goodwell in Texas Co.	23.57	18.39	18.53	16.40	14.71	12.62	14.27	11.69	9.69	11.56	14.86	-3.13	-5.68	-3.92
Texas - Dalhart in Dallam Co.	26.61	20.16	25.26	14.66	20.09	10.14	9.78	13.31	9.93	14.48	14.08	-8.75	-5.30	-5.12
N. M. --Clayton in Union Co.	24.26	13.26	18.12	11.45	10.98	7.15	7.24	9.53	5.54	12.03	15.48	-9.72	-7.62	-4.54
Average	23.82	17.64	20.95	13.56	14.69	11.93	10.04	11.20	9.58	11.17	15.22	-6.76	-5.37	-5.31

[1/] From climatological reports - U. S. Weather Bureau

Exhibit III.

Value of implements and machinery in dollars [1]
for 27 Southern Plains counties.

	1910	1920	1925	1930
Kansas (13 south-western counties)[2]	2,018,005	6,822,106	7,672,617	17,399,747
Colorado (Baca, Bent, Cheyenne, Kiowa, Prowers)	860,977	3,594,339	2,680,801	4,581,740
Oklahoma (Beaver, Cimarron, Texas)	1,120,481	3,815,146	3,591,176	8,999,047
Texas (Dallam, Hansford, Hartley, Sherman)	236,859	788,159	1,172,946	3,721,091
New Mexico (Colfax, Union)	388,328	1,674,174	1,001,486	1,304,553
Totals	4,624,650	16,693,924	16,119,026	36,006,178

[1] Summarized from census data.

[2] Clark, Finney, Ford, Grant, Gray, Greeley, Hamilton, Kearney, Meade, Morton, Seward, Stevens, Wichita.

Exhibit IV.

Number of farms[1] in
27 Southern Plains counties.
(22 counties 1890 & 1900)

	Number of farms						
	1890	1900	1910	1920	1925	1930	1935
Kansas[2] (13 counties)	4,931	2,932	7,308	7,111	7,668	8,293	8,757
Colorado (Baca, Bent, Cheyenne, Kiowa, Prowers)	750	1,084	3,431	5,725	5,117	5,218	5,464
Oklahoma (Beaver Cimarron, Texas)	---	---	7,901	5,551	5,416	4,954	5,190
Texas (Dallam, Hansford, Hartley, Sherman)	81	71	683	729	1,078	1,652	2,109
New Mexico (Colfax, Union)	---	---	2,616	3,704	2,608	2,252	2,396
Totals	5,762	4,087	21,939	22,820	21,887	22,369	23,916

[1] Summarized from census data.

[2] Clark, Finney, Ford, Grant, Gray, Greeley, Hamilton, Kearny, Meade, Morton, Seward, Stevens, Wichita.

Exhibit V.

Average farm size - acres[1/]
in 27 Southern Plains counties.

(22 counties 1890 & 1900)

	1890	1900	1910	1920	1925	1930	1935
Kansas[2/] (13 counties)	219.9	964.1	475.4	676.8	616.9	657.4	651.5
Colorado (Baca, Bent, Cheyenne, Kiowa, Prowers)	236.5	555.1	324.0	537.3	578.1	611.0	580.2
Oklahoma (Beaver, Cimarron, Texas)	----	----	238.9	558.6	621.8	659.0	693.1
Texas (Dallam, Hansford, Hartley, Sherman)	2644.8	51304.7	1979.2	2942.7	2383.5	1453.7	1366.5
New Mexico (Colfax, Union)	----	----	837.1	1206.3	1327.2	1719.7	1696.3
Average	256.1	1730.1	465.5	771.4	780.7	812.7	811.9

1/ Summarized from census data.

2/ Clark, Finney, Ford, Grant, Gray, Greeley, Hamilton, Kearny, Meade, Morton, Seward, Stevens, Wichita.

Exhibit VI.

Number of farms by size in 27 Southern Plains counties. 1/
(22 counties 1890 and 1900)

	1890		1900		1910			1920			1925			1930			1935		
	Number of farms		Number of farms		Number of farms			Number of farms			Number of farms			Number of farms			Number of farms		
	100-499A	Over 1000A	100-499A	Over 1000A	100-174A	260-499A	Over 1000A	100-174A	260-499A	Over 1000A	100-174A	260-499A	Over 1000A	100-174A	260-499A	Over 1000A	100-174A	260-499A	Over 1000A
Kans. (13 counties 2/)	4,657	40	1,574	485	2,934	1,966	563	1,062	2,781	914	1,037	2,899	848	968	2,744	1,121	1,146	2,779	1248
Colo. (Baca, Bent, Cheyenne Kiowa, Prowers)	702	9	604	92	1,538	1,113	118	819	2,696	466	758	2,188	418	789	1,780	644	795	1,979	647
Okla. (Beaver, Cimarron, Texas)	--	--	--	--	4,954	1,433	66	1,307	1,440	246	1,256	2,265	304	757	1,788	508	1,061	1,813	531
Texas (Dallam Hansford, Hartley, Sherman)	24	7	4	53	95	144	182	39	117	323	64	229	361	106	388	467	149	506	540
N. M. (Colfax, Union)	--	--	--	--	1,236	778	185	533	1,411	586	326	973	421	228	659	530	272	640	578
Totals	5,383	56	2,182	630	10,757	5,434	1,114	3,760	8,445	2,535	3,441	8,554	2,352	2,848	7,359	3,270	3,423	7,717	3544

1/ Summarized from census data.
2/ Clark, Finney, Ford, Grant, Gray, Greeley, Hamilton, Kearny, Meade, Morton, Seward, Stevens, Wichita.

EXHIBIT VII.

Land in farms and percent of all land 1/
in 27 Southern Plains counties.
(22 counties 1890 and 1900)

	1890		1900		1910		1920		1925		1930		1935	
	Total acres in farms	% of all land	Total acres in farms	% of all land	Total acres in farms	% of all land	Total acres in farms	% of all land	Total acres in farms	% of all land	Total acres in farms	% of all land	Total acres in farms	% of all land
2/ Kans. (13 counties)	1,084,153	15.2	2,826,612	39.5	3,474,511	48.6	4,812,951	67.3	4,730,419	66.1	5,451,850	76.2	5,704,867	79.8
Colo. (Baca, Bent, Cheyenne, Kiowa, Prowers)	177,347	3.0	601,716	10.1	1,111,828	18.7	3,075,879	51.8	2,958,111	49.8	3,188,415	53.7	3,170,172	53.4
Okla. (Beaver, Cimmaron, Texas)	------	----	---------	----	1,887,206	51.5	3,101,063	84.6	3,367,639	91.9	3,264,494	89.1	3,597,032	98.1
Texas (Dallam, Hansford, Hartley, Sherman)	214,231	6.9	3,642,632 3/	117.2	1,351,824	43.5	2,145,226	69.0	2,569,428	82.7	2,401,588	77.3	2,882,027	92.7
N. M. (Colfax, Union)	---------	----	---------	----	2,189,857	37.3	4,468,282	76.2	3,461,422 4/	70.5	3,872,704	78.8	4,064,355	82.7
Totals and Percents	1,475,731	9.1	7,070,960	43.7	10,015,226	38.9	17,603,400	68.4	17,087,019	69.0	18,179,051	73.4	19,418,453	78.4

1/Summarized from census data.
2/Clark, Finney, Ford, Grant, Gray, Greeley, Hamilton, Kearny, Meade, Morton, Seward, Stevens, Wichita.
3/Some of the large ranches included in this figure extend outside the 4 counties.
4/The land area of Union County, N. M. changed between 1920 and 1925.

EXHIBIT VIII.

Number of improved or crop acres per farm in 27 Southern Plains counties. 1/
(22 counties 1890 and 1900)

	Number of improved acres per farm 3/				Number of crop acres per farm 4/		
	1890	1900	1910	1920	1925	1930	1935
Kansas 2/ (13 counties)	92.8	165.2	215.4	301.0	263.0	365.2	413.7
Colorado (Baca, Bent, Cheyenne, Kiowa, Prowers)	62.8	103.1	85.8	141.6	154.6	188.2	288.4
Oklahoma (Beaver, Cimarron, Texas)	----	-----	134.3	204.3	201.7	305.2	332.3
Texas (Dallam, Hansford, Hartley, Sherman)	337.7	127.7	535.3	270.0	347.3	435.1	590.1
New Mexico (Colfax, Union)	-----	-----	49.3	104.0	122.3	130.8	142.0
Averages	92.3	148.1	156.1	204.5	209.9	292.2	344.3

1/ Summarized from census data.
2/ Clark, Finney, Ford, Grant, Gray, Greeley, Hamilton, Kearny, Meade, Morton, Seward, Stevens, Wichita.
3/ Improved land is all land regularly tilled or mowed; land pastured and cropped in rotation; land lying fallow; land in gardens, orchards, vineyards and nurseries; and land occupied by buildings.
4/ Crop land includes crop acres harvested, acres of crop failure and crop acres lying fallow.

EXHIBIT IX.

1/ 2/
Number of cattle per farm in 27 Southern Plains counties.
(22 counties 1890 and 1900)

	Number of cattle per farm						
	1890	1900	1910	1920	1925	1930	1935
3/ Kansas (13 counties)	18	118	22	35	29	27	23
Colorado (Baca, Bent, Cheyenne, Kiowa, Prowers)	19	146	21	32	23	26	24
Oklahoma (Beaver, Cimarron, Texas)	---	---	8	27	20	28	21
Texas (Dallam, Hansford, Hartley, Sherman)	429	2,831	125	162	105	67	46
New Mexico (Colfax, Union)	---	----	47	53	51	67	38
Averages	24	172	23	39	32	34	27

1/ Summarized from census data.
2/ Cattle includes all calves, steers, bulls and cows.
3/ Clark, Finney, Ford, Grant, Gray, Greeley, Hamilton, Kearny, Meade, Morton, Seward, Stevens, Wichita.

EXHIBIT X.

Acres of cereals and wheat harvested 1/
in 27 Southern Plains counties.

	3/ 1910		1920		1925		1930		1935	
	Acres of cereals harvested	Acres of wheat harvested	Acres of cereals harvested	Acres of wheat harvested	Acres of cereals harvested	Acres of wheat harvested	Acres of cereals harvested	Acres of wheat harvested	Acres of cereals harvested	Acres of wheat harvested
Kansas 2/ (13 counties)	539,142	323,187	1,156,265	742,420	1,538,190	1,024,875	2,384,471	1,839,579	1,040,396	974,368
Colo. (Baca, Bent, Cheyenne, Kiowa, Prowers)	46,728	12,863	218,639	56,360	382,834	153,268	459,535	133,893	98,126	49,091
Okla. (Beaver, Cimarron, Texas)	325,675	116,121	699,677	320,941	798,333	469,959	1,194,496	981,384	585,011	568,377
Texas (Dallam, Hansford, Hartley, Sherman)	35,455	12,617	83,407	41,062	197,952	116,289	435,510	302,568	337,622	331,202
N. M. (Colfax Union)	23,344	865	127,308	28,151	104,847	20,925	101,483	18,883	9,105	2,175
Totals	970,344	465,653	2,285,296	1,188,934	3,022,156	1,785,316	4,575,495	3,276,307	2,070,260	1,925,213

1/ Summarized from census data.
2/ Clark, Finney, Ford, Grant, Gray, Greeley, Hamilton, Kearny, Meade, Morton, Seward, Stevens, Wichita.
3/ Cereals include corn, oats, wheat, barley, rye, and sorghums. Acreages apply only to parts of crop grown for grain

83-41-43

EXHIBIT XI.

Total improved or crop acres 1/ in
27 Southern Plains counties
(22 counties 1890 and 1900)

	Total improved acres 3/				Total crop acres 4/		
	1890	1900	1910	1920	1925	1930	1935
Kansas 2/ (13 counties)	457,407	484,505	1,573,955	2,140,649	2,016,568	3,028,470	3,623,145
Colorado (Baca, Bent, Cheyenne, Kiowa, Prowers)	47,093	111,740	294,534	810,505	790,951	982,157	1,302,500
Oklahoma (Beaver, Cimarron, Texas)	------	-----	1,061,467	1,134,079	1,092,282	1,512,085	1,724,661
Texas (Dallam, Hansford, Hartley, Sherman)	27,353	9,067	365,582	196,842	374,433	718,819	1,244,565
New Mexico (Colfax, Union)	-----	-----	128,398	385,041	318,990	294,577	340,210
Totals	531,853	605,312	3,424,536	4,667,116	4,593,224	6,536,108	8,235,081
Total improved or crop acres as % of all land (weighted:	3.3	3.7	13.3	18.1	18.5	26.4	33.2

1/ Summarized from census data.
2/ Clark, Finney, Ford, Grant, Gray, Greeley, Hamilton, Kearny, Meade, Morton, Seward, Stevens, Wichita.
3/ Improved land is all land regularly tilled or mowed; land pastured and cropped in rotation; land lying fallow; land in gardens, orchards, vineyards and nurseries; and land occupied by farm buildings.
4/ Crop land includes crop acres harvested, acres of crop failure, and crop acres lying fallow.

EXHIBIT XII

1/ 2/

Total Number of Cattle in 27 Southern Plains Counties
(22 counties 1890 and 1900)

	Total Number of Cattle						
	1890	1900	1910	1920	1925	1930	1935
Kansas 3/ (13 counties)	86,575	344,695	161,481	249,110	225,077	221,685	203,285
Colorado (Baca, Bent, Cheyenne, Kiowa, Prowers)	14,303	158,688	71,836	182,351	116,107	137,166	133,485
Oklahoma (Beaver, Cimarron, Texas)	-----	-----	65,218	148,405	110,303	136,905	111,347
Texas (Dallam, Hansford, Hartley, Sherman)	34,789	200,990	85,497	118,243	112,872	111,358	97,367
New Mexico (Colfax, Union)	-----	------	122,551	196,759	133,963	151,395	91,558
Totals	135,667	704,373	506,583	894,859	698,322	758,509	637,042

1/ Summarized from census data.
2/ Cattle include all calves, steers, bulls and cows on farms.
3/ Clark, Finney, Ford, Grant, Gray, Greeley, Hamilton, Kearny, Meade, Morton, Seward, Stevens, Wichita.

EXHIBIT XIII

83-41-45

Tenancy in 22 Southern Great Plains counties 1/

	1910		1920	1930	1935	
	% operators who are tenants	% operators full or part owners	% operators who are tenants	% operators who are tenants	% operators who are tenants	% operators full or part owners
2/ Kansas (9 counties)	18.6	80.7	38.7	42.9	46.1	53.8
Colorado (Baca, Bent, Cheyenne, Prowers)	15.6	83.1	18.7	40.3	46.7	53.0
Oklahoma (Beaver, Cimarron, Texas)	7.0	92.7	23.9	36.7	35.5	62.0
Texas (Dallam, Hansford, Hartley, Sherman)	25.5	68.8	33.4	36.9	46.2	52.0
New Mexico (Colfax, Union)	5.1	92.9	14.8	32.1	35.9	61.9
Percents weighted by number of operators	11.9	87.1	25.6	38.5	42.4	56.3

1/ Summarized from census data.
2/ Clark, Finney, Ford, Grant, Gray, Meade, Morton, Seward, Stevens.

EXHIBIT XIV

Farm values and extent of mortgage debt in 27 Southern Plains counties 1/

	1910			1920			1925			1930		1935
	Value all property per farm	Value land & bldgs. per farm	% mortgage is of value land & bldgs (Owned land only) 3/	Value all property per farm	Value land & bldgs. per farm	% mortgage is of value land & bldgs. (Owned land only)	Value all property per farm	Value land & bldgs. per farm	% mortgage is of value land & bldgs. (Owned land only)	Value land & bldgs. per farm	% mortgage is of value land & bldgs. (Owned land only)	Value land & bldgs. per farm
	$	$		$	$		$	$		$		$
Kansas 2/ (13 counties)	9,944	8,296	17.3	21,617	17,697	22.3	17,169	14,814	37.6	19,359	27.6	12,526
Colorado (Baca, Bent, Cheyenne, Kiowa, Prowers)	8,833	7,026	24.3	15,753	12,522	22.2	10,716	8,729	38.1	10,261	33.4	6,048
Oklahoma (Beaver, Cimarron, Texas)	3,813	3,004	18.3	14,002	11,175	21.8	11.074	9,406	35.3	14,757	25.8	8,541
Texas (Dallam, Hansford, Hartley, Sherman)	27,969	23,003	24.7	60,868	48,339	19.3	38,451	33,878	33.0	29,756	37.4	19,155
New Mexico (Colfax, Union	8,195	5,782	27.0	17,178	12,837	24.5	11,639	9,443	43.2	12,663	29.3	8,416
Averages	7,915	6,350	19.6	18,827	15,002	22.4	14,541	12,352	37.8	16,311	29.8	10,354

1/ Summarized from census data.
2/ Clark, Finney, Ford, Grant, Gray, Greeley, Hamilton, Kearny, Meade, Morton, Seward, Stevens, Wichita.
3/ Mortgage averages on basis of number of farms of owned land reporting mortgage debt.

83-41-47

Exhibit XV.