A SURVEY OF THE EFFECTS OF THE AGRICULTURAL REVOLUTION ON THE AGRICULTURAL ECONOMIC HISTORY OF THE KANSAS DUST BOWL

by

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A Thesis

Presented to the Department of Economics
and the Graduate Division of the University of Oregon
in partial fulfillment
of the requirements for the degree of
Master of Science

June 1940

APPROVED:

[redacted]

Major Adviser

[redacted]

For the Graduate Committee

of the School of Economics

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Chapter I

Introduction

Various groups of people are interested in the economic effects of the current changes in farming methods in the Great Plains region. Farmers are concerned about shifts in land values and in competitive advantages. Farm laborers, machinery manufacturers, and foreign producers are aroused by various developments. Changes in marketing methods are important to others. City dwellers, a thousand miles away, are affected when a black blizzard sweeps from the dust bowl. Trends in land management and utilization affect the cost of living and give rise to social problems which are of concern to all.

What is happening to Agriculture, and what are the repercussions on the economic system? It is the aim of this study to analyze trends and development in a more comprehensive way than has been done before, and to interpret the findings in the light of sound economic generalizations.

The need for such a study is evident. Men who are qualified, and those who are not, are writing and talking of commercial agriculture, deserted farm houses, suitcase farmers, and soil exploitation.[1]

When the President of the Kansas State College addressed the Kansas State Board of Agriculture in 1933 he declared: "The commercial attitude leads not only to high specialization, high dependence on cash income, and low self-sufficiency, but it also leads to the exploitation of the soil

1. "A dust bowl is a dying land," quotation from "Unto Dust," by George Greenfield, New York Times, March 8, 1937.

rather than to its conservation."[1] Whether intentionally or not the speaker was striking hard at Machine Agriculture.

The trend toward Mechanization was deplored by a leading speaker before the Kansas State Board of Agriculture when it met in 1935.[2] In his address Dr. Richards described a trip through a section of the state where one abandoned farm house after another was passed. The farms were owned by a physican, who hired men to farm with machinery. The speaker estimated that twenty families had been displaced through the use of machinery in that section alone, and eloquently declared: "If I had it in my power I would tax the earnings from such land to such an extent that no man in America would be able to speculate in that which is the bread and butter for American people. I would tax the income from that land so high that it would not pay anyone to speculate in it. In asking these things we are pleading for our homes, for the home type of agriculture."[3]

The main purpose of this study is to determine whether or not the changes in agricultural technique and utilization of land in the Dust Bowl area have been, and are, practical from the standpoint of Economics, and, if possible, to formulate a program which is superior to the present one.

1. Kansas State Board of Agriculture, Quarterly Report, March, 1933, p. 48
2. Richards, Charles A., "Agriculture and the New Age," Kansas State Board of Agriculture, Quarterly Report, March, 1935, pp. 19-20
3. Ibid., p. 19

1. The Period

For the most part, this analysis covers the period from 1920 to 1936. However, for the purpose of getting the real development of the country, it will be necessary to consider also the historical background. The current revolution in agricultural techniques had its beginning in Kansas at the close of the war, initiated by the high prices of agricultural goods during the war period. In one of the bulletins of the United States Dept. of Agriculture the statement was made that: "Mechanical power apparently had little influence on the number of work animals on farms until about 1920."[1]

The combine harvester was of even less importance before 1920. The first combine owned in Finney County was operated by Bruce Josserand, north of Pierceville, in 1918.[2] There were only 14 combines in Kansas in 1919.[3] Neither the combine nor the truck had any appreciable effect upon the economic structure of Kansas before the twenties.

2. The Region

The area selected for this study is the Great Plains region of Kansas. The term "Great Plains" is defined in various ways. The Kansas State Planning Board includes the western one-third of the state in the so-called High Plains region.[4] President Roosevelt's Great Plains Drought Committee includes the western eight out of fifteen tiers of counties

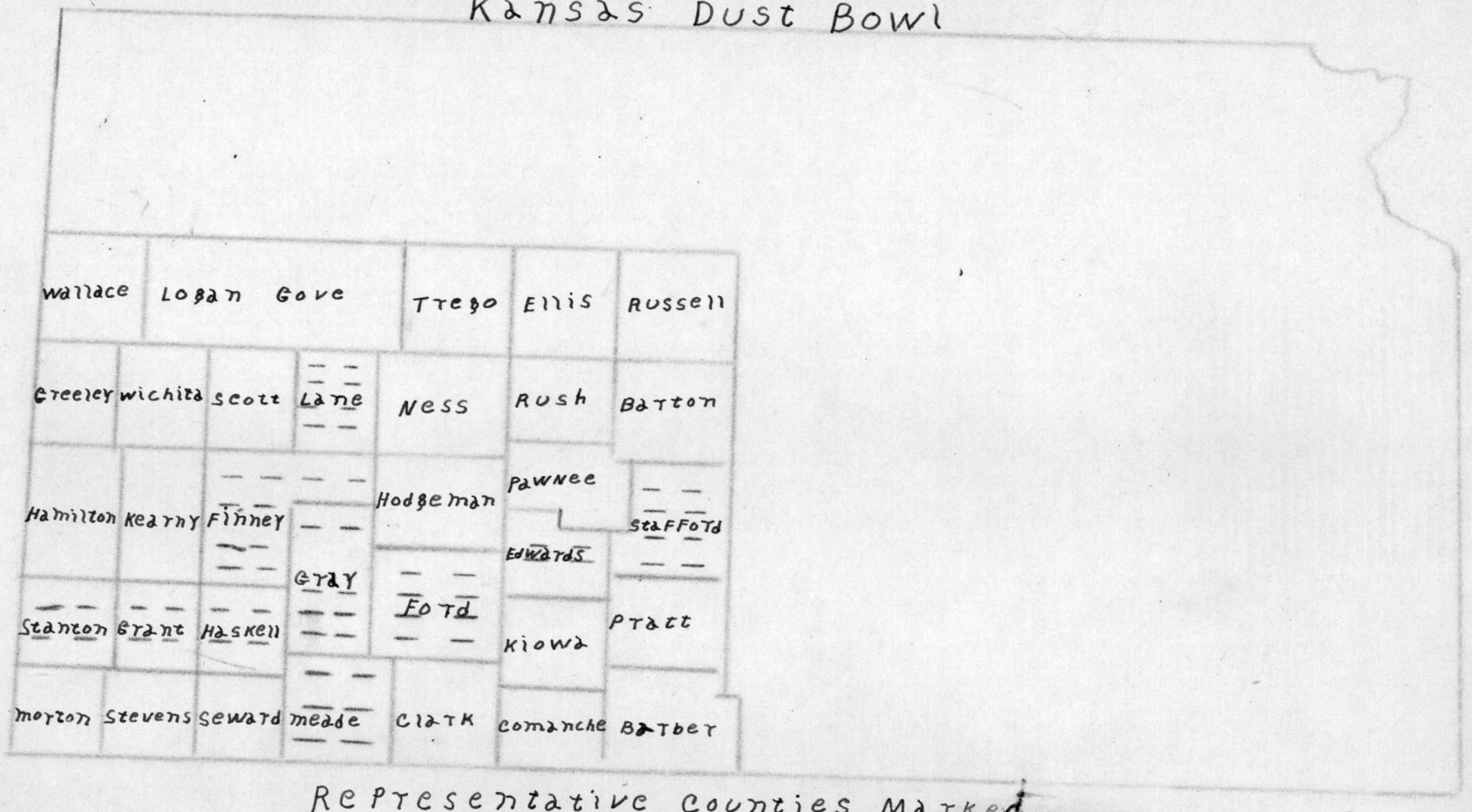
1. Hurst, W. N. and L. M. Church, Power and Machinery in Agriculture, U. S. Dept. of Agriculture, Miscellaneous Publication 157, 1933, p.11.
2. Blanchard, L. H., Conquest of Southwest Kansas, Eagle Press, Wichita, 1931, p. 135.
3. Matthei, L. E., "More Mechanization in Farming." International Labor Review XXIII, (March, 1931) p. 332.
4. Kansas State Planning Board, Progress Report, 1934, Topeka, p. 3.

crossing the state from north to south.[1] Since the term, "Great Plains," is a vague one, its meaning is arbitrarily restricted here to the seven tiers of counties west of Reno, omitting the two northern tiers. This region is also designated as the Kansas "Dust Bowl."

For purposes of brevity, it has been considered advisable to choose ten representative counties from this area, and to base our statistical research upon these. The accompanying map will show that these counties should give a fair representation of the area.

1. Great Plains Committee, The Future of the Great Plains, Washington, D. C., December, 1936, p. 25.

Kansas Dust Bowl



Representative Counties Marked - - -

3. Physical Characteristics

Briefly the characteristics of the region may be generalized as follows:

1. Topography, level to slightly rolling.
2. Relatively good soil, free from stones. Sandy in southern portion.
3. Temperature for part of the year is cool. Winter wheat, especially, does not thrive well where warm weather prevails throughout the year.[1] The mean winter temperature of western Kansas ranges from 17.5 to 22.5.[2]
4. Light annual rainfall with a tendency for its concentration during the spring and summer months. The rainfall in the Great Plains region varies from seven to twenty-five inches.[3]
5. Elevation of from 2,000 to 4,100 feet above sea level, rising gently from east to west.
6. Rapid evaporation due to warm weather and hot winds, ranging from over nine inches in July at Fort Hays to eleven inches at Garden City.[4]

4. The Extent of Mechanization

It is a well known fact that farms in this area are highly mechanized, but since it is impossible to present data on every phase of the movement toward machine farming, only the most important will be considered at this time. This information will be referred to later in the study.

1. Salmon, S. C. and R. S. Throckmorton, Wheat Production in Kansas, Kansas State College Agricultural Experiment Station. Bulletin 248, Manhattan, 1929, p. 9.
2. Ibid., p. 38.
3. Flora, S. D., State Meteorologist, Monthly Reports, 1927-1930, Topeka.
4. Hodges, Elliott, and Grimes, Types of Farming in Kansas, Kansas State Agricultural College Experiment Station, Bulletin 251, Manhattan, 1930, p. 26.

Chapter II

Economic Development of the Plains Area

Few problems in the field of social science can be adequately considered without reference to their institutional setting and historical background. So it is with the problem of the Mechanization of Agriculture. One's understanding of it will be increased through a brief survey of the economic development of the state, prior to the period of Mechanization.

1. Historical Background

Nearly four hundred years ago, the beginnings of a white civilization were laid in Kansas and in the Southwest. Francisco Vasquez De Coronado entered the state in 1541, at the head of a Spanish exploring party, at the southwestern corner and traveled in a northeasternly direction halfway across Kansas. The objects of Coronado's search were the fabled cities of Cibola; disappointment was the result, but father Juan De Padilla was left behind to found a Mission among the Indians.

Cutler, in his "History of Kansas", published 1883, has quotations taken from the reports of Coronado, which tell of the long marches across the plains and sand heath, "smooth and wearisome, and bare of wood". Also he relates a storm on the plains. "Coronado's men quailed with many tears, weakness and vows, before the storm of wind and hail which tore their tents, destroyed their equipage and caused their horses to break their reins, some being blown down the banks of the ravine".

In 1682 La Salle laid claim for the French to all land drained by the Mississippi and its tributaries, and the territory was named Louisiana. Explorers and fur traders penetrated that part of the territory which is now Kansas. In 1763 France ceded her claims to the territory to Spain. It was returned to the French in 1800, and held by them until 1803, when

the Louisiana Territory was purchased by the United States.

Spain claimed the plains region, however, until a treaty in 1819 restricted her territory to the region southwest of Dodge City. Mexico took possession of that part of the state in 1821, after winning her independence from Spain, and in 1836 the free nation of Texas laid claim to it. The entire state became United States territory as a result of the war with Mexico, 1846-48. The territory of Kansas was organized in 1854 and became a state January 29, 1861.

2. The Buffalo

The Pawnee and Wichita Indians were the earliest known inhabitants of the Kansas plains. They ate meat and cultivated corn, pumpkins, and beans. The economic factors of chief importance in determining their manner of getting a living were the prairie country and the American bison. There were also deer, elk, bear, antelope, lynx, wolves, and wildcats, in addition to the great herds of bison which roamed the plains, but the early history of Kansas is inseparably linked with the latter. The Indians ate the meat, and used the hides for tepees, clothing, and other purposes.

The buffalo grass of the Kansas plains is highly nutritious. It is equally good, whether green or dry, and therefore afforded year-round pasture for the mighty herds, for which Kansas was a favorite grazing area. Since the buffalo has played an important part in the later as well as the early history of the state, the following description of him by Castenada, one of Coronado's followers, is appropriate:[1]

"The first time we encountered the buffalo, all our horses took

1. Blanchard, Leola H., Conquest of Southwest Kansas, Eagle Press, Wichita, 1931, p. 7.

flight on seeing them, for they were a terrible sight. They have a broad and short face, eyes two palms from each other and projecting in such a manner sideways that they can see a pursuer. Their beard is like that of a goat and so long that it drags the ground when they lower the head. They always change their hair in May, and at that season resemble lions. Their tail is very short and terminates in a great tuff. When they run they carry it in the air like a scorpion. Their hair is so fine that handsome clothes could certainly be made of it, except that it cannot be dyed, as it is a tawny red."

The buffalo left a definite imprint on the plains, herds would follow leader, cutting deep trails which would be used over and over again. Buffalo "Wallows", which dotted the plains were small depressions pawed out by the animals where they rolled to remove dead hair in the spring, and sought a coating of dust or mud for protection against insects.

3. The Trails

With the Louisiana purchase there followed in quick succession exploring parties led by Lewis and Clark, Pike, Long, Fremont, and Kit Carson. These explorers did not consider the Great Plains region fit for habitation by white men. It was called the "Great American Desert" by Pike and so designated on maps of the United States for many years.

Pikes Journal gives us the description of a portion of the Dust Bowl. "The border of the Arkansas river is the paradise of our territory for the wandering savages. I believe there are elk, deer, and buffalo sufficient on the banks of the Arkansas river alone, if used without waste, to feed all the savages in the United States territory one century, but the region could not support white men in large numbers, even along the rivers. The wood now in the country would not be sufficient for a moderate share of

population more than fifteen years.

The following decades in the history of this region, until the late sixties, might well be called the "Period of the Trails". Most of the trails which led to the west, crossed Kansas, the geographic center of the nation. Perhaps the best known of them all was the Santa Fe Trail. Five hundred of the seven hundred and fifty miles of this famous old route were in Kansas. It stretched from Independence, Missouri, to Santa Fe, New Mexico, crossing Kansas in a South-westernly direction. The trail branched at Cimarron Crossing, west of Dodge City, one route following the north side of the Arkansas River through Gray, Finney, Kearney, and Hamilton Counties, while the other crossed Haskell, Grant and Morton to the Southwest corner of the state. The latter was a shorter but a more dangerous cutoff, as there was less water and fuel and the Indian menace was greater. Santa Fe trade began in 1821 and grew rapidly until 1843, when it was stopped by Santa Anna and did not reach significant proportions again until 1850.

The Santa Fe Trail was suggested by Pike as the best means of reaching the Mexican territory. The trail was opened in 1821 and Cutler relates the experience of Captain Becknell of Missouri, which describes the hardships of the journey and the nature of the region. Evidently the first trip by Becknell was successful.[1]

"The second effort of Captain Becknell was attended with very different success. With a company of thirty white men and perhaps five thousand dollars worth of goods of various description, he started from Missouri. Being an excellent woodsman and anxious to avoid the circuitous

1. Cutler, History of Kansas, Andreas, New York, 1883.

route of the upper Arkansas river, he resolved to steer more directly toward Santa Fe, entertaining little or no suspicion of the terrible trials which awaited him across the pathless desert. With no guide but the starry heavens, and perhaps a pocket compass, the party embarked upon the arid plains which extended far and wide before them to the Cimarron river. The adventurous band pursered their forward course without being able to procure any water, except from the scanty supply they carried in their canteens. As this source of relief was completely exhausted after two days march, the suffering of both men and beasts had driven them almost to distraction. The forlorn band was at last forced to the cruel necessity of killing their dogs and cutting off the ears of their mules in the vain hope of relieving their thirst with the hot blood. Frantic with dispair, in prospect of the horrible death which now stared them in the face, they scattered in every direction in search of water, but without success".

"Frequently led astray by the deceptive glimmer of the mirage, or false pond, as these treacherous oases of the desert are called, and not suspecting (as was really the case) that they had already arrived near the banks of the Cimarron, they resolved to retrace their steps to the Arkansas. However, they were no longer equal to the task, and would undoubtedly have perished in those arid regions, had not a buffalo, fresh from the river side, and with stomach distended with water, been discovered by some of the party just as the last rays of hope were receeding from their vision. The hopless intruder was immediately dispatched and water procured from his stomach. This allowed the stronger to go to the river and return with full canteens to assist the less fortunate".

Noble Prentiss in his History of Kansas describes the noted highway thus: "A hard smooth thoroughfare from sixty to one hundred feet wide, it had not a bridge in its entire length and was the best natural road of its length ever known in the world."[1]

Freighting was a big business on the trail before the fifties; calico, groceries, and leather goods were exchanged for mules, furs, and spices. Some of the goods went into Mexico until 1852, when a high tax was placed upon the goods by the Mexican Government. This lost trade was soon replaced, however, by a rapidly growing trade with the gold fields in New Mexico and Arizona. Amunition, hardware, whiskey, flour, and shoes were demanded, while wool was exported after 1858 in considerable quantities, as well as furs, tallow, and hides.

A registry of those engaged in Santa Fe trade was kept by S. M. Hayes and Co., Council Grove, which showed that in 1858 those in trade numbered 2,440 men. They used 1827 wagons, 15,714 oxen, 5,316 mules, 429 horses, and carried 9,608 tons of goods. The total invested capital including wagons was $3,500,000.[2]

In 1868 Colonel J. F. Meline estimated there were from five to six thousand teams plying the route, and wrote: "The trains are remarkable. Each wagon team consisting of ten yoke of fine oxen selected and arranged not only for drawing, but for pictorial effect, in sets of twenty either all black, all white, all spotted, or otherwise marked uniformly."[3]

In 1866 the Kansas Pacific was pushed westward and by 1870 this mode of transport had displaced to a large extent the teams of oxen.

1. Wyman, Walker D1, "Freighting a Big Business on the Santa Fe Trail", Collection of Kansas State Historical Society, Vol. 18, P. 27.
2. Ibid., P. 23.
3. Ibid., P. 26.

4. The Cattle Era

Following the close of the Civil War, railroads were pushed westward and a new era, the "cattle era" began. The Kansas Pacific, Now the Union Pacific, reached Abiline in 1867, and that summer the first herd of cattle was started on its way from Texas to Abiline by Joseph G. McCoy. He marketed 35,000 head that fall at an average price of fifteen dollars per head.[1]

For five years, great herds of cattle were driven over the Chisholm Trail from the Red River district in Texas to Abiline, and later Newton when the Santa Fe was extended into that town. In the following years, as railroads construction progressed westward, the cattle "center" was also shifted, eventually reaching Dodge City.

Conditions were then favorable for the growth of the cattle industry in the western part of the state. The Indians were finally subdued in 1869, although there were subsequent raids; The buffaloes were being slaughtered rapidly; free consent to use the range was given by both the government and the railroads.

The firm of Barton Brothers introduced the cattle industry into this region in 1872, when they brought 3,000 head of Texan long horn cattle to the Arkansas River Valley in the Western part of the state.[2]

Within a short time all the available grazing land was taken up, and by 1880 various ranchers claimed all the land to the Colorado line. However, very few of the early ranchers owned much of the land they used,

1. Henry, Stuart, Conquering Our Great American Plains, New York, 1930, P. 44.
2. Blanchard, Leola H., Conquest of Southwest Kansas, Eagle Press, Wichita, 1931, P. 46.

aside from the watering places and ranch building sites. The range was free, but was monopolized through control of the watering places. The chief expense was wages, as the ranchers paid no taxes, rent, or feed bills, depending entirely upon grass for animal food in the winter as well as the summer months.

The supremacy of the cattlemen was of short duration, however, for the region was rapidly homesteaded, as soon as it became definitely known that the Indians had abandoned the region. The railroads were as active in bringing in homesteaders as they had previously been in establishing the cattle industry, and within a short time the open range was gone and crop agriculture begun.

5. Settlement

The Homestead Act which became a law in 1862, provided that any person (A) the head of a family, or over twenty-one years of age and (B) who was a citizen of the United States, or had declared his intentions to become such, might acquire fee simple title to a quarter section of land on condition of five years residence. The settler had six months after filing on land before establishing a home and commencing his improvements. Temporary absence of six months was also allowed. Time served in the army or navy was deducted from the five year period. With the Indians gone, the high pressure advertising of the railroad companies began to produce results and a boom developed in the eighties.

Under the land laws it became possible for a single individual to acquire title to 480 acres of land; 160 acres as a homestead; 160 acres as a pre-emption, and 160 acres as a timber claim. Pre-emption required immediate settlement and the payment of one dollar and twenty-five cents

per acre after six months. Two dollars and fifty cents per acre was paid within limits of railroad land.

Such opportunities to acquire land brought people in large numbers to the state following the immense crops of 1883, 1884, and 1885. There was much speculation in real estate by both Eastern and Kansas people. Scores of new towns were mapped and lots sold, Public buildings and street car lines constructed, and railroads extended. The following paragraph appearing in the Kinsley Graphic, March 8, 1879, illustrates the lure held out to prospective settlers.

"The inducement for settlement in Meade county may be summarized as follows: Water of the best quality in abundance in the creeks and rivers, and springs are easily accessible by digging. A variety of soils unsurpassed in quality. Lime and Sandstone, Peat beds, no railroad land to checker the map and retard the close settlement, no Indian reserves, no county organization to support, no taxes to pay, a fair prospect of a railroad from the eastern part of the state through the county".[1]

A blizzard in 1886 and a drought in 1887, however, helped to bring an end to the boom, and settlers were more easily discouraged because many were not familiar with Kansas soil and climate conditions. Banks and business houses failed, thousands of settlers left Kansas, some of the western counties being almost depopulated. Meade County, for example, with a population of 4,561 in 1888 had only 1,592 as late as 1903.[2] Ghost towns, the desolate remains of once thriving trading centers, may yet be seen here and there on the Kansas prairies, mute evidence of the speculation of the period.

1. Kinsley Graphic, March 8, 1879, Files in Kansas Historical Society Library, Topeka.
2. Sullivan, Frank S., A History of Meade County, Topeka, 1916, PP. 103-130.

Not all the settlers left, however, and to the nucleus that remained were added others as good crops encouraged immigration. It is of these hardy spirits who remained that Gov. John A. Martin spoke when he addressed the Southwest Exposition at Garden City in 1886.

"The loneliness and immensity of the plains had no terrors for you. You invaded their solitudes. You pushed the frontier steadily westward. You plowed and planted and digged and sowed. You were determined to conquer the land, by irrigation if necessary. You came, you stayed, you conquered. You saw the wilderness vanish until every last doubting Thomas was silenced, and the whole world realized that here on the western border of Kansas was a rich, as beautiful, and as productive a land as the sun, journeying from continent to continent, looks down upon and warms with his genial rays. There is something splendid in the march of civilization into, and over, an unpeopled land-something grander than the advance of a victorious army. It is better to build up than to destroy-better to redeem a desert than to make one. The march of the armies of industry and peace across the plains, peopling their solitudes, conquering the wilderness and forcing from its soil a fatness, is an achievement, romantic and inspiring, and you people of western Kansas are the heroes of this conquest."[1]

The early settler was almost as dependent upon the buffalo as the Indian had been in the era before. The hides were a source of income, the meat was used for food, and the chips were used as fuel for which there were no substitutes on the treeless plains of the west. Even after the extermination of the buffalo, many settlers owed their livelihood to him, for the bleached bones scattered generously over the prairie

1. Blanchard, Leola H., Conquest of Southwest Kansas, Eagle Press, Wichita, 1931, P. 153.

were gathered and sold for from five to ten dollars per ton, to be ground into fertilizer.

The blizzard of 1886 was the last blow to the free-range cattle industry, as it was responsible for the extermination of entire herds. That year the commissioners of Finney and other counties prohibited all cattle, horses, sheep, and other domestic animals running at large. By 1890 nearly 16,000,000 acres had been brought under cultivation in Kansas, but most of this was in the eastern and central sections of the state.

Chapter III

Farming on the Plains

It has been said that farming is a way of life. Nowhere was that more true than of western Kansas before 1920. Among the types of people who settled there, were, first, those who were seeking opportunities in a "New Country" where land was cheap; second, people who had failed to compete successfully with their fellows elsewhere, and who turned to the west with new hope, or as a last resort. The first group persisted because of their idealism, faith, and ambition; the second remained because there was no other place for them to go. In either case it was a way of life. One group cultivated the soil and lived for the future; the second, cultivated the soil.

The methods of production were simple. Wheat was the principal crop. The family was the production unit, and the ultimate in equipment was a "gang" plow pulled by four or five horses. The number of units of equipment depended upon the number of the members of the family big enough to drive a team. The only other necessary implement for the sowing of wheat was the drill.

The two implements used in cutting the grain were the "binder" and "header". The binder cuts a swath of grain from six to eight feet wide, and ties the stalks in bundles, and deposits them in windrows on the field. Men working in the field assemble the bundles in shocks which offer some protection from the rain, but often shocks of grain bundles are built after the harvest is completed. When the farmer did not stack his bundles, he was eager to obtain quickly the services of a custom thresherman in the community, so that his grain might be safely stored in the bin, or hauled to market before rain or insects caused damage.

The header cuts off the head of the wheat stalk and elevates these by two revolving canvasses into a header barge, which is driven alongside the header while it is in operation. When the barge is filled it is pulled to the stack-site and unloaded on the stacker. Such stacks shed rain, if properly built, and protect the unthrashed grain for months. It was not uncommon, before the universal use of the combine, for a farmer to employ from six to twelve laborers during the harvest season.

The farm of that period utilized considerable man power; for every team of from two to five horses required a driver. The importance of horse power made the demand for animal feed of prime importance to every farmer, and large areas of pasture and cultivated land were set aside to supply that demand. Since it was necessary to grow feed and do chores daily for the work horses, the farmer usually kept other livestock which required similar care and attention. Feeding and caring for horses, cows, pigs, and chickens made, therefore, a heavy demand on the ti e of every farm family. The necessity of doing "chores" two or three times daily, and the slow speed of horse-drawn transport, made it imperative that the farmer make his home on the farm. The isolated rural home was typical.

Then came the agricultural revolution of the twentieth century. Gradually the horse gave way to the tractor, the carriage to the automobile, the wagon to the truck, and the binder and header to the combine. The "horse and buggy" days in agriculture in Kansas were drawing to a close.

Chapter IV

Wheat Acreage 1920, 1929, 1931, 1935

for Ten Kansas Counties[1]

County	1920[a]	1929[b]	1931[c]	1935[d]
Stafford	222,875	271,841	233,807	220,097
Edwards	170,101	213,495	194,151	183,538
Ford	320,329	375,964	401,977	346,848
Gray	135,252	254,845	296,818	252,596
Haskell	26,506	169,716	185,230	197,460
Grant	4,162	120,001	200,247	136,983
Stanton	870	64,181	160,330	143,680
Meade	138,474	227,426	255,284	217,640
Finney	45,446	113,620	225,217	196,786
Lane	98,220	145,612	211,399	171,026
Total	1,162,255	1,956,701	2,364,460	2,066,654
Percent of 1920 acreage	100	168	200	177

The acreage in 1935 was somewhat smaller than in 1931 due chiefly to two factors, namely; the Agricultural Adjustment Act, and droughts. The disasterous failures of the preceeding four years caused some land abandonment, but the more important factor, by far, was the wheat control program of the Federal Government.

1. Source: Kansas State Board of Agriculture
   a. 22nd Biennial Report
   b. 27th Biennial Report
   c. 28th Biennial Report
   d. Quarterly Report, December 1935

The Agricultural Adjustment Act was the only thing which saved the farmers in this region. The following table will show the relationship between the earned agricultural income and the government benefit payments in 1934.

Federal Government Benefit Payments and Earned Agricultural Income in 1934 in Ten Kansas Counties.*1

County	Benefit Payments for: Corn-Hog	Wheat	Value Of Farm Produce
Stafford	$49,330.00	$ 847,830.18	No data obtained
Edwards	24,442.30	747,908.00	No data obtained
Ford	13,002.44	1,307,199.35	$2,082,075
Gray	24,975.80	987,468.62	767,762
Haskell	7,252.19	776,576.47	513,390
Grant	20,276.49	590,914.06	792,359
Stanton	10,599.03	443,360.09	682,910
Meade	12,680.32	739,693.79	1,160,366
Finney	27,019.86	670,804.26	2,112,904
Lane	15,721.30	550,390.04	935,613
Total	$205,302.73	$7,662,044.86	

The extent to which grain production was restricted in suggested by the acreage of idle or fallowed crop land for the years 1930 and 1935.

Idle or Fallow Crop Land, 1930 and 1935, Ten Kansas Counties*2

	1935		1930
Stafford	61,132	acres	11,612
Edwards	53,943		4,463
Ford	90,614		21,025
Gray	98,614		23,522
Haskell	62,206		19,481
Grant	61,075		43,883
Stanton	72,955		43,667
Meade	70,688		34,969
Finney	87,078		32,296
Lane	61,125		17,669
Total	719,749		252,587

*1 Kansas State Board of Agriculture, 29th Biennial Report
*2 U. S. Department of Agriculture, 1935 Census of Agriculture

The amount of idle or fallow crop land in 1935 was 467,162 acres more than in 1930. This does not take into account the large number of acres which was taken out of wheat production and turned to the production of feed crops for livestock.

The mechanization of agriculture has naturally shown its effect upon the amount of land used for grazing purposes. The following table will show the amount of land in pasture for the years 1926, 1932, 1934, as well as the amount of land needed to care for one cow in 1936.

Pasture acreage, 1926, 1932, and 1934
with grazing capacity for 1936
Ten Kansas Counties*

County	1926[a]	1932[a]	1934[a]	1936[b] acres per cow
Stafford	84,631	74,009	79,710	22
Edwards	70,204	58,434	62,324	24
Ford	171,626	124,266	135,092	22
Gray	145,468	75,715	80,062	25
Haskell	82,370	16,728	24,133	25
Grant	103,828	44,973	44,417	25
Stanton	54,904	38,147	49,355	25
Meade	245,532	203,339	191,523	22
Finney	331,255	217,837	236,845	25
Lane	199,859	133,855	170,147	23
Total	1,489,677	987,303	1,073,607	

During the six year period from 1926 to 1932, it will be observed that the number of acres used primarily for grazing purposes declined one-third. This decline was particularly sharp in Grant, Haskell, and Gray counties, where agricultural development was tardy. The increase in pasture land after 1932 is the result of government reclamation projects and erosion control. Many of these added acres resemble undisturbed weed patches morethan pastures.

*a. Source: Kansas State Board of Agriculture, Biennial Reports
b. Source: Kansas State College, Special information.

It very logically follows that livestock should next be considered, since the decline in pasture acreage and decrease in the number of animals which can graze a pasture are positive checks upon the number of livestock. Machinery has replaced the draft animals, and increased working hours per day with the use of the machine has lessened the time which can be given to chores.

The estimates of experts vary as to the amount of land required to sustain an average work animal. The average for the United States in 1919 was 7.8 acres.[1] The amount of land required depends upon the kind of grain fed. A standard ration for a horse per year would be 125.5 bushels of oats, or 71.7 bushels of corn, or 83.6 bushels of barley; and 2.2 tons of hay. The weight of the horse, of course, must also be considered.[2]

If we assume that our dry region is the average, that is, if by decreasing our horse population by one we have 7.8 acres more for cultivation, we find that the shift from horse to machine agriculture in ten counties alone has released half a million acres from feed crops.[3]

Cattle

That the number of cattle on Great Plains farms was considerably less in 1930 and 1935 than in 1920 is a matter of record.[4] Every county, except Ford, registered a decline during the first decade of the period. The decline continued to 1935 in Ford, Gray, Meade, and Finney, despite

1. U. S. Department of Commerce, Bureau of Census, The Farm Horse, Washington, 1933, P. 60
2. Ibid.
3. U. S. Department of Agriculture, Census of Agriculture, 1935.
4. Sources: 1920 Statistics 22nd Biennial Report Kansas State
   1930 Statistics 27th Biennial Report Board of
   1935 Statistics Quarterly Report, Dec, 1935 Agriculture

the encouragement the AAA gave the cattle industry. The number remained about the same in Haskell and Stanton counties from 1930 to 1935, and increased in Edwards and Stafford. Lane had a slight increase, and Grant, which had the fewest cattle of any of the ten counties in 1930, reported an increase in 1935. Undoubtedly the crop control program was responsible for the reversal of trends.

In 1935 Stafford led the counties in the number of cattle, on fifth of her 26,845 head were milk cows, the remainder being beef cattle. The explaination for this large number is that Stafford county land is of a very sandy nature, not conducive to wheat production. However, corn thrives very w ll, and most of the corn produced is marketed in the form of corn fed beef. Meade, Finney, and Lane counties have a comparatively large number of cattle due to the topography of the land. The land is rough, and if cultivated, would very soon be damaged by water erosion.

Modern Machinery and Farming Methods

There is a great contrast in the farming methods of 1920 and 1935 in western Kansas. The farmer in 1920 had the care of his work animals and his cattle. Chores were the important part of his work. He tried to produce feed crops for his livestock and, in so far as possible, to produce grain crops for market. The roads were not kept in the best of condition and an important cost was delivering the produce to the middle-man.

The most successful farmer today is one who understands machinery rather than animals. He is more interested in the price of gasoline than in the price of oats or hay. His money outlay is large, and so he is principally a cash grain farmer.

1. One Crop Farming

One of the trends in land utilization concurrent with the introduction of machinery is toward one crop farming. In 1920 one-third of the cultivated acreage was planted to crops other than wheat. Now only one-fifth of the cultivated area is so used, unless the wheat crop fails. Year after year, the land is sown to wheat and the farmer's chief concern is lack of moisture, rather than loss of fertility.

The probable effects of this trend should be examined. The agricultural experiment station of Kansas State College, after extensive research maintains that, "one of the oldest known methods of keeping soil productive is by growing different crops on a piece of land rather than by growing the same crop year after year".[1]

Rotation of crops, it is pointed out, helps eradicate weeds, control insects, control plant disease, and increase the productiveness of the soil. The effects of fallow on the yield of wheat at Garden City is indicated by the following results of experiments at the Garden City Branch Station, Kansas State College.

Effects of Fallow on Wheat Yield, Garden City Station.[2]

Method of seedbed preparation	Average yield per acre 1914-30	Number of failures in 16 years
Late plowing	4.6	10
Early plowing	6.9	9
Early listing	7.5	9
Summer fallow (alternate yrs.)	11.8	5

1. Throckmorton, R. E., and Duley, F. L., Soil Fertility, Kansas State Agricultural Experiment Station, Bulletin 260, Manhattan, 1932, p. 30.
2. Ibid.

Where the land was fallowed, the number of failures was less than on other land, but the land was in use only half the time. Therefore the percentage of success was no greater. The tractor has probably tended to encourage continuous use of the land, but since 1930 a reversal of this trend has appeared.

In another publication of the experiment station, the conclusion was reached that in western Kansas, except when fallow in included, "Extensive experiments have failed to demonstrate any marked gain in the yield of wheat as a result of growing it in rotation with other crops".[1]

2. New Implements

A second trend, which the tractor has encouraged, is the use of new types of tillage implements. These new implements are particularly a product of tractor farming because they are in some cases too unwieldly or too heavy to be drawn by horses. Furthermore, the tractor with its great speed and capacity has made it possible for the farmer to go over the ground more times, and to work it with a greater variety of implements. This development in tillage implements is significant, for it has (a) made possible better and more careful preparation of the soil, (b) further increased the capital needs of the farmer, and (c) stimulated the agricultural implement industry.

The great need is for tillage equipment and methods which will not increase wind erosion. The problem of wind erosion is not a new one. One of the outstanding authorities on the cultural and business life of the

1. Salmon, S. C., and Throckmorton, R. E., Wheat Production in Kansas, Kansas Agricultural experiment Station, Bulletin 248, Manhattan, 1929, p. 13.

Plains territory is C. C. Isely of Dodge City. Isely's research has convinced him that there were dust storms on the prairies before white men ever saw them.

From April to October the prevailing winds in Kansas are from the south except in the western portion where they are from the southeast during April, May, and June. In the extreme western portion they continue from the southeast through July and August.[1]

During a dry year, in the winter and spring, winds of high velocity blow the loose soil from the fields causing great dust storms. April is the windiest month of the year. The so-called hot winds are the most destructive. They occur irregularly, usually during periods of high temperatures, and greatly damaging growing crops, especially during the month of July when the corn is silking.

There is a great difference in the wind velocity of the eastern and western parts of the state. The western third of the state is one of the "windiest inland spots in the nation."[2]

The seriousness of the wind erosion problem can hardly be realized by anyone who has not visited this territory. Buried fences and farm implements, soil drifting in roads like snow, fields dotted with mounds where tumbleweeds have caught drifting dirt, testifying to the magnitude of the soil movement during a dry season. The economic costs are large. (1) labor in recovering buried implements, trees and fences, (2) expense in clearing roads and highways, (3) cost of working down field mounds, in many cases more than the value of the land, (4) the loss of soil, exposing

1. Information from office of weather, Fort Hays State Experiment Station.
2. Kansas State Planning Board, Progress Report, 1934, (Mimeographed), Topeka, P. 7.

the subsoil, in places rendering the land worthless, (5) injury to animals, (6) injury to health of the inhabitants, (7) damage to property value because many people are reluctant to live in the "Black Blizzard" region.

A paper was read before the fiftieth annual session of the conference of state and provincial health authorities of North America at Atlantic City in 1935, written by Ross L. Rayburn, bacteriologist in charge of the Public Health Laboratories, Kansas State Board of Health, and two other authorities,[1] in which the statement was made that several individuals who had lived in western Kansas for more than fifty years were interviewed, and that each made the statement that "never in his experience or his knowledge had such severe dust storms occurred in previous years.[2]

In this paper it was pointed out that there are two types of dust storms, both the result of high winds. One is the result of the wind blowing the dust from the ground, with the dust clouds rising steadily higher into the air. The second type, dust which has already been carried into the air, gradually settles, as the wind lessens in velocity.[3]

Reports from the Meterologist, A. A. Justice, at Dodge City vividly describes the storms. The following is a description of the storm on April 14, 1935.[4]

"Instant darkness followed, lasting for forty minutes, then for a period of about three hours there was darkness--some children were caught

1. Earl G. Brown, M. D., Secretary and Executive officer, Public Health Service, and Selma Gottlieb, Ph. D., chemist, Division of Sanitation, Public Health Service.
2. Public Health Service, "Dust storms and their possible effects on Health," P. 2, Reprint 1707, from Public Health Reports, Vol. 50, No. 40, October 4, 1935, P. P. 1369-1383.
3. Ibid., P. 5.
4. Monthly Report, Dodge City Station, A. A. Justice.

in the park and narrowly escaped serious consequences. Many persons spent hours in stalled motor cars along the highways. Others related going on hands and knees for considerable distances seeking shelter."

Mr. Justice's description of the storm as a meteorological phenomenon is as follows:

"The cloud extended east and west as far as could be seen in a straight line. As it came on, it presented a rolling, tumbling appearance, something like a great wall of muddy water. The base of the cloud was inky black, the top portion of a lighter color, due to the amount of light falling on the two portions. The height of the cloud was estimated to be about 1,000 feet."

His report concerning the storm of the tenth and eleventh, stated that ther were forty-one consecutive hours of dense dust, traffic was tied up, business at a standstill, no one ventured out unless compelled to do so, there was much drifting soil, and that further damage was done to the wheat.[1]

It was during the storm of April tenth and eleventh that two childre of the Salmon family, living four miles north of Russell Springs, Kansas, in Logan County, were lost. The younger child found his way back to the house, but the older, a boy of twelve years, perished in the storm, and was found the next day in an adjoining field.[2]

The publicity which was given to the "Black Blizzards" had a severe economic effect upon the region. Land valves were materially decreased,

1. Monthly Report, Dodge City Station, A. A. Justice.
2. Personal Interview.

and still more important, credit in the form of loans was greatly reduced. Had it not been for loans and benefit payments by the government the Dust Bowl area would have been completely barren.

As for the damage to land, not only the blowing fields were being damaged, but also adjoining fields were eroded through no fault of their owners. Pasture lands in many sections were completely ruined, due to the layers of dust which each successive storm deposited upon the land.

The "suitcase" farmer has been given the blame for the present condition of the Dust Bowl, and the critics have been partly justified; yet a great deal of consideration is necessary before the blame can be justly allocated.

A summary of wind erosion control measures suggested by F. L. Dudley, follows:[1] (1) Preservation of crop residues or stubble to anchor the soil; (2) strip planting of adaptable grasses and other plants; (3) permanent windbreaks of trees and shrubs; (4) moisture conservation through terracing; (5) improvement in methods of cultivation to leave a rough top-soil; (6) prevention of over grazing on both grasses and grains; (7) contour cropping; (8) strip cropping; (9) livestock farming; (10) protection of soil by a growing crop; (11) gully control, particularly for prevention of water erosion.

Even though continuous growing of wheat is to be condemned for its drain upon fertility, it should be observed that the mechanization of agriculture has encouraged turning the sod, and diverting interest from

1. Dudley, F. L., "Erosion Control" Kansas State Board of Agriculture, March, 1935, Quarterly Report, P. 29.
Also--"Attacking the Soil Erosion Problem on a Nation-wide Front," Agricultural Engineering, XVL, August 1935, P. 295.

livestock raising and diversified farming. The compensating factor, however, the Director of the Kansas Soil Erosion Service writes, that in the absence of crop failure, wheat farming keeps the soil protected by a growing crop nine months out of the year, and that there is much less erosion than if perhaps the land were used for a variety of crops.[1]

Water erosion may seem a relatively unimportant problem in a country which lacks sufficient rainfall for crop production. Rains may be far between, but when one comes, it is very often in the nature of a sudden thundershower; that is, a "Gulleywasher". Great gashes may be cut in the soil within an hour's time, and fertile soil that has not been blown away may be washed away even more quickly. Here, too, is a problem for this region, where, when it rains, it comes down in torrents. Control is not merely a matter of farming methods and tools, for dams must be built across gullies, ditches filled with brush, and land in some cases resodded. However, these proposals are expensive to the farmer; in many cases more costly than the land itself. Naturally soil conservation in such instances is not practical for the farmer, and only through government aid in a long range program can this policy be pursued.

Water conservation on level fields has been improved by the use of basin implements which make depressions in the soil. However, these depressions are so small that the moisture from exceptionally heavy rains cannot be entirely conserved.

An example of rainfall in Kansas, which is not unusual, is that of

1. Dudley, F. L., Erosion Control, Kansas State Board of Agriculture, March, 1935, Quarterly Report, p. 29.
Also-- Attacking the Soil Erosion Problem on a Nation-wide Front, Agricultural Engineering, XVI, August 1935, p. 295.

April, 1938, when during a three hour period, ten inches of rain fell in Logan County.[1]

1. Bailey, Reporter for weather Bureau Station, Oakley, Kansas.

Chapter V

The Combine and its Problems

Combine harvesters threshers were not used until 1890 and then only in very dry sections of the United States.[1] The chief objections seemed to be that (1) the wheat shelled when left standing until fully ripe; (2) the grain could not be handled efficiently because it ripened unevenly; (3) it was widely held that the machines were enormous affairs, cumbersome and inefficient.

The first small combine was manufactured in Idaho in 1905.[2] Other small combines were manufactured a few years later which were used in the far west. In 1918 a small combine adapted for use on the Great Plains was introduced. It had an auxiliary engine and was pulled by horses. Very few were purchased until 1922, but the number has increased rapidly since that time. In 1926 new models were introduced with a direct power drive from the tractor itself. The advantages of this model were (1) smaller investment, since there is no axiliary engine on the combine, (2) smaller crew, for it is not necessary to have an operator for the combine. Thus the market for the combines was sonsiderably enlarged. More recently, further changes have been made in an effort to capture the small-farmer market. For example, the Allis-Chalmers"all-crop Harvester" cuts a swath only five and one-half feet wide, is equipped with rubber tires, and is manufactured for a speed of eight to ten miles per hour. This harvester sells for only $595 F. O. B. factory.[3]

The spread of the combine has assumed all the characteristics of an

1. Report, of the U. S. Secretary of Agriculture, 1929, Washington, P. 10
2. U. S. Dept. of Commerce, Yearbook 1930, Washington, 1931, P. 416.
3. Kansas State Board of Agriculture, 29th Biennial Report, Topeka.

avalanche", the Secretary of Agriculture wrote in his 1929 report.[1] The number of machines manufactured in the United States rose from 270 in 1914 to 36,957 in 1929,[2] but nowhere was its spread more rapid than in the Great Plains area.[3]

The reasons for the rapid introduction of this machine undoubtedly are: (1) saving in labor; (2) reduction in harvesting and threshing costs; (3) earlier marketing; (4) release from dependence on an outside labor supply; (5) Grain saved under certain conditions; (6) lesser burden during harvest season upon farm women; (7) eliminates dependence on a custom thresherman; (8) abolished the straw stack and the labor of scattering the straw back on the field; (9) harvest season shortened.

Wheat farmers frequently go from one season to another with no other source of income than the wheat crop. Consequently, cash needs often become pressing even before the time the wheat has ripened. Furthermore, harvest expenses have been quite heavy, making even more attractive a machine which makes it possible to market the grain as the harvest progresses. Under the binder and the header system, there was always a wait for the community thresherman after a harvest was completed.

There may be other advantages of the combine, but it is advisable to turn from the advantages to the disadvantages at this time. Thus for our discussion has been quite favorable to the use of the combine, yet there are limitations which are very serious. (1) The straw may be needed for feed; (2) in regions where windstorms are apt to occur, or where strong

1. Report, of the U. S. Secretary of Agriculture, 1929, Washington, P. 10
2. U. S. Dept. of Commerce, Yearbook 1930, Washington, 1931, P. 416.
3. Kansas State Board of Agriculture, 29th Biennial Report, Topeka.

winds are prevalent, the strongest of wheat plants may lodge; (3) in regions where hail risk is great, farmers hesitate to wait until the grain is in a condition for threshing; 940 weed seeds are threshed out with the straw and are scattered back on the land; (5) sappy weed seeds and fragments cause heating and discoloration of grain; (6) the straw on the ground may interfere with plowing; (7) the size of the weeds often interfere with the operation of the combine; (8) there may be moisture in the threshed grain, because low or damp spots in the field have not yet ripened; (9) rainfall during the harvesting season may make threshing impossible; (10) when grain is fully ripe, delays caused by breakdowns causes greater loss; (11) a larger amount of capital is required; (12) the combine cannot be used in humid climate, and (13) all grain is not recovered.

In the Great Plains region the limitations are probably at a minimum, but many farmers object to their operation.

Tractors on farms in ten Kansas Counties*
for the years 1920, 1934, 1935

County	1920[a]	1934[b]	1935[c]
Stafford	143	962	1007
Edwards	129	627	658
Ford	215	1121	1043
Gray	100	762	695
Haskell	43	463	486
Grant	21	369	303
Stanton	11	345	273
Meade	84	700	626
Finney	36	610	557
Lane	55	449	418
Total	837	6408	6066

*A. Kansas State Board of Agriculture, 22nd Biennial Report
B. Kansas State Board of Agriculture, 29th Biennial Report
C. Kansas State Board of Agriculture, 2nd Quarterly Bulletin, 1935

An increase of approximately eight-fold in the number of tractors between 1920 and 1934 is significant only when considered in relation to the total number of farms in the area. According to the 1935 farm census, there were 8260 farms in these ten counties, or only 2,194 more farms than tractors; and a "Farm" for census purposes is a tract of land as small as three acres, or smaller if the agricultural products in a given year are valued at $250 or more.

Furthermore many tractors are used in these counties only part of the year by farmers who also farm in other areas. These tractors in many cases are domiciled in other counties for purposes of census. The decrease in the number for 1935 is a result of: first; foreclosure, crop failure making it impossible for many farmers to make required payments; Second, restricted government planting program: third, change in domicile for assessment purposes by the owners.

Figures showing ownership during several periods of combine-harvester threshers are also both interesting and impressive.

Combines on farms in ten Kansas Counties, 1923, 1934, 1935*

County	1923[a]	1934[b]	1935[c]
Stafford	258	685	669
Edwards	78	481	491
Ford	127	835	753
Gray	38	546	495
Haskell	37	338	362
Grant	7	210	179
Stanton	1	213	168
Meade	68	482	417
Finney	12	345	309
Lane	13	310	285
Total	639	4445	4218

*A. Kansas State Board of Agriculture, 24th Biennial Report
B. Kansas State Board of Agriculture, 29th Biennial Report
C. Kansas State Board of Agriculture, 2nd Quarterly Bulletin 1935

In the eleven years from 1923 to 1934, the number of combines had increased seven times. While the number of combines is only 49.94 per cent of the number of farms, allowance must be made for the following factors: first, a combine is often owned jointly by two or more farmers; second, there is a certain amount of custom work done for neighbors by farmers with combines; third, many combines are used by farmers who also farm in other counties, and the machines are listed for census purposes in other counties; fourth, poor crops may result in foreclosure of machines. The decrease in the number of combiners in 1935 may be attributed to the same factors which caused the decline in the number of tractors.

Comparative costs of harvesting on different acreages with Binders, Headers, and Combines*

Acres	Machine	Power	Crew	Cutting days	Cost per acre
	Binder-7 ft.	4 horses	2 men	3.3	$5.03
50	Header-12 ft.	10 horses	6	2.0	3.78
	Combine- 16 ft.	15 H. P. tractor	2	1.4	8.30
	Binder-7 ft.	4 horses	2	6.7	4.53
100	Header-12 ft.	10 horses	6	4.0	3.57
	Combine-16 ft.	tractor	2	2.9	4.91
	1 Binder	4 horses	2	13.4	4.37
200	2 Binders	8 horses	4	6.7	4.53
	1 Header	10 horses	6	8.0	3.47
	1 Combine	tractor	2	5.7	3.20
	2 Binders	8 horses	4	10	4.43
300	3 Binders	12 horses	6	6.7	4.53
	1 Header	10 horses	6	12	3.43
	2 Headers	20 horses	12	6	3.50
	1 Combine	tractor	2	8.5	2.64
	2 Binders	8 horses	4	13.4	4.37
400	3 Binders	12 horses	6	8.9	4.45
	1 Header	10 horses	6	16.0	3.41
	2 Headers	20 horses	12	8.0	3.47
	1 Combine	tractor	2	11.4	2.35
	3 Binders	12 horses	6	11.1	4.41
500	2 Headers	20 horses	12	10.0	3.44
	1 Combine	tractor	2	14.3	2.18

The above table indicates that the combine, on large areas is much more economical than the older methods of harvesting, providing there are no failures.

* Grimes, W. E., R. S. Kifer and J. A. Hodges, The effect of combined Harvester-Thresher on Farm Organization in Southwestern Kansas and Northwestern Oklahoma, Circular 142, Kansas State Agricultural Experiment Station, Manhattan, 1928. The cost of binder and header do not include cost of threshing.

Number of farms in ten counties in the years 1920, 1930, 1935,[a] with the number of U. S. Agricultural benefit payment contracts in 1935[b]

County	1920	1930	1935	1935 Contracts
Stafford	1490	1359	1317	2130
Edwards	805	823	829	903
Ford	1280	1338	1407	2134
Gray	733	828	935	791
Haskell	177	461	429	1049
Grant	194	533	466	791
Stanton	198	315	411	890
Meade	842	933	883	1369
Finney	717	971	1029	1499
Lane	473	489	554	715
Total	6,911	8,050	8,260	

In these ten Plains Counties the number of farms has actually increased, although this is one of the most highly mechanized farm regions in the United States. The explanation is peculiar to this region, and is not of general applicability to the entire country. This area has had enough unturned sod so that farmers could increase their acreage without crowding out anyone. Part of this land has not been cultivated because of its location; some because it had been considered submarginal land under old techniques; and some had not been plowed because it was still in transition from a ranch economy to a farming area. The introduction of machinery speeded the process of turning the soil, and increased land values. It was a sparsely settled country and there were large areas where it was hardly necessary to break the plow furrow, even at section lines.

A. Data from U. S. Dept. of Commerce, Bureau of the Census, Census of Agriculture, 1920, 1930, 1935.
B. Soil Conservation office, Manhattan, Special Information, October, 1938. (Contracts are by fields rather than farms)

The relationship between the number of farms in 1935 and the number of benefit contracts, are absolute proof of the dependence of the farmers upon the government during the years of depression. Had it not been to the benefit of the farmers to comply with the government program, the cooperation, on such a wide basis, would not have existed.

Very briefly consider the changes in the labor situation which have accompanied the Agricultural Revolution in the Southwest. This can best be presented in the form of a summary.

1. The seasonal peak in the demand for labor has disappeared to such an extent that the migratory harvest hand is a thing of the past.

2. The nature of the agricultural task has changed.

3. There has been a great shrinkage in the volume of permanent labor required.

4. The machine has tended to become the seasonal factor on Great Plains farms instead of the laborer.

5. Agricultural tasks are not as fatiguing to-day, and may be performed in a shorter time.

6. Whereas formerly sheer physical strength was desired, to-day there is a premium upon general intelligence and mechanical ability.

7. The disruption in family life, formerly caused by hired hands, has been eliminated. The farm is no longer a hotel, restaurant, and food factory.

8. With the elimination of the annual tide of migratory workers has come a more stable community life. The latter was an unsettling factor in many communities.

9. Mechanization has reduced the relative importance of labor costs

in agricultural production.

10. Mechanization has removed a handicap under which the farmer of western Kansas labored, in that he was at a disadvantage in using hired workers; labor in that area was relatively scarce and a higher price had to be paid per labor unit than in other parts of the "wheat belt".

11. The agricultural labor task has become more like the urban labor task, and the agricultural worker and the city worker are "at home" in either city or country.

12. The social environment is undergoing change. Both farmers and laborers are spending more time in towns, and enjoying, more nearly, city life.

13. The so-called agricultural ladder from hired man to tenant, to owner, has become more difficult to climb, due chiefly to the increase in capital requirement.

Percentage of all farms operated by tenants*

County	1910	1920	1930	1935
Stafford	44.3	48.2	48.1	50.0
Edwards	31.6	43.9	44.3	47.1
Ford	33.8	48.7	42.6	43.0
Gray	14.3	43.0	41.8	48.4
Haskell	4.7	44.1	46.2	47.0
Grant	3.1	20.6	54.4	50.0
Stanton	1.1	18.2	41.6	49.0
Meade	14.7	32.9	34.9	37.4
Finney	22.9	34.0	44.6	49.2
Lane	20.1	37.8	39.0	43.0

*Percentages derived from Census of Agriculture, 1920 and 1935, United States Dept. of Commerce, Bureau of Census.

Between 1920 and 1935, the percentages of farms operated by tenants increased in seven counties, remained practically the same in Stafford, and declined in Ford and Gray counties. It will be observed that the tenacy percentages was already high in these latter three counties. During the period from 1930 to 1935 Grant showed a decline from 54.4 per cent to 50 per cent, while the other nine showed positive increases.

Since wheat is the principal crop in this region, we will use that product for an example of the chances for prosperity. There has been no offical survey, as far as I know, which can be considered accurate. A Kansas wheat farming corporation estimated that $6.63[1] was the average cost of farming an acre of wheat in 1927. However this corporation was dissolved in the early thirties, due partly to financial difficulties, and partly to breaches of charter.

A survey of cost of wheat production covering the states of Kansas, Nebraska, North Dakota, South Dakota, Missouri, Iowa, and Minnesota, placed the cost of producing on acre of wheat in 1927 at $16.95.[2] There is no doubt that both figures are incorrect. From personal observation and interviews with Kansas wheat farmers, I have concluded that the average cost per acre of wheat production in Southwest Kansas, exclusive of rentals, to be approximately $7.50.

Most tenant farmers give rent on a share crop basis, and in most sections of this region the landlord is to receive one-fourth of the yield, delivered to market. Before the tenant has made his cost of production it is necessary for the product to sell for $10.00 per acre.

1. Company Report, Byrd Wheat Farming Corporation, 1930.
2. Crops and Markets, Vol. 5, No. 6, P. 196.

Annual rainfall in Ten Kansas Counties by two year intervals from 1929-1936.* (inches)

	1929	1931	1933	1935	1936
Stafford	22.91	23.00	15.90	16.01	15.02
Edwards	21.94	18.24	15.40	16.06	14.14
Ford	21.90	21.94	15.25	15.09	14.17
Gray	21.16	15.43	14.16	16.16	13.06
Haskell	19.24	12.47	11.24	12.01	12.82
Grant	15.19	9.06	19.61	11.79	15.26
Stanton	14.66	11.26	16.17	9.89	10.66
Meade	20.06	14.57	13.49	19.17	17.94
Finney	18.03	17.73	18.84	9.56	14.12
Lane	15.91	11.33	15.76	19.77	14.95

The small amount of moisture during the year is an indication of the failures which must follow. Add to this the fact that most rains in this region are of the "gully-gashing" type, which is of small benefit to the soil due to the rapid run-off, and you have a sound foundation for the contention that "dry farming" in Southwest Kansas is distinctly uneconomical.

With those figures in mind, let us consider what has really been the case since 1928. For purpose of brevity we will consider five representative counties in the Dust Bowl region.

*S. D. Flora, State Meterologist, Topeka, Special Information, October, 1938.

Price in cents-yield in bushels*[1]

Year		Finney	Ford	Grant	Gray	Haskell
1929	yield[a]	11	18	16	18	19
	price[b]	90	90	90	90	90
1931	yield	20	19	20	18	19
	price	27	27	27	27	27
1932	yield	10	9	9	5	7
	price	25	25	25	25	25
1933	yield	6	7	8	6	5
	price	27	27	27	27	27
1934	yield	4	4	6	4	4
	price	67	67	67	67	67
1935	yield	3	4	5	2	4
	price	68	68	68	68	68
1936	yield	6	5	5	4	5
	price	70	70	70	70	70

Merely finding the average yield, and multiplying that by the average price would not give us accurate results, therefore it is necessary to consider the following table.

Yearly value of wheat crop per acre in five representative counties.*[2]

County	Total	1929	1931	1932	1933	1934	1935	1936
Finney	$27.74	9.90	5.40	2.50	16.20	2.68	1.44	4.20
Ford	34.37	16.20	5.13	2.25	1.89	2.68	2.72	3.20
Grant	35.13	14.40	5.40	2.25	2.16	4.02	3.40	3.50
Gray	29.75	16.20	4.84	1.25	1.62	2.68	1.36	2.80
Haskell	34.35	17.10	5.13	1.75	1.35	2.68	2.72	3.50

*[1] A. Biennial Reports, 1929-1936, Kansas State Board of Agriculture.
B. Records, H. D. Lee Elevator Company.
*[2] Ibid (B)

The above table indicates that tenant farmers in all counties except Finney made a profit in 1929. However, since that date, no single county has shown that the average tenant has made the cost of production, and even though production and price are low, the landlord still receives his crop rental at the elevators. During the past ten years more than half the land owners in Logan county are on the delinquent tax list, and their livestock are being sold at sheriff's sale to satisfy creditors.[1] Nearly all the farmers who are owner-operators have obtained government loans to carry them through.

1. Tax Files, Logan county, Russell Springs, Kansas.

Chapter VI

Irrigation

Irrigation has been carried on in Western Kansas for more than fifty years. Probably the Garden City ditch was the first to be constructed in Kansas. According to D. R. Menke of Garden City, it was built by W. H. A. Armentrout in 1879.[1]

The most important irrigation section in the state is around Dodge City and Garden City in the Arkansas River Valley. More than 65,000 acres are under regular irrigation from wells and ditches, and another 300,000 acres may be brought under irrigation when the Kansas-Colorado water controversy is settled.[2] "Large areas of Southwest Kansas are underlain with streams and other underground bodies of water at comparatively shallow depths. This is particularly true of the Arkansas River Valley where water is found at varying depths from eight to sixty feet.[3]

There are several strata of water bearing gravel, one below the other, in many sections of western Kansas. This water flows down from the mountains of Colorado and may be lifted for irrigation purposes. The engineers on the State Planning Board report that water conditions are such as to permit pumping year after year without lowering the water level.[4]

Most of Scott county could be brought under irrigation according to the State Planning Board engineers. Four-fifths of the county is smooth,

1. Blanchard, Leola, Hl, Conquest of Southwest Kansas, Eagle Press, Wichita, 1931, P. 87.
2. Estimate by G. S. Knapp, chief of Division of water resources, State Board of Agriculture.
3. Blanchard, Leola, Conquest of Southwest Kansas, Eagle Press, Wichita, 1931, P. 95.
4. Kansas State Planning Bord, Progress Report, 1934, P. 83.

and in the center is a tract of low bottom land known as White Woman Basin, which includes about 25,000 acres of fine black soil. The county has two streams, the Beaver and the White Woman, with numerous small tributaries. Wells adequate for irrigation purposes need be dug only fifteen to twenty feet, and there are many fine flowing springs. The White Woman Basin is flooded annually with overflow water carried down by the river from Colorado. In this basin the White Woman River sinks into the ground and becomes a subterranean stream.[1]

Ford county was the home of the Eureka Canal Irrigation Company, which was backed by Asa T. Soule of Rochester, New York. To him this project was purely a scheme to promote his own fortune. The construction of the canal actually cost $250,000, but was sold by Soule to an English firm for one million dollars. Mr. Soule also constructed a railroad from Dodge City to Montezuma, but upon his death, both the railroad and irrigation canal were abandoned.[2]

In considering the material on Kansas irrigation I think authorities have concluded that due to the nature of the soil, topography of the land, and availability of water, western Kansas could be made to bloom exceptionally well. In their analysis, however, they have neglected to consider the economic advisibility of such improvement. The crops which could be produced in this region even under irrigation are already being over produced, and further increase in production would lower the selling price very greatly. Also the additional cost of production would make this

1. Blanchard, Leola, Conquest of Southwest Kansas, Eagle Press, Wichita, 1931, PP. 100-105. (summarized)
2. Kansas City Star. September 7, 1903, Newspaper files, Kansas State Historical Society.

region unable to compete with regions producing the same good under more favorable conditions.

Chapter VII

A Program for Kansas

In formulating a constructive agricultural program for Kansas, and, which will apply to agriculture in all regions, the most important action is to recognize and discontinue using land which is sub-marginal. In a technical sense land is marginal when the value of its product is just sufficient to pay the costs incurred in producing this product and nothing is left as rent of the land. The people who cultivate this land will get pay for their labor and a return for their seed and other expenses, but there is nothing left to justify any investment in the land. Land that produces less than this is sub-marginal and a loss will be incurred if it is used. Land that produces more than the marginal land is supermarginal and after all expenses are paid there is something left as pay for the use of the land. This pay for the use of the land is land rent. The annual rent is capitalized at a going rate of return for such investment and this gives land value.

The preceding sounds simple if one does not look into it too closely. However there are a number of questions which may be asked. What period of time is considered in figuring the income from land?

Is the income based upon what the land produced last year, this year, or in years to come? If future income is considered what prices are to be applied to the yield to determine the net income to the land or the lack of such net income? Also the level of costs will vary, and what level will be considered in determining net income? Taxes must be paid before net income is computed, and what level of taxation is assumed? These, and

many other questions must be answered before a definite solution may be found. Naturally one year cannot be used as a yardstick in computation. The time used should be sufficiently long to cover a complete business cycle. This is especially important in trying to estimate future yields and prices. Another factor to be considered in determining whether land is submarginal is the use to which it can be put. Land that cannot be used profitably for wheat production may be profitable for grazing purposes if allowed to remain in grass. There is land in Western plains county that is now definitely sub-marginal, but which would have been supermarginal if the native grass had not been destroyed. Unfortunately this grass cannot readily be restored. Weeds, insect pests, and disease of plants are still other factors to be considered. These pests, particularly weeds, may increase to such an extent that land which would otherwise be supermarginal becomes submarginal.

These are some of the more important considerations involved in determining whether Kansas has any considerable areas of land which are marginal or submarginal, or other areas which, because of erosion, declining fertility or other causes may become marginal or submarginal in the near future. The problem is not easy of solution but it can be solved with sufficient accuracy for all practical purposes if the needed information is secured and then a constructive program is based on such information.

Kansas has scarcely begun to secure the information needed to solve the problem. The sooner the information is secured the more quickly will the present process of perpetuating misery and privation on submarginal land be stopped. Also this will stop losses to the state and nation which

are incurred when relief must be extended to those who make the mistake of attempting to farm marginal and submarginal land.

This chapter has dealt chiefly with land which is marginal and submarginal. Little has been said of the efficient use of the supermarginal lands. More efficient use of these better lands would naturally result from more definite information concerning them. This is one of the greatest values from such a program. It is one of the most certain ways of increasing the prosperity and happiness of the people of Kansas. Delay in starting such a program will result in losses to the people of the state that will be far greater than the cost of securing the needed information and putting into operation a program for the efficient use of Kansas land. When this is done, Kansas can have a satisfactory land utilization program and it will be possible to answer the question of whether there are any considerable areas of marginal and sub-marginal lands in Kansas. Until this is done the state and the citizens of the state must continue to guess concerning these vital matters with all the individual and social losses that go with such guessing.

An alternative to this program, and one which seems to me more logical, is for the Government to rehabilitate these farmers in industrial pursuits, which would cost no more than direct aid at the present time, and would in the long run benefit those farmers, who, on marginal and supermarginal could secure a more comfortable living. In normal years we produce more agricultural products than we can domestically consume, and since our foreign markets have shrunk since the war, there is no logical reason for Federal subsidy to any industry which operates under an increasing cost handicap. Our demand for agricultural goods is

inelastic, so if any industry is to be aided it should be those in which there is an elastic demand for its products. Many persons claim that our county is suffering from mal-distribution rather than over production, but I prefer to use the term "mal-production", in that our productive efforts should be turned from inelastic fields to elastic ones. Undoubtedly more homes could use bath tubs, electric lights, automobiles, and other manufactured goods. In fact there is hardly a limit which could be placed upon consumption of this type, but the amount of wheat we can use in the form of bread stuff is definitely limited-and our production techniques have exceeded consumption. Possible new markets can be opened, but with each nation tending to become more nationalistic, it is rather doubtful. Perhaps the farmers would object to this action, since they have been kidded into thinking they were individualists, however, a bit of education will go a long way even with a farmer, and experience has been a dear teacher.

Chapter VIII

Farm Loans

An examination of loans made to farmers by the Federal Land Bank of Wichita and by the Land Bank Commissioner indicates that government loans are made to the largest percentage of farmers in the wheat growing counties. The percentages of farmers who were borrowers June 30, 1935, in ten counties in the plains region, compared to the percentage of borrowers in ten eastern counties.*

Western		Eastern	
County	percentage	County	Percentage
Stafford	17	Harvey	12
Edwards	25	Butler	11
Ford	38	Greenwood	11
Gray	45	Woodson	13
Haskell	38	Allen	8
Grant	31	Bourbon	10
Stanton	32	Crawford	4
Meade	59	Labette	8
Finney	43	Neosho	6
Lane	56	Coffee	12

To be eligible as a borrower, an applicant for a loan from a Federal Land Bank must be a bona fide operator of a farm or must derive the principal part of his income from farming operations or livestock raising.

It is reasonable to assume, therefore, that Federal Land Bank funds were largely acquired by actual farmers in this region and were used to finance the acquisition of land, farm equipment, or both. The farm credit

*Farm Credit Administration, Wichita, Agricultural Leaders' Handbook. No. 2, Wichita, 1936, P. 9.

administration states that loans may be made for the following purposes.[1]

1. To provide for the purchase of land for agricultural purposes.

2. To provide for the purchase of equipment, fertilizers, and livestock.

3. To provide buildings and for the improvement of farm land.

4. To liquidate indebtedness of the owners of the land mortgaged, incurred for agricultural purposes, or incurred prior to January 1, 1933.

5. To provide the owner of land mortgaged with funds for general agricultural uses.

6. Loans may be made to pay indebtedness, if it is secured by a lien on farm property, even though farmer is not personally liable.

A survey of the region and an examination of the agricultural statistics gathered by federal and state authorities indicates that:

1. The trend in livestock production does not explain the widespread use of government funds.

2. The use of fertilizer has probably shown no increase.

3. There has been little building and construction work on farms in this area. The one exception is the round top machine shed.

4. "General Agricultural purposes" are, chiefly, machinery and seed costs.

5. Indebtedness for "Agricultural purposes" incurred prior to January 1, 1933, was largely for the purchase of farm machinery.

6. Loans secured by "liens on farm property for which the farmer is not personally liable" may have originated in the acquisition of farm machinery.

7. Tenancy trends do not suggest the acquisition of land for

1. Ibid., P. 7.

agricultural purposes as a complete explanation for this large percentage of loans in wheat growing counties.

There is little doubt that a large portion of Land Bank loans in western Kansas was used for the purchase of equipment. However, most of the farmers who were interviewed used the loans for the payment of delinquent taxes and for the repayment of loans to personal friends. Total loans outstanding in the entire state of Kansas, by the Federal Land Bank and Land Bank Commissioner on June 30, 1935, amounted to $ 134,828,800.

The Production Credit Corporation of Wichita sponsored the organization of fifteen Production Credit Associations in Kansas, which had 3,321 loans amounting to $ 2,456,527.34 outstanding, on October 31, 1934. These associations made short term loans for production purposes, including the purchase of machinery, the fattening of livestock, and the harvesting of crops. Most of the loans were for one year's time, but could be made for as long as two years. Little information is available showing the distribution of the loans. While the borrowing period is limited, doubtless a portion of these loans has gone into machinery or to retire obligations arising out of the acquisition of machinery in the past.

Neither the Federal Land Bank nor the Production Credit Association has supplied the farmer with the funds for the purchase of farm equipment in a satisfactory manner. The Federal Land Bank loan is available only to land owners. The Production Credit Association loan does not run for a sufficient period of time to meet the needs of farmers in a region of uncertain rainfall.

Although not of outstanding importance, but a humorous indication of the attitude of a colored farmer toward government assistance, is the following letter, which is an exact copy of the one received by the Logan County Relief office.[1]

1. Logan County Relief Office, Filed Records.

A SAD, SAD STORY.

PERCY L. ZIBELL
ZIBELL: WINONA KANSAS JUNE TH 15/1935

SOME TIME IN MAY ON AND BEFOR THE THIRTYES.(30).MAY I HOT A LETTER FROM THE POOR COMMIONER MR. S. K. TITUS STATING THAT IAND MY WIFE MUST APPERE DON AT RUSSELL.. SPRINGS THAT THERE WERE A NEW RELIEF BEING SET UP. AND I DID AS I WERE INFARM TO DO CALL DON TO THE SPRINGS.

ALL MIST UP SENCE I CALL SENCE I CALL DON TO THE SPRINGS I CANT FIND THE FELLOW THAT RELY TOLD ME TO COME AND I CANR FIND THE FELLOW THAR HADE ANY THANG TO DO WITH IT AT ALL.

THAY ALL SAY I DID NOT HAVE ENY THANG TO DO WITH IT.

I ASK MR. S. K. TITUS HE SAY I DID NOT HAVE NOTHING TO DO WITH IT.

I AS MR. JAMES C. JONES I DID NOT HAVE ENY THANG TO DOWITH IT.

I SEEN MR. CLIPPON THE COUNTY AGENS HE TALK RUFF.

I THOUGH MABY YOU WOOD KNOW YOUR SELTH.

I AM LEFT BETREEN THE DEAVEL AND THE DEEAP SEA. I DONT KNOW WHERE I AM GONING BUT I AM GONING SOM.

FILED. IN BOOK ONE. (1)

WELL. HERE. THE WAY IT GOES.

I. THOUGHT THAT I COOD DEPEND UP.ON THE HOMESTID.REABILITATION.SO I GOSE AND MAKE ARANGMENT AND BY MY SELTH SOME CORN TO FEAD MY WORK HORSES.

AND THEN I BY SOME SEEAD POTATOES COST $165.a100.LB.

TWENTY NINE LB BU.S COST. COLBY $33.60

HALLING POTATOES FROMCOLBY KANSAS. COST 4.50.

COIN FOR WORK HORSES COST SEVEN BU.AT 1.10A. 7.70.

MY STORE BILL WHILE I WERE WATING FOR REABILIGTION 1o.28.c

MY GASS AND OIL FOR THE TRACTOR. COST 13.65.

SEAD CORN FORTEN ACRES. AT 2.50. BU 5.00

SOODAN. GRASS.10c LP. ONE HUNDRED LP. FOR TEN. A.....10.00

CANS SEAD SIX CENTS A LP. THAT 3.00 A. BU. COST FOR ##.ACRES 30.00

MILOW MASE CONT KNOW WHT IT COST BUT PLENTY.....00.00

THAT LEVE SIX. ACRES FOR GARDENG AFTER FIGGING OUT POTATOES

COST SIX ACRES LEFT FOR GARDEN 3.00 to 6.00.

COSS TO SEAD GARDEN.....33.00

TOTAL AMOUNT..... .....$1.47.72c

MY REABILITATION CHACK.WERE.....61.00.

OVER CHACK NO FUNDS.....$86.72c

KNOW THEN YOU READLY SEE AFTER CHACK ING THE AMOUNT IT TAKES TO SEAD SEVEN FIVE ACORS THAT I DID NOT ASK FOR TO MUCH MONEY BUT MR. CLIPPION THE COUNTY AGENS SAYS I AM OFF THAT I DONT NEAD IT THAT HE GOT TO MUCH THROUGH ME LAST YEAR WHEN HE GOT ME A 150/00 BUT LAST YEAR FARMING STOP WHEN THE FARMERS GOT THERE CROP IN FORIT WERE SO DRY THAT THERE WERE NOTHING DRORED AND ALL FARMING EXPENCES STOP ANDTHERE WERE NO YOUST OF HOLLING ABOUT YOUR SHORTIS IN ROPARTING EXPENCES AND BONDFIDED FARMER KNED THATE NO YOUST OF SAYING ENY MORE ABOUT IT AS HE KNUE HE HAD A NUGG BOWERED ALL RADY TO BUCK THE BROTH.

MR. CLIPPION DECLAIS THAT I CONT NEAD NOR T AN75.$00 toPLANT SEVENTY FIVE ACRES I THANK MR. CLIPPION IS LL MIXTA UP JUST LIKE MY SELTH. HE DOXRN CONSEDER WHAT $TILE OF A FARMERING I AM DOINGHE SEAS HE WILL NOT PROVE OF THE LONE FOR SEAD MY REABILITATION CHACK IS ALL SPENT NOHING TO GO ON AT ALL THE STORE KEAPPER SAYS THAT HE CANT LT ENY THANG OUT AND TAKE A CHANCETHE REABILITATION HAVE A LINE ON MY CROPAND ALL THE PERNAL PROPERTY. THE POTATOER DEALER SAYS I WILL HOLD THOS POTATOES FOR MY MONEY THE GASSALONE MAN SAD DAM ME AND SAD THE SHARIFF WILL HANDLE THE MATTERS YOU WHERE SEE I AM AT AS I SAY BETWEN THEDEVEL ANDTHE DEEP SEE MY FLOW CAN IS EMPY IF I CANT GET THE SEAD LOND THOUGH I AM DUCK ARE MABY I CAN MAKE A GOOD HORSE TRADE GOING SOME THAT WHAT I SAY AND DONT MEAN. MABY.?

YOURS_____ REABILITATION COSPONDING

Chapter IX

Conclusion and Summary

The foregoing discussion has clearly shown that agriculture in the "Dust Bowl" area of Kansas is in a position which is not pleasant to see and which is difficult to correct. Two proposals have been offered: First, if markets can be expanded it is possible to follow a program of soil conservation, which, in the long run may be beneficial to the farmer as an individual and society as a whole. Second, if markets cannot be expanded, it will be profitable, as well as advisable to remove from cultivation the agricultural land which does not return to the farmer his cost of production. During the last twenty years we have developed ton-litters of hogs, and in other ways have been able to make two blades of grass grow where one originally grew, yet during this time our population at home has increased very little and our export market has shrunk. Most produce of agriculture has an inelastic demand, and when the supply is continually increased the only probable result is a lower price for the farm produce, and since agriculture is an increasing cost industry, the lower selling price per unit will have to cover a rising cost of production.

The dust storms which have ravaged the South-western portion of the state for the last four years have not yet been put under control, as was shown on February 18, 1939 when this country was again darkened and visibility reduced to less than one hundred fifty feet. It is unlikely that snowfall during the rest of the winter will be sufficient to stop the dust.

Many farmers have been forced to gather together their few belongings and move to new homes; others have stayed merely because they did not have finances necessary for a change. The rest realize that their only salvation is through cooperation with each other and with the Government.

The children of farmers have been handicapped in social and educational development, and most of them have been forced to do the labor of matured persons because the farmer could not afford to pay wages to someone else. Perhaps the farmers have been encouraged and given strength to carry on by reading and believing the passage in the Bible, "Blessed be the poor, for they shall inherit the earth."

Due to the fact that the State and Federal Boards have only begun an intensive study of this region it is necessary to speak in terms of trends and indications in regard to future programs for this region. The period since 1920 is too short to insure reliability in predicting a change in climatic conditions.

It is doubtful if the future of this region may lie in a return to a range industry due to the destruction of pasture land by dust and weeds. If rainfall in the future is not greatly increased, even a program of re-sodding would not be successful.

To make this region successful in agriculture, irrigation seems to to be necessary. However, even though there might be a sufficient amount of water available for this purpose, the topography of the land would make necessary a program of surveying and leveling the fields which would greatly increase the cost of production. Evaporation by wind and heat is so great that showers are of little value to growing crops. Also the run-off is not regulated. During the winter and spring of 1939 more than a normal amount

of precipitation fell, but the growing wheat in the area was almost a total loss.

No industry should be subsidized to the extent that agriculture was in 1934, except infant industries, and no person recognizing existing conditions can expect the farmer to carry the disadvantages of his life with little hope of making wages for himself or his family. Farming has been called a way of life, but there are better ways than on the plains of the Kansas Dust Bowl.

Bibliography

1. Agricultural Adjustment Administration, Agricultural Conservation 1936 U. S. Dept. of Agriculture, Washington D. C., 1937.

2. Aicher, L. C., Damming attatchment for Listers, Thirteenth Biannial Report of the State Board of Agriculture, Kansas, Topeka, 1937. PP. 78-82.

3. Blanchard, Leola Howard, Conquest of Southwest Kansas, Eagle Press, Wichita.

4. Byrd, Wheat farming corporation, Report, 1930.

5. Chambers, T. B., "The S. C. S. Erosion Control Program", Agricultural Engineering, XVIX August 1935, PP. 301-303.

6. Cutler, Wm. History of State of Kansas, Andreas, Publisher, New York, 1883.

7. Dodge, R. I., The Plains of the Great West, Putnam, New York, 1877.

8. Dodge City Globe, January 1, 1931.

9. Dudley, F. L., "Erosion Control", Kansas State Board of Agriculture, Quarterly Report, Topeka, March 1935, P. 29.

10. Flora, S. D. Direct Correspondence, October 1938.

11. Great Plains Committee, The Future of the Great Plains, report of President Roosevelt's special committee, Washington, Dec. 1936.

12. Greenfield, George, "Unto Dust", New York Times, March 8, 1937.

13. Grimes, W. E., "Farm Leases in Kansas", Kansas State Agricultural College Experiment Station, Bulletin No. 221, Manhattan, 1919.

14. Grimes, W. E., J. A. Hodges, and R. S. Kifer, The Effects of the Combine Harvester-Thresher on Farm orgination in Southwestern Kansas and Northwestern Oklahoma, Kansas State Agricultural College Experiment Station, Bulletin No. 142 Manhattan, 1928.

15. Grimes, W. E., J. A. Hodges, R. D. Nichols, and Jesse W. Trapp, A study of Farm Organization in Central Kansas, United States Department of Agriculture, Bulletin No. 1296, Washington, D. C., 1925.

16. Hibbs, Ben, "Dust Bowl" Country Gentleman, March, 1936, PP. 5-6, and 82-87.

17. Hibbs, Ben, "The Dust Bowl Can be Saved", Saturday Evening Post. December 18, 1937.

18. Hodges, J. A., F. F. Elliott, and W. E. Grimes, Types of Farming in Kansas, Kansas State Agricultural College Experiment Station, Bulletin No. 251, Manhattan, 1930.

19. Hurst, W. M., and L. M. Church, Power and Machinery in Agriculture, Miscellaneous Publication No. 157, United States Department of Agriculture, 1933.

20. Kansas City Star, (September 7, 1902, Newspaper Files, Kansas State Historical Society), Topeka.

21. Kansas State Board of Agriculture, Biennial Reports, Topeka, XXll to XXX.

22. Kansas State Board of Agriculture, Quarterly Reports, (March 1933, March 1935, December 1935, December 1936) Topeka.

23. Kansas State Planning Board, Progress Reports, (Mimeographed), Topeka. 1934-1935.

24. Kinsley Graphic, (March 8, 1879) Files in Kansas Historical Society Library, Topeka.

25. Knapp, George S., "The Kansas-Colorado Water Controversy", Kansas State Board of Agriculture, 22nd Biennial Report, Topeka, 1920, PP. 250-258. Logan County Tax Files, Russell Springs, Kansas.

26. Matthaei, L. E., "More Mechanization in Farming", International Labor Review, XXIII, (March, 1931) PP. 324-368.

27. National Resources Boaid, Soil Erosion, Washington, 1935.

28. Poor's Financial Service, 1936 Industrials, Poor Publishing Company, New York, 1937.

29. Rhoades, E. L. "Harvest Labor, 22nd Biennial Report, Kansas State Board of Agriculture, Topeka, 1920.

30. Richards, Charles, A., "Agriculture and the New Age", Kansas State Board of Agriculture, Quarterly Report, March 1935, Topeka, P. 19.

31. Salmon, S. C., and R. I. Throckmorton, Wheat Prodution in Kansas, Kansas State Agricultural College Experiment Station, Bulletin No. 248, Manhattan, 1929.

32. Southwestern Bell Telephone Company, Economic Survey of Kansas, Saint Louis, 1930.

33. Stephens, P. H., "Why the Dust Bowl?", Journal of Farm Economics XIX, August, 1937, PP. 750-757.

34. Stuart, Henry, Conquering our Great American Plains, E. P. Dutton and Company, Incorporated, New York, 1930.

35. Throckmorton, R. I., and R. L. Dudley, Soil Fertility, Kansas State Agricultural College Experiment Station, Bulletin no. 260, Manhattan, 1932.

36. Topeka State Journal, August 5, 1936.

37. United States Department of Agriculture, Yearbooks, Annual Reports, Secretary of Agriculture, Washington, 1920-37.

38. United States Department of Commerce, Bureau of Census, Kansas, Statistics by Counties, the 1935 census of Agriculture, Washington.

39. Washburn, R. S., Cost of Producing Winter Wheat in the Central Great Plains Region of the United States, Department Bulletin no. 1198 United States Department of Agriculture, Washington, 1924.

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