THE ECONOMIC EFFECTS OF THE CONSERVATION PROGRAM ON THE SMALL LIVESTOCK FARMS OF THE STILLWATER CREEK AREA OF OKLAHOMA

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By

CYRIL C. PIERCE

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Oklahoma Agricultural and Mechanical College

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Chris Nelson
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Chris Nelson
Head, Department of Agricultural Economics

D. G. McIntosh
Dean of Graduate School

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DEFINITIONS OF TERMS USED

Conserving Farms: Those farms in the Stillwater Creek Area whose operators signed an agreement with the Government to carry out soil conserving practices.

Non-Conserving Farms: Those farms in the Stillwater Creek Area whose operators did not sign an agreement to carry out soil conserving practices.

Cooperating and Non-Cooperating Farms: Terms used synonymously with Conserving and Non-Conserving Farms.

Total Farm Receipts: Cash farm receipts plus increases in farm inventories (except land)

Total Farm Expense: Cash farm expenses plus estimated cost of board for hired labor and decreases in farm inventories (except land).

Total Farm Income: Gross receipts less total farm expenses and value of unpaid family labor.

Building Expense: Net decrease in building inventory.

Machinery Expense: Net decrease in machinery inventory.

Productive Livestock: All farm livestock excluding horses and mules.

Net Decrease: When first inventory plus purchases is greater than second inventory plus sales.

Net Increase: When second inventory plus sales is greater than first inventory plus purchases.

Animal Unit: One mature horse or cow, four calves, two yearling heifers, steers or colts, five market hogs, eight shoats, a sow with pigs, four sows, seven sheep, fourteen lambs, one hundred hens, or fifty turkeys, is equal to one animal unit.

INTRODUCTION

The problem of conserving our soil resources is one of major importance and has been recognized as such by soil scientists and those engaged in experimental work for a long period of time. On the other hand, the farmers of the nation have been slow to awaken to the seriousness of the situation. As long as there was a wealth of undeveloped land to be had for the taking, it is not surprising that they should have ignored any suggestions that might have added additional expenses and labor to their farming operations. On the other hand, the present generation has begun to realize that farm income is doomed to decline under present exploitive methods of farming.

Much has been written by qualified soil technicians concerning the causes of soil loss and the most acceptable methods of controlling those losses.[1/] The problem that now confronts the farmer is one based on the economic feasibility of a conservation program for his home farm. He would like to know how much conservation he can afford, the amount of cash expense involved, the immediate effects upon crop yields, the additional income that he can expect from a soil conserving program; in short, he would like to know how much of the soil the present generation can afford to save and at the same time conserve the human resources of the nation.

Since 1936 the Bureau of Agricultural Economics and the Soil Conservation Service have established cooperative research projects in the economics of soil conservation. These projects cover 51 demonstration areas in 17 states. Some of these have been operating for as long as five years while others have been in existence for only a few months.

1/ Miscellaneous publications of the Soil Conservation Service.

Practically all of the material available on the economic phases of the program consists of studies made by these research workers. Most of their summaries and analyses, however, deal either with isolated individual farms or single factors affecting the program. Where the study has been extended to larger groups, they were rather indefinite, being based on "average farms" or such wide divisions as "cooperators and non-cooperators". It is recognized that each individual farm has its problems but it is also felt that information should be made available which could be applied to all farms of a similar type.

The object of this study is to show the economic changes, if any, which have been brought about by the conservation program on a definite type of farm in a given farming area. Any program which brings about changes in the farming system will also have a definite effect upon the managerial problems of the farm operators. This has been taken into consideration and some attempt has also been made to point out the changes it may be necessary to make if a conservation program is adopted on farms of this type.

The information used in this study was taken from the farm records available for the area. Arather comprehensive survey was made in 1933 by the Oklahoma Agricultural Experiment Station and a limited number of farm records were collected by the Soil Conservation Service in connection with the Bureau of Agricultural Economics for the years of 1937 to 1940, inclusive. A comparison of the group of small livestock farms for 1933, 1938 and 1939 gives a rather definite picture of the organization of the farms before the conservation area was organized and of the changes which have taken place after the inauguration of the conservation program. The farms were divided into two groups: for 1933 the division

was made on the basis of those who later cooperated with the conservation program and those who did not; the 1938 and 1939 records are for the actual cooperators and non-cooperators within the Demonstration area. Throughout this study the terms "cooperators" and "conservers" are used synonymously to indicate those farmers in the area who signed and carried out a cooperative agreement with the Soil Conservation Service.

Attention is called to two research bulletins published by the Iowa Agricultural Experiment Station, Ames, Iowa. These bulletins are entitled "Economics of Agricultural Land Use Adjustments" and have a close relationship to the problems involved in this study. Bulletin 209, Part I of this series, was written by Rainer Schickele and was published in March, 1937. This work deals with the methodology in compiling data for Economic studies of the soil conservation program. Part II, Bulletin 241, written by Rainer Schickele and John P. Himmel, was published in October, 1938. This bulletin was sub-titled "Socio-Economic Phases of Soil Conservation in the Tarkio Creek Area and consisted in the main of a study of the effects of tenure and farm indebtedness on the program. The authors found that tenants, other than those related to the landlord, and operators carrying heavy farm indebtedness were not apt to be concerned about the future of the soil.

The Southwest Social Science Quarterly for December, 1940, carried an article written by Duncan and Boyer who summarized briefly some of the social implications of the conservation program in the Stillwater Creek area. They report that very few social differences could be found between the cooperators and the non-cooperators in this governmentally sponsored soil conservation program. After investigating six factors,

namely, (1) age, (2) education, (3) mobility, (4) fertility, (5) standard of living, and (6) distance from market, they found that only the second and the fift factors as listed above might have a bearing on the program.

higher in school and to have a slightly higher standard of living as expressed in terms of the amount of money spent on family living.

A number of articles concerning economics and the conservation program have appeared in the issues of Current Farm Economics during recent years. These articles were written by staff members of the Department of Agricultural Economics and specific references have been made to these articles in the body of the thesis.

Description of the Stillwater Creek Area

Physical Description of the Area

The Stillwater Creek watershed is located on the eastern edge of the Red Plains region which runs northeast to southwest through Central to Western Oklahoma. Stillwater Creek, starting in Southeastern Noble County, about 75 miles south of the Kansas state line, flows in a southeasterly direction across Payne County into the Cimmaron River.

The soils of this area are composed chiefly of the red shales and sandstones of the Permian period overlying mixed shales, sandstones and limestones of the Pennsylvanian period. These soils are characterized by their red color and frequent alkali spots.

The watershed was originally composed of flat to gently rolling areas of older clay pan soils such as Kirkland, cut by streams and ancient gullies twenty-five to a hundred feet deep and three to five times as wide. The general landscape is rough but decidedly not rugged. The whole area is subject to erosion with advanced stages of gully erosion occurring on much of the cultivated land.

The soils of the area can be grouped into classes which have similar conditions as far as type of farming, slope and erosion are concerned. [1/] The soils of Group No. 1 are rather flat to gently rolling upland soils. They make up the older soils of the area and are largely in cultivation. These soils are droughty in nature due to well developed claypans near plow depth. Sheet erosion is the chief problem with gullies usually wide and shallow. Few uncrossable gullies are present.

Group 2 soils occur on the edges of the table lands and usually

1/ Appendix - p. 71

adjacent to Group 1 soils. They are rolling but seldom occur on slopes as steep as 5 per cent. They are in the "B" slope range with a major portion of their area in the 2½ to 3½ per cent range. These soils contain frequent alkali spots and erosion is most severe. They have been rather highly cultivated and a considerable area has been abandoned owing to erosion. This group probably represents the greatest problems in land use of any group in the area.

The soils of Group No. 3 are generally tighter soils originally covered with grasses. Only about 50 per cent of this area has ever been cultivated and some of this has been retired. They are "B" slopes averaging 4 per cent and sheet erode easily and gully quite often.

Group 4 soils are all in pasture and contain the most of the "C" and "D" slopes of the area. They menace the better soils lying above and create a problem in water disposal.

Group 5 is the most variable group of the area. These soils occur on the "B" slopes near the major valleys and gully readily. The nature of the soil together with a predominance of cultivated row crops has caused erosion to reach advanced stages. Much gullied and abandoned land is found in this group.

Group 6 soils are gently rolling valley soils usually found high on the terraces or second bottom. The soils erode badly though not so much as groups 2, 3 and 5. Most of this area is in cultivation and due to the friable nature of the soils, gullying is quite extensive.

The soils of Group 7 are the most productive in the area. They are divided into two groups, those in 7A being the flood plains along the major streams. These soils are damaged by silting and flooding. Erosional debris much less fertile and coarser than the earlier deposits are left by flood waters and are harmful to the type of crops grown on

these soils.

The 7B soils are the first terrace or alluvial soils immediately above the flood plains. Most of these soils are in cultivation and have not been affected a great deal by erosion except for silting damage.

The Stillwater Creek watershed averages 900 feet above sea level. The growing season is slightly over 200 days with the latest killing frost recorded occurring on May 1, and the earliest on October 6. The lowest temperature recorded was -18 degrees Fahrenheit and the highest temperature 115 degrees Fahrenheit. The average rainfall for the area from 1894 to 1930 and 1931 to 1940 inclusively was 33.69 inches and 30.97 inches respectively.[2/]

Water conservation has always been a major problem for farmers of this area. Due to the erratic pattern of the rainfall[3/] it is hard for the soil to absorb enough moisture to carry the crops through the normal growing season. The droughts of recent years which have depleted the subsoil moisture have tended to aggravate this condition. Most farms of the area also need additional tanks and ponds for livestock water.

Wind erosion in this area is of such minor importance as compared to sheet and gully erosion that it deserves little consideration.

2/ Wahlgren, H.F. Climatological Data. Annual Report of Weather Bureau, Oklahoma City, Oklahoma.

3/ Figure 5, p. 22

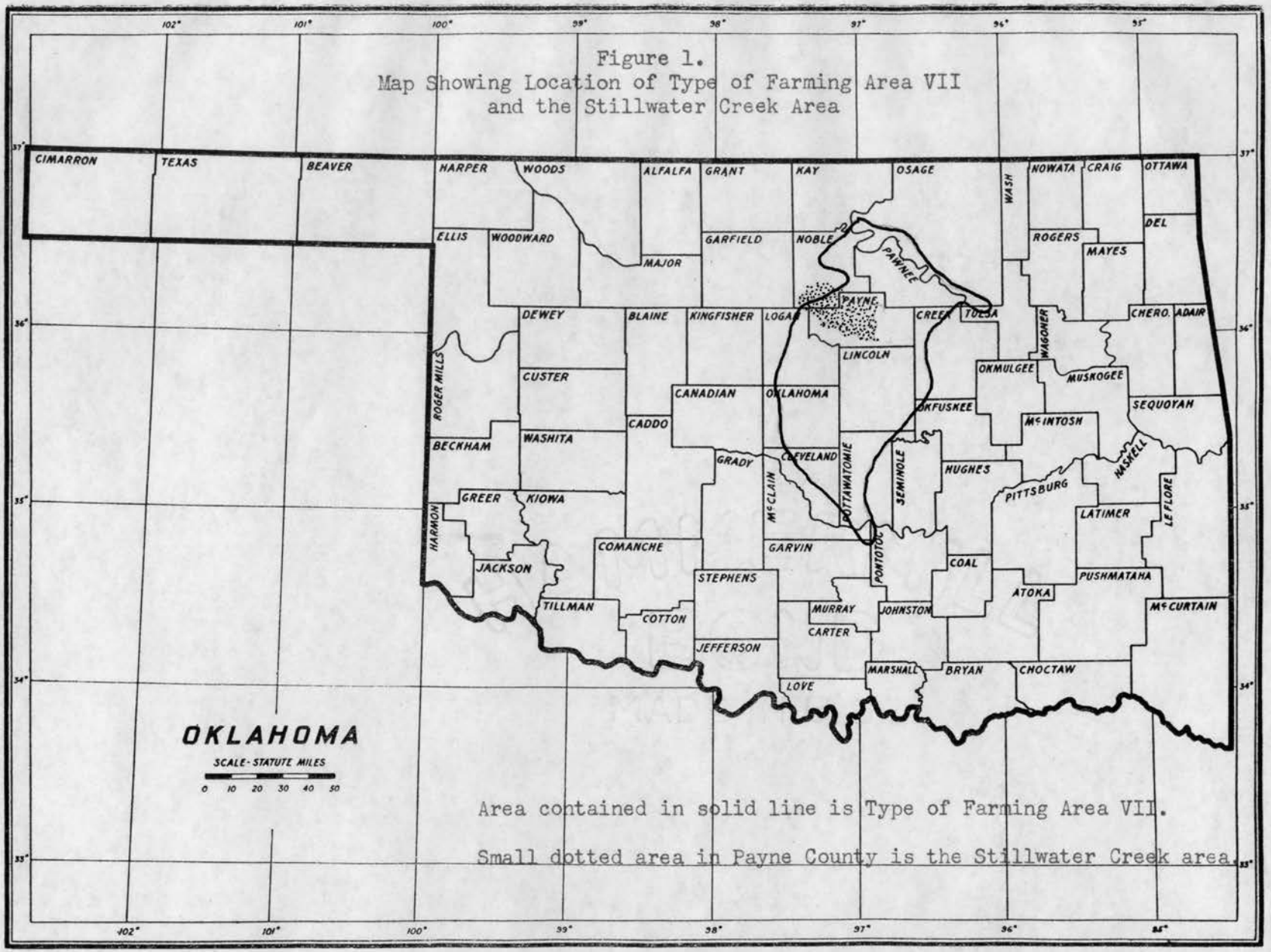


Figure 1.
Map Showing Location of Type of Farming Area VII
and the Stillwater Creek Area

Area contained in solid line is Type of Farming Area VII.

Small dotted area in Payne County is the Stillwater Creek area.

Description of Tenancy in the Stillwater Creek Area

Farms of this area covered in the 1933 survey are divided into two groups: those who later became cooperators with the soil conservation program and those who did not. They are referred to here as conserving and non-conserving farms. Of those who later became cooperators, approximately 60 per cent owned part or all of the land which they farmed, while only 48 per cent of those who did not cooperate owned a part or all of their land. A survey of the same area for 1938 and 1939 shows that there has been little change if any in the amount of farm tenancy in the area as a whole and that the same per cent of both groups were tenant farmers.

Table 1
Per Cent of Full-Owners, Part-Owners and Tenants in both Conserving and Non-Conserving Groups of Farms for All Farms in the Area and for Livestock Farms
(1933 and average for 1938 and 1939)

	Conserving Farms			Non-Conserving Farms		
	Full Owners	Part Owners	All Tenants	Full Owners	Part Owners	All Tenants
All farms in the Area, 1933	35.8	24.7	39.5	29.1	18.8	52.1
Livestock farms in Area, 1933	45.3	28.3	26.4	30.3	28.8	40.9
All farms in the area, 1938 and 1939	34.1	26.2	39.7	33.0	19.0	53.0
Livestock farms in Area, 1938, 1939	38.2	26.4	35.4	32.2	10.2	57.4

Of the livestock farmers included in the area in 1933, farm tenancy was higher among the non-conservers than it was in the group who later became soil conservers. There is a still wider spread between the per cent of farm tenants on the cooperating and non-cooperating

livestock farms in 1938 and 1939, although farm tenancy is higher in the soil conserving group in 1938 and 1939 than it was in 1933. However, in 1933 only 48 per cent of the farms in the area were livestock farms, while in 1938 and 1939, 70 per cent of all farmers in the area were depending upon livestock as a major source of income.[4/] The proportion of tenancy in this area is found to be considerably less than in the State as a whole as may be seen by comparing the following figures with those in Table 1.

Table 2.
Farm Tenure in Payne County and Oklahoma
As It Existed in 1935 and 1940

Type of Tenure	Payne County				Oklahoma			
	1935		1940		1935		1940	
	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
Total Operators	3034	100.0	2543	100.0	213,325	100.0	179687	100.0
Full Owners	862	28.4	800	31.5	58,796	27.6	55,859	31.1
Part Owners	349	11.5	339	13.3	23,093	10.8	25,227	14.0
All Tenants	1870	56.6	1438	54.5	130,661	61.2	97,821	54.4

Source: United States Census of Agriculture.

In 1935 only 45.1 per cent of the tenant farmers in the state had been on the same farm for as long as two years.[5/] The high rate of mobility among tenant farmers tends to discourage the use of soil conserving practices among this group. Too, it has been found that tenure seems to affect the system of farming followed on the rented farms. The tendency is toward a cash crop system of farming. Tenants plant a smaller portion of their land to legumes and other soil building crops than do owner operators.[6/]

4/ Table 4, p. 18.

5/ Southern, John H. Farm Tenancy in Oklahoma. Oklahoma Agricultural Experiment Station Bulletin No. 239. December, 1930. p.24.

6/ Ibid. p. 29.

From these facts, together with the figures shown in Table 4, page 13, it can be concluded that the operators who own their farms are more apt to conserve the soil and that they are in a better position to produce livestock than are the tenants who are encouraged in the production of cash crops. One solution might be for the tenant farmer to pay a cash rent if he prefers livestock to crops as a source of income.

Table 3.
Per Cent of Tenants Paying Cash Rent, Share Rent, and Part Cash and Share Rent Among the Small Livestock Farmers of Stillwater Creek Area and for All Tenants in Payne County and Oklahoma

Type of Rent Paid	Small Livestock Farms Stillwater Creek Area		All Types of Farms Payne County	Oklahoma
	1938	1939	1940	1940
Cash Renters	% 58.8	41.7	47.2	27.2
Cash and Share Renters	% 17.6	25.0	9.2	10.8
Share Renters	% 23.5	33.3	32.6	50.4

Source: Local surveys and United States Census of Agriculture.

Physical Aspects of the Soil and Water Conservation Program in the Stillwater Creek Area.

The results shown in Soil Conservation demonstrations in the Stillwater Creek area during the last five years[1] seem to be the best guides available for future recommendations in connection with soil and water conservation problems. Many of the practices have been found to have very little value, or at best, to show negligible returns on the cost of including them in the farm program. On the other hand, technicians of the Soil Conservation Service state that much of the work has been found to be highly successful in conserving soil and water. The following recommendations for the area are based on findings of the Soil Conservation Service which has been active in aiding the farmers of this area. Their statements have been accepted as authoritative since their work is of a much wider scope than any previous efforts made toward conserving the soil in this area.

Terracing

On all cultivated land of over 3 per cent slope, terracing has been found to be a satisfactory means of holding the soil.[2] Most of these terraces have been built level with outlets at the flow line level to conserve the water. Pondage and the long period necessary for surplus water to be evaporated or absorbed on the tighter soils is one of the chief objections from the economic viewpoint to this type of terrace. Level closed terraces should not be used owing to the impervious condition of the majority of these soils.

1/ Wade, Albert E. Project Monograph of the Stillwater Creek Project. Soil Conservation Service, Stillwater, Oklahoma. 1940.

2/ Ibid. p. 23.

On tight soils the terrace should be given a variable grade of 0.1 to 0.25 feet and a drop of 0.5 feet on the first 100 feet to the outlet.[3]

Large wide based ridges with wide flat channels and with maximum horizontal spacings are desirable for heavy types of farm machinery. Smaller type terraces are cheaper to construct and are used in many cases where only light farm machinery is available.

The most difficult problem of terrace construction and the cause of most of the failures is frequent alkali spots. These alkali spots should be avoided where possible in building terraces. Where it is necessary to cross them, the terrace should have a core of good soil and should be surfaced with good dirt.

Terracing cannot be said to be a failure on any farm in the area. It is probably second only to contour tillage in controlling erosion in this area.

Contour Tillage

Contour farming alone as a means of controlling erosion is not recommended except on very flat areas where erosion has not progressed to an extensive degree. Contour farming is recommended on all terraced land in order to prevent erosion between terraces, protect the terraces and conserve moisture.

Contour furrows are recommended for all pasture land in the area which is free of trees. These furrows should be three to five inches deep, five to ten inches wide, three to fifteen feet apart and the disturbed soil should cover as little grass as possible.[4]

3/ Ibid. P. 110.

4/ Ibid. P. 119.

Strip Cropping

Strip cropping has not been considered by conservation experts to be entirely successful in the area due to the difficulty of establishing adequate cover on the sown strips. It would be well to add here however, that the basis for these conclusions are rather limited since most of the attempts to establish strip crops were made during years in which unfavorable weather conditions were prevalent. Crops used, such as small grains, sorghums, and winter legumes, were effective during the time they covered the land but they did not extend through both the early fall and early spring rains when protection to the soil was needed.

Strip cropping alone was used only on Group 1 and some Group 6 soils.[5] Strip cropping is not recommended for general use with terraces in this area except in cases of severely erosive soils, such as the Vernon.[6]

Diversion Terraces

Diversion terraces are recommended throughout the area to protect lands from runoff accumulating above. They are especially valuable in this area for protection of alluvial valley lands from rough broken areas. Diversions are also constructed in many cases to increase the water supply of farm ponds.

Waterways and Outlets

Disposal of runoff water is one of the major problems of this area, In many cases, sodded outlets and meadow strips have been found to be satisfactory as a means of controlling this surplus water. Where some type of masonary outlet is necessary, loose rock structures sodded with bermuda grass have been found to be cheap and practical.

5/ Appendix - p. 71

6/ Wade, op. cit., p. 18.

Dams

Masonary dams for use in controlling gullies are little used owing to expense of installation. Loose rock, brush and straw are widely used for this purpose. In the case of extremely large gullies, earth dams may sometimes be used. These dams must be high enough to prevent overtopping and to divert the excess runoff away from the gully. Construction of a diversion channel around the head of the gully has proven very effective in controlling small gullies.

Fences

The problem of fencing is somewhat closely related to the problems of soil conservation. Construction of fences which follow the terraces would, perhaps, be inducive to contour farming. The construction of adequate fences would also tend to encourage the practice of pasture rotation. Though the need of adequate fencing is widely recognized, the problem has not received a great deal of attention in this area. In many cases the farms are owned by absentee landlords who are reluctant to expend the additional cash for this purpose.

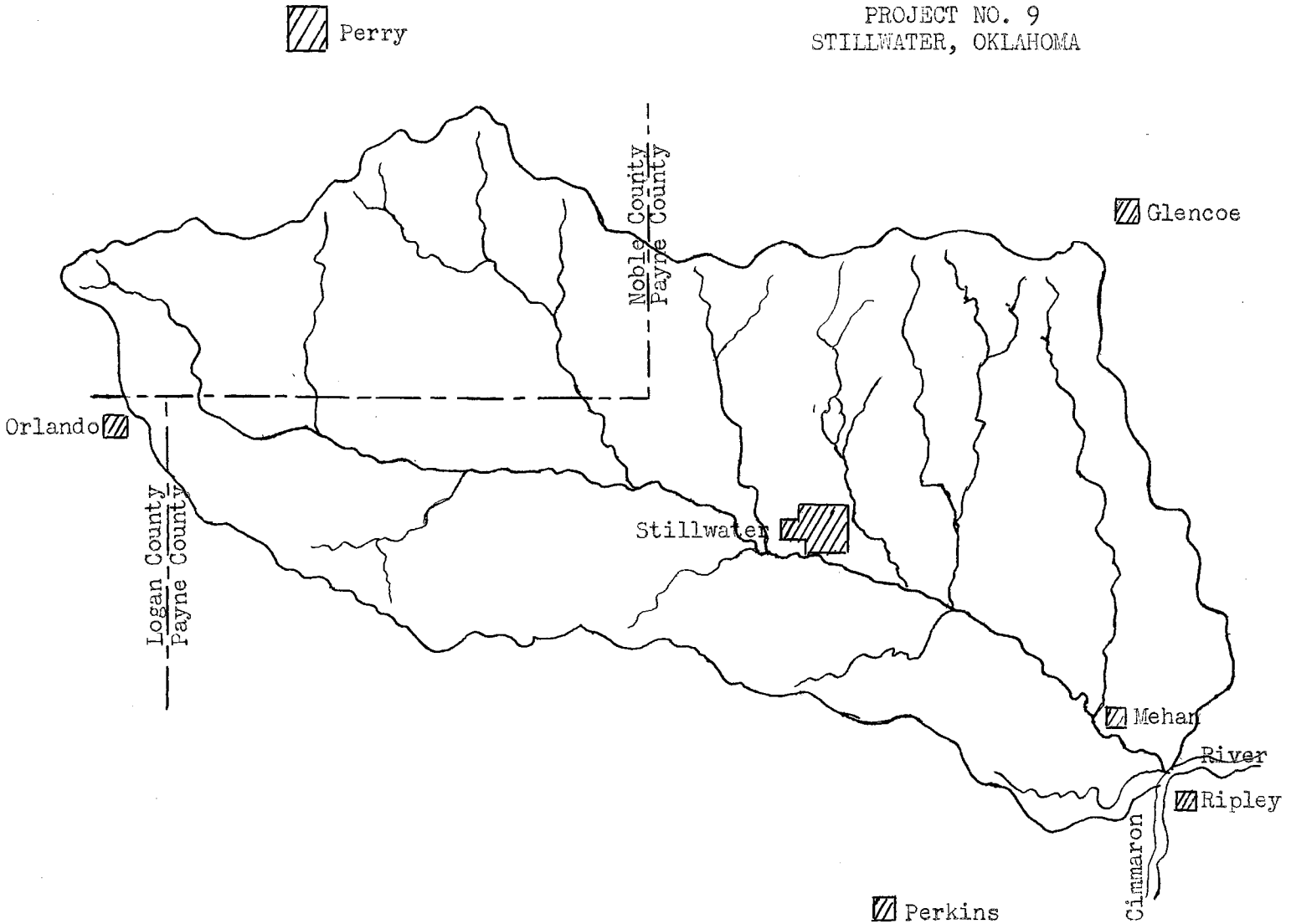
Description of the Small Livestock Farms and the Effects of the Conservation Program Upon Them

Description of the Small Livestock Farms

In classifying the farms in the northern portion of the Stillwater Creek area, the source of income was the chief consideration. Those farms having 50 per cent more income from livestock or livestock products than from any other source were classed as livestock farms, those with 50 per cent more from crops as crop farms, and those receiving 40 per cent or more of their entire income, or as much as $400 regardless of percentage, from labor off the farm were considered as part-time farmers. All others were considered as general farms. The percentages used here as a basis of classification are purely arbitrary. The United States Census reports typed all farms on the basis of 40 per cent of the total income, products used on the farm itself not included. The census report, however, breaks down the classification into various types of livestock farms such as dairying, animal-specialty, stock-ranching and poultry. Since all livestock farms of this area were to be considered as one class, regardless of the kind of livestock involved as the major enterprise, it was found to be more accurate to use a figure higher than 40 per cent. The basis of classification used above would be equivalent to requiring that approximately 60 per cent of the income be from livestock.

After classifying the farms in the Northern portion of the watershed according to the method described above, they were further subdivided on the basis of size. It was found that approximately 55 per cent of the farms fell within the group ranging from 120 to 259 acres and that approximately 41 per cent of the farms of this size were livestock farms. These small livestock farms grow a variety of feed crops

Figure 2.


U. S. SOIL EROSION SERVICE
DEPARTMENT of the INTERIOR
PROJECT NO. 9
STILLWATER, OKLAHOMA
Perry
Noble County
Payne County
Glencoe
Orlando
Logan County
Payne County
Stillwater
Mehan
River
Ripley
Cimmaron
Perkins

including grain sorghums, corn, oats, wheat, barley, forage sorghums, wild hay, and also some cotton as a cash crop. A substantial proportion of the farm income from this group is from the sale of dairy products due in part to the favorable market outlets for these products in the town of Stillwater. These farms vary from the average in the area as a whole inasmuch as they are limited as to size and all of them depend upon some form of livestock for a large proportion of their income. In the western portion of the watershed there are a number of larger farms producing wheat and cattle and along the major streams many of the bottom-land farms are producing cotton as a cash crop.

The soils of the small livestock farms of this area are essentially the same as those described under the portion of this study devoted to the area as a whole. The exception to this would be the classes of soils described as bottom lands since farms in the group studied are practically all upland farms. The conservation program consists for the greater part of mechanical measures for controlling the loss of the soil. Within the limits of this study, none of the livestock farms were found to be carrying out a planned crop rotation system for soil improvement. In the case of the permanent pasture land the information available indicates that little has been done to improve its condition other than the construction of some contour furrows.

On those farms cooperating with the conservation program, adequate means for controlling loss of soil has been adopted. These measures were installed at the expense of the government and no adequate figures are available on the cost of such construction work when done by the operator although it is conceeded that a similar program could be carried out by the operator over a period of years at very little cash expense if he so desired. At any rate this would be only a temporary

problem and this study is concerned chiefly with the long time economic effects which a program of soil conservation would have on farms of this size and type.

Effects of the Conservation Program on the Small Livestock Farms

Type of Farming

From the table on the following page it is found that in 1933 48.8 per cent of all farms in the area were livestock farms and that 29.8 per cent of the total were livestock farms in the 120 to 259 acre group. In 1938 and 1939 the livestock farms had increased to 70.1 per cent for the area and 40.7 per cent of the group were small livestock farms. This change in type of farming, based on the farm income, cannot be attributed to the soil conservation program as much as to the fact that the index of purchasing power of livestock and livestock products increased during this period from 65 to 90, while the index of purchasing power of farm crops decreased from 67 to 60.[1/] It is of significance to note that the livestock farmers were the only group in which there were a larger number of soil conserving farmers than there were non-conservers.

For the past five years the prices of Oklahoma farm products have been very distinctly in favor of livestock production, while the lack of rainfall has tended to bring about changes in the type of crops grown in the area.[2/] These changes in the price level and the weather conditions have affected both the farm organizations and the farm incomes, and consequently it would be hard to say just how much of the change in the type of farming in this area could be ascribed to the conservation

1/ Figure 3, p. 17.

2/ Table 5, p. 20

Table 4.

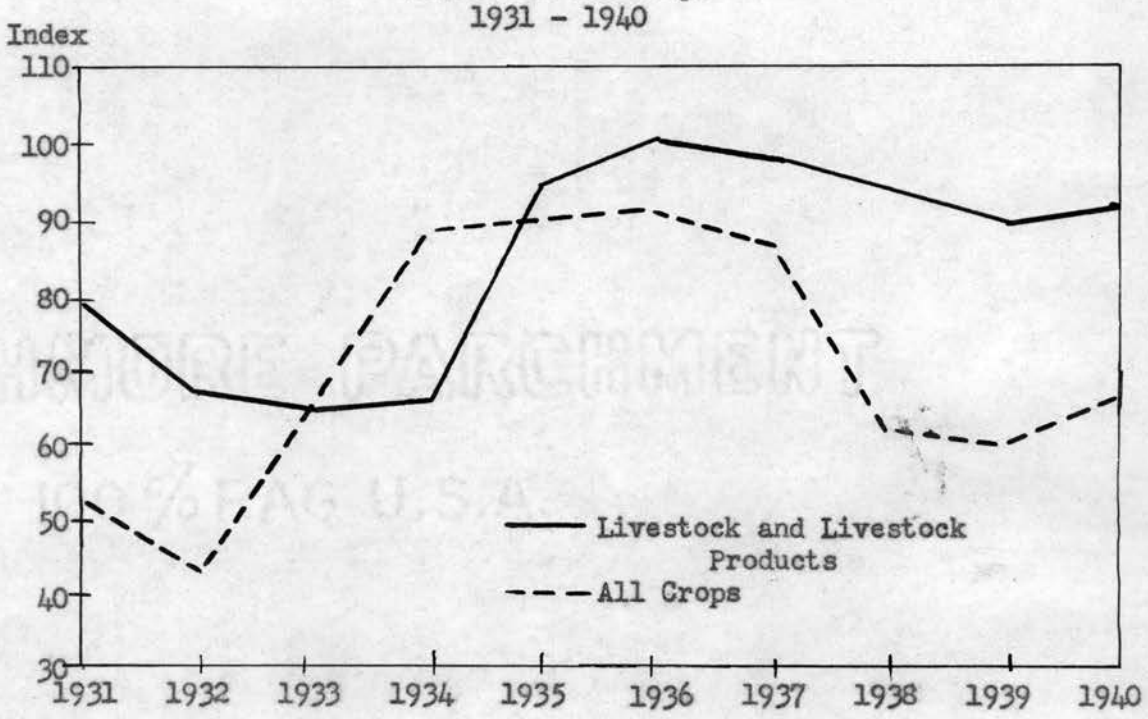
Classification of Farms in the Northern Portion of the Stillwater Creek Area as to the Source of Income
(Per Cent)

Type of Farm	1933						Average of 1938 and 1939					
	120 - 259 Acres			All Farms			120 - 259 Acres			All Farms		
	*S.C.	N.C.	TOT.	S.C.	N.C.	TOT.	S.C.	N.C.	TOT.	S.C.	N.C.	TOT.
Livestock	18.3	11.5	29.8	29.8	18.6	48.4	26.1	14.5	40.7	45.6	24.5	70.1
Crop	6.8	8.5	15.2	12.1	13.0	25.1	1.2	2.5	3.7	2.5	5.4	7.9
General	4.8	5.4	10.1	8.7	9.6	18.3	2.9	3.3	6.2	6.2	5.4	11.6
Part-time	1.4	2.2	3.7	2.8	5.4	8.2	1.2	3.3	4.6	4.6	5.8	10.4
TOTAL	31.3	27.6	58.9	53.5	46.5	100.0	31.5	23.7	55.2	58.9	41.1	100.0

* S.C. - Soil Conserving farmers who cooperated with the government program of conservation in this area. Also referred to in the text as cooperators.

N.C. - Non-conserving or non-cooperating farmers.

Figure 3.
INDEX OF PURCHASING POWER OF OKLAHOMA FARM PRICES
Livestock and Crops
1931 - 1940



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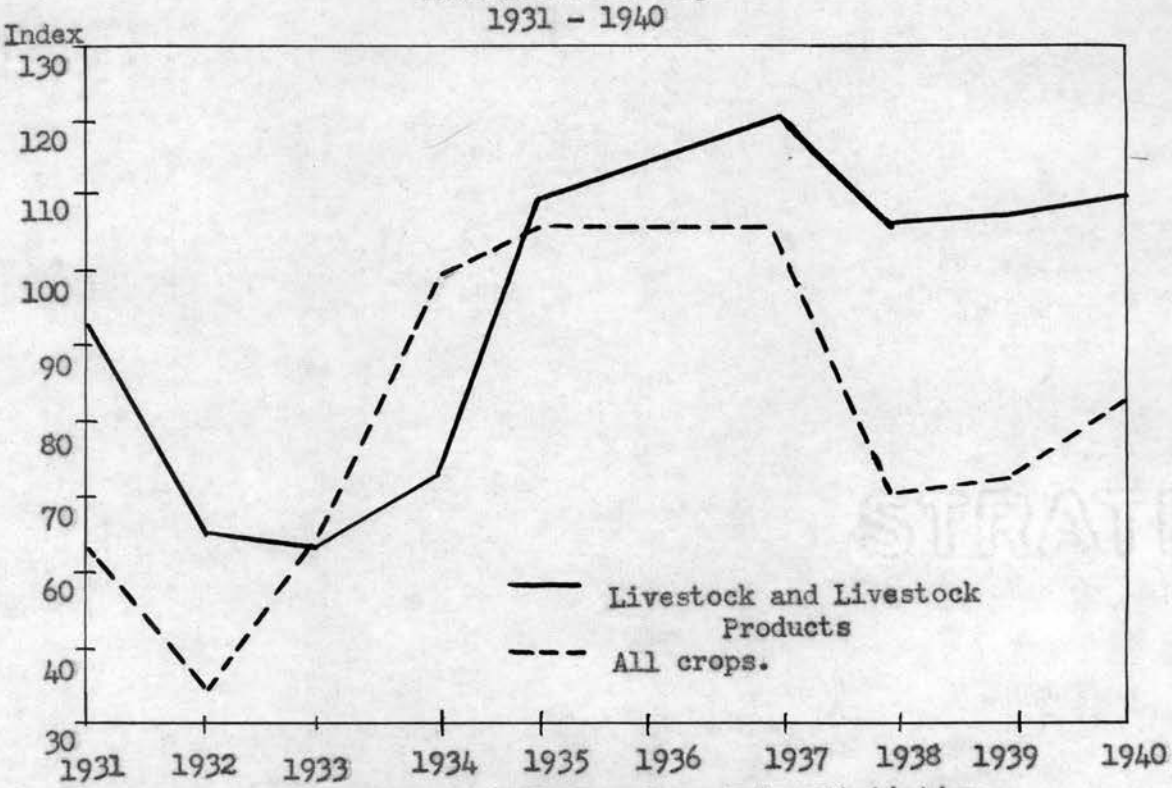

Source: Hedges and Blood. Oklahoma Farm Price Statistics.
Oklahoma Agricultural Experiment Station Bulletin 238.

program. It is probable that with a return of a period of more plentiful rainfall and an adjustment in the prices of farm products that many of these farms will return to the practice of producing considerably more cash crops in relation to the livestock kept than at present.

Tucker and Nelson state that those farmers most likely to cooperate with the conservation program are those who can do so without disrupting their farming system to any great extent.[3/] The livestock farmers are in a position to utilize the pasture and forage crops and can more easily divert their acreage of row crops to sown crops and pasture crops without materially affecting their farm organization. Since it was found that a greater per cent of the livestock farmers conserved the soil than did any other group, it would appear that the statement made at the opening of this paragraph is probably true. It is doubtful then if the conservation program in itself has had as much effect upon the type of farming within this area as has the fact that the type of farming carried on by the operator has affected his willingness to conserve the soil.

Land Use

Proper land utilization is, no doubt, a very definite problem of this as of most other areas of Oklahoma. Type of farming areas are usually rather definitely limited by climatic, biological and social conditions.[4/] These conditions are more exacting in some areas than in others, and in such areas the farm operator has little choice in determining which crops would best utilize the land. In this area, however,

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3/ Tucker, E. A., and Nelson, Peter. "Does a Program of Conservation Interfere with Farm Operations?" Current Farm Economics, Vol. 13, No. 5, (October, 1940) 130

4/ Duncan, O.D., "Human Problems in Land Use Planning". Current Farm Economics. pp. 139.

a variety of feed crops can be grown, depending upon the type of soil found on the local farm and the climatical conditions of the year under consideration. These conditions make it possible for the operator to choose his crops within limits and to adjust his land use to fit his needs in carrying out his livestock program.

The relative advantages of livestock and livestock product prices during the past few years have caused many of the small farmers, as previously discussed, to turn to dairy cattle as a source of income. As is to be expected these farm operators have adjusted their crop acreages to coincide with their livestock program. Row crops, such as cotton, corn and grain sorghums have been replaced with small grains and forage sorghums which will produce pasturage as well as grain and hay. The total crop acreage has been reduced and the amount of permanent pastures increased.

It will be noted in the accompanying table that the soil conserving farms have a higher acreage of row crops, while the non-conserving group leads in the acreage of small grain. The conserving farms also lead in the acreages of permanent pasture and legumes, but it should be stated here that the legumes grown on both conserving and non-conserving farms are produced for feed rather than soil improvement. No farms in the area were found which carried out a definite crop rotation system for the purpose of soil improvement.

It was stated on page 18 that it was doubtful if the type of farming had been affected a great deal by the conservation program though undoubtedly the kind of crops grown have been affected by the program to some extent. However, it would be a mistake to attribute all changes in land use in this area to any one cause, for the Agricultural

Adjustment Administration, climatic conditions and the relative prices of farm crops and livestock and their products have also exerted an influence. No definite means have been determined by which the effects of each of these factors could be measured.

Table 5.
Land Use on the Small Livestock Farms in the Northern Portion of the Stillwater Creek Area

Land Use. Ave. Acres Per Farm	1933		1938		1939	
	S.C.	N.C.	S.C.	N.C.	S.C.	N.C.
No. Farms in Sample	65	41	28	16	29	16
Per Cent Land in Crops	42.8	42.3	37.8	40.9	40.5	38.6
Permanent Pasture	74.9	81.0	95.1	88.5	86.8	84.2
Wheat	2.2	4.1	12.8	14.8	6.8	9.3
Oats	9.9	15.2	14.5	19.7	14.8	17.8
Barley			3.5	1.5	6.5	4.6
Corn	14.3	12.1	3.8	0.9	5.6	2.1
Cotton	6.1	4.6	1.5	0.8	3.8	1.2
Grain Sorghums	15.2	14.5	8.4	3.7	3.9	1.0
Native Hay	9.9	9.9	5.3	13.3	6.9	8.5
Alfalfa	*		2.1	0.3	2.4	- -
All Other Legumes	8.4	8.3	3.6	2.3	4.5	1.4

* 1933 figure includes alfalfa.

It has been suggested, and is probably true, that the program carried out on farms cooperating with the soil conservation program has served as an educational medium for the non-cooperating farms, for, over a period of years, it has been found that practically the same changes have taken place in the use of land in both groups of farms.

Crop Yields and Crop Production

Different weather conditions would make it impractical to compare the crop yields for the two periods covered in this survey. However,

a comparison of the yields on conserving and non-conserving farms for each of the periods is significant. It is of interest to note that farmers on conserving farms, both before and after the conservation program was inaugurated, have, in most cases, produced higher yields of all crops. The yields of wheat seem to be affected less by climatic changes and management than do the other crops grown in this area.

From the study of the monthly precipitation records of the Stillwater station and the crop yields for Payne County, it would seem that the outstanding factor determining crop yields in this area is the monthly distribution of the rainfall.[5] This seems to be more important than the amount of the annual precipitation. For example, the study made at the Panhandle Experiment Station indicates that the amount of moisture in the ground at the time of seeding wheat is of as much or more importance than that received during the growing season.[6]

The correlation between seasonal rainfall and crop yields is further substantiated by the data presented in Figure 6, page 23. The corn yields in Payne County from 1928 to 1939 inclusive, would appear to have followed very closely the distribution of rainfall during the months of June, July and August. Neither the total amount of precipitation for the year nor for any one of the three months alone seem to have a definite bearing on the corn yields but rather they are dependent upon plentiful rainfall throughout the three months indicated. Unusual temperatures also appear to affect the corn yields to some extent.

5/ Figure 5, p. 22.

6/ Daniels, Harley A. A Study of Climatic Factors That May Affect Crop Yields in the High Planes of Oklahoma. Panhandle Agriculture Experiment Station.

Figure 5.

MONTHLY PRECIPITATION AND COTTON YIELDS
FOR PAYNE COUNTY FROM
1928 - 1940

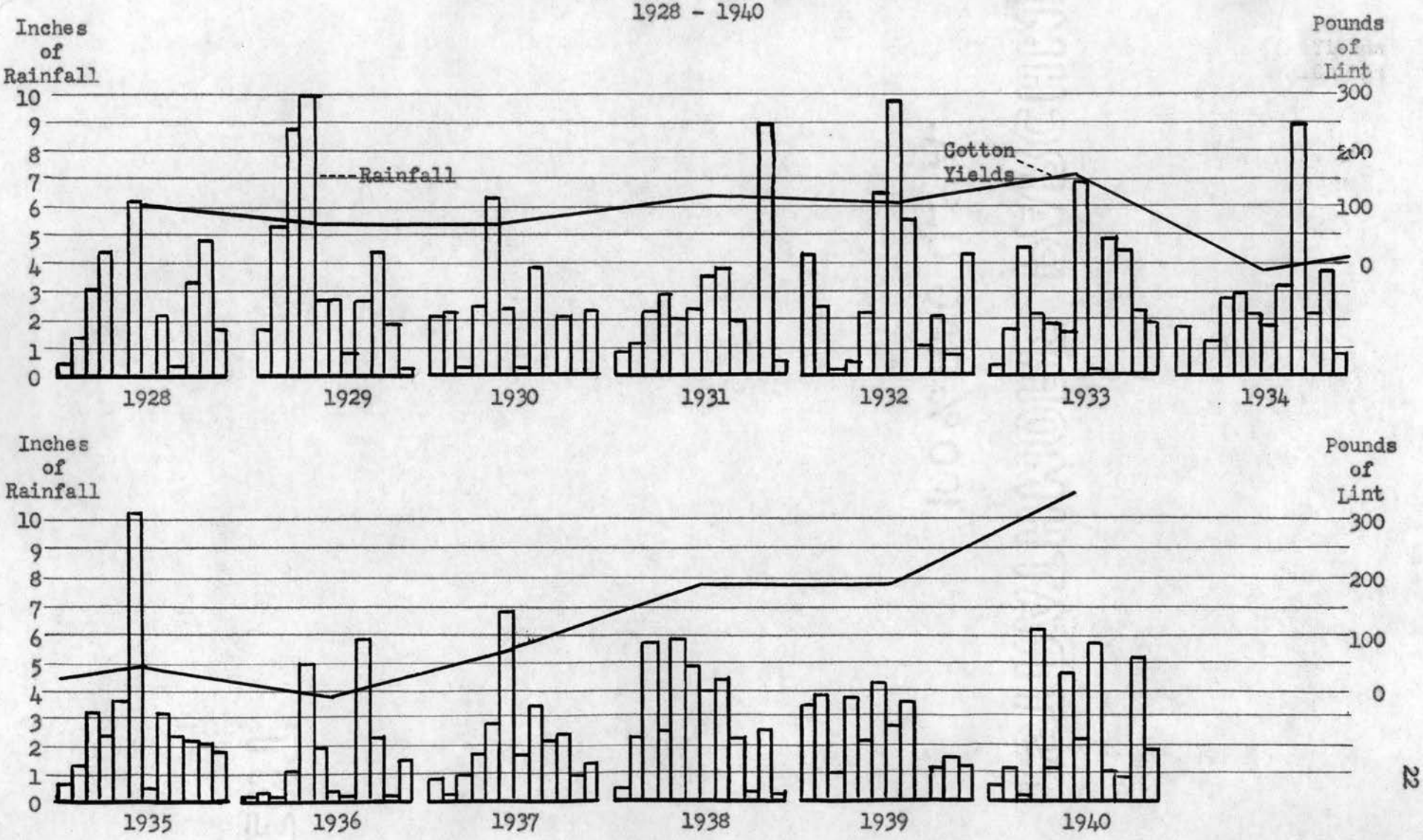

Figure 6.

SEASONAL DISTRIBUTION OF RAINFALL AND ITS EFFECT
ON THE CORN YIELDS IN PAYNE COUNTY, OKLAHOMA
Years 1928 - 1939

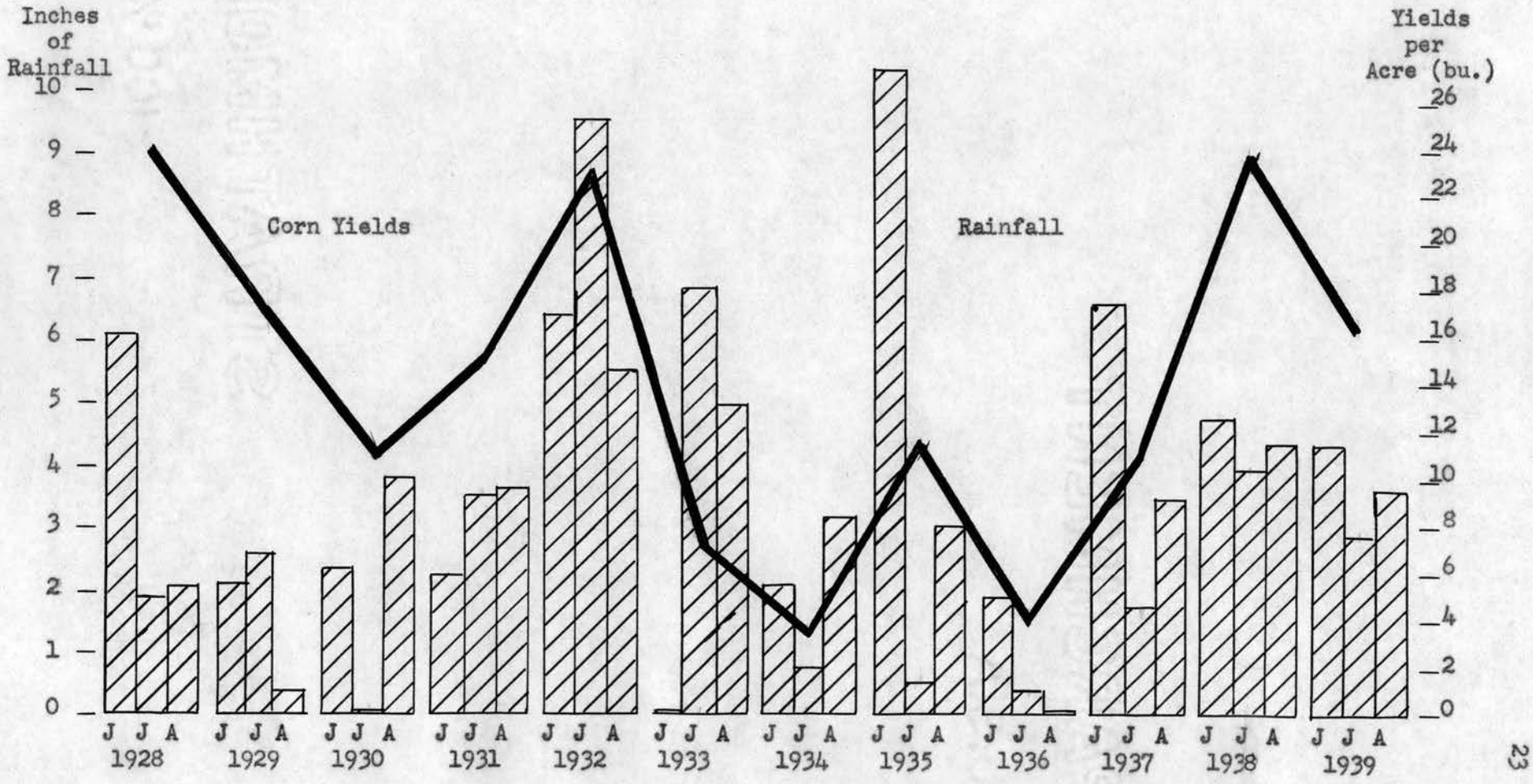

Table 6.
Crop Yields on the Small Livestock Farms
in the Stillwater Creek Area

MAJOR CROPS		1933		1938		1939		Average	
		S.C.	N.C.	S.C.	N.C.	S.C.	N.C.	S.C.	N.C.
Number of Farms		65	41	28	16	29	16	28.5	16
Wheat	Bu.	8.9	9.2	10.5	10.4	9.7	10.3	10.2	10.3
Oats	Bu.	17.5	16.4	23.1	29.5	14.3	13.7	18.6	22.0
Barley	Bu.			20.8	14.6	11.4	9.1	14.7	10.4
Corn	Bu.	8.4	6.3	29.3	26.0	17.9	16.2	22.4	19.2
Cotton	Lbs. Lint	185.8	143.1	157.7	185.6	186.1	177.8	171.8	180.1
Grain Sor.	Bu.	14.4	13.0	10.4	7.9	8.2	5.2	9.7	7.0
Forage Sor.	Tons	1.5	1.2	1.06	1.12	0.88	0.80	0.98	0.97
Native Hay	Tons	0.80	0.60	0.87	0.66	0.69	0.79	0.68	0.71
Alfalfa	Tons			1.9	2.8	1.2			

From this and other studies made on yields in connection with the conservation program, 7/ it is apparent that immediate increases in yields cannot be expected, though a long time program of conservation should show favorable results. The total production of small grains and forage crops has increased materially on the small livestock farms of this area. As the carrying capacity of pastures for livestock increases we can expect even more of the crop land to be converted into feed crops in order to care for the increase in livestock production, particularly dairy cattle.

Kinds and Number of Livestock

The small livestock farms of the area, both cooperating and non-cooperating, have a very similar organization. Both groups depend chiefly upon dairy cattle as their major livestock enterprise and both

7/ Tucker, E.A. and Nelson, Peter. "Does a Program of Conservation Interfere with Farm Operations?" Current Farm Economics, Vol 13, No. 5, (October, 1940) 130-135.

groups seem to be gradually increasing the size of their herds. This is not, however, an unusual condition during periods when prices are comparatively favorable for livestock and livestock products. The kinds and breeds of livestock kept will depend upon the likes and dislikes of the individual operator together with his financial status. The average size of these farms is so small that it is improbable that very many of them will ever attempt to produce range beef cattle or sheep as a source of income.

It appears from the following table that the non-cooperating farmers have slightly more dairy cattle per farm and that they carry more productive livestock per hundred acres of land than do the cooperating farmers. The possibility of soil conserving practices increasing the carrying capacity of the treated pastures and thus enabling the cooperating farmers to carry more livestock does not seem to have been realized. It is improbable that the conservation program will materially affect the number of livestock on these farms since there has been no relative change i in numbers of livestock over the six year period covered in this survey.

Table 7
Average Number of Livestock Units per Farm on the Small Livestock Farms

Kinds of Livestock	1933		1938		1939	
	S.C.	N.C.	S.C.	N.C.	S.C.	N.C.
Dairy Cattle	7.30	8.00	6.70	7.60	8.30	9.90
Total Cattle	13.9	11.8	9.60	11.2	13.1	14.3
Poultry	.97	.98	.96	1.27	.96	1.03
Swine	.95	1.91	.95	.56	1.00	.81
Total units productive livestock per 100 acres land	9.34	8.36	6.44	7.51	8.46	9.54

Feeds and Feeding

The majority of the crops grown on these small livestock farms was disposed of through some type of livestock enterprise since cash crops for the two years covered in this study averaged only 13.7 acres on the cooperating farms and 14.9 acres on the non-cooperating farms. These cash crops consisted for the most part of wheat and a very small acreage of cotton supplemented by surplus feed crops in some cases. On the average, the non-cooperating or non-conserving farmers sell a slightly greater amount of their feed than do the soil conserving farmers.

The operators of the soil conserving group spend more money for mill feed than do the non-conserving group but they in turn receive more income per cow from the sale of dairy products. There is very little difference, however, in the net increase per unit of productive livestock in the two groups. The farmers in the non-conserving group carry more productive livestock per 100 acres of land and have less permanent pasture per head of productive livestock.

Conservation measures which tend to increase the carrying capacity of the permanent pastures during the next few years may either enable the soil conserving farmers of the area to increase the size of their herds or produce their marketable livestock products with less cash feed expense.

Table 8

Land Use in Relation to Income on the Small Livestock Farms in the Stillwater Creek Area

ITEM	UNIT	1938		1939		Average	
		S.C.	N.C.	S.C.	N.C.	S.C.	N.C.
Farms in Sample	No.	28	16	29	16	28.5	16
Ave. Size per Farm		179.3	173.3	177.6	170.6	178.4	171.9
Crop Land in Cash Crops	percent	22.5	26.2	17.0	16.9	19.6	21.7
Productive Livestock Units per 100 Acres	No.	6.4	7.5	8.5	9.5	7.5	8.5
Permanent Pasture per Unit Prod. Livestock	Acres	8.2	6.8	5.8	5.2	6.8	5.9
Cash Feed Expense per Unit Productive Livestock	$	9.29	5.32	7.95	6.42	8.52	5.91
Income per Cow from Sale Dairy Products	$	38.52	30.36	40.36	33.74	39.37	31.83
Net Increase per Unit Productive Livestock	$	51.89	45.14	41.44	39.52	45.89	42.02

Labor and Equipment

The immediate effect of the soil conservation program is to require considerable additional labor and equipment with which to install mechanical measures needed to stop the soil erosion. This, however, is not a permanent change and it is found that after a few years of operation the farms carrying a conservation program require, on an average, no more labor than those who do not.[8/] This study and others which have been made indicate that the tillage of crops on the contour

8/ Tucker and Nelson. Current Farm Economics, Vol. 13, No. 5

Table 9
Equipment and Labor Costs on Conserving and Non-Conserving Farms in the Stillwater Creek Area

	1938		1939	
	S.C.	N.C.	S.C.	N.C.
Number of Farms in Sample	28	16	29	16
Average Acres Crop Land Per Farm	67.7	70.9	71.9	65.9
Machinery Expense Acre of Crop Land	1.60	1.50	1.83	1.39
Labor Cost per Acre of Crop Land	1.61	1.24	1.06	1.60
Per Cent of Labor Hired	29.6	25.1	48.0	13.0

require no more labor than the "up-and-down" method of farming.

The labor costs in the above table were figured on the basis of the hired labor plus the unpaid family labor without considering the operators labor which was figured on a uniform basis for each farm. The operators on the non-conserving farms used considerable more unpaid family labor and less hired labor than did the soil conserving farmers. Machinery expense is somewhat higher on farms where soil conservation is practiced.

Table 10 indicates that the cooperating group of small livestock farmers in this area had considerably higher investments in farm machinery, dwellings and other farm buildings. This might be attributed to a number of factors, chief among which is the human factor. It is entirely possible that the man who conserves the soil would also provide a better home for his family and better buildings for his livestock. Too, this type of operator would, as a matter of pride, have better farming equipment and would spend more for the maintenance of these buildings and equipment.

No doubt, the fact that there is a higher per cent of tenancy among the non-cooperators than there is in the cooperating group would

also account to some extent for the lower investments in the non-cooperating group. The additional investments do not seem to be essential to the operation of the farm unit as the non-cooperators farm approximately the same amount of land, raise similar crops and keep more livestock. However, as a matter of convenience the additional buildings and equipment would be desirable. No data has been compiled to show that it is necessary for carrying out the conservation program in this area.

It will be noted that the inventorie are considerably higher in the cooperating group for 1939 than they were in 1938. This is not due to additions made during this year but rather to the fact that the farms used in this study were not the same ones in all cases for each of these two years. The only conclusion that can be drawn from this table is the fact that the investments are higher in the cooperating group.

Table 10
Average Investments in Machinery, Dwellings and Other Farm Buildings on the Small Livestock Farms of Stillwater Creek Area

ITEMS	1938		1939	
	S.C.	N.C.	S.C.	N.C.
Machinery	$307	282	393	261
Dwellings	482	454	676	456
Other Buildings	508	362	639	350

Farm Income

The final measure of success for any type of farm organization or farm enterprise is the amount of income which it yields to the operator and the rate earned on the investment which is involved. In summarizing the farm records for the two years in which complete records were available on the two groups of farms, it was found that, on an average, the income for the non-conserving farmers was $100.00 per farm more than for the farms on which an active program of soil conservation was carried out. There was not a great deal of difference in the total farm receipts of the two groups. The non-conserving farmers had only five dollars more income than the conserving farmers on all types of livestock and livestock products. The greatest difference was in the net increase of crops and in labor off the farm.

The farm expenses for the two groups seem to be the determining factor in the difference in the amount of income. The soil conserving farmers have considerably more building, machinery, feed and hired labor expense than do the non-conserving farmers. All other expenses are approximately equal with the exception of the unpaid family labor which is higher on the non-conserving farms.

As has been pointed out in previous comparisions, the physical organization of the farms in the two groups do not vary to a great extent, nor do the type of crops grown or the crop yields per acre. The 28 per cent greater income on the non-conserving farms, then, in undoubtedly due to the additional expenses incurred on the soil conserving farms. Whether or not these expenses are due to conservation practices is questionable. The additional building and machinery

expense is probably due to the higher investments on the cooperating farms.[9/] Neither is it known how much of the automobile expense was due to personal rather than farm use. More hired labor was used on the cooperating farms but the non-cooperating farms had more family labor available to offset this expense.

It will be noted that the summary of the farm income and expenses for the small livestock farms found on the following page does not include farm products used in the home. Since this information was not available, the analysis of the effect of the conservation program on the farm income cannot be given as much weight as would be possible if the information were complete.

9/ Table 10, page 30.

Table 11.

Summary of Farm Receipts and Farm Expenses of the Small Livestock Farms of the Stillwater Creek Area for 1938 and 1939

	1938		1939		Ave. 1938-1939	
	S.C.	N.C.	S.C.	N.C.	S.C.	N.C.
Farm Receipts						
Net increase in cattle less dairy products sold	$120.68	$149.31	$190.24	$228.62	$156.07	$188.97
Dairy products sold	269.53	257.25	318.10	299.81	294.25	278.53
Egg sales	50.39	66.94	41.75	61.00	46.00	63.97
Net increase of all other productive livestock	163.04	119.00	79.24	60.12	120.40	89.56
Net increase in workstock	-----	15.62	16.34	------	4.98	4.12
Net increase in crops	178.28	204.87	100.65	128.75	138.79	166.81
A. A. A. payments	51.46	40.38	60.38	41.81	55.47	41.09
Labor off the farm	32.89	44.87	21.07	48.19	26.88	46.53
Miscellaneous farm income	2.78	-----	2.83	1.97	2.81	.94
Total Farm Receipts	$869.05	$898.04	$830.60	$870.17	$845.65	$880.52
Farm Expenses						
Building expense	$ 38.14	$ 31.37	$ 48.03	$ 18.62	$ 43.18	$ 24.19
Machinery expense	108.25	106.12	131.48	91.50	120.07	98.81
Feed expense	107.14	69.19	119.37	104.37	113.37	86.78
Crop expense	68.82	65.06	51.55	54.50	60.05	59.78
Miscellaneous livestock expense	4.89	5.31	6.93	6.12	5.93	5.72
Net decrease in workstock	3.21	-----	------	7.87	------	------
Hired labor	32.25	22.00	36.38	13.69	34.35	17.75
Unpaid family labor	76.68	65.75	40.10	91.50	58.07	78.62
Other farm expense	58.34	37.25	45.14	55.94	49.35	45.99
Total Farm Expense	$497.77	402 .05	$478.98	$440.61	$484.37	$417.64
TOTAL FARM INCOME	$371.28	$496.19	$351.62	$429.56	$361.28	$462.88

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Case Farms of the Area

As a further aid in evaluating the conservation program on the small livestock farms a more detailed description and summary of the farm business is given for a number of the individual farms which vary in their organization and in the amount of total farm income received by their operators. The first and fourth as listed below may be considered as general livestock farms, the second as a small subsistence livestock farm and the third as a specialized dairy farm. The number of farms were very limited on which records were available for at least one year previous to the inauguration of the soil conservation program and three years since the program was put into effect. These farms were selected from this group on which records were available because they are to large extent typical of the various classes into which the livestock farms of the area might be divided.

It can be repeated here, with reference to all of these farms, that none of them carry out a planned system of crop rotation in which soil improvement crops are included. All of the legumes grown on these farms are used for livestock feed or for pasture.

Farm No. 1
General Livestock Farm

Farm No. 1 is slightly larger than the average size of the whole group. It consists of 211 acres, 80 of which is owned by the operator and the remainder of which is rented on a cash basis. This land is rather severely eroded, the erosion index for the crop land being 3.92 and for the whole farm 2.70 as compared with 3.15 and 2.59 respectively

Farm No. 1.
General Livestock Farm
Summary Sheet

Table 12

Land Use, Yields per Acre and Livestock Kept on Farm
for the Years of 1933, 1937, 1939 and 1940

ITEMS	1933	1937	1939	1940
Land Use (acres)				
Total Farm	211	211	211	211
Permanent Pasture	121	122	122	130
Crop Land	83	83	83	74
Oats	22	18	22	24
Corn	7	---	---	3
Cotton	6	7	5	4.5
Grain Sorghums	15	14	10	12
Forage Sorghums	---	14	---	10
Native Hay	15	---	20	12
Legumes	---	---	10	7
Yields per Acre:				
Oats (bu.)	6.8	13.3	22.6	25.2
Corn (bu.)	10.0	6.5	----	18.0
Cotton (lbs. lint)	239.0	77.0	226.0	252.0
Grain Sorghums (bu.)	17.5	4.3	10.0	21.7
Forage Sorghums (tons)	----	.7	----	Sil.6.1
Native Hay (tons)	.8	----	.5	.4
Units of Livestock on Farm:				
Workstock	3.26	2.50	2.50	2.25
Milk Cows	5.00	6.00	7.50	7.00
Other Cattle	2.25	3.38	3.12	4.68
Poultry	1.00	.28	.35	.49
Swine	.37	.49	.94	2.44
Total Productive Livestock	8.62	10.15	11.91	14.81

for the area as a whole.

The organization of this farm in regards to the crops grown and the livestock kept has changed very little during the past eight years. The crops are typical of the area, consisting of oats,corn, cotton, grain sorghums, forage sorghums, native hay and legumes. Cotton, which has been eliminated entirely from the farming system on many of these farms

has continued to be produced on this farm and has had a significant effect on the farm income in favorable cotton producing years as may be noted by comparing the yields and income as shown on the summary sheet for farm No. 1, page 38.

The livestock kept on this farm consists of grade Jersey cows crossed with a Hereford bull. The principal source of income from livestock as shown in table 13, page 38, is from the sale of cream and surplus calves. The increased yields and the production of more feed has enabled the operator to increase the total number of animal units on the farm.

The conservation program has consisted chiefly of the establishment of physical measures to control the loss of soil and in changes in crop acreages. In March, 1934, agreements were signed whereby the government terraced 63 acres of the crop land and contoured 12 acres of permanent pasture. The only expense incurred by the operator was the quarrying of rocks for the outlets. The Government also set trees in the worst gullies and furnished seed for 5 acres of lespedeza and 8 acres of sweet clover. All of the crop land is farmed on the contour.

A study of the land use on this farm as shown in table 12, page 35 would indicate that the program has resulted in a reduction of the acreage of row crops and an increase in the acreage of sown crops and legumes. The increase in permanent pasture is due to the conversion of 8 acres of the native hay land into pasture.

Crop yields, as shown in the table on the preceeding page, have increased steadily during the years of 1937 to 1940. Much of this can be attributed to the increased amount and the distribution of the rain-

fall which provided a more favorable growing season in the latter years. The high yields of cotton for 1939 and 1940 are due no doubt to the weather conditions.

The increase in the amount of hired labor necessary for 1939 and 1940 was due principally to the harvesting and threshing of grain and putting up of silage crops. It is doubtful if the conservation program has affected the amount of labor needed on the farm or the farm machinery expense.

The income was much higher on this farm for 1940 than for the preceeding years which can be attributed to the net increases in crops. Much of this, as has been pointed out, was due to a more favorable growing season rather than conservation or managerial practices. The erosion of the crop land has been checked but much of the pasture land still needs contouring. It will be noted that the yields of native hay are decreasing. This seems to be true throughout the area due to the failure of many of the natural grasses to reseed themselves during the recent dry years. The greatest need at the present on this farm in regard to soil conservation is a program for improvement of the permanent pastures and a definite crop improvement rotation.

Farm No. 1.
General Livestock Farm
Summary Sheet, Continued

Table 13
Farm Receipts, Farm Expenses, Farm Income, Farm Family Earnings and Rate Earned on Rented Investment.

	1933	1937	1939	1940
Farm Receipts:				
Net increase of cattle less dairy products sold	$ 52	$ 95	$ 193	$ 217
Dairy products sold	102	431	281	250
Eggs sold	193	18	19	60
Net increase of all other productive livestock	---	112	120	81
Net increase in horses	95	---	---	20
Net crop increases	207	82	154	999
A A A payments	---	35	80	77
Labor off the farm	---	63	16	---
Miscellaneous farm income	7	1	19	---
Total Farm Receipts	$656	837	882	1704
Farm Expenses:	$	$	$	$
Building expenses	7	28	22	20
Machinery expense	10	46	22	27
Feed expense	34	135	88	36
Crop expense	11	30	62	146
Miscellaneous livestock expense	---	---	---	20
Net decrease in productive livestock	12	---	---	---
Net decrease in horses	---	35	13	---
Hired labor	30	35	61	127
Unpaid family labor	---	---	36	60
Other farm expenses	109	109	64	62
Total Farm Expenses	$213	$418	$368	$500
Total Farm Income	$443	$419	$514	$1204
Unpaid family earnings	351	359	499	1340
Value products used at home	260	Inc.	Inc.	76
Less rent paid	352	60	51	52
Farm Family Earnings	$351	$359	$499	$1340
Value of land and buildings furnished by landlord	$2370	$2893	$2879	$2872
Rate Earned on Rented Investment by landlord (per cent).	14.8	2.1	1.8.	1.8

Farm No. 2
Subsistence: Livestock Farm

Farm No. 2 is one of the smallest in the group, consisting of 120 acres. The operator is considerably older than the average and the farm is operated to a large extent on a subsistence basis. Most of the family living is produced on the farm and the cash income is derived from the sale of cream from five dairy cows. The crop land is devoted entirely to the production of feed crops, mainly oats, barley, grain sorghums and legumes. The erosion index for the crop land is 3.26 and for the entire farm 2.93. The slope index is 1.90 for the crop land and 1.82 for the entire farm. The farm is in a serious state of erosion as can be seen from these figures.

In September, 1934, an agreement was signed with the Government for the construction of terraces on 35 acres of crop land and contour furrows on 6 acres of pasture land. All of the crop land is contour farmed. In September 1936 a detailed crop rotation system worked out which included small grains, sorghums and legumes.[1/] By comparing this with the table on page 40 it can be readily seen that this plan has not been very closely adhered to. In April, 1937, 1700 catalpa trees were set out for a farm woodlot. Part of the pasture land was set to Bermuda grass. The operator reports that this, together with the contour farrowing, has increased the carrying capacity of his pastures approximately 25 per cent.

Changes in land use brought about by the Conservation Programs have resulted in an increase in pasture land and a decrease in

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1/ Page 41

Farm No. 2
Subsistence Livestock Farm

Summary Sheet

Table 14
Land Use, Yields per Acre and Livestock kept on Farm for the Years of 1933, 1938, 1939 and 1940

ITEMS	1933	1938	1939	1940
Land Use (Acres):				
Total Farm	160	120	120	120
Permanent Pasture	23	48	45	55
Crop Land	101	66	70	60
Oats	15	15	19	7.5
Barley	—	11	20	6
Corn	12	—	1	—
Grain Sorghums	15	—	4	16
Cotton	23	—	—	—
Forage Sorghums	—	9	4.5	—
Native Hay	10	14	—	—
Legumes (all uses)	25	11	18.5	17
Crop Yields:				
Oats (bu.)	13	15.0	10.0	31.5
Barley (bu.)	—	20.5	12.0	8.7
Grain Sorghums (bu.)	6.6	—	7.5	7.8
Forage Sorghums (tons)	—	.77	2.7	—
Livestock on Farm:				
Workstock	3.5	3.0	3.0	3.0
Milk Cows	3.0	3.0	3.0	4.5
Total Animal Units Cattle	10.88	6.25	6.37	6.25
" " " Poultry	.60	.65	.70	.52
" " " Swine	1.63	.61	1.22	1.94
Total Units Prod. Livestock	13.11	7.51	8.29	8.71

cultivated acreage. Corn and cotton have been eliminated from the cropping system. It will be noted on the summary sheet, however, that the operator has always had a considerable acreage of legumes. Yields have not been materially affected by the conservation program to date.

The livestock on the farm are of good quality but the size of the farm and the age of the operator limits the number which can be profitably kept.

Table 15
Cropping Plan
for
Farm No. 2

Acres	1935	1936	1937	1938
6.0	Sweet Clover	Same	Same	Same
4.5	Lespedeza	"	"	"
10.5	Bermuda Pasture	"	"	"
1.75	Corn	Corn	Alfalfa	Alfalfa
2.75	Woods	Same	Same	Same
2.0	Hog Lots	"	"	"
2.0	Sweet Clover	"	"	"
.5	Farmstead	"	"	"
15.5	Pasture	"	"	"
.5	Dallis Grass	"	"	"
2.5	Darso	Lespedeza with oats	Lespedeza	Lespedeza
3.0	Oats	Austrian Winter Peas	Oats	Wheat
2.0	Darso	Oats	Summer Legumes	Oats
2.5	Darso	Wheat	Wheat	Oats
3.0	Woods	Same	Same	Same
2.5	Corn	Corn	Alfalfa	Alfalfa
2.0	Darso	Vetch	Corn	Oats
3.5	Oats	Mung Beans	Darso	Vetch
3.5	Oats	Darso	Vetch	Mung Beans
1.5	Darso	Mung Beans	Darso	Vetch
1.75	Darso	Oats	Darso	Vetch
.25	Dallis Grass	Same	Same	Same
2.5	Sown Sorghums	"	"	"

Farm No. 2
Subsistence Livestock Farm
Summary Sheet, Continued

Table 16
Farm Receipts, Farm Expenses, Farm Income, Farm Family Earnings and Rate Earned on Rented Investment

ITEMS	1933	1938	1939	1940
Farm Receipts:				
Net increase of cattle less dairy products sold	$ 206	$ 58	$ 90	$ —
Dairy Products sold	208	145	200	85
Eggs sold	70	34	22	20
Other productive livestock	5	91	134	53
Net increase in horses	138	—	—	—
Net crop increases	467	41	141	351
A. A. A. Payments	—	71	65	65
Total Farm Receipts	$1,094	$ 440	$ 652	$ 574
Farm Expenses:				
Building Expense	$ —	$ 10	$ 18	$ 16
Machinery expense	5	73	61	79
Feed expense	30	75	65	57
Crop expense	24	35	45	23
Miscellaneous Livestock expense	—	—	—	6
Net decrease in cattle	—	—	—	32
Net decrease in horses	—	—	5	10
Hired labor	—	21	—	20
Unpaid family labor	60	—	40	—
Other farm expense	18	14	21	27
Total Farm Expenses	$ 137	$ 228	$ 255	$ 270
Total Farm Income	$ 957	$ 212	$ 397	$ 304
Unpaid family labor	$ 60	$ —	$ 40	$ —
Value of Products used at home	102	121	99	70
Less rent paid	132	66	94	118
Farm Family Earnings	$ 351	$ 359	$ 499	$1,340
Value of land buildings furnished by landlord	$2,370	$2,893	$2,879	$2,872
Rate earned on rented investment by landlord (per cent)	7.8	8.1	11.3	21.4

The data found on the summary sheet for this farm would indicate that it requires no additional expenditures in order to maintain a satisfactory conservation program. The farm income has not been increased to any extent during the past three years. The high per cent of returns shown from crops for 1940 is due to increases in inventory of feeds on hand at the time the survey was taken.

Soil losses from erosion seem to be greatly reduced on this farm under the present farming system. It is also encouraging, from the standpoint of soil improvement, to find that all crops produced on the farm are fed to livestock and that the manures are returned to the soil.

Farm No. 3
Specialized Dairy Farm

Farm No. 3 is a good example of the specialized livestock farms found in the area, the livestock enterprise consisting chiefly of the production of whole milk for the market.

The main crops consist of wheat, oats, barley and sorghums which are all fed to the livestock, supplemented with protein concentrates purchased off the farm. The soil conserving measures definitely have not increased the yields on this farm.

Seventy-five acres of the pasture land was contoured at the beginning of the program but since that time a portion of the pasture land has been diverted to crops. All of the crop land is terraced with the exception of 14 acres and is farmed on the contour. The operator estimates that not over one day a year is necessary for the maintainence of terraces and that approximately 24 days a year are spent in distributing barnyard manures. This latter item, however, is not a result of following a conservation program but would no doubt, require the same amount of time on this farm even though the operator had not cooperated with the Government in their soil conserving program.

The records for this farm do not indicate that there is any additional expense involved in maintaining the conservation program. Neither do they indicate any material gains in this case due to the program other than those long-time benefits which may result from stopping soil losses through surface run-off.

Farm No. 3
Specialized Dairy Farm

Summary Sheet

Table 17
Land Use, Yields per Acre and Livestock kept on Farm for the Years of 1933, 1937, 1939 and 1940

ITEMS	1933	1937	1939	1940
Land Use (Acres):				
Total Farm	160	255	240	303
Permanent Pasture	75	74	88	63
Crop Land	68	175	145	233
Wheat	—	59	43	63
Oats	—	60	40	50
Corn	2	—	—	6
Cotton	14	12	—	—
Grain Sorghums	15	—	—	19
Forage Sorghums	23	14	—	40
Barley	—	—	30	25
Legumes (all uses)	—	17	21	10
Crop Yields per Acre:				
Wheat (bu.)	—	10.0	10.0	4.0
Oats (bu.)	—	17.3	14.7	21.5
Barley (bu.)	—	—	11.7	2.8
Cotton (lbs. lint)	160	61	—	—
Grain Sorghums (bu.)	20.0	—	—	3.3
Forage Sorghums (tons)	1.65	.64	—	1.7
Livestock on the Farm:				
Workstock	6.25	5.50	6.00	7.00
Milk Cows	25.5	14.5	17.5	20.5
Total Animal Units Cattle	42.5	25.25	22.0	27.37
" " " Poultry	.94	1.45	1.25	.97
" " " Swine	2.5	1.78	.50	.37
Total Units Prod. Livestock	45.94	27.48	23.75	28.71

Farm No. 3
Specialized Dairy Farm
Summary Sheet, Continued

Table 18
Farm Receipts, Farm Expenses, Farm Income, Farm Family Earnings and Rate Earned on Rented Investments

ITEMS	1933	1937	1939	1940
Farm Receipts:				
Net increase of cattle less dairy products sold	$——	$ 113	$ 208	$ 476
Dairy products sold	1,200	1,080	1,200	1,500
Eggs sold	62	80	32	——
Net increase all other productive livestock	——	158	114	48
Net increase in horses	46	——	105	——
Net crop increases	461	746	367	685
A. A. A. Payments	——	87	189	189
Labor off the farm	——	75	141	250
Miscellaneous Farm Income	35	35	——	——
Total Farm Receipts	$1,804	$2,374	$2,356	$3,148
Farm Expenses:				
Building expense	——	129	73	80
Machinery expense	380	529	429	504
Feed expense	520	371	298	450
Crop expense	35	130	55	109
Misc'l. livestock expense	——	10	20	7
Net decrease in cattle	42	——	——	——
Net decrease in horses	——	25	——	35
Hired labor	250	3	25	22
Unpaid family labor	180	135	60	640
Other farm expense	89	68	32	69
Total Farm Expense	$1,496	$1,400	$ 992	$1,916
Total Farm Income	$ 308	$ 974	$1,364	$1,232
Unpaid Family labor	80	135	60	640
Value products used at home	47	?	173	36
Less rent paid	170	257	185	294
Farm Family Earnings	$ 365	$ 852	$1,412	$1,614
Value of land and buildings furnished by landlord	$3,500	$5,375	$4,800	$6,600
Rate earned on rented investment by landlord (per cent)	4.8	4.7	3.8	4.4

Farm No. 4
General Livestock Farm

Farm No. 4 is operated by one of the Bohemian farmers of whom a number is found in this area. It is owned by the operator who has resided on this one farm for a long period of years. This family is typical of this class of operators in the area to the extent that they are a thrifty people, getting along with few home conveniences, and producing a large part of their living on the farm.

The crop land is all terraced and contour farmed. The operator estimates 7 days a year labor for the maintainence of mechanical measures of the program and another 14 days for the distribution of barnyard manures.[2/]

The chief source of income is from the sale of dairy products and surplus cattle. In 1940 the operator spent considerable time working off the farm putting up native hay for his neighbors.

Row crops have been reduced on the farm and replaced by small grains.[3/] The probable reason for this change from corn and grain sorghums to barley and forage sorghums is the uncertainity of Grain Sorghum yield due to weather and insect and the relatively low yields of corn from 1933 to 1937 inclusively.[4/] The total crop acreage has been slightly increased and the permanent pasture decreased. The pastures of this farm are in poor condition and steps need to be taken to increase their their carrying capacity.

2/ Paragraph 3, page 44

3/ Page 49

4/ Figure 6, page 23

Farm No. 4
General Livestock Farm
Summary Sheet

Table 19
Land Use, Yields per Acre and Livestock Kept on Farm
for the Years of 1933, 1938, 1939 and 1940

ITEMS	1933	1938	1939	1940
Land Use (Acres):				
Total Farm	240	240	240	240
Permanent Pasture	125	132	115	115
Crop Land	89	94	112	100
Oats	25	22	25	25
Barley	---	25	30	25
Corn	16	4	5	5
Grain Sorghums	30	10	10	10
Forage Sorghums	6	---	12	15
Native Hay	11	10	10	10
Cowpeas	20	---	20	10
Yields per Acre:				
Oats (bu.)	13.4	29.5	16.1	29.1
Barley (bu.)	---	21.5	17.8	2.4
Corn (bu.)	1.25	25	10	15
Grain Sorghums (bu.)	10.6	5	Fail.	18
Forage Sorghums (tons)	1.0	---	1.25	.87
Native Hay (tons)	.63	.60	.70	.87
Livestock on Farm:				
Workstock	5.0	5.5	7.0	6.25
Milk Cows	5.5	10.0	11.0	11.50
Total Animal Units Cattle	11.13	17.00	35.0	17.75
" " " Poultry	---	.62	.75	.69
" " " Swine	.25	.78	.94	1.06
Total Units Prod. Livestock	12.63	18.40	36.69	19.50

Crop yields seem to fluctuate from one year to another, due probably to climatic conditions rather than conservation practices. The only expense to increase materially was that of labor and machinery, due to the purchase and operation of hay harvesting equipment.

Farm No. 4
General Livestock Farm
Summary Sheet, Continued.

Table 20
Farm Receipts, Farm Expenses, Farm Income, Farm Family Earnings and Rate Earned on Rented Investment

ITEMS	1933	1938	1939	1940
Farm Income:				
Net increase cattle less sale of dairy products	$ 70	$ 220	$ 250	$ 522
Dairy products sold	65	264	104	235
Eggs sold	100	——	20	25
Increase other Prod. Livestock	28	57	182	74
Net increase horses	75	——	——	——
Net crop increase	76	——	401	——
A. A. A. Payments	——	61	34	34
Labor off the farm	——	——	30	262
Total Farm Receipts	$ 414	$ 602	$1,021	$1,152
Farm Expenses:				
Building expense	——	79	33	63
Machinery expense	59	35	39	100
Feed expense	25	——	30	50
Crop expense	13	63	61	30
Miscellaneous Livestock expense	——	——	——	5
Net decrease in horses	——	10	201	10
Net decrease in crop inventory	——	78	——	72
Hired Labor	5	3	12	31
Unpaid family labor	240	——	60	120
Other farm expenses	118	82	77	86
Total farm expenses	$ 460	$ 350	$ 513	$ 547
Total Farm Income	$ -46	$ 252	$ 508	$ 605
Unpaid family labor	$ 240	$——	$ 60	$ 120
Value of products used at home	51	90	44	69
Farm Family Earnings	$ 251	$ 342	$ 612	$ 794

Feeding Practices of the Small Livestock Farmers of the Stillwater Creek Area

The problems of the farm planner would fade into comparative insignificance if it were possible to evolve a set formula for the various farming areas which could be followed in determining the best crops and livestock which should be kept and the relative proportions of each. Such a formula would be purely theoretical and under actual circumstances it must be admitted that there is no best type of farming but that the type will vary from farm to farm depending upon the man, the capital available and the natural resources of the farm. Assuming that capital is not a fixed factor and that the soil can be classified as to type, degree of erosion, etc., it is then evident that most of the variation on the individual farm is due to the human element, or the managerial ability of the operator. That there is a difference in the farm operators of this area is evident from the fact that many of them refused the aid of the government in installing mechanical measures for the conservation of the soil at practically no cost to themselves.

The most tangible factor available for measuring the efficiency of the small livestock farms is the feeding practices of their respective operators and the amount of income produced by the various classes of livestock. Little effort has been made in the past to determine the actual feeding practices of farmers in this area. In 1937 the research division of the Soil Conservation Service secured a detailed statement of the feed disposal on 55 farms in this area. All of the operators of this group were cooperating with the soil conservation program with exception of 7. To date this

information has not been summarized for publication, but since it is perhaps the best information available, a brief summary is given here and has been used as a basis for determining the average practices of the farmers of the area in later years included in this study.

It was found that the group as a whole followed no definite feeding schedule but that the kinds and amounts of feeds fed to the various classes of livestock varied on each individual farm. To make these figures more comparable, the grain and mill feed fed were reduced to their corn equivalents and the roughages to prairie hay equivalents.[1/] The percentage distribution of each kind of feed fed to the various classes of livestock was computed for 1937 and these figures used for distributing the total amounts of grain, mill feed and roughages known to be fed during 1938 and 1939. An average of these two years gives a corn and prairie hay equivalent per animal unit for each class of livestock which can be used as a rough measure of the general feeding program. It would appear that this figure is out of line for the poultry for the year of 1937 inasmuch as very little wheat was fed during this year to any other livestock due to the comparatively high price of wheat. When the same percentage distribution is used for other years, some adjustment needs to be made in this figure.

The following table indicates that as a whole the group of non-cooperating farmers do not feed their livestock as heavily as do those of the cooperating group. It will be noted that there is also a discrepancy in the amounts fed to the various classes of livestock

1/ Table 21, p. 52

Table 21
Corn Equivalent Bushels of Grain and Mill Feed Fed to Various Classes of Livestock on the Small Livestock Farms for 1937, 1938 and 1939

Type of Farms	Year	Work-Stock	Milk Cows	Other Cattle	Poultry	Swine
Corn Equivalents for Grain:						
All Farms	1937	19.73	7.58	3.61	78.00	82.77
Cooperating Farms	1938	20.76	6.26	4.66	133.00	72.50
Cooperating Farms	1939	19.29	6.56	3.27	81.44	82.75
Average 1938 and	1939	19.89	6.31	3.74	97.94	78.84
Non-Cooperating Farms	1938	25.65	6.40	4.25	54.58	57.21
Non-Cooperating Farms	1939	21.17	4.86	2.69	68.86	74.97
Average 1938 and	1939	23.31	5.55	3.33	61.11	65.92
Corn Equivalents for Mill Feed:						
All Farms	1937	.04	8.16	2.44	9.27	13.22
Cooperating Farms	1938	.35	8.03	2.50	13.65	.60
Cooperating Farms	1939	.65	7.76	2.32	.68	.60
Average 1938 and	1939	.54	7.85	2.38	4.71	.65
Non-Cooperating Farms	1938	.05	2.88	1.06	12.59	.09
Non-Cooperating Farms	1939	.63	7.20	1.14	.95	1.03
Average 1938 and	1939	.35	5.26	1.11	7.38	.55
Prairie Hay Equivalents in tons for Roughages:						
All Farms	1937	1.06	.87	.69	.02	.005
Cooperating Farms	1938	1.34	.94	.94	.05	.05
Cooperating Farms	1939	1.63	1.05	1.26	.05	.05
Average 1938 and	1939	1.52	1.00	1.59	.05	.05
Non-Cooperating Farms	1938	1.25	.71	.73	.02	.04
Non-Cooperating Farms	1939	1.24	.70	.69	.04	.05
Average 1938 and	1939	1.24	.71	.71	.03	.04

For more detailed information as to distribution of the feed crops of this area, see pages 76 and 77 of the Appendix.

in the two groups, but these figures cannot be authenticated since only the total amounts of feed and numbers of livestock were known. The division was made, as previously stated, on the asumption that all crops would be divided as they were in 1937. Failure of any one crop might easily change this ratio since it is the tendency of the operator to base his feeding on whatever feed is available.

Table 22.

Average Feed Requirements per Livestock Unit

Class of Livestock	Pounds Legume Hay	Pounds Carbonaceous Roughage	Pounds Carbonaceous Grain	Pounds Protein Supplement.	Acres of Native Pasture	Acres of Winter Pasture	Acres Supplementary Summer Pasture
Dairy Cows	2,000	3,000	2,100	300	1 - 3	2	1
Other Cattle		2,000 to 3,000		200 to 300	5 - 12	3 - 4	
Swine			1,000	25 - 35			
Sheep	200 to 300		40 - 60		½ - 1	¼ - ½	
Horses		4,000 to 5,000	2,000 to 4,000				
Poultry	400 to 500		57 - 60	18 - 20			

Source: Agronomy Manual for Oklahoma. United States Department of Agriculture and Soil Conservation Service. Stillwater, Oklahoma, January, 1936.

It would probably be correct to assume that the workstock are fed on a more uniform basis than any other type of livestock on the farm. Shortages of feed would be absorbed by the cattle and hogs. The amounts fed to hogs vary with the market conditions for swine and in all cases somewhat less grain is fed per hundred pounds of gain in hogs than in many areas of Oklahoma. Most of the farmers market sour cream and a considerable portion of the skim milk goes to the hogs as a supplement for the grain.

Considerably more mill feed and hay per animal unit are also fed to each class of livestock on the cooperating farms. It is also true that a much higher percentage of the roughage fed on the cooperating farms consisted of legume hays. This added considerable expense to the cost of the roughage fed but was to some extent responsible for the increased yields of milk on these farms.

The most pertinent question relative to the management of these farms would concern the profitableness of these two feeding systems. On page 32 a summary of the income and expenses of these two groups of farms show that the non-cooperating farmers average approximately one hundred dollars per farm more net income. As previously pointed out this amount is not additional receipts but largely due to higher expenses on the cooperating farms. These operators purchased more mill feed, fed more home grown feeds and had more pasture acreage per livestock unit. They received more income per dairy cow from the sale of dairy products but there was little difference in the total income from all livestock per farm. It would appear that the non-cooperators make up for their lack of production per cow by keeping larger numbers of them. They save the additional feed cost but probably work harder

in caring for the extra stock.

Since neither of these two groups seemed to follow approved feeding practices or a definite cropping system it would seem safe to assume that more efficient procedures of farm management might be instigated in order to raise the farm income of both groups without being any harder on the soil resources than the present system. The entire problem is one of managerial efficiency which the farm planner must carefully consider. Again the human element enters into the problem. It is evident that these operators are going to change very little in the future if left to their own devices, as few of them have done so over the past six years under the operation of the Governmentally sponsored soil conservation program. One solution to this problem might be adult education along the lines of farm management for the operators of this area.

Farmers who do not realize the need for conservation are few and likewise most of them would be willing to conserve the soil when shown how they can do so at no financial loss to themselves. So far, it has not been evident that there would be any immediate advantages in conserving the soil. On the other hand, an effective program of conservation would undoubtedly demand some change in the cropping system. Since the average farm income for this area is so small, it is doubtful if the operator could afford to make any changes that would lower his income since it would necessarily affect his standard of living.

Table 23

Amounts and Values of Feeds Fed to Livestock
on the Small Livestock Farms of the Area

	Farm No. 1			Farm No. 2			Farm No. 3			Farm No. 4		
	1937	1939	1940	1938	1939	1940	1937	1939	1940	1938	1939	1940
Wheat (bu.)							67	14				
Oats (bu.)	178	706	335	110	57	155	817	620	472	598	442	502
Barley (bu.)	27			185	260	27		430	15	850	75	130
Corn (bu.)	20		7		15		45		75	131	13	89
Grain Sorghums (bu.)	60	100	10			51				73	64	68
Total Grain Fed (lbs.)	11,472	27,392	11,560	12,400	15,444	9,112	32,684	51,120	20,024	71,360	22,056	31,096
Corn Equivalent (bu.)	183	428	174	201	252	143	499	653	310	1,167	343	496
Value of Grain ($)	$128	278	127	$116	149	94	$444	412	199	$654	215	335
Bran (lbs.)	5,300	3,300	600	5,200	2,000	1,000						
Cotton Seed Meal (lbs.)	1,600	1,100	200	1,000	2,600	500	4,600	13,900	9,600			
Mixed Dairy Feed (lbs.)							5,200		19,200			
Poultry Feed (lbs.)	150						5,700					
Total Concentrates (lbs.)	7,050	4,400	800	6,200	4,600	1,500	15,900	13,900	28,800			
Corn Equivalent (bu.)	111	70	11	83	71	21	200	243	401			
Value of Concentrates ($)	$135	68	11	$ 75	65	20	$237	265	432			
Native Hay (tons)		17	9¼	5	5		2.5	14	9.4	8	6	17.6
Forage Sorghums (tons)	10		3	4	10.5	4	7	36	36		1	15
Legume Hay (tons)				4	3	3.6		2.3		Oat and Barley Hay 3		
Sorghum Silage (tons)			1						75			
Total Roughage (lbs.)	20,000	34,000	24,500	26,000	37,000	15,200	191000	32,600	90,800	16,000	14,000	71,200
Value of Roughages ($)	$ 65	86	76	$ 86	101	62	72	96	444	$ 44	36	207
Productive Livestock Units	10.15	12.16	14.81	7.51	8.29	8.71	27.48	23.75	28.71	18.40	26.69	19.50
Total Livestock Units	12.65	14.41	17.06	10.51	11.29	11.71	32.98	29.75	35.71	23.90	33.69	25.75
Butter Fat Produced per Cow	216	183	150	144	171	99	157	152	152	117	40	82
Net Increase Productive L.S.	$656	613	596	$328	446	126	$1,421	1,554	2,024	$541	556	581
Total Value of Feed	$328	452	237	$277	313	176	$753	773	1,075	$698	251	542
Net Increase over Feed	$328	161	359	$ 51	133	- 50	$668	781	949	$-157	305	39

Possible Future Effects of the Conservation Program on the Small Livestock Farms

The problems of the farm manager are many and diverse. In no other business is it so hard to foresee the future or to estimate the cost of production. In other businesses it is fairly easy to determine the cost of raw products, labor, machinery depreciation, etc., and to estimate the production. In farming there are many factors such as the weather that can entirely disrupt the farm plans and for which it is impossible to make accurate forecasts. Farming, as a business, is still further complicated by the difficulty of determining the best possible combination of enterprises and combination of elements entering into the organization of the various enterprises.

Since soil is one of the basic factors of production, it is unquestionable that over a long period of time any farming system should provide for the conservation of the soil resources as well as the other factors of production. The individual operator concerned with the present must decide whether or not he can expend capital and labor to protect future production or whether he will follow a system whcih will yield the highest possible returns for the current year. Throughout Oklahoma this problem is further aggravated by the tenancy situation. A large per cent of the farmers of this state rent the land which they operate and in many cases have only a one-year contract. This causes a high rate of mobility among the tenants and consequently makes it hard to interest them in the future condition of the farms which they occupy.

No doubt farmers in general would be willing to adopt a conservation program if they could be shown where they could do so without

detracting from their present farm income. The entire problem evolves around the most profitable land use under a conservation program. Theoretically the operator, by the proper combination of enterprises and the adoption of approved practices, could conserve the soil and at the same time maintain his present farm income. However, the data for this area does not present conclusive evidence that this can be done. It would appear then to be a problem of managerial ability with whcih the farm planner is to cope if he wishes to "sell" a program of soil conservation.

Any attempt to plan for the future is subject to a number of definite limitations which must be kept in mind by the farm planner. On the small livestock farms there are several factors which might be mentioned here.[1/] In the first place it is hard to determine the exact amount of feed which will be available for consumption due to variations in yields and furthermore, the quality of the feed is subject to variations even on adjoining farms. Then too, there is always the possibility of variations in the quality of the livestock kept by the individual producer and in his skill as a livestock feeder. Add to this the fact that the only guide available to follow in most cases is experimental data in regards to the efficiency of various rations and the fact that farm conditions are more variable than these controlled experiments, and it is only then that a true conception of the problems besetting the farm manager can be fully appreciated.

A study of the feeding practices of the four farms described in

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1/ Sitterley, John H. Feed Consumed by Livestock. Bulletin 203, Ohio Agricultural College Extension Service. Janurary 1940, pp. 4.

the previous section shows a wide variation in the kinds and amounts of feeds fed even on each farm from one year to another. When compared to the average soil conserving farm for the area it is found that they are feeding more and getting higher returns per cow than the average operator. It is evident, however, that the feeding method which produces the highest yields per cow are not necessarily the most profitable combinations for the farm as a whole. The kind of feed fed seems to be the most important factor in determining profit. In most cases the greatest profit was received when smaller amounts of mill feed were fed and comparatively larger amounts of roughage were used.

It would be impractical to attempt here to make definite recommendations as to the changes which should be made in the individual farm organizations, but a comparison of the feeding summary for these farms with the individual summary sheets showing the farm organization and receipts indicate that some changes could be made which would, no doubt, improve the efficiency of these farms.

First, it appears that it is profitable to feed some mill feed in the form of a protein concentrate where it is used only as a supplement for home grown feeds. Farm No. 4 is a good example of an effort made to eliminate this expense entirely by feeding greater amounts of grain.[1/] It is possible as shown by the records for this farm to increase the butter fat yields per cow by heavy feeding of grain but the cost was too great to be offset by the additional butter fat produced.

1/ Table 23, p. 56

Secondly, it is recommended that a considerable portion of the land be devoted to the production of hay, since those farms feeding comparatively large amounts of roughages seemed to yield the greatest farm income.

Third, most of these farms could very profitably use some type of temporary pasture to supplement the native pasture, wheat and barley for winter pasture and sudan for summer grazing being recommended. This can be double cropped in combination with other crops without affecting to any extent the total production of hay and grain. From the few cases in which it has been used, it appears that silage would be profitable as a feed for cattle. Trench silos may be used in this area and do not entail a great deal of expense in their construction, as compared to other types of structures which might be used.

Fourth, it seems that in many cases the operator could profitably make some changes in the numbers and kinds of livestock which he keeps. The records show that the operator on farm No. 1 follows the practice of renting out a portion of his permanent pasture each season. It is questionable as to whether this is more profitable than adding additional units of livestock to utilize this pasture. The records also show that the operator of farm No. 4 keeps an average of six units of workstock in addition to a tractor on a 240 acre farm, of which he has in crops, on an average, only 100 acres. Since horses are the heaviest consumers of feed on the farm it appears that it would be more profitable to divert this feed into productive livestock.

No doubt there are other changes, such as the use of better livestock, which would increase the net income of the operator but are of only passing interest here as they would not directly affect

the soil conserving program. Judging from the past record of the farm operators in this area, it is doubtful if they will make many changes in the future in their farm organization unless they are placed in direct contact with efficient farm planners. The probable effects of the conservation program in this area will be to benefit the cooperators only to the extent that they will be able to maintain their yield over a longer period of years. On the other hand, the conservation program is adapted to livestock farming and by utilizing a greater portion of their crop lands for the production of roughages, the conserving farmers can control soil losses on most of their land and probably feed their livestock more efficiently at the same time.

Summary and Conclusions

Summary

This study of the Stillwater Creek area indicates that from the standpoint of conservation there are two important factors which must be considered. First, that loss of soil through water erosion has reached advanced stages on much of the land, and second, that the farms of the area have changed from crops to livestock as a major source of income in the majority of cases. The relationship of the conservation program to livestock farming and its effect on this type of farms, is, then, of increasing importance to the farm planner. A brief summary of the effects of the conservation program on the livestock farms, as nearly as they could be surmised from the material available, is given below.

Livestock farming as practiced in this area is more adaptable to conservation measures than are the other types of farming. There is a correlation between both the ability to cooperate in a soil conservation program and to carry on livestock farming and the type of tenure. Owner-operators or part-owners seem to be in a better position to change their type of farming and are apt to be more concerned about soil losses.

The soil conservation program as carried out on the small livestock farms consists entirely of physical measures for controlling erosion. Such measures consist of terracing, contour farming, contour furrowing on pasture land, some strip cropping and the use of dams, baffles and diversion ditches. No planned system of crop rotations for soil improvement is used and very little, if any, commercial fertilizers have been applied. These mechanical measures were installed on the cooperating farms at very little expense to the operator, most of

the cost being borne by the Government.

The small livestock farms which practice soil conservation do not vary to any great extent from the non-conserving farms as far as land use is concerned. The two groups of farms grow practically the same crops and about the same acreages of each. The soil-conserving farmers plant a slightly larger acreage of row crops than do the other operators. Crop yields do not seem to be affected by the conservation program. The conserving farmers average slightly higher yields on most crops but this condition prevailed previous to the conservation program on these two groups of farms. This would indicate that the increased yields are due to better management or better land rather than to the program.

The chief factor affecting crop yields in this area seems to be the erratic weather conditions. Unpredictable seasonal distribution of the rainfall and temperatures that vary during the growing season make all crop uncertain as to yields.

Both groups of farmers sell a portion of their feed crops. The non-cooperating farmers as a whole receive more from the sale of crops than do the cooperating farmers. The net income per farm is higher for the non-cooperating group. This is not due so much to additional farm receipts but to expenses on the conserving farms, particularly the building, machinery, and cash feed expense. It would appear, however, that this additional expense does not result from the conservation program but rather to the fact that the cooperating farms have better equipment and buildings, which in turn implies that they may be willing to sacrifice a portion of their cash income for the improved living conditions which they seem to have. It should be added here that data on income was not complete in every detail. No information was available on the

amounts of farm products used in the home. Had these figures been included the comparative incomes for the two groups might have been materially affected.

The study of individual farms indicate that on the various types of livestock farms in the area none of the operators carry out a consistent cropping program. Consequently, the amounts and kinds of feeds available vary from year to year which should tend to disrupt any planned feeding syatem. Livestock yields and returns seem to vary with the amount and kinds of feeds fed to the livestock. Most of the operators in the area supplement the home grown feeds with mill feeds which they purchase.

The economic success or failure of the farm business of the small livestock farmer of the area seems to be more closely related to the individual ability of the operator than to any other one factor. Whether or not an operator conserves the soil also seems to be directly associated with the managerial efficiency with which he operates the rest of his farm business. The conservation program as a whole seems to be an effect of good management rather than a cause of it. There seems to be a great deal of room for improvement in efficiency among both the conserving and non-conserving farmers.

Conclusions

The data compiled in this study of the small livestock farms of the Stillwater Creek area in relation to the conservation program justify the following conclusions.

1. The conservation program is not likely to increase either the crop yields or the farm income in the immediate future.

2. The theoritical possibility of increased forage crops on the cooperating farms increasing the numbers of livestock has not been realized. The uncertainity of feed crop yields, due to weather conditions, makes it impractical to expand the livestock program to any great extent since in years of crop failures the crop farmers stand to lose less than do the livestock farmers who must feed their livestock.

3. The average farm income for this group of farms is so small that the operators could not afford to conserve the soil if there is any danger of the program lowering this income.

4. It is possible that the farms of this area are passing through a transitional period in which the type of farming, when based on farm income, is changing from crops to livestock. Since the numbers of livestock have not increased materially, it is more probable that this change in the farm income is temporary owing to the relative prices of farm products.

5. The human factor, or the differences in the operators themselves, seem to determine to a large extent their willingness to conserve the soil. Based on investments in dwellings, farm equipment, and farm buildings, per cent of ownership, etc., the cooperators were found to have a higher standard of living and were willing to sacrifice

a portion of their present income, if necessary, to maintain this standard by conserving the soil for future use.

6. Soil conservation should not be looked upon as a final solution to the farm problems of this area but rather as a step toward the goal of higher managerial efficiency.

APPENDIX

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Classification of Farms in the Northern Portion of the Stillwater Creek Area on the Basis of Ownership, Size, Type of Farming, and Conservation Practices

1933

Type of Farms		40 - 119 A.			120 - 259 A.			260 - 359 A.			360 A. Over		
		OO	PO	T	OO	PO	T	OO	PO	T	OO	PO	T
L. S.	S.C.	12	2	2	29	12	24	5	9	-	2	7	2
	N.C.	3	3	2	14	8	19	3	5	4	2	3	2
Crops	S.C.	5	2	7	4	2	18	-	1	3	1	-	-
	N.C.	2	1	12	8	4	18	1	-	-	-	-	-
General	S.C.	2	1	1	2	3	12	1	4	1	-	2	2
	N.C.	5	2	5	3	4	12	-	-	1	-	-	2
Part Time	S.C.	3	1	1	2	1	2	-	-	-	-	-	-
	N.C.	8	-	3	1	1	6	-	-	-	-	-	-

1938

L. S.	S.C.	4	1	3	15	7	9	1	2	4	1	4	3
	N.C.	3	1	4	7	1	10	-	-	2	1	1	1
Crops	S.C.	-	-	-	-	-	1	—	1	-	-	-	-
	N.C.	2	-	-	2	1	3	-	1	2	-	-	-
General	S.C.	1	-	-	1	-	1	-	3	1	-	1	-
	N.C.	2	-	1	1	-	2	1	-	-	-	-	-
Part Time	S.C.	-	-	1	-	1	2	-	-	-	-	-	-
	N.C.	-	-	-	-	1	-	-	-	-	-	-	1

1939

L. S.	S.C.	3	2	-	13	5	14	2	5	4	3	3	2
	N.C.	3	-	4	5	1	11	—	1	2	-	1	-
Crops	S.C.	1	-	-	1	-	1	-	-	1	-	-	-
	N.C.	-	-	1	-	-	-	1	-	-	-	-	-
General	S.C.	-	-	-	-	-	5	-	1	-	-	1	-
	N.C.	-	-	-	2	2	1	-	1	1	-	-	-
Part Time	S.C.	2	-	4	-	-	-	-	-	-	-	-	-
	N.C.	1	1	1	1	1	5	-	-	-	-	-	1

Soil Groups Found in the Stillwater Creek Area

Group No. 1.

15 - Kirkland Silt loam.
14 - Oswego silt loam.
18 - Kirkland very fine sandy loam (shallow phase).
70 - Calumet silt loam.

Group No. 2.

12 - Kirkland very fine sandy loam.
9 - Renfrow very fine sandy loam.

Group No. 3.

23 - Renfrow silty clay loam.
13 - Vernon clay loam.
20 - Labette silty clay loam.

Group No. 4.

Rough broken land.

Group No. 5.

16 - Bates very fine sandy loam.
17 - Vernon very fine sandy loam.
19 - Noble fine sandy loam.
31 - Barett fine sandy loam.
21 - Darnell fine sandy loam.

Group No. 6.

41 - Teller very fine sandy loam.
22 - Reinach very fine sandy loam (colluvial phase).
42 - Daugherty fine sandy loam.

Group No. 7.

A. - First Bottoms.
2 - Yahola silty clay loam.
3.- Yahola very fine sandy loam.

B. - Second Bottom or Terrace Soil.
35 - Kay silty clay loam.
8 - Reinach very fine sandy loam.
5 - Reinach silty clay loam.

Source: Wade, Albert E. "Project Monograph of the Stillwater Creek Project," Soil Conservation Service, Stillwater, Oklahoma, 1940.

Average Monthly Precipitation in Inches and the Deviation from Normal
for the Stillwater Station, Payne County, Oklahoma

Year		Jan.	Feb.	Mch.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Annual
1928	*Rain.	.30	1.38	3.07	4.44	3.27	6.11	1.90	2.02	.37	3.33	4.77	1.56	33.69
	**Dev.	- .78	+ .17	+ .68	+ .44	-1.79	+2.26	- .95	-1.05	-3.40	+ .39	+2.63	+..23	- 1.17
1929	Rain.	-----	1.66	4.19	7.97	8.99	2.11	2.66	.43	2.66	4.38	1.80	.10	-----
	Dev.	-----	+ .45	+1.80	+3.97	+3.93	-1.74	- .19	-2.64	-1.11	+1.44	- .34	-1.23	-----
1930	Rain.	2.13	2.15	.35	2.47	6.23	2.36	.14	3.84	.91	2.02	1.36	2.19	26.05
	Dev.	+1.05	+ .94	-2.04	-1.53	+1.17	-1.49	-2.81	+ .77	-2.86	- .92	- .78	+ .86	- 7.64
1931	Rain.	.86	1.04	2.15	2.88	2.02	2.24	3.56	3.67	2.01	.99	8.99	.49	30.90
	Dev.	- .22	- .17	- .24	-1.12	-3.04	-1.61	+ .71	+ .60	-1.76	-1.95	+6.85	- .84	- 2.79
1932	Rain.	4.17	2.41	.09	.49	2.28	6.47	9.55	5.55	.94	2.08	.72	4.32	39.08
	Dev.	+3.05	+1.20	-2.26	-3.53	-2.73	+2.52	+6.90	+2.57	-2.76	- .92	-1.47	+2.94	+ 5.51
1933	Rain.	.41	1.72	4.62	2.23	1.73	Trace	6.81	4.99	4.80	4.85	2.33	1.96	35.75
	Dev.	- .71	+ .51	+2.27	-1.79	-3.28	-3.95	+4.15	+2.01	+1.10	+1.15	+ .14	+ .58	+ 2.18
1934	Rain.	1.75	.80	1.14	2.65	2.68	2.07	.72	3.19	8.95	2.23	3.67	.82	30.67
	Dev.	+ .67	- .41	-1.21	-1.37	-2.33	-1.88	-1.94	+ .21	+5.25	- .77	+1.48	- .56	- 2.90
1935	Rain.	.60	1.38	3.15	2.45	3.59	10.31	.51	3.08	2.26	2.18	2.16	1.92	33.59
	Dev.	- .52	+ .17	+ .80	-1.57	-1.42	+6.36	-2.15	+ .10	-1.44	- .82	- .03	+ .54	+ .02
1936	Rain.	.14	.25	.02	1.11	4.84	1.91	.37	Trace	5.77	2.31	.08	1.49	18.29
	Dev.	-1.00	-1.07	-2.29	-2.86	- .11	-2.08	-2.39	-3.08	+2.07	- .78	-2.31	+ .35	-15.54
1937	Rain.	.91	.23	.96	1.72	2.86	6.61	1.76	3.46	2.24	2.38	.87	1.49	25.49
	Dev.	- .23	-1.09	-1.35	-2.25	-2.09	+2.62	-1.00	+ .38	-1.46	- .71	-1.51	+ .35	- 8.34
1938	Rain.	.57	2.25	5.63	2.51	5.71	4.80	3.88	4.39	2.16	.37	2.60	.42	35.29
	Dev.	- .57	+ .93	+3.35	-1.46	+ .76	+ .81	+1.12	+1.31	-1.54	-2.72	+ .22	- .72	+ 1.46
1939	Rain.	3.42	.61	1.09	3.64	2.29	4.23	2.87	3.62	.39	1188	1.59	1.32	26.95
	Dev.	+2.28	- .71	-1.22	- .33	-1.96	+ .24	+ .11	+ .54	-3.31	-1.91	- .79	+ .18	- 6.88
1940	Rain.	.69	3.71	.19	6.02	1.22	4.55	2.43	5.62	1.17	1.13	5.10	1.90	33.78
	Dev.	- .45	+2.39	-2.12	+2.05	-3.73	+ .56	- .33	+2.54	-2.53	-1.96	+2.72	+ .76	- .10

Source: Wahlgren, H. F., Monthly Reports of Climatological Data for Oklahoma. Annual Reports United States Department of Commerce, Weather Bureau, Oklahoma City, Oklahoma.

* Rain. - - Rainfall
** Dev. - - Deviation from Normal

Monthly Mean and Annual Average Temperatures for Stillwater Station, Payne County

Year		Jan.	Feb.	Mch.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Annual Average
1928	Mean	40.0	43.6	53.3	57.8	70.0	74.0	80.6	81.3	71.6	66.0	49.0	41.8	60.8
	Dev.	+ 3.3	+ 4.8	+3.4	- 1.3	+ 2.5	- 2.6	+ 0.1	+ 0.6	- 1.5	+ 5.4	- 0.3	+ 4.1	+ 1.5
1929	Mean	34.6	31.1	53.2	64.2	66.0	71.1	81.0	83.6	72.2	64.0	?	42.0	59.5
	Dev.	- 2.1	- 7.7	+ 3.3	+ 5.1	- 1.5	+ 0.5	+ 0.5	+ 2.9	- 0.9	+ 3.4	?	+ 4.3	+ 0.3
1930	Mean	22.4	49.6	47.7	63.9	67.3	?	84.2	83.9	77.6	61.6	50.9	39.9	?
	Dev.	-14.3	+10.8	+2.2	+ 4.8	—0.2	- ?	+ 3.7	+ 3.2	+ 4.5	+ 1.0	+ 1.6	+ 2.2	?
1931	Mean	42.6	47.7	45.6	56.4	64.8	81.1	83.6	79.4	82.4	69.9	54.0	44.4	66.5
	Dev.	+ 5.9	+ 8.9	- 4.3	- 2.7	- 2.7	+ 4.5	+ 3.1	- 1.3	+ 9.3	+ 7.3	+ 4.7	+ 6.7	+ 3.3
1932	Mean	39.6	49.6	44.0	64.8	69.2	72.2	83.2	81.2	73.6	61.0	45.8	35.9	60.4
	Dev.	+ 3.7	+10.2	- 6.0	+ 5.4	+ 1.6	+ 0.6	+ 2.6	+ 0.4	+ 0.4	- 0.1	- 3.4	- 2.1	+ 1.1
1933	Mean	47.2	38.2	52.4	62.1	71.2	81.8	89.0	78.4	77.7	62.4	52.2	46.0	62.8
	Dev.	+10.9	- 1.2	+ 2.4	+2.7	+ 3.6	+ 5.2	+ 3.4	- 2.4	+ 4.5	+ 1.3	+ 3.0	+ 8.0	+ 3.4
1934	Mean	41.6	42.7	49.4	62.0	69.4	83.5	88.6	90.6	67.4	63.6	51.3	38.2	62.4
	Dev.	+ 5.3	+ 3.3	- 0.6	+ 2.6	+ 1.8	+ 6.9	+ 8.0	+ 9.8	- 5.8	+ 2.5	+ 2.1	+ 0.2	+ 3.0
1935	Mean	40.4	41.4	55.3	56.1	69.6	73.5	83.9	83.5	69.6	61.5	45.6	38.8	59.3
	Dev.	+ 4.1	+ 2.0	+ 5.3	- 3.3	- 4.0	- 3.3	+ 3.3	+ 2.7	- 3.6	+ 0.4	- 4.6	+ 0.8	- 0.0
1936	Mean	34.1	32.4	57.0	61.2	71.4	8017	87.8	89.6	78.0	59.2	47.8	43.6	61.9
	Dev.	- 2.2	- 7.0	+ 7.0	+ 1.8	+ 3.8	+ 4.1	+ 7.2	+ 8.8	+ 4.8	- 1.9	- 1.4	+ 5.6	+ 2.6
1937	Mean	30.6	40.9	46.1	61.0	70.6	78.8	85.0	86.0	75.0	62.2	46.5	38.1	60.1
	Dev.	- 5.7	+ 1.5	- 3.9	+ 1.6	+ 3.0	+ 2.2	+ 4.4	+ 5.2	+ 1.8	+ 1.1	+ 2.7	+ 0.1	+ 0.7
1938	Mean	41.6	46.3	58.4	60.0	68.7	76.6	82.2	83.4	74.8	68.2	48.6	40.6	62.4
	Dev.	+ 5.3	+ 6.9	+ 8.4	+0.6	+ 1.1	- 0.0	+ 1.6	+ 2.6	+ 1.6	+ 7.1	- 0.6	+ 2.6	+ 3.1
1939	Mean	43.4	37.2	53.6	59.8	70.6	78.0	83.8	81.6	80.4	67.2	47.3	43.8	62.2
	Dev.	+ 7.1	- 2.2	+ 3.6	+ 0.4	+ 3.0	+ 1.4	+ 3.2	+ 0.8	+ 722	+ 6.1	- 1.9	+ 5.8	+ 2.8
1940	Mean	22.9	39.8	51.6	59.4	67.4	75.2	79.8	77.5	75.2	57.2	46.2	42.7	58.4
	Dev.	-13.4	+ 0.4	+ 1.6	- 0.0	- 0.2	- 1.4	- 0.8	- 3.3	- 2.0	+ 6.1	+ 3.0	- 4.7	- 1.0

Source: Wahlgren, H. F., Annual Reports of Climatological Data For Oklahoma, Oklahoma City, Oklahoma.

Mean - - Mean monthly temperatures.
Dev. - - Deviation from normal temperatures.

Yields of Wheat, Oats,
Corn, and Cotton in Payne County

Years	Wheat (bu)	Oats (bu)	Corn (bu)	Cotton (lbs lint)
1919	11.6		20.0	
1920	14.7		22.0	
1921	12.6		24.0	
1922	7.1		20.0	
1923	8.2	12.8	9.6	
1924	14.7	22.1	19.0	
1925	7.6	11.9	10.3	
1926	13.5	13.7	26.9	
1927	9.1	14.4	22.5	
1928	12.1	19.6	24.1	150
1929	11.0	22.4	17.6	121
1930	10.2	22.9	11.2	119
1931	15.2	18.7	15.0	169
1932	11.4	11.1	23.5	150
1933	10.2		7.7	203
1934	10.5	4.7	3.7	46
1935	9.4		11.8	88
1936	11.0		4.2	32
1937	15.9		11.5	119
1938	12.2		24.0	239
1939	11.6		16.6	236
1940	12.0			394

Relationship between Seasonal Rainfall and
Corn Yields in Payne County, Oklahoma

Year	Rainfall in Inches			Average
	June	July	August	Yield
Normal	3.95	2.66	2.98	14.2
1928	6.11	1.90	2.02	24.1
1929	2.11	2.66	.43	17.6
1930	2.36	1.04	3.84	11.2
1931	2.24	3.56	3.67	15.0
1932	6.47	9.5 6	5.55	23.5
1933	- - -	6.81	4.99	7.7
1934	2.07	.72	3.19	3.7
1935	10.31	.51	3.08	1118
1936	1.91	.37	----	4.2
1937	6.61	1.76	3.46	11.5
1938	4.80	3.88	4.39	24.0
1939	4.32	2.87	3.62	16.6
1940				

Percentage Distribution of Feeds Fed to the Various Classes of Livestock in the Stillwater Creek Area in 1937

Type of Feed to Livestock	Work-stock	Milk Cows	Other Cattle	Poul-try	Swine
Wheat	2.5			77.0	20.5
Oats	46.0	29.0	8.0	9.0	8.0
Barley	28.0	22.0	6.0	16.0	28.0
Corn	8.0	15.0	.9	17.0	59.0
Grain Sorghums	9.0	15.0	5.0	61.0	9.0
Bran	3.0	94.0	1.0	1.0	1.0
Cotton Seed Meal		74.0	25.0		
Dairy Feed		90.0	10.0		
Poultry Feed				100.0	
Native Hay	39.0	37.0	24.0		
Grain Sorghum Fodder	25.0	58.0	15.0	1.0	1.0
Cane Hay	20.0	52.0	24.0		
Sudan Grass Hay	12.0	59.0	29.0		
Oat Straw	18.0	57.0	26.0		
Alfalfa Hay	33.0	51.0	16.0		
Other Legume Hay	36.0	64.0			
Other Hay	33.0	52.0	12.0		

Source: Summary of Survey of the feeding practices taken in the Stillwater creek area in 1937.

Amounts, Corn Equivalents, and Values of the Feeds Fed on the Small Livestock Farms of the Stillwater Creek Area for the Year of 1938

	Amount Fed (lbs.)	Corn Equiv. (bu.)	Farm Values	Amount Fed (lbs.)	Corn Equiv. (bu.)	Farm Values
Wheat	46,980	798	$ 478	34,440	585	$ 350
Oats	150,176	2,215	1,408	142,208	2,098	1,333
Barley	13,392	225	125	18,048	303	169
Corn	32,144	574	270	18,760	335	157
Grain Sorghums	17,920	304	425	56,616	960	134
Cotton Seed	3,000	51	30			
Cotton Seed Meal	5,400	86	84	72,000	115	112
Bran	54,900	709	604	5,600	72	62
Other Mill feeds	42,100		595	29,000	426	648
Native Hay	104,000	1,056	286	146,000	1,483	401
Sorghum Hay	113,000	1,264	239	76,000	853	162
Sudan Hay	69,000	748	146	38,000	414	81
Millet Hay				15,000	168	32
Alfalfa Hay	174,000	1,904	914	14,000	153	74
Cowpea Hay	16,000	187	94	14,000	152	74
Other Hay	28,000	291	70	36,000	374	90
1939						
Wheat	58,860	1,000	$ 559	38,520	654	$ 366
Oats	191,488	2,824	1,916	119,232	1,759	1,192
Barley	54,768	920	548	27,840	467	278
Corn	100,240	1,790	716	28,672	512	205
Grain Sorghums	90,328	1,509	839	11,424	194	106
Cotton Seed	5,110	87	51	1,510	26	15
Cotton Seed Meal	30,700	426	614	10,500	168	210
Bran	114,700	1,480	1,434	76,900	993	961
Cowpeas	2,225	36	44	490	7	8
Other Mill Feed	3,700	53	55	200	3	3
Native Hay	430,000	4,368	1,129	174,000	1,768	457
Sorghum Hay	206,000	2,311	463	92,000	1,032	207
Sudan Hay	94,000	1,025	211	90,000	981	202
Millet Hay	58,000	651	130	27,000	303	61
Alfalfa Hay	142,000	1,554	674			
Cowpea Hay	9,000	94	43			
Mung Bean Hay	5,000	47	21			
Other Hay				22,000	229	49
Totals		20,175	$9,467		9,096	$4,320

Cyril C. Pierce