

A STUDY OF THE EFFECT OF OIL AND GAS DEVELOPMENT UPON  
LAND UTILIZATION IN THE LUCIEN OIL FIELD,  
NOBLE AND LOGAN COUNTIES, OKLAHOMA

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## CHAPTER I

### INTRODUCTION

#### Problem and Purpose

In recent years, several studies have been made on the effect of oil and gas development on agricultural land use in Oklahoma. One study was made of a declining oil field near Garber, Oklahoma.<sup>1</sup> Another project of the same nature was carried on in the West Edmond field which is in the discovery and development stage of production.<sup>2</sup> Both fields are located in the north central wheat producing section of Oklahoma (Figure 1).

The present study was designed to analyze land utilization in an oil field of settled production as contrasted with the two studies mentioned above where declining production of an oil field or increasing production of a new field was found. Moreover, in order to provide a more complete picture of the effect of oil production in a type of agricultural area, this field is also located in the north central Oklahoma wheat area.

Farmers of Oklahoma have received a large part of their income and wealth from petroleum. Since many oil fields have been discovered and developed in agricultural areas, it has become important to know what agricultural land utilization changes, if any, have occurred. Studies of particular oil fields may disclose divergent patterns, but eventually, there may be enough individual studies to warrant their being combined so that

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<sup>1</sup> Edward Gregory, A Study of the Effect of Oil and Gas Development Upon Land Utilization in the Garber Oil Field, Garfield County, Oklahoma, Unpublished thesis, Oklahoma Agricultural and Mechanical College.

<sup>2</sup> C. D. Edmond, The Effects of Oil Operations on Land Uses in the West Edmond Oil Field, Unpublished report, Oklahoma Agricultural and Mechanical College.



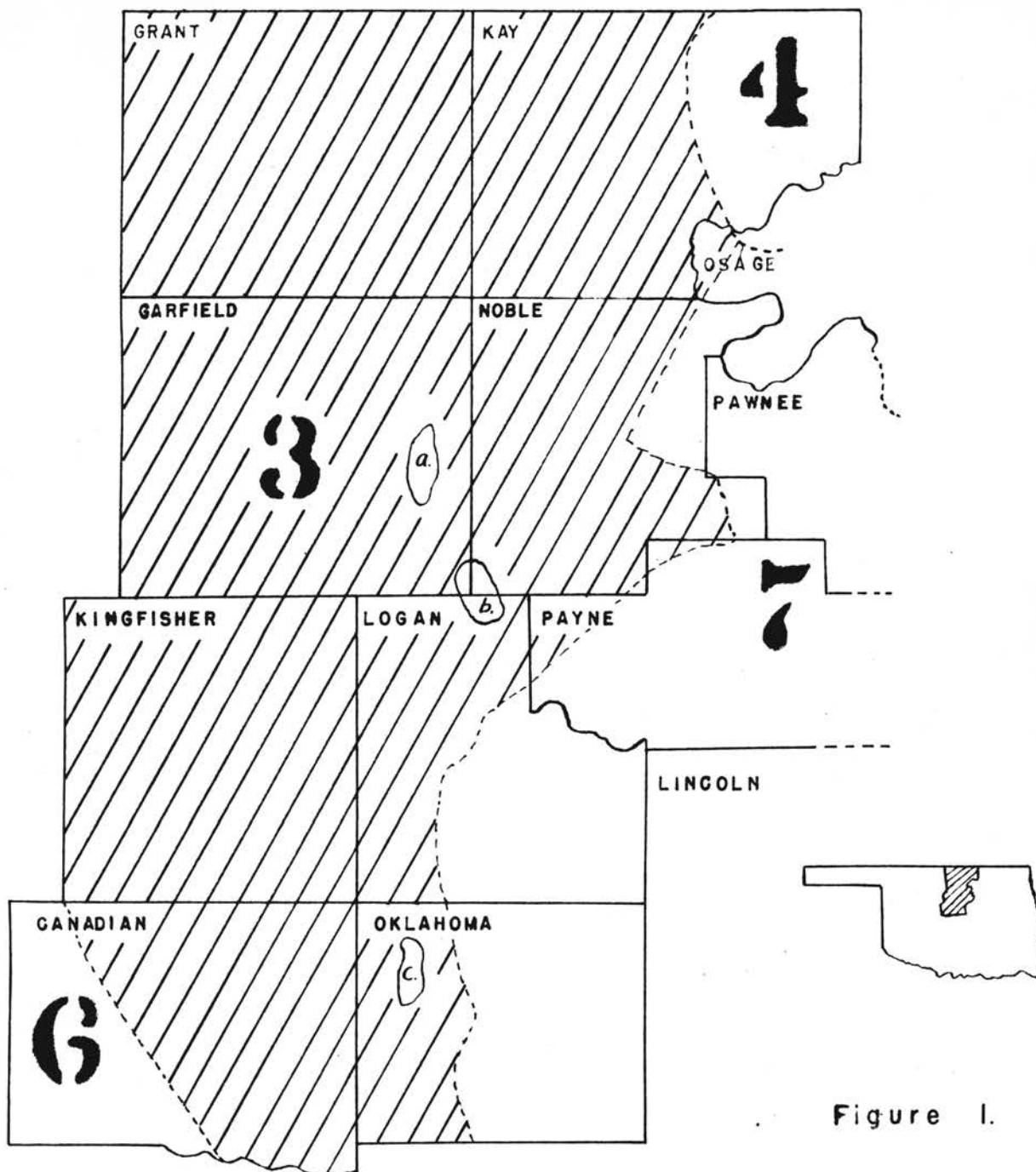


Figure 1.

LOCATION OF AREAS USED IN THE STUDY OF THE  
EFFECTS OF OIL AND GAS DEVELOPMENT UPON LAND

UTILIZATION

- a. Garber-Covington Oil Field: E. Gregory
- b. Lucien Oil Field: Jean Neustadt
- c. West Edmond Oil Field: C. D. Edmonds

relationships can be established which may be used in pointing out significant changes in land use in an agricultural area after oil is discovered. Furthermore, with these studies as an aid, it may be possible to alleviate some of the problems that have caused friction between oil companies and farmers. While this goal is not the purpose of the present study, if it is at all helpful in solving some of these problems, both causes may be served.

The major hypothesis for this study is: The discovery, development, and production of oil and gas in an agricultural area tends to alter the land utilization of that area. The minor hypotheses are:

1. That oil and gas development tends to increase owner-operatorship and to decrease tenancy.
2. That oil and gas development tends to shift cash cropping to livestock production.
3. That oil and gas development tends to increase the non-agricultural income in the area of development.

#### Method of Approach

The comparable approach was used in this study to show the relationship between oil and agriculture. This was done by analyzing the agricultural characteristics of an oil field area and a physiographically similar area having no oil production, and drawing comparisons between the two areas. The assumption is made that certain of the differences can be attributed to the influence of oil development on the agricultural economy of the area when the variables of tenure and soil are held constant.

The cost data for both areas were calculated on the same basis; that is, the same prices for products sold and the same wages for man or machine labor were used in determining income.

The area used for this study is the Lucien Oil Field. This is a field with settled production and is centered in an agricultural area having wheat as the major crop. The Control Area, approximately eight miles to the southwest of the oil field was chosen after a study was made of twenty surrounding townships seeking an area with similar climate, topography, and soil. By using the 1935 Agricultural Census, the Control Area was also compared with the Field Area for various agricultural characteristics. After these comparisons were made, the Control Area chosen resembled the Field Area in as many characteristics as possible, with the exception of oil development (Figure 3).

The basic data were collected by personal interviews with farmers. Questionnaires were made to facilitate the collection of the information needed. In the Field Area as many farm operators were contacted as could be found, and this included farms covering approximately two-thirds of the entire Field Area. Thirty-two individual farm units were surveyed in the Field Area and a like number surveyed in the Control Area. The one-third of the Field Area that was not covered was land which for the most part lay outside the oil field itself (Figure 2). The sample of the Control Area included the same number of units as was surveyed in the Field Area and was fairly evenly distributed throughout the area (Figure 3).

Difficulty was encountered in getting answers to some of the questions asked. Newspapermen, petroleum magazine writers, lease buyers, and others had previously canvassed the entire Field Area and parts of the Control Area. The farmers were hesitant about giving information to another interviewer. The indications were that they had the feeling this information would be used for a crop estimate report, an internal revenue report, or would lead to a published article. It was reported that several articles

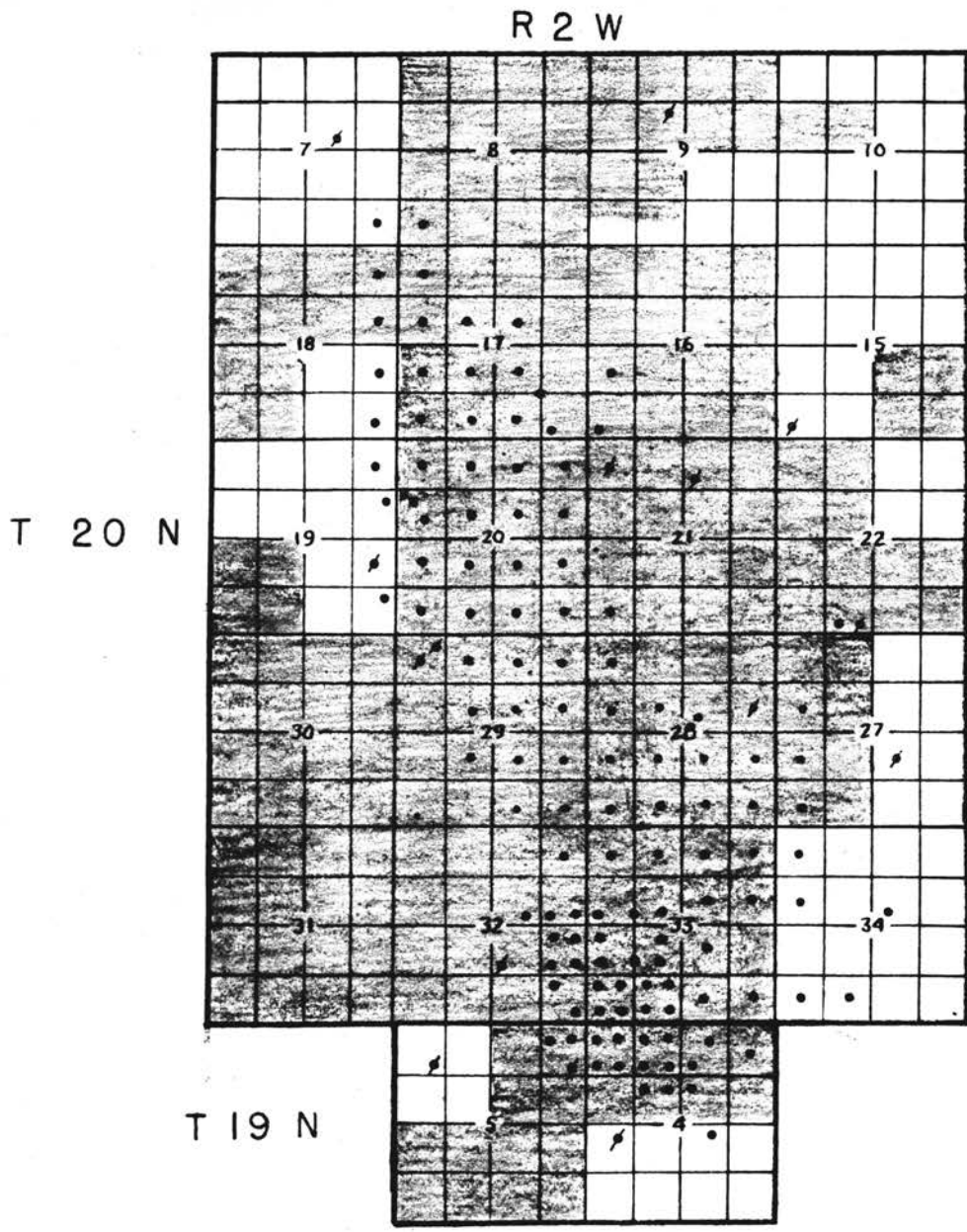


Figure 2.

# FIELD AREA

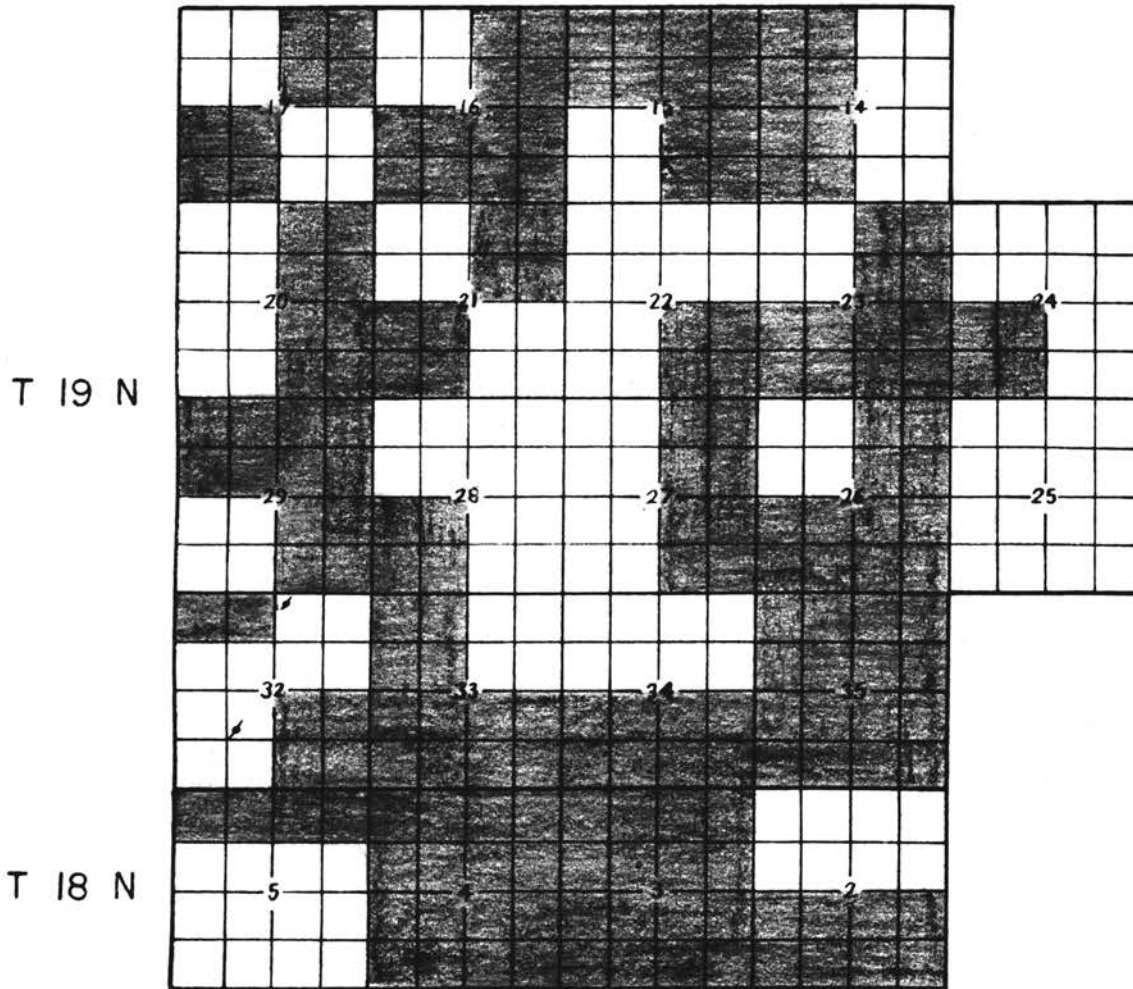


Figure 3.

# CONTROL AREA

■ Area Surveyed

had been written which were not complimentary to the farmers in the areas. Further questioning indicated that in at least several cases erroneous information was given. On the strength of the additional interviews, some schedules were corrected by the interviewer in line with the new information.

It is felt that a more accurate analysis of the problem would result if a survey of an agricultural area were made before any oil and gas leasing takes place. This would then be followed up by a frequent survey from the date of the first mineral lease through the period of actual discovery and development. A periodic survey would be needed for a number of years after development had ceased in order to show the full effects of oil and gas development on agricultural land uses.

However, this process is difficult since oil operators will not reveal areas that they want to "block up" for prospective oil operations.

#### Agricultural History

Around the turn of the twentieth century most farms in these two areas were 160 acres, the size set by the Homestead Act of 1862. At that time there were more operators since the farms were smaller than they are today. The farmers were predominately of German extraction, as are many of them today. As capital was accumulated, the enterprising individuals increased their holdings, and the sellers then moved to nearby towns, thus reducing the number of farm operators and increasing the size of the farm unit. While the original farms were 160 acres, today in the Field Area the average size per farm is 306 acres and in the Control Area the average size per farm is 275 acres (Table 2). Between 1894 and 1905 some cotton was raised; also corn and sorghums were raised to a relatively large extent. Shortly after

1900, the two areas shifted to wheat production, and this practice has predominated to the present. Hog production in the early days was the main livestock enterprise, but with the shift to wheat, the number of hogs decreased and the number of beef cattle increased. The present trend in this section seems to be to decrease cropland acreage in favor of grasslands. There is also a tendency toward more dairy production as a result of the recently added milk plant in Perry, Oklahoma.

#### Lucien Oil Field History

In September, 1932, the first important oil field in Oklahoma to be unitized was opened in Township 20 North, Range 2 West of the Indian Meridian, and was known as the Lucien Field. Eight major oil companies controlled 2,160 acres with the Shell Petroleum Corporation controlling 34.27 percent of the total. There were 53 wells drilled in the original field with a spacing of one well to each forty acres. The spacing was later changed to one well on each ten acres in part of the field. These wells were drilled with heavy rotary equipment to a depth of around 4,900 feet and were then drilled in with cable tools to a bottom hole depth of approximately 5,000 feet. In 1946, there were about 4,000 acres proven with

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<sup>3</sup> This information was obtained from Mr. T. A. Kolb, a Noble County farmer, who was born on his present farm in 1882 and has helped develop this area.

<sup>4</sup> Unitization means the development of an oil field through the centralized administration of one or several companies, not the development by a large number of operators.

<sup>5</sup> B. B. Zavico, "Geology and Economic Significance of the Lucien Field," World Petroleum, V (November, 1934), p. 416.

a cumulative production of more than 33,043,995 barrels of oil.<sup>6</sup> Soon after production started proration was ordered, but this did not last long.<sup>7</sup> For this reason the figures for yearly recovery are not available.

The topography of the area forms an ascending terrace in Sections 8, 9, 16, 17, 20, and 21. It breaks sharply to the west in Sections 7, 18, and 19.<sup>8</sup> The soil is reddish gumbo and sandy loam. From personal observation, the soil and topography of the Control Area are similar to those of the above-mentioned Field Area.

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<sup>6</sup> National Oil Scouts Association of America, Yearbook, (Incorporated) XVII, 1947, p. 515.

<sup>7</sup> Personal communication, Lawrence W. Alley, Assistant Director, Oklahoma Corporation Commission, November 28, 1947.

<sup>8</sup> Zavoice, op. cit., p. 416.



## CHAPTER II

### TENURE

#### General

As has been mentioned previously, the Lucien Oil Field was discovered and development started in 1932. For this reason, 1932 was selected as the base year for determining mobility or stability of tenure. The dates used to measure stability of the part-owners in both areas are the dates of purchase of the land owned and not on the date tenancy started on the rented land. In some cases the operators were on a farm as tenants before the date of purchase, some were on their rented farms before purchasing other land, and still others rented other land after the purchase of their land. This information is not available from the data gathered, so the date of purchase or inheritance of the land will be used below.

#### Length of Tenure By Tenure

##### Owner-Operators

In the producing Field Area seven of the present owners owned 1,848 acres in 1932 or before. In the non-producing Field Area there were three operators who owned 640 acres prior to the base date. The total Field Area shows ten owners holding approximately 66 percent of all owner-operated land and accounting for 67 percent of the owners beginning operation of their present farm by 1932 (Table 1). In contrast with this is the fact that prior to the base date only 640 acres were owned by four operators in the Control Area. This accounts for 36 percent of the present owned land and 44 percent of the owner-operators in the Control Area at present. From these comparisons it is evident that there is considerably greater stability in the Field Area so far as owner-operated units are concerned.

Table 1. Length of Tenure: Lucien Oil Field  
and Control, 1948

	: 1932 or Earlier			:: 1933 or Later		
	: Producing:	Non-Producing:	Control	:: Producing :	Non-Producing:	Control
	: Field Area:	Field Area :	Area	:: Field Area :	Field Area :	Area
Owners (Number)	1,848	640	640	1,120	160	1,120
Number of Farms (Number)	7	3	4	4	1	5
Part-Owners (Number)	320	480	560	2,044	420	3,529
Number of Farms (Number)	1	1	1	4	1	9
Tenants (Number)	0	320	480	800	1,640	2,464
Number of Farms (Number)	0	1	2	4	5	11
Total (Number)	2,168	1,440	1,680	3,964	2,220	7,113
Number of Farms (Number)	8	5	7	12	7	25

After 1932 there were four owner-operators or 36 percent of the owner-operators who acquired 1,120 acres in the producing Field Area and one operator or 25 percent of the owner-operators who acquired 160 acres in the non-producing Field Area. In the Control Area there were five operators or 56 percent who acquired 1,120 acres after 1932. The average size farm acquired in the Field Area was approximately 255 acres as compared to 225 acres in the Control Area. These figures are approximately that of the average size farm in these areas. It must be noted that the national depression was going on at this time, and there is a natural tendency for people to move from urban to rural areas in times of national financial stress. This does not fully explain why so much acreage was purchased in the Field Area as the price of land was high at this particular time due to oil development. A more detailed examination of the five owner-operators in the Field Area who acquired ownership after 1932 reveals that the farms were acquired in 1934, 1938, 1939, 1941, and 1942. It is known that the farm acquired in 1934 was a gift. In the Control Area all land was purchased after 1937 up to and including 1946. These figures tend to show that the purchases were not made during the height of the depression or during the height of oil development, but during a period of financial recovery and the tapering off of oil exploration.

#### Part-Owners

Before 1932 only one of the part-owners owned land in the producing Field Area having 320 acres, one in the non-producing Field Area with 480 acres, and one in the Control Area with 560 acres. It is interesting to note that each of these operators either inherited or purchased the land

owned from a parent. It is an Old World characteristic to bequeath to their heirs that property acquired during their lifetime.

After 1932 there seemed to be more mobility and the acquisition of more land. In the producing Field Area four operators or 80 percent of the operators in this class acquired 2,044 acres as compared to one operator or 50 percent gaining 420 acres in the non-producing Field Area. In the Control Area nine operators or 90 percent acquired 3,929 acres after 1932. It is evident that longer tenure by this group of operators is also found in the Field Area.<sup>1</sup> In the Field Area only 80 acres of the land was purchased before 1940 and that was purchased from the operator's father. The land purchased in the non-producing Field Area was done so in 1939 and the land acquired in the Control Area was either purchased or inherited between 1933 and 1946, being fairly evenly distributed during that period.

#### Tenants

Of the tenant-operators interviewed in the producing Field Area none of them operated his present farm before 1932. There was one tenant-operator or 17 percent of the tenant-operated farms in the non-producing Field Area who operated the present farm before 1932. In the Control Area, two tenants or 15 percent operated their present farm prior to 1932. These two operators had been on the same farm for more than 30 years. After 1932 all tenant-operators in the producing Field Area and five tenant-operators or 83 percent in the non-producing Field Area moved on their present farm. In

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<sup>1</sup> This does not mean that this much acreage was purchased at the time, but shows that part-owner-operators were operating this much acreage at the time of the survey and purchased the land owned by them in the periods given in this study.

the Control Area eleven or 85 percent of the tenant-operators moved to their present farm after 1932. A more detailed examination shows that of those tenants moving on to their present farm after 1932 in the producing Field Area, one had been on the same farm more than 10 years, two more than 5 years, and one for 3 years. In the non-producing Field Area one had been on the farm 10 years, two for 5 years, and the other two for 1 year. In the Control Area, two had been on their present farm for 10 years, one for 5 years, one for 4 years, one for 2 years, and six for only 1 year. As in the case of owner-operators and part-owner-operators there was greater stability in the Field Area and greater mobility in the Control Area as evidenced by the greater number of one-year tenants.

#### Summary

Tenure stability of owner-operated farms is greatest in the producing Field Area. The Field Area owner-operators owned over twice as much land before 1932 as was acquired after 1932. On the other hand, owner-operators in the Control Area acquired nearly twice as much land after 1932 as was owner-operated before that date. This indicates that land acquisition may have been more difficult in the area of production.

Tenure stability of part-owner-operators was greatest before 1932 when the present owners acquired possession of most of the land either by purchasing it from a parent or by inheritance. After 1932 mobility of part-owners seemed to be greatest in the Control Area where almost one-third more acreage was acquired than in the Field Area. However, the average acreage acquired after 1932 was about the same in all areas. Data show that more land was available after 1932 and more part-owner-operators acquired this land after 1932 in the Control Area. The stability of both

owner-operators and part-owner-operators appears to be greatest in the Field Area which is probably a result of the German characteristic plus the development of oil in 1932.

The stability of tenure was again greatest among tenants in the Field Area. There seemed to be about the same amount of land available to tenants after 1932 in both areas, which probably means that some few owner-operators or part-owner-operators moved to town and made these farms available to tenants. At the same time, many had no incentive to leave their farm. This factor of stability seems to create the difference between the Field Area and the Control Area in the amount of rent land available to tenants and part-owner-operators. While there was a certain degree of mobility in all areas, it appears that tenure stability was greatest in the producing Field Area since all the tenants in that area had been on their farms 3 years or longer.

Therefore, it appears that tenure is more stable in the area of development and this is apparently due to the fact that the landlords do not care to change tenants so often if they are fairly efficient, the tenants are in a community they like and fit into and do not care to move, and that because of oil and gas development the owner- and part-owner-operators do not have any incentive to leave the farm and make land available since they can now farm with less labor intensification.

CHAPTER III  
MAJOR LAND USE

General

The major hypothesis to be tested is that oil and gas development in an agricultural area tends to alter the land utilization of that area. The first minor hypothesis, that oil and gas development tends to increase owner-operatorship and to decrease tenancy, will also be tested here. These hypotheses will be tested by showing comparisons between the Field Area and Control Area and between the producing and non-producing portions of the Field Area. The type of tenure will be taken into consideration in an attempt to ascertain the relationships and causes, if any, that are brought about by oil development.

The term, "major land use," in this study will mean the allocation of the land to either pastureland, cropland, or other land. The "other land" includes the homestead, wasteland, acreage occupied by oil field buildings and equipment. In other words, "other land" means all land not included in either cropland or pastureland.

The Field Area consists of 9,792 acres or an average of 306 acres per farm as compared to 8,793 acres in the Control Area with an average of 275 acres per farm (Table 2). Of the total acreage in the Field Area 50 percent is owner-operated as compared to 42 percent of the total acreage being owner-operated in the Control Area. The higher percentage of owner-operatorship in the Field Area can be explained only by deduction. It might be expected that an outside source of income such as accrues to landowners upon the discovery of oil, would encourage owner-operators to leave the farm and find a tenant for it. However, as will be shown later, it appears that the

Table 2. Major Land Use: Lucien Oil Field and Control, 1946

	Total Field Area			Producing Field Area			Non-Producing Field Area			Control Area			Field Area : Control Area	
	Owners	Part-Owners	Tenants	Owners	Part-Owners	Tenants	Owners	Part-Owners	Tenants	Owners	Part-Owners	Tenants	:	:
Number of Farms (Number)	15	7	10	11	5	4	4	2	6	9	10	13	32	32
Total Land Area (Acres)	3,768	3,264	2,760	2,968	2,364	800	800	900	1,960	1,760	4,089	2,944	9,792	8,795
Average Size of Farms (Acres)	251.2	466.2	276.0	269.8	472.8	200.0	200.0	450.0	326.7	195.6	408.9	226.5	306.0	275.0
Land Owned (Acres)	3,768	1,120	-	2,968	800	-	800	320	-	1,760	1,919	-	4,888	3,679
Average (Acres)	251.2	160.0	-	269.8	100.0	-	200.0	160.0	-	195.6	191.9	-	152.8	115.0
Percentage of Total (Percent)	100.0	34.6	-	100.0	33.8	-	100.0	35.6	-	100.0	46.9	-	49.9	41.84
Land Rented (Acres)	-	2,144	2,760	-	1,564	800	-	580	1,960	-	2,170	2,944	4,904	5,114
Average (Acres)	-	307.2	276.0	-	312.8	200.0	-	290.0	326.7	-	217.0	226.5	153.3	159.8
Percentage of Total (Percent)	-	65.4	100.0	-	66.2	100.0	-	64.4	100.0	-	53.1	100.0	50.1	58.16
Cropland (Acres)	995	1,226	1,278	732	921	416	261	305	862	653	2,044	1,580	3,497	4,077
Average (Acres)	66.2	175.1	127.8	66.6	184.2	104.0	65.3	152.5	143.7	72.6	204.0	106.2	109.3	127.4
Percentage of Total (Percent)	26.4	37.6	46.3	24.6	38.96	52.0	32.6	33.8	44.0	37.1	50.0	46.9	35.7	46.4
Pastureland (Acres)	2,543	1,884	1,340	2,023	1,348	332	520	536	1,008	1,056	1,904	1,375	5,767	4,335
Average (Acres)	169.5	269.1	134	183.9	269.6	83.0	130.0	265.0	168.0	117.3	190.0	105.8	180.2	135.5
Percentage of Total (Percent)	67.4	57.7	48.6	68.2	57.0	41.5	65.0	59.6	51.4	60.0	46.6	46.7	58.9	49.30
Other Land (Acres)	232	154	142	213	95	52	19	59	90	51	141	189	528	381
Average (Acres)	15.4	22.0	14.2	19.3	19.0	13.0	4.8	29.5	15.0	5.7	14.0	14.5	16.5	11.91
Percentage of Total (Percent)	6.2	4.7	5.1	7.2	4.0	6.5	2.4	6.6	4.6	2.9	3.4	6.4	5.4	4.3



owner-operator, when oil is discovered, may, instead of leaving the farm, change his system of farming to one that requires more capital and considerably less labor and, consequently, farm life becomes more appealing. This is particularly evident in the producing Field Area where 61 percent of the land is owner-operated. On the other hand, Gregory, in his study of an old oil field, found that tenancy was more prevalent in the Field Area<sup>1</sup> than in the area used for Control.

Owner-operators in the Field Area who have no production are virtually in the same status as the owner-operators in the Control Area. There is no particular incentive to leave the land. Being near to production, they have a strong incentive to remain in the area and watch development. This would seem true particularly when there is little positive evidence that the edge of the field has been defined.

In addition to the above, owner-operators in the Field Area are German predominately and this characteristic may further explain why such a large percentage of the land is owner-operated. It may be that the natural acquisitive instinct of the German is so strong that he is reluctant to move off the farm into town and a life of relative idleness. In the Control Area the possibility of future oil development may be one cause for owner-operators remaining on the farm. On the other hand, they are farmers and have the same incentive for remaining on the farm as owner-operators have in any area.

From Table 2, it may be seen that 59 percent of all the land in the Field Area is in pastureland, and only 36 percent of all the land in

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<sup>1</sup> Gregory, op. cit., p. 21.

cropland. In the Control Area 49 percent of all the land is in pastureland. The Control Area shows 46 percent or almost 33 percent more cropland than is in the Field Area. The producing Field Area has over 60 percent of its acreage in pastureland. The non-producing Field Area has only 56 percent of the land in pastureland. In many respects this latter area seems to be more comparable to the Control Area. The non-producing portion of the Field Area has 39 percent of its land in cropland as compared to only 34 percent of the total land in crops in the producing portion of the Field Area. This relationship is pointed out because it shows that from the standpoint of major land use, land in the producing Field Area is used less intensively than in the non-producing Field Area. The non-producing Field Area has, in turn, a more extensive land use than does the Control Area where pasture and cropland share the land about equally.

The producing Field Area shows in the other land use an average per farm of 18 acres and nearly 6 percent of the total acreage. This is greater than either the non-producing Field Area or Control Area and indicates that the development of oil does reduce the possible number of acres for agricultural production.

#### Major Land Use By Tenure

##### Owner-Operators

In order to determine more accurately the effect of oil development on land utilization, the farms were divided into owner-operated, part-owner-operated, and tenant-operated classifications. In the producing Field Area owner-operated land amounted to 2,968 acres (30 percent of all land) as compared to 800 acres (8 percent of all land) in the non-producing Field Area, and 1,760 acres (20 percent of all land) in the Control Area. A larger

percentage of land is owner-operated in the producing Field Area and as has been seen this appears to be a result of the additional income received from oil development which enabled owner-operators to acquire 1,120 acres after the discovery of oil in 1932.

Owner-operators in the Control Area had 37 percent of their land (653 acres) in cropland. This is greater than the non-producing Field Area which had 33 percent of the land in cropland and still greater than the 25 percent of the land in cropland in the producing Field Area.

The allocation of land for pasturing purposes is, of course, the reverse of the cropland situation. Owner-operators in the producing Field Area had 68 percent of the total land in pastureland as compared to 65 percent in the non-producing Field Area, and only 60 percent in the Control Area.

Owner-operated farms in the producing Field Area had an average of a little over 19 acres in other land uses as compared to 4.8 acres per farm in the non-producing Field Area, and 5.7 acres in other land in the Control Area. This relationship appears to be due to requirements in the producing Field Area for land for oil development.

From the above description of owner-operated units, it may be seen that the dominant pattern of land utilization by owner-operators in the producing Field Area is pastureland with pasture becoming less important as one moves from the producing Field Area out through the non-producing Field Area to the Control Area. The other important major land use is that of cropland and this is greatest in the Control Area and least in the producing Field Area. The tendency is for owner-operators to act the same as the over-all analysis indicates; that is, greater intensity in the Control

Area and a more extensive farm enterprise pattern in the producing Field Area.

#### Part-Owners

Land utilization by part-owner-operators follows essentially the same pattern as that of owner-operators, except for the variation resulting from the difference in the proportion of land owned. In the Field Area there are seven farms that are operated by part-owners as compared to ten in the Control Area. Part-owners in the producing Field Area, five in number, own 34 percent of the land operated. In the non-producing Field Area the two part-owners own 36 percent of the land and in the Control Area the ten part-owner-operators own 47 percent of the land they operate. In the Control Area 50 percent of the part-owner operated land is cropland as contrasted to 34 percent in the non-producing Field Area, and 39 percent in the producing Field Area. Pastureland accounts for 47 percent of the land in the Control Area, 60 percent in the non-producing Field Area, and 57 percent in the producing Field Area. The non-producing Field Area has 7 percent of the land classified as other land. This high percentage is due to the fact that there were only two farms in this group and one of them had a great deal of wasteland in the form of a large gully. The producing Field Area had 4 percent of the total acreage in other land as compared to 3 percent in the Control Area.

The land utilization pattern for part-owners in the three areas is only slightly different than for owner-operators. A larger percentage of the land in the Control Area is devoted to cropland than to pastureland. In the non-producing Field Area there is somewhat less cropland than in the producing Field Area, and slightly more pastureland than in the

producing Field Area. Since this class of operator rents more land in the Control Area than in the other two areas, the acreage in cropland tends to be larger than in either portion of the Field Area. This probably is due to the fact that the landlords from whom they rent are more interested in the greater cash income obtainable from cropland as compared to pastureland. As a rule, the only part of the income from livestock enterprises that finds its way to the landlord is that from pasture rent. It is probable that if the oil income to this class of operator were substantial enough in the producing Field Area then the pasture acreage would be increased and the cropland acreage would be decreased to give the extensive type of operation that is prevalent in the area on owner-operated farms. Table 7 shows that part-owner-operators in the producing Field Area received less than one-fifth as much oil income as did full owners.

#### Tenants

In the Field Area there are ten tenant farmers, four in the producing Field Area and six in the non-producing Field Area. The Control Area has thirteen tenant farmers operating 2,944 acres or an average of 227 acres per farm. The average size farm in the producing Field Area is 200 acres as compared to 327 acres in the non-producing Field Area. The large size of the farms in the non-producing Field Area probably is due to the fact that absentee owners retain title to the land because of possible oil development but have no desire to live on the farms themselves. Conversation with various operators in the Field Area tends to confirm this belief. While owners might sell the surface and retain the mineral rights they would have to maintain a constant watch on tax sales to see that they would not lose their rights because of delinquent taxes. Moreover, their income

from rent probably is as great as the income from any equally safe investment they might make with the proceeds of a sale. Approximately 70 percent of all the land in the non-producing Field Area is rented. This fact is an indication that because of speculative reasons the price of land may be too high to permit new operators to gain ownership of the land and cause them to remain tenants. This situation was found in Gregory's study.<sup>2</sup>

In the Control Area tenants have 47 percent of their total acreage in cropland as compared to 44 percent in the non-producing Field Area, and 52 percent in the producing Field Area. The large percentage of cropland in the producing Field Area may be due to the fact that this area has the smallest average size farm (200 acres) and there is a natural tendency to have more cropland on a small farm so as to increase cash crop income and in turn maximize profits. In the producing Field Area 42 percent of the total land is devoted to pastureland as contrasted to 51 percent in the non-producing Field Area, where the farms are largest, and 47 percent in the Control Area. Both the producing Field Area and the Control Area have approximately 7 percent of the total land in other land uses, whereas, the non-producing Field Area has 5 percent of the land in other land uses. This indicates that the non-producing Field Area has considerably more land to allocate to pasture and cropland uses while tenant-operated farms in the non-producing Field Area have nearly 40 more acres per farm in cropland than either of the other two areas, the farms being approximately a third larger.

The land utilization pattern among tenants in the producing Field Area is more predominately one of intensive crop farming than in either the non-producing Field Area or Control Area. In the non-producing Field Area,

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<sup>2</sup> Gregory, *op. cit.*, p. 22.

particularly, the data indicate that tenants have the more extensive types of enterprises. The difference for this, again, appears to be due to the size of the farm, which in the non-producing Field Area averages about 327 acres, in the Control Area 227 acres, and in the producing Field Area 200 acres. Generally, the smaller the farm, the greater will be the proportion in cropland, as this is usually the main source of income.

#### Summary

In the Field Area, owner-operatorship (38 percent) is the dominant tenure pattern with pastureland (59 percent) being the dominant land utilization pattern. In the Control Area, tenant-operatorship (33 percent) is the leading tenure pattern and this is accompanied by a system of land utilization which allocates 49 percent of all land to pastureland. A more intensive system of farming is found in the Control Area where 46 percent of the land is in cropland as compared to only 36 percent in the Field Area. The high percentage of owner-operatorship in the Field Area seems to be due to the fact that the owners either have no incentive to sell and leave the farm, or else have the financial ability to remain on the farm and engage in the less intensive enterprises substituting capital for labor. The intensive type of farming in the Control Area probably is due to the fact that the farmers have to cash crop in order to provide a maximum income for their families.

The producing Field Area owner-operated land has a larger percentage of pastureland than either the non-producing Field Area or Control Area, showing an extensive system of farming and a minimum of cash cropping. The producing Field Area part-owner-operated units show the least percentage of pastureland and a cropland percentage between that of the non-producing

Field Area and Control Area. This seems to indicate that some oil increment causes a variation in the type of farming. This will be seen more clearly in subsequent chapters. In the producing Field Area, tenant-operated units show the greatest amount of cropland and the least amount of pastureland. This likely is due to the smaller average size farm units in this area. The non-producing Field Area tenant-operated units show the greatest amount of pastureland and the least cropland acreage which appears to be due to the larger size of the farms. The Control Area tenants fall between these two classes. Since there is no oil income to a tenant, it appears that the land utilization pattern is set up to maximize profits in each individual area.

Therefore, the land utilization pattern seems to be one of extensive farming of the Field Area and a more highly intensified system of farming in the Control Area. It also appears that the owner-operatorship is considerably more important in the Field Area as compared to a higher tenant-type of operatorship in the Control Area.



## CHAPTER IV

### PRIMARY MINOR LAND USE

#### General

The second minor hypothesis to be tested is that oil and gas development tends to shift cash cropping to livestock production. This will be analyzed partially in this chapter and will be completed in the following chapter on secondary minor land uses.

By primary minor land use is meant the manner in which land is employed for the production of crops. For this study, land use has been broken down into wheat acreage, oat acreage, and feed acreage. Wheat and oats are the only two major crops in either area. The feed class includes vetch, sorghums, corn, combination of vetch, and a small grain, and<sup>1</sup> cotton.

The Field Area has 3,497 acres of cropland of which 2,069 acres are in the producing Field Area and 1,428 acres in the non-producing Field Area. The Control Area has 4,077 acres of cropland (Table 3). Of the total cropland in the Field Area 62 percent is in wheat. In the oil producing portion of the Field Area 60 percent is in wheat, in the non-producing Field Area 65 percent, and in the Control Area 65 percent of the cropland is in wheat production. These figures substantiate the fact that both the Field and Control Areas are in a wheat producing section of Oklahoma. The Control Area shows

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<sup>1</sup> Cotton was placed in this group because of the small acreage devoted to that crop, 136 acres, and in order to show 100 percent utilization of the cropland. Cotton was found only in the Control Area, but was relatively unimportant.

Table 3. Primary Minor Land Use: Lucien Oil Field and Control, 1946

	Total Field Area			Producing Field Area			Non-Producing Field Area			Control Area			Field Area	Control Area
	Owners	Part-Owners	Tenants	Owners	Part-Owners	Tenants	Owners	Part-Owners	Tenants	Owners	Part-Owners	Tenants		
Wheat (Acres)	572	741	957	399	499	348	173	242	509	335	1,481	850	2,170	2,666
Average (Acres)	38.1	105.8	85.7	36.2	99.8	87.0	43.3	121.0	84.8	37.2	148	65.4	67.8	83.31
Percentage of Cropland (Percent)	57.6	60.4	67.1	54.5	54.2	83.7	66.3	73.3	59.1	51.3	72.5	61.6	62.1	65.39
Percentage of Farms Reporting (Percent)	60.0	100.0	100.0	54.5	100.0	100.0	75.0	100.0	100.0	100.0	100.0	76.9	81.2	90.6
Oats (Acres)	285	364	341	220	314	65	63	50	276	187	384	220	988	791
Average (Acres)	18.8	52	34.1	20	62.8	16.2	15.8	25.0	46	20.8	52.4	16.9	30.9	24.72
Percentage of Cropland (Percent)	28.5	29.7	26.7	30.1	34.1	15.6	24.1	16.4	32.0	28.6	18.8	15.9	28.3	19.40
Percentage of Farms Reporting (Percent)	73.3	71.4	70.0	72.7	80.0	50.0	75.0	50.0	83.3	55.5	70.0	69.2	71.9	65.6
Feed (Acres)	138	121	80	113	108	3	25	13	77	131	179	310	339	620
Average (Acres)	9.2	17.2	8.0	10.2	21.6	0.75	6.3	6.5	12.8	14.6	17.9	23.8	10.6	19.38
Percentage of Cropland (Percent)	13.9	9.9	6.3	15.4	11.7	0.72	9.6	4.3	8.9	20.1	8.8	22.5	9.7	15.21
Percentage of Farms Reporting (Percent)	33.3	42.9	40.0	36.4	40.0	25.0	25.0	50.0	50.0	66.7	60.0	76.9	37.5	68.8

the smallest percentage of oat acreage having only 19 percent of the cropland in oats. This probably is a result of the greatest emphasis on cash cropping in the Control Area where the highest proportion of the land is rented. The Field Area reported 28 percent of cropland in oats, the producing Field Area reported 29, and the non-producing Field Area reported 27 percent. The feed acreage was fairly evenly distributed. The Field Area had 10 percent, the producing Field Area 11 percent, the non-producing Field Area 8 percent, and the Control Area had 15 percent of the cropland in feed. The higher percentage of feed acreage in the Control Area probably is closely correlated with the more intensive cattle enterprise in that area.

#### Primary Land Use By Tenure

##### Owner-Operators

In the Field Area 60 percent of the owner-operators reported having wheat which utilized 58 percent of their cropland. In the Control Area, all of the operators reported having wheat which used 51 percent of their cropland. Each of these areas had an average of approximately 38 acres of wheat per farm. Data from the producing Field Area show that 55 percent of the operators had 55 percent of their cropland in wheat as compared with 75 percent of the operators reporting wheat, using 67 percent of their cropland in the non-producing Field Area. The significant relationship of wheat production appears to be the high percentage of operators who raised wheat in the Control Area and the non-producing Field Area as compared to the number of owner-operators raising wheat in the producing Field Area. The four owner-operators in the non-producing Field Area all reported having fed all their wheat crop. This would indicate a rather intensive livestock program. While this group had about the same total number of animal units per farm

as the producing Field Area owner-operators the type of animal units on owner-operated farms in the two areas differed rather sharply. This will be discussed further in Chapter V.

In the Field Area, 73 percent of operators reported using 29 percent of the cropland for oat production. The producing Field Area operators show that 73 percent of them used 30 percent of their cropland for oats. In the non-producing Field Area 75 percent of the operators used 24 percent of their cropland for oat production. Only 56 percent of the owner-operators in the Control Area grew oats and they used 29 percent of the total cropland for this purpose. There is a considerable degree of homogeneity in the percentage of cropland allocated to oats in the Field Area. The fact that owner-operated farms in the Control Area had fewer beef cattle per farm and fewer chickens per farm may explain partially why such a comparatively small percentage of operators in the Control Area raised oats.

In the Field Area 33 percent of the owner-operators reported having 14 percent of their cropland in feed crops. In the Control Area 67 percent of the operators had feed crops planted which totaled 20 percent of their cropland. The difference in number of operators who planted feed in the two areas may be due to the fact that all the operators in the Control Area had dairy cattle as compared to 67 percent of the operators in the Field Area who had dairy cattle. Thirty-six percent of the operators in the producing Field Area and 25 percent of the operators in the non-producing Field Area utilized 15 percent, and 10 percent of their cropland, respectively, for feed production. This difference again appears to be due to the types of livestock enterprises which will be discussed in the following chapter. It appears that the allocation of cropland to the above crops is in close accord

with the types of livestock enterprises of the several areas. The analysis of the livestock enterprises will help clarify the major differences in cropland uses.

#### Part-Owners

In each of the study areas, all farms operated by part-owners grew wheat. The Control Area used 73 percent of the cropland, the non-producing Field Area used 73 percent of the cropland, the producing Field Area used 54 percent of the cropland, and the total Field Area used 60 percent of the cropland for wheat production. The high percentage of cropland allocated to wheat in the non-producing Field Area and Control Area appears to be used for the purpose of a cash income as 96 percent of the total cropland income comes from wheat in part-owner-operated farms in the Control Area, and 100 percent of the cropland income was from wheat production in the non-producing Field Area. Furthermore, these operators rent more than half the land they farm, which would tend to increase cash cropping on the unit.

Eighty percent of the operators in the producing Field Area used 34 percent of their cropland for oats. In the non-producing Field Area 50 percent of the operators utilized 16 percent of their cropland for oats as compared to 70 percent of the Control Area operators who used 19 percent of their cropland for oats. It is likely that this class of operators in the producing Field Area used more acreage for oats because they had a much greater number of beef cattle and a higher average number of chickens per farm than the other areas and, in addition, had a considerably larger average number of animal units per farm. There appears to be no significant difference in the number of part-owner-operators raising feed as they range between 40 to 60 percent of all operators with the 40 percent in the

producing Field Area, 50 percent in the non-producing Field Area, and 60 percent in the Control Area. The producing Field Area shows the largest percentage (12 percent) of cropland devoted to feed stuff. As mentioned above, this area leads part-owner-operated farms in animal units and this fact appears to explain partially the cropland use in each area. There seems to be little or no relationship between land utilization and oil development on part-owner-operated farms. It appears that the part-owner-operators in the producing Field Area are striving for profit maximization in their cropland utilization in the same manner as part-owner-operators in other areas. As was mentioned earlier, their oil income is negligible so they are forced to maximize their farm income.

#### Tenants

In the producing and non-producing Field Areas all of the tenant-operators raised wheat as compared to 77 percent of the tenants in the Control Area who used 62 percent of their cropland for this purpose. Tenant-operators in the producing Field Area used 84 percent of their cropland for wheat as compared to 59 percent of the cropland in wheat in the non-producing Field Area. The low percentage of wheat acreage in the non-producing Field Area apparently is a result of operations by two of the six operators. These two tenant-operators were more than 50 percent below the average wheat acreage of all operators in the area. These same two tenant-operators together accounted for only about 11 percent of the total wheat acreage grown by tenants in that area. There seems to be no explanation why these two operators are not typical of the area. This reduces the entire tenant-operated wheat acreage by a considerable degree.

Since no direct oil income is received by tenants, they have no alternative but to cash crop the land to maximize profits. Moreover, landlord-tenant arrangements in this area encourage cash crops. Tenants have a higher percentage of cropland in wheat than do the owners or part-owners and seem to follow the usual pattern of cash cropping. As will be seen in a following chapter, the tenants receive 75 percent of their cropland income in all areas from wheat. This shows the importance of this crop as a cash income to the tenant farmer.

Only 50 percent of the tenants in the producing Field Area raised oats on 16 percent of the cropland. The non-producing Field Area tenants used 32 percent of their cropland for oats, and 83 percent of the operators participated in this type of production. In the Control Area 69 percent of the tenants raised oats on 16 percent of their cropland.

The tenants had a smaller percentage of the total cropland in oats than did either the owners or part-owners. They also had fewer animal units per farm than either owner- or part-owner-operated farms. Only the tenants in the producing Field Area failed to sell oats indicating the necessity of tenants to gain income not only from wheat but also from the sale of oats.

In the Control Area 77 percent of the tenant-operators used 23 percent of the cropland for feed. Fifty percent of the tenants used 9 percent of the cropland for feed in the non-producing Field Area. Feed production is negligible in the producing Field Area as one operator raised three acres of feed. However, on the whole, tenant-operators produced more feed than did other types of operators. This situation is contrary to what is believed to be normal, that is, more cash cropping than on owner- or part-owner-operated farms.

As a rule, tenant farmers do not have the financial ability to go into livestock production, particularly the long-run process of beef cattle production. When they do go into livestock production, it probably will be to the extent of only several dairy cows, since the sale of dairy products can be lucrative to the tenant and also a form of steady income. They have a tendency to specialize, as much as financially possible, in this enterprise. This general situation seems to be true of the tenants in these areas. Table 4 shows that a high proportion of the tenants have dairy cattle and the average number per farm is not significantly lower than for other tenure groups.

#### Summary

More than two-thirds of the cropland in each area is devoted to wheat. Oat production utilized approximately one-fourth of all the cropland and the remaining acreage is used by various feed crops. Wheat is grown primarily as a cash crop with a larger percentage of total cropland being devoted to this crop on part-owner-operated farms. Wheat production is relatively more important in the Control Area where this form of income is necessary. It appears that wheat production is relatively more important, or occupies a larger percentage of the cropland, in the area showing the least number of animal units. This is true particularly in the case of owner-operated and part-owner-operated farms. On tenant farms, wheat still occupies the largest percentage of the cropland in the area with the greatest number of animal units. The indications are that when a livestock enterprise is not possible for one reason or another wheat will be grown as the cash crop. This is not surprising in view of the fact that these farms are located in the principal wheat area of Oklahoma. The producing field



Area farms operated by owners and part-owners received a smaller percentage of cropland income from wheat than was the case in the Control Area. It appears that with the added oil income the owners and part-owners in the Field Area were able to afford livestock production, decreasing the area of cropland, and not depending so heavily on a cash crop income.

The production of oats shows a great deal of homogeneity in all areas among the different tenure types. It appears that this crop is grown primarily as a supplemental feed crop and that the income from this crop is not important except in the case of tenants in the non-producing Field Area where income from this source comprised nearly one-fourth of their cash crop income.

Feed production is most important in the Control Area where it occupies 15 percent of the cropland. It appears that this is a result of the larger dairy cattle enterprises in that area. Feed appears to be raised only for home use purposes and not for cash income.

Therefore, it seems that intensive livestock enterprises are prevalent in the owner- and part-owner-operated units of the producing Field Area where oil income has made this type of enterprise possible. It also appears that there is a more intensive cash-crop pattern in the Control Area, necessitated by the need of a cash income.

## CHAPTER V

### SECONDARY MINOR LAND USE

#### General

The testing of the second minor hypothesis will be completed in this chapter. That hypothesis states that oil and gas development tends to shift cash cropping to livestock production.

"Secondary minor land use" is used herein to show how the land is utilized in respect to livestock enterprises. Beef cattle, dairy cattle, and chickens are the predominant classes of livestock in both the Field and Control Areas. The term "miscellaneous animals" includes saddle and work-horses, sheep, turkeys, and hogs. None of these types is important in numbers if taken alone.

The producing Field Area has an average of 46 beef cattle per farm. This figure is substantially larger than in the other areas. It is in this area that the acreage in pastureland is highest. The Control Area has the least number of beef cattle per farm and it also has the smallest acreage per farm in pastureland. The non-producing Field Area lies just between these two areas. The beef cattle enterprise is more important in the producing Field Area and becomes less important further away from the center of oil production. This was partly explained when the type of tenure was taken into consideration, as there are four tenants in the producing Field Area, six in the non-producing Field Area, and thirteen in the Control Area. The tenants seem to follow the general pattern of intensive cash cropping, leaving the livestock enterprises to owners.

Dairy cattle are considerably more important in the Control Area with an average of 6 dairy animals per farm. The producing Field Area averages

Table 4. Secondary Minor Land Use: Lucien Oil Field and Control, 1946

	: Total Field Area			:: Producing Field Area			:: Non-Producing Field Area			:: Control Area			Field Area	Control Area
	Owners	Part-Owners	Tenants	Owners	Part-Owners	Tenants	Owners	Part-Owners	Tenants	Owners	Part-Owners	Tenants	:	:
Beef Cattle (Number)	649	372	215	476	334	105	173	38	108	174	342	122	1,224	638
Average (Number)	43.2	53.1	21.5	43.2	66.8	26.3	43.5	19.0	18.0	19.3	34.2	9.4	38.3	19.9
Percentage of Farms Reporting Animals (Percent)	86.7	100.0	90.0	81.8	100.0	100.0	100.0	100.0	83.4	77.8	88.8	53.6	90.6	71.9
Dairy Cattle (Number)	70	50	35	43	44	11	27	6	22	60	61	84	153	205
Average (Number)	4.6	7.1	3.5	3.9	88.0	2.8	6.8	3.0	3.7	6.7	6.1	6.5	4.8	6.41
Percentage of Farms Reporting Animals (Percent)	66.7	85.7	90.0	72.7	100.0	100.0	100.0	50.0	83.4	100.0	100.0	84.6	84.4	93.8
Chickens (Number)	4,610	1,950	1,890	3,710	1,450	455	900	500	1,435	1,545	1,548	1,468	8,450	4,561
Average (Number)	307.0	278.5	189.0	337.0	290.0	114.0	225.0	250.0	239.2	171.7	154.8	112.9	264.1	142.5
Percentage of Farms Reporting Animals (Percent)	86.7	100.0	90.0	81.7	100.0	100.0	100.0	100.0	83.4	100.0	100.0	84.6	90.6	93.8
Miscellaneous Animals (Number)	133	41	25	122	37	6	11	4	17	24	117	47	197	188
Average (Number)	8.8	5.8	2.3	11.1	7.4	1.5	2.8	2.0	2.8	2.7	11.7	3.6	6.2	5.9
Percentage of Farms Reporting Animals (Percent)	73.3	57.9	70.0	72.7	60.0	60.0	100.0	50.0	83.4	77.8	80.0	61.5	71.9	71.9
Total Animal Units (Number)	595.4	339.3	226.7	438.6	301.7	94.0	156.8	37.7	1,328	229.5	376.2	215.3	1,161.4	821
Average (Number)	39.7	48.5	22.7	39.9	60.3	23.5	39.2	18.8	22.1	25.5	37.6	16.5	36.3	25.6

5 dairy animals per farm and the non-producing Field Area has an average of 5 dairy animals per farm. A partial explanation for this probably lies in the tenure pattern coupled with outside sources of income to owners in the Field Area. The income study will show the relative importance of the livestock enterprises. Chickens are more numerous in the producing Field Area which has an average of 280 per farm as compared to an average of 142 in the Control Area. Again, the average number for the non-producing Field Area lies between the two areas.

Miscellaneous animals are relatively unimportant because they include workstock which are seldom used, saddle horses for the children, and hogs for home use. One farmer in the producing Field Area did report having a number of sheep and turkeys, but this is not typical of the area as no other operator reported having either sheep or turkeys.

There are more total animal units in the producing Field Area than in either of the other areas. In this area there is an average of 42 animal units per farm as compared to 27 in the non-producing Field Area and 26 in the Control Area. Livestock production is carried on more intensively in the producing portion of the Field Area and becomes relatively less important as one moves out to the Control Area. It appears that the added income from oil development makes it possible for the producing Field Area operators not only to finance a livestock program, but permits them to substitute capital intensive for labor intensive enterprises. This will be seen more clearly in the distribution of animals to types of tenure and again in the analysis of income.

## Secondary Minor Land Use By Tenure

### Owner-Operators

In the producing Field Area, owner-operators have 476 beef cattle for an average of 43 per farm as compared to 174 beef animals in the Control Area for an average of 19 per farm. Owner-operators in the producing Field Area have an average of 65 acres more pastureland per farm than is shown in the Control Area. There seems to be definite causes for this relationship and it appears that the first cause is the fact that owner-operators in the producing Field Area have an outside source of income which gives them the financial ability to go into beef cattle production on a relatively large scale. The assurance of a monthly royalty check also increases their credit rating. It further appears that the operators in the Field Area prefer the labor extensive enterprises and financial needs do not compel them to participate in the more labor consuming enterprises. However, owner-operators in the non-producing Field Area have virtually the same number of beef cattle per farm as those in the producing Field Area. The four operators in this area were exclusively livestock producers, as none showed any cash income from crop sales.

In the Control Area all of the owner-operators have dairy cattle. Also, all of this class of operators in the non-producing Field Area have dairy cattle as compared to only 73 percent of the owner-operators in the producing Field Area who have dairy cattle. The Control Area shows an average of 7 dairy animals per farm as compared to 4 dairy animals per farm in the producing Field Area. This fact further substantiates the assumption that operators in the Control Area will engage in the more labor-consuming enterprises as compared to the extensive type of farming in the producing Field Area.

Chickens seem to be most important in the non-producing Field Area where all of the operators have an average of 225 chickens per farm. All operators in the Control Area have chickens with an average of 171 per farm. Only 82 percent of the operators in the producing Field Area raised chickens but they had an average of 337 per farm. While poultry production is normally considered as relatively intensive, it is work that may be done by women and children. Therefore, while labor intensive, it is light work and probably fits in well with the relatively extensive type of operations practiced by owner-operators in this area.

Total animal units average about the same in the producing and non-producing Field Areas; that is, approximately 40 units per farm. In the Control Area there is an average of 26 animal units per farm showing greater livestock enterprises in the Field Area. In the Control Area 26 percent of the animal units are dairy cattle while in the Field Area 12 percent of the animal units on owner-operated farms are dairy cattle. In other words, labor-consuming livestock production is considerably more in evidence in the Control Area.

#### Part-Owners

The distribution of livestock on part-owner-operated farms is similar to that of owner-operated farms. In the Control Area 89 percent of the operators have raised cattle which averages 34 head per farm. In the producing Field Area 100 percent of the operators in this group raise beef cattle and have an average of 67 beef animals per farm. Farms operated by this class of operator in the producing Field Area average about 90 acres more pastureland than do similar farms in the Control Area. This again is evidence of the importance of the beef raising enterprise in an area of oil

development, as there is no apparent physical reason why there should be more pastureland in this area.

Peculiar to the producing Field Area part-owner-operated farms is the fact they have an average of 9 dairy animals per farm as compared to 6 dairy animals per farm in the Control Area. While this type of operation is contrary to what might be expected, the income table shows that these operators have a negligible non-agricultural income, and so endeavor to maximize their agricultural income. The net agricultural income of these operators is exceeded only by the part-owner-operators in the Control Area. These operators also have the largest farms and their feed acreage is exceeded only in the tenant-operated farms in the Control Area. Another reason for this situation might be that since these operators indicate more ambition by renting additional land to operate, they may also be willing to work harder in the more intensive labor enterprises. The non-producing Field Area has relatively few beef dairy cattle compared with part-owners in other areas, but the figures probably are not significant in view of the fact that there were only two operators in this class and apparently these operators depended largely on cash grain income.

The operators of this class in the producing Field Area seem again to show more intensity of livestock enterprises as they show an average of 290 chickens per farm as compared to an average of 155 chickens per farm in the Control Area. The non-producing Field Area has an average of 250 chickens per farm. It will be noted later that the income from eggs sold is also greater in the producing Field Area while poultry production is frequently associated with the small size farms. Part-owner-operators in the

producing Field Area have the largest average farm of any of the various classes of operators in any area.

The producing Field Area has an average of 60 animal units per farm as compared to an average of 38 animal units in the Control Area. Taking into consideration the cropland and pastureland which have already been discussed, it appears the part-owner-operated farms in the producing Field Area as well as owner-operators have a more extensive type of farming enterprise than do those in the Control Area. The part-owner-operated farms, particularly, are well diversified and apparently try to make maximum use of their resources.

#### Tenants

Slightly over 50 percent of the farms in the Control Area raised beef cattle as compared to 100 percent in the producing Field Area. The tenants in the producing Field Area had an average of 26 beef animals and in the Control Area the average was 9 beef animals per farm. This small number would indicate that the beef enterprise is not a major enterprise such as it appears to be in the producing Field Area. The question arises how they were able to have such an intensive beef cattle enterprise in view of the small acreage of pasture available, 83 acres per farm. A partial explanation may be that they concentrated on beef cattle to the virtual exclusion of other types of livestock. This was not true of tenants in the Control Area where the dairy cattle enterprise was important. The Field Area has an average of 134 acres per farm in pastureland on the tenant-operated farms as compared to 105 acres average per farm in the Control Area. It does not appear, therefore, that pasture acreage is much of a controlling factor in the livestock enterprises of these operators. Tenants generally have



little choice in the allocation of the land as the land utilization pattern usually is established at the time they rent the farm. The development of oil may have had some influence on this pattern just as the need for a cash crop in the Control Area probably influenced the pattern of utilization in the Field Area and stability of tenure and livestock enterprises frequently go hand-in-hand.

The producing Field Area and Control Area show an average of approximately 113 chickens per farm. But the non-producing Field Area tenant-operators show an average of 239 chickens per farm. This is not as significant as it appears to be, because two of the six tenant-operators owned over 80 percent of the chickens in that area. This is probably a result of the more intensive livestock pattern.

Dairy cattle numbers are over twice as great in the Control Area as in the producing Field Area. In the total Field Area there is an average of 3 dairy animals per farm and an average of 3 in the producing Field Area as compared to an average of 7 dairy animals in the Control Area on tenant farms.

The small number of dairy cattle in the Field Area probably is a result of the tenure and the relative stability of tenure in these areas. While dairy cattle is a long-run enterprise, it is possible for tenants to move their several dairy cattle from farm to farm or to sell them in the area and purchase dairy cows in their new location.

#### Summary

Livestock enterprises follow a rather consistent pattern. Beef cattle numbers are greater per farm in the Field Area, particularly in the producing portion of that area, than they are in either of the other two areas.

Beef cattle production seems to follow very closely the pastureland pattern of the areas. The producing Field Area shows the greatest average acreage of pastureland per farm. This situation may also be influenced by the fact that owners and part-owners in the Field Area have a non-agricultural income to help finance their livestock enterprises, and so may increase their pasture acreage, whereas, oil income is not available in the Control Area or to tenants in the Field Area.

The dairy cattle enterprise is fairly consistent also within the areas. Over 50 percent of the operators in each type of tenure and class of land raised dairy cattle. Only the non-producing Field Area owner-operated farm and the part-owner-operated farms in the producing Field Area reported an average per farm that was larger than the average in all the areas of the Control Area. These areas were highest in dairy cattle numbers of all the areas, but with these exceptions, the Control Area showed more intensive dairy cattle production than any of the other areas.

Chickens and miscellaneous animals are fairly well distributed throughout all areas. There are, however, nearly twice as many chickens in the Field Area and a few more miscellaneous animals in the Field Area. The larger number of chickens in the Field Area is possibly a result of the operators who might be willing to care for a larger number of chickens as the additional number does not require a great deal more time or labor. They are probably also in a little better financial position to raise more chickens in the Field Area.

The type of farming seems to be less labor intensive in the Field Area with greater emphasis on beef production as compared with a relatively more

intensive secondary minor land use in the Control Area with its greater emphasis on dairying.

Therefore, it appears rather conclusive that livestock production as a whole is more highly intensified in the Field Area than in the Control Area, but within the Field Area, the type of livestock enterprise is significantly less labor intensive.

## CHAPTER VI

### INCOME

#### General

The last minor hypothesis to be tested is that oil and gas development tends to increase non-agricultural income in the area of development. This will be tested by comparing the producing and non-producing Field Area with the Control Area. The landlord's share of crop was not deducted from the tenant's income in the cases of crop rent nor were owner-operators charged any rent on land. In the matter of expenses, only 10 percent of the cost of new machinery bought the year the study was made has been charged off. In the case of old machinery, repairs and maintenance only were considered as an expense. In other words, out-of-pocket expenses were about the only expenses charged to the operators.

The total Field Area had a gross agricultural income of \$86,011.39 as compared to \$79,543.47 in the Control Area. The average net agricultural income in the Field Area was \$1,045.73 as contrasted to \$1,417.33 in the Control Area. This appears to be the result of more intensive crop farming in the Control Area. In the Field Area the average oil income per farm was \$499 as compared to \$74.97 in the Control Area. The oil income in the Control Area came from leases, lease bonuses, and rentals. There are no producing wells in this area. Off-the-farm agricultural income averaged \$38.28 per farm in the Field Area and \$92.50 per farm in the Control Area. Off-the-farm non-agricultural income in the Field Area averaged \$208.44 per farm and in the Control Area it averaged \$66.06 per farm. Total expenses averaged \$1,642.12 in the Field Area and \$1,068.40 per farm in the Control Area. The high expense in the Field Area appears to be a result

Table 5. Cropland Income: Lucien Oil Field and Control, 1946

	Total Field Area			Producing Field Area			Non-Producing Field Area			Control Area			Field Area	Control Area
	Owners	Part-Owners	Tenants	Owners	Part-Owners	Tenants	Owners	Part-Owners	Tenants	Owners	Part-Owners	Tenants		
Wheat Income (Dollars)	1,915.17	6,799.31	7,562.28	1,913.17	5,513.26	1,089.43	-	1,286.05	6,472.85	910.20	19,484.72	10,559.58	16,274.76	30,954.30
Average (Dollars)	127.54	999.90	756.23	173.92	1,102.65	272.36	-	643.02	107.88	101.13	1,948.47	812.26	508.59	967.32
Percentage of Cropland Income (Percent)	79.71	88.9	78.9	79.71	86.66	100.00	-	100.00	76.22	100.00	96.54	97.7	82.91	96.89
Oat Income (Dollars)	486.85	569.98	2,004.73	486.85	596.98	-	-	-	2,004.73	-	455	77.35	3,088.56	532.35
Average (Dollars)	32.45	85.26	200.47	44.26	119.40	-	-	-	334.12	-	45.5	5.95	96.52	16.64
Percentage of Cropland Income (Percent)	20.29	7.80	20.90	20.29	9.38	-	-	-	23.61	-	2.25	0.70	15.73	1.67
Feed Income (Dollars)	-	252	14.52	-	252	-	-	-	14.52	-	286	175	266.52	461
Average (Dollars)	-	36	1.45	-	50.40	-	-	-	2.42	-	28.60	13.5	8.33	14.41
Percentage of Cropland Income (Percent)	-	3.5	0.20	-	3.96	-	-	-	0.17	-	1.41	1.60	11.36	1.41

Table 6. Livestock Income: Lucien Oil Field and Control, 1946

	Total Field Area			Producing Field Area			Non-Producing Field Area			Control Area			Field	Control
	Owners	Part-Owners	Tenants	Owners	Part-Owners	Tenants	Owners	Part-Owners	Tenants	Owners	Part-Owners	Tenants	Area	Area
<b>Dairy Cattle</b>														
Income (Dollars)	1,114.00	200.00	200.00	600.00	200.00	-	514.00	-	200.00	714.00	757.00	1,355.50	1,514.00	2,824.50
Average (Dollars)	74.2	28.5	20.00	514.54	40.00	-	128.50	-	33.33	79.5	75.70	104.12	47.51	88.27
Percentage of Livestock Income (Percent)	3.39	1.1	1.3	2.52	1.32	-	5.7	-	2.30	5.3	.03	12.6	2.29	6.08
<b>Beef Cattle</b>														
Income (Dollars)	21,192.50	10,515.50	9,172.50	15,297.50	8,321.00	5,140.00	5,895.00	2,192.50	4,032.50	5,974.00	10,791.00	2,398.00	40,878.50	19,159.00
Average (Dollars)	1,412.83	1,501.92	917.25	1,390.68	1,664.20	1,285.00	1,473.75	1,096.25	672.08	66.38	1,079.10	184.1	1,277.45	598.72
Percentage of Livestock Income (Percent)	64.5	57.9	60.6	64.28	55.04	80.00	65.2	72.35	46.33	44.4	48.60	22.2	61.83	41.25
<b>Chicken Income (Dollars)</b>														
Income (Dollars)	2,189.20	585.20	682.00	1,672.00	497.20	110.00	497.20	88.00	572.00	193.60	177.32	105.60	5,436.40	476.52
Average (Dollars)	144.61	85.02	68.2	152.00	99.44	27.50	124.30	44.00	95.33	21.51	17.73	8.12	107.39	14.89
Percentage of Livestock Income (Percent)	6.61	3.20	4.50	7.03	3.29	1.71	5.50	2.90	6.57	1.40	0.80	1.00	5.20	1.03
<b>Miscellaneous Animal</b>														
Income (Dollars)	457.60	1,200.00	55.00	457.60	1,200.00	-	-	-	55.00	428.00	4,015.00	495.00	1,712.60	4,938.00
Average (Dollars)	30.50	171.40	5.50	41.60	240.00	-	-	-	9.17	47.6	401.50	38.00	53.52	154.31
Percentage of Livestock Income (Percent)	1.39	6.6	0.4	1.9	7.94	-	-	-	0.6	3.2	18.08	4.6	2.59	10.63
<b>Milk Income (Dollars)</b>														
Income (Dollars)	1,040.00	1,150.00	600.00	955.00	1,150.00	-	85.00	-	600.00	-	-	-	2,790.00	-
Average (Dollars)	69.30	164.20	60.00	86.81	250.00	-	21.25	-	100.00	-	-	-	87.19	-
Percentage of Livestock Income (Percent)	3.17	6.3	4.0	4.01	7.61	-	0.9	-	6.89	-	-	-	4.22	-
<b>Cream Income (Dollars)</b>														
Income (Dollars)	1,265.00	2,050.00	1,625.00	815.00	1,950.00	350.00	450.00	100.00	1,275.00	4,449.00	3,040.00	4,250.00	4,940.00	11,739.00
Average (Dollars)	84.30	264.20	162.50	74.09	390.00	87.50	112.50	50.00	212.50	494.30	304.00	326.90	154.38	366.84
Percentage of Livestock Income (Percent)	3.85	11.30	10.70	3.42	12.90	5.45	5.00	3.30	14.65	33.10	13.69	39.40	7.47	25.27
<b>Egg Income (Dollars)</b>														
Income (Dollars)	5,600.00	2,450.00	2,795.00	4,000.00	1,800.00	825.00	1,600.00	650.00	1,970.00	1,700.00	3,425.00	2,185.00	10,845.00	7,310.00
Average (Dollars)	373.30	350.00	279.50	383.64	360.00	206.25	400.00	325.00	328.33	188.90	342.50	168.00	338.91	228.44
Percentage of Livestock Income (Percent)	17.1	13.5	18.5	17.33	11.90	12.84	17.70	21.45	22.63	12.60	15.42	20.20	16.40	15.74

Table 7. Total Income: Lucien Oil Field and Control, 1946

	Total Field Area			Producing Field Area			Non-Producing Field Area			Control Area			Field	Control
	Owners	Part-Owners	Tenants	Owners	Part-Owners	Tenants	Owners	Part-Owners	Tenants	Owners	Part-Owners	Tenants	Area	Area
Pasture or Rent Income (Dollars)	230.00	35.00	--	150.00	35.00	--	80.00	--	--	20.00	--	125.00	265.00	145.00
Average (Dollars)	15.30	5.00	--	13.63	7.00	--	20.00	--	--	2.20	--	9.60	82.81	4.50
Percentage of Gross Agricultural Income (Percent)	0.65	0.14	--	0.56	0.16	--	0.8	--	--	0.02	--	0.6	0.3	0.1
Total Cropland Income (Dollars)	2,400.07	7,648.29	9,581.53	2,400.07	6,362.24	1,089.43	--	1,286.05	8,492.10	910.00	20,225.72	10,811.73	19,629.89	31,947.45
Average (Dollars)	160.00	1,092.61	1,058.15	218.19	1,272.45	272.36	--	643.02	141.54	101.13	2,022.57	831.67	613.43	99.83
Percentage of Gross Agricultural Income (Percent)	6.8	29.6	38.8	9.1	29.6	14.5	--	30.0	49.4	6.3	46.6	49.8	22.8	40.2
Total Livestock Income (Dollars)	32,838.30	18,148.70	15,129.50	23,797.10	15,118.20	6,425.00	9,041.20	3,030.50	8,704.50	13,458.60	23,205.22	10,787.10	66,116.50	47,451.02
Average (Dollars)	2,189.20	2,592.67	1,512.95	2,163.37	3,023.64	1,606.25	2,266.30	1,515.25	1,450.75	1,495.40	2,320.53	829.72	2,066.14	1,482.84
Percentage of Gross Agricultural Income (Percent)	92.6	70.4	61.2	90.3	70.3	85.5	99.1	70.00	50.6	93.5	53.4	49.6	76.9	59.7
Gross Agricultural Income (Dollars)	35,468.37	25,796.99	24,713.03	26,347.17	21,515.44	7,514.43	9,121.20	4,316.55	17,196.60	14,388.60	43,431.04	21,723.83	86,011.39	79,543.47
Total Expense (Dollars)	28,737.00	12,977.00	10,834.00	22,830.00	8,820.00	4,626.00	5,907.00	4,157.00	6,208.00	7,731.00	17,273.00	9,185.00	52,548.00	34,189.00
Average (Dollars)	1,915.80	1,853.85	1,083.40	2,075.45	1,764.00	1,156.50	1,678.00	2,078.50	1,034.66	859.00	1,727.30	706.54	1,642.12	1,063.40
Net Agricultural Income (Dollars)	6,731.37	12,854.99	13,877.03	3,517.17	12,695.44	2,888.43	3,214.20	159.55	10,988.60	6,657.60	26,158.04	12,538.83	33,463.39	45,354.47
Average (Dollars)	448.75	1,856.43	1,387.00	319.74	2,539.09	722.11	803.55	79.77	1,831.43	739.73	2,615.80	964.52	1,045.73	1,417.33
Percentage of Net Income (Percent)	24.3	83.5	97.2	14.5	85.9	100.00	95.3	25.8	96.5	84.8	85.4	87.4	58.4	85.9
Off-Farm Agricultural Income (Dollars)	--	975.00	250.00	--	975.00	--	--	--	250.00	--	2,585.00	375.00	1,225.00	2,960.00
Average (Dollars)	--	139.28	25.00	--	195.00	--	--	--	41.66	--	258.50	28.85	38.28	92.50
Percentage of Net Income (Percent)	--	6.3	1.7	--	6.6	--	--	--	2.2	--	8.4	2.6	2.1	5.6
Oil Income (Dollars)	14,704.00	1,264.00	--	14,544.00	1,104.00	--	160.00	160.00	--	1,080.00	1,319.00	--	15,968.00	2,399.00
Average (Dollars)	980.26	180.50	--	1,332.18	220.80	--	40.00	80.00	--	120.00	131.90	--	499.00	74.97
Percentage of Net Income (Percent)	53.2	8.2	--	59.9	7.5	--	4.7	25.8	--	13.8	4.3	--	27.9	4.5
Off-Farm Non-Agricultural Income (Dollars)	6,220.00	300.00	150.00	6,220.00	--	--	--	300.00	150.00	114.00	560.00	1,440.00	6,670.00	2,114.00
Average (Dollars)	414.66	4,285.00	15.00	565.45	--	--	--	150.00	25.00	12.66	56.00	110.76	208.44	66.06
Percentage of Net Income (Percent)	22.5	1.9	1.1	25.6	--	--	--	48.4	1.3	1.4	1.8	10.00	11.6	4.0
Total Net Income (Dollars)	27,655.37	15,393.99	14,277.03	24,281.17	14,774.44	2,888.43	3,374.00	619.55	11,388.60	7,851.60	30,622.04	14,353.83	57,326.39	52,827.47
Average (Dollars)	1,843.69	2,199.14	1,427.70	2,207.38	2,954.89	722.11	843.55	309.78	1,898.11	872.40	3,062.20	1,104.14	1,791.45	1,650.85

of the monthly income from oil which enabled the operators to make monthly improvements or repairs. The total net income in the Field Area was \$57,326.39 or an average of \$1,791.45 per farm and \$52,027.47 or an average of \$1,650.85 per farm in the Control Area.

#### Income By Tenure

##### Owner-Operatorship

In the producing Field Area 80 percent of the total cropland income came from wheat, the remainder coming from oats. In the Control Area 100 percent of the total cropland income came from wheat. Owner-operators in the non-producing Field Area did not show any cash income from crops, which means that all of the crops were either consumed on the farm or held for later sale. There were eleven owner-operators in the producing Field Area as compared to nine in the Control Area. The average income per farm in the producing Field Area from wheat was \$173.92 as compared to \$101.13 in the Control Area. As previously mentioned, both the producing Field Area and the Control Area had approximately 50 percent of their cropland in wheat. From the income figures it seems that the owner-operators in the producing Field Area find it more profitable to market their wheat as such, since the wheat acreage for owner-operators in the Control Area was almost twice as great as for that class of operators in the producing Field Area. In all three areas there was no feed income reported showing that the acreage devoted to feed is not for a direct cash income but for livestock feed.

The livestock income consists of animals sold plus the products of various farm animals. The average livestock income per farm in the producing Field Area was \$2,163.37 which was 90 percent of the gross agricultural income. In the non-producing Field Area there was an average



livestock income per farm of \$2,266.30 which was 99 percent of the gross agricultural income. In the Control Area 94 percent of the gross agricultural income was from livestock and they had an average of \$1,495.40 per farm. Only in the Control Area did beef cattle income account for less than 50 percent of the total livestock income and even here it amounted to 44 percent; another indication of the relative intensity of operations. The rest of the livestock income was fairly evenly distributed between other livestock items as may be seen in Table 6.

In the three areas pasture or rent income was unimportant as it only amounted to \$150.00 in the producing Field Area, \$80.00 in the non-producing Field Area, and \$20.00 in the Control Area.

No off-the-farm agricultural income was reported by any of the owner-operators. While there was some exchange of labor it was worked on an exchange labor basis and not a cash basis.

Off-the-farm non-agricultural income was important only in the producing Field Area where \$6,220 was reported. Of the eleven operators in this class, one of them reported \$3,960.00 income from writing for a magazine, another owner-operator taught school and received \$1,800.00, and the third operator was a pumper and received \$520.00 from this source. This includes all of the off-the-farm non-agricultural income, but this type of income is not typical of the various areas.

Before discussing the oil income in the owner-operated areas, it should be mentioned that the figures used herein are believed to be low. This was one item on the original schedule that all operators were hesitant to answer. From questioning oil company employees about certain individual operators, and the oil produced on some of their land, it was concluded

that some of these operators had given erroneous answers about royalty income. It was not possible to adjust the figures, so they will be used even though thought to be much too low.

In the producing Field Area owner-operators reported an oil income of \$14,544.60. Of this amount, two operators reported \$11,000.00. Both of these operators are believed to have more oil income than reported. The total oil income in the producing Field Area was almost 60 percent of the total net income. In the non-producing Field Area there was only \$160.00 reported as a lease bonus. The Control Area owner-operators received \$1,080.00 from oil payments other than royalty consisting of rentals and bonuses. This amounted to only 14 percent of the total net income. These figures show the importance of oil income to the owner-operators in the producing Field Area even though they might be much too low.

The average expense per farm in the producing Field Area was \$2,075.00 as compared to \$1,678.00 in the non-producing Field Area, and \$859.00 in the Control Area. Since the owner-operators in the producing Field Area had a monthly income rather than a seasonal income, it appears that they were able to maintain their equipment in a little better condition and have repairs made or buy new equipment when needed and so show greater expenses.

Because of the oil income which averaged \$1,332.00 per farm in the producing Field Area, they have larger average net incomes. This amounts to \$2,207.00 in the producing Field Area, \$844.00 in the non-producing Field Area, and \$872.00 in the Control Area. From the standpoint of net income, the non-producing Field Area and the Control Area are about equal and if these two areas had the same amount of oil income as the producing Field Area had, all three areas would be somewhat more comparable from the

standpoint of net income. This appears to prove partially the hypothesis that oil and gas development does tend to increase non-agricultural income and thus the net income to owner-operators in the area of development. However, it will be noted in Table 7 that the net agricultural income of owner-operators in the producing Field Area was less than half that of the owner-operators in the other two areas. There is every reason to believe that without the oil income owner-operators would strive to increase their net agricultural income by more intensive operations. It follows then that with the oil income owner-operators farm somewhat differently than they would if such income were not available.

#### Part-Owners

Income receipts show that wheat is by far the most important crop. In the Control Area 97 percent of the crop income is from wheat, 2 percent from oats, and 1 percent from feed crops. In the producing Field Area 87 percent of the crop income is from wheat, 9 percent is from oats, and 4 percent from feed. One hundred percent of the cropland income in the non-producing Field Area is from wheat. Wheat is the major cash crop enterprise in all areas. The feed and oats are raised primarily for home use and a substantial portion of these crops find their way to market in livestock. In the Control Area the total cropland income was 47 percent of the gross agricultural income, in the non-producing Field Area it was 30 percent, and in the producing Field Area it amounted to 30 percent of the gross agricultural income. Operators in this class in the two areas do not vary much in income from outside sources. The farms are about equal in size and the rented land is nearly the same. Therefore, their operations logically should be very similar. About all that one can say about the cropping practices of these

operators is that part-owner-operators in the Control Area cash crop more than do those in the Field Area. One-half their land is cropland as compared to about one-third for these operators in the Field Area. Therefore, their cash crop income is greater.

Livestock income of the operators in this class from dairy cattle is negligible in all three areas. However, beef cattle receipts show that of the total livestock income the producing Field Area had 55 percent, the non-producing Field Area had 72 percent, and the Control Area had 49 percent. This relationship shows larger beef cattle enterprises in the Field Area which showed smaller cash grain receipts than the Control Area. It further indicates a more extensive type of enterprise in the producing Field Area. Average income from this source was about the same in the non-producing Field Area and the Control Area. However, operators in the Control Area with only 49 percent of their income from beef cattle show greater diversification. The Control Area had 18 percent of the total livestock income returned from miscellaneous animals sold as compared to 8 percent in the producing Field Area and none in the non-producing Field Area. This appears to be due to the sale of a greater number of hogs which provided an additional source of income in the Control Area.

The only area where operators of this class reported receipts from milk was the producing Field Area. Approximately 8 percent of the total livestock income came from milk. It is believed that these part-owner-operators found it as profitable to sell whole milk as to use the time necessary for separation in order to sell cream. However, with the addition of the milk income to cream income, the producing Field Area operators received approximately 20 percent of the total livestock income from this

source. This is considerably more of the total livestock income received from the sale of dairy products than is the 14 percent of the total livestock income from cream sales in the Control Area, and 3 percent in the non-producing Field Area. Operators of this class averaged nearly nine dairy animals per farm, considerably more than for any class of operator in any area.

Egg income furnished an average income per part-owner-operated farm of approximately \$350.00 in all three areas. This seems to be considered by all operators as a steady source of income even though it is fairly small. There seems to be no pattern of poultry production which is influenced by oil development.

In the producing Field Area total livestock income was 70 percent of the gross agricultural income, also, 70 percent in the non-producing Field Area, and 53 percent in the Control Area. Again, this shows a more intensive livestock enterprise pattern in the Field Area.

Pasture or rent income was negligible in all three areas. Off-the-farm agricultural income accounted for 7 percent of the net income in the producing Field Area, none in the non-producing Field Area, and 8 percent in the Control Area. This larger percentage in the Control Area is due to the fact that two operators owned threshing machines and this accounted for the entire sum. Off-the-farm non-agricultural income was not reported in the producing Field Area and only \$300.00 was reported in the non-producing Field Area and \$560.00 in the Control Area. This income was a result of oil field work in each case.

Oil income to this class of operator amounted to an average of \$221.00 per farm in the producing Field Area, \$80.00 per farm in the non-

producing Field Area, and \$132.00 in the Control Area. The seemingly high average in the Control Area is a result of rentals and lease bonuses. Income from leases and bonuses are not so likely to be found within or right at the edge of a producing field, particularly, if the edge of the field has been fairly well defined.

Expenses averaged about the same in all areas being a little higher in the non-producing Field Area. The average net income per farm was \$2,955.00 in the producing Field Area, \$310.00 in the non-producing Field Area, and \$3,062.00 in the Control Area. The higher expense reduced the net agricultural income considerably in the non-producing Field Area. However, there were only two operators of this class in the area and the figures must be viewed with caution.

Livestock enterprises are more dominant in the Field Area under part-owner-operators as was true of owner-operated farms. Income from dairy products makes up a considerable proportion of the livestock income in this area. Oil income contributes to some extent to the income of the part-owner-operators in all areas, but is somewhat more important in the producing Field Area.

#### Tenants

In the Control Area 98 percent of the total cropland income came from wheat, 2 percent from feed, and less than 1 percent from oats. In the non-producing Field Area 76 percent of the total cropland income came from wheat, 24 percent from oats, and less than 1 percent from feed. In the producing Field Area, 100 percent of the total cropland income came from wheat. The total cropland income in the Control Area was 50 percent of the gross agricultural income, 49 percent in the non-producing Field Area,

and 15 percent in the producing Field Area. These figures show that cash grain cropping is relatively more important to the tenants in all three areas than it was to owner-operators or part-owner-operators. They also show that cash grain farming is more important outside the producing field than it is in the field. However, the smallest average size farms and the smallest average cropland is found in the producing Field Area. Moreover, these operators are in the beef cattle enterprise to a considerably greater degree than tenants in the other areas. It is felt that the relatively more stable tenure conditions of tenants in this area partially explain the importance of beef cattle on tenant farms in the producing Field Area.

There was no income from the sale of dairy cattle in the producing Field Area, but in the Control Area dairy cattle accounted for 13 percent of the total livestock income. Tenants in the non-producing Field Area received about 2 percent of their livestock income from this source. This is evidence of the relative importance of dairy cattle in the three areas, particularly so if such sales are a normal source of income. Historical information in regard to this was not obtained.

Beef cattle receipts accounted for 80 percent of the total livestock income for tenants in the producing Field Area, 46 percent in the non-producing Field Area, and 22 percent in the Control Area. While less emphasis is shown on beef cattle on tenant-operated farms than on owner-operated or part-owner-operated farms, as a general rule, it should be noted that income from beef cattle was only a little less important on tenant farms than on owner- and part-owner-operated farms in the producing Field Area. This situation is very unusual. Tenants in this area, instead of being primarily cash crop operators, received more than 80 percent of

their income from livestock and livestock products, a major proportion from the heavy capital requiring enterprise, beef cattle. The only explanation available from the data collected lies in the length of tenure of tenants in this area; none reported any off-farm income. In the chapter on tenure, it will be recalled, it was pointed out that no tenant had lived on his present farm for less than three years and 75 percent had lived on the same farm for more than five years.

Sales of live chickens and miscellaneous animals are unimportant in all three areas as a source of income. Milk income was reported only in the non-producing Field Area by tenant-operators and will be added to the cream income of that area. Of the total livestock income 6 percent came from cream in the producing Field Area, about 21 percent in the non-producing Field Area, and 39 percent in the Control Area. This same sequence was true of the findings on owner-operated and part-owner-operated farms. It appears that the operators in the Control Area sell more dairy products than they do in the other two areas. The location of the Control Area and Field Area does not seem to influence this as there are good roads leading to Perry, Oklahoma; Guthrie, Oklahoma, and Enid, Oklahoma, from all areas. The importance of dairying seems in all cases to be associated indirectly with actual oil producing areas. The remainder of the livestock income seems to be fairly evenly distributed in the three areas as can be seen in Table 6.

In the producing Field Area 86 percent of the gross agricultural income came from livestock. This is in contrast with 51 percent in the non-producing Field Area, and 50 percent in the Control Area. This shows that the tenants as well as the owner-operators and part-owner-operators in the



Control Area place more emphasis on cash grain cropping and in the Field Area the emphasis is on livestock enterprises probably being due to the tenure situation previously mentioned.

Pasture or rent income is unimportant and none was reported in the Field Area and only one tenant in the Control Area sub-rented his pasture for \$125.00. There was no off-the-farm agricultural income reported in the producing Field Area, but in both the non-producing Field Area and Control Area approximately 2 percent of the net income was earned in off-the-farm agricultural activities. Again in the producing Field Area no off-the-farm non-agricultural income was reported, but one tenant-operator in the non-producing Field Area reported \$150.00 from running a pump station and one tenant-operator in the Control Area earned \$1,440.00 by working for the railroad. None of the tenants in any of the areas had any oil income.

Net income averaged \$722.00 per farm in the producing Field Area, \$1,898.00 per farm in the non-producing Field Area, and \$1,104.00 in the Control Area. The low income in the producing Field Area appears to be due to the fact that the tenants in this area were operating the smallest average size farm plus the fact that they were operating less intensively than tenants in the other areas. Gregory found this same thing to be true; that is, larger tenant farms and higher incomes in the Control Area.<sup>1</sup>

#### Summary

The income for owner-operators seems to be obtained primarily from the same sources in all three areas. Each area shows that the owner-operators received a majority of their gross agricultural income (over 90 percent)

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<sup>1</sup> Gregory, op. cit., p. 50.

from livestock production. Approximately 6 percent of the gross agricultural income came from crop income on owner-operated farms in all three of the areas. This seems to be due to the fact that most of the grain produced finds its way to some form of livestock production. The expenses appear to be high in all three areas, but the net income is higher in the producing Field Area and about equal in the non-producing Field Area and Control Area. This appears to be the result of the relatively large oil income in the producing Field Area.

In the owner-operated, part-owner-operated, and tenant-operated farms, wheat is the most important crop. Only in the tenant-operated farms in the Control Area was the crop income a larger percentage of gross agricultural income than was livestock income. This shows that the type of farming in the Control Area is one of cash cropping as compared to a more intensive livestock enterprise program in the Field Area. Of note is the fact that tenants operate more nearly like owners in the producing Field Area than in either of the other areas, placing major emphasis on livestock production, particularly, beef cattle.

Oil income was more important in the Field Area, having been 28 percent of the net income as compared to 5 percent in the Control Area. In the producing Field Area about 60 percent of the net income came from oil payments. Income received as a result of oil development places the receivers in a position to place more emphasis on the more capital intensive but seemingly less profitable enterprises such as beef cattle. This is also true of the tenants in that area. These operators show the greatest stability of tenure of any of the tenant operators.

It was found that in all types of operatorship and in all areas that off-the-farm agricultural and off-the-farm non-agricultural income is rather unimportant, because while some substantial gains are shown, they are not typical of the general situation and are earned by a few operators only.

In the tenant-operated farms crop income was more important in the Control Area and a larger percentage of gross agricultural income than on either owner-operated or part-owner-operated farms. Livestock was more important to the tenants in the Field Area. Apparently because of tenure stability of the type of farming practiced by the owner-operator and part-owner-operators carries over into the tenant farms.

As mentioned above, off-the-farm agricultural and non-agricultural income is incidental on tenant farms in all three areas. Apparently tenants do not continue to benefit directly from oil development after the initial development is over. Many of the tenants had worked in the oil field, but not the year that this survey was made.

Therefore, it is apparent that oil and gas development tends to increase non-agricultural income in the area of development and also this development appears to change the land utilization pattern in the area of development, primarily the producing Field Area.

## CHAPTER VII

### SUMMARY AND CONCLUSIONS

#### Summary

This study has been made as a separate unit of a project originated by the Agricultural Economics Department of the Oklahoma Agricultural and Mechanical College to determine the relationship of oil and gas development to agricultural land uses in Oklahoma.

The procedure followed in this study has been that of a comparative analysis of the impact of flush oil production and income upon an agricultural economy as contrasted with an area physiographically similar but without any oil development.

The major hypothesis states, "the discovery, development, and production of oil and gas in an agricultural area tends to alter land utilization of that area." Tenure and tenure mobility was checked by analyzing the minor hypothesis, "oil and gas development tends to increase owner-operatorship and to decrease tenancy." The matter of income was tested by the minor hypothesis, "oil and gas tends to increase the non-agricultural income in the area of development." The problem of the cropping pattern in relation to the livestock production was tested by the minor hypothesis, "oil and gas development tends to shift farming operations from cash cropping to livestock production."

Before summarizing this study, it should be noted that certain conditions are peculiar to owners, part-owners, and tenants in any area, and that the predominately German population has had certain effects. In other words, the pattern of land utilization and tenure is undoubtedly influenced by factors other than the discovery and development of oil and gas.

The producing Field Area had the greatest tenure stability among owner-operators. It may be added that stability was comparatively greater in the other two tenure classes in this area as compared with the other areas. Also apparent is the fact that mobility was considerably less in the Field Area after 1932, the discovery and development of oil, than was true in the Control Area. This appears to be due to the development of oil as the income received from the farm and royalty appears to be greater in the long-run than the sale of the surface rights, thus there was no incentive to sell.

In the Field Area, owner-operatorship (38 percent) and pastureland (59 percent) are the dominant patterns of major land use and tenure. In the Control Area tenant-operatorship (33 percent) and pastureland (49 percent) are the dominant patterns of land utilization and tenure. The Control Area is more intensively farmed than the Field Area, using 46 percent of the total land for cropland as compared to only 36 percent in the Field Area. This dependence upon cash cropping is further shown by the fact that 40 percent of the total gross agricultural income is derived from crops in the Control Area as compared to 23 percent of the gross agricultural income in the Field Area. The high percentage of owner-operators in the Field Area seems to be due partially to the lack of incentive to sell or leave the farm plus the fact that they have on the average \$500.00 yearly income from oil which helps them to maintain the less labor intensive enterprises. The tenant-operators in the Field Area had the largest percentage of the total land in cropland. This group of operators also has the smallest number of animal units per farm as well as a low income. The land utilization pattern seems to be one of intensive cash cropping in the Control Area, becoming less intensive in the non-oil producing Field Area and extensive in the producing Field Area. A more intensive type of beef cattle enterprise is found among the operators of the producing Field Area, becoming less intensive in the

non-producing Field Area and most extensive in the Control Area. In contrast to this is the fact the more intensive dairy cattle enterprises are found in the Control Area. This appears to be due to the fact that tenure stability is greater in the Field Area giving the operators more time to go into the long-run process of beef cattle enterprises. While it is true that the dairy cattle enterprise is also a long-run enterprise, it is of such a nature that operators can sell and buy at will.

Wheat is the main cash crop in all areas using approximately two-thirds or more of the total cropland. Oats and feed crops utilize the remaining cropland acreages, but these crops are unimportant in most areas as a cash crop as they find their way to market in some form of livestock. It appears that the Control Area has the most intensive wheat program probably as a result of a greater need for cash income. The non-producing Field Area seems to be the hybrid group and has a tendency to be the link between the producing Field Area and the Control Area. It appears that the farms with fewer animal units, such as is the case of tenant-operated farms and the Control Area, generally have the more specialized wheat farming as compared to the higher average of oat production in areas with more animal units. Other feed crops are produced for home use and are fairly constant in all areas.

In the Field Area, 77 percent of the agricultural income was from livestock; 23 percent from crops. In the Control Area, 40 percent of the agricultural income was from crops and approximately 60 percent from livestock. The Field Area reported approximately 28 percent of the net income from oil payments as compared to 5 percent in the Control Area from indirect oil payments. Off-the-farm agricultural income was a little higher in the

Control Area but as a whole was relatively unimportant. Off-the-farm non-agricultural income was greatest in the Field Area, but even here it was not important and could not be considered typical of the area. The sale of livestock products was the most important single source of income in all areas.

From the foregoing analysis it appears that the development of oil may be partially responsible for the relatively intensive beef cattle enterprise in the Field Area. This is a distinct contrast with the intensive cash cropping of wheat found in the Control Area. Oil development apparently seems to stabilize tenure in the Field Area, and definitely increases income in this area.

The purpose of this study has been to examine the actual conditions obtained in an area of flush oil production as they relate to farming. This study has attempted to show relationships between this area of oil development and one void of this development and to ascertain whether this oil development has effected agricultural land utilization. It is hoped that when a sufficient number of similar studies on this subject have been completed that this study will be helpful in the overall determination of the effect of oil development on agricultural land uses in Oklahoma.

#### Conclusions

Based upon the foregoing data as related to the Lucien Oil Field, the following conclusions seem to obtain:

1. Oil and gas development tends to increase or to maintain owner-operatorship and to decrease tenancy. It seems to encourage also greater tenure stability in the area of oil development.

2. Oil and gas development tends to shift the emphasis in farming from cash cropping of wheat to relatively greater intensification of an extensive type of livestock beef cattle.
3. Oil and gas development tends to increase non-agricultural income in the area of development through royalty payments and thus makes more available spare time for off-the-farm non-agricultural activities.

Therefore, it would seem that the development of oil and gas does alter the basic land utilization pattern in the area of development, directing the pattern towards more ownership and less tenancy; towards more stability and less mobility; towards more livestock production and less cropping; and towards greater non-agricultural income in the area of oil development.



**APPENDIX**

Table 8. Summary Table: Land Use, Lucien Oil Field  
and Control, 1947

	: Total : Field : Area :	: Producing: Field : Area :	: Non-Producing: Field : Area :	: Control : Area :
Number of Farms (Number)	32	20	12	32
Total Land Area (Acres)	9,792	6,132	3,660	8,793
Average Size of Farms (Acres)	306	306	305	275
Land Owned (Acres)	4,888	3,768	1,120	3,679
Average (Acres)	152.8	235.0	186.6	115.0
Percentage of Total (Percent)	49.9	61.4	30.6	41.84
Land Rented (Acres)	4,904	2,364	2,540	5,114
Average (Acres)	153.25	118.2	211.7	159.81
Percentage of Total (Percent)	50.1	38.6	69.4	58.16
Cropland (Acres)	3,497	2,069	1,428	4,077
Average (Acres)	109.3	103.45	119.0	127.4
Percentage of Total (Percent)	35.7	33.7	39.0	46.4
Pastureland (Acres)	5,767	3,703	2,064	4,335
Average (Acres)	108.2	185.15	172.0	135.5
Percentage of Total (Percent)	58.9	60.4	56.4	49.3
Other Land (Acres)	528	360	168	381
Average (Acres)	16.5	18.0	14.0	11.91
Percentage of Total (Percent)	5.4	5.9	4.6	4.3
Wheat (Acres)	2,170	1,246	924	2,666
Average (Acres)	67.8	62.3	77.0	83.31
Percentage of Cropland (Percent)	62.1	60.3	64.8	65.39
Percentage of Farms Reporting (Percent)	81.2	75.0	91.67	90.6
Oats (Acres)	988	599	389	791
Average (Acres)	30.9	30.0	32.42	24.72
Percentage of Cropland (Percent)	28.3	28.9	27.2	19.4
Percentage of Farms Reporting (Percent)	71.9	69.5	74.16	65.6
Feed (Acres)	339	224	115	620
Average (Acres)	10.6	11.20	9.58	19.38
Percentage of Cropland (Percent)	9.7	10.8	8.0	15.21
Percentage of Farms Reporting (Percent)	37.5	33.2	33.33	68.8

(Continued)

Table 8. Summary Table: Land Use, Lucien Oil Field  
and Control, 1946

	: Total : Field : Area :	: Producing : Field : Area :	: Non-Producing : Field : Area :	: Control : Area :
Beef Cattle (Number)	1,224	915	319	638
Average (Number)	38.3	45.80	26.58	19.94
Percentage of Farms Reporting (Percent)	90.6	89.5	91.7	71.9
Dairy Cattle (Number)	153	98	55	205
Average (Number)	4.8	4.9	4.6	6.41
Percentage of Farms Reporting (Percent)	84.4	84.5	83.3	93.8
Chickens (Number)	8,450	5,615	2,835	4,561
Average (Number)	264.1	280.8	236.3	142.5
Percentage of Farms Reporting (Percent)	90.6	89.5	91.7	93.8
Miscellaneous Animals (Number)	197	165	32	188
Average (Number)	6.2	8.3	2.7	5.9
Percentage of Farms Reporting (Percent)	71.9	69.5	83.3	71.9
Total Animal Units (Number)	1,161.4	834.3	327.1	821
Average (Number)	36.3	41.7	27.3	25.66
Wheat Income (Dollars)	16,274.76	8,515.86	7,758.90	30,954.30
Average (Dollars)	508.59	425.79	646.58	967.32
Percentage of Cropland Income (Percent)	82.91	86.4	79.3	96.89
Oat Income (Dollars)	3,088.56	1,083.83	2,004.73	532.35
Average (Dollars)	96.52	54.19	167.06	16.64
Percentage of Cropland Income (Percent)	15.73	11.0	20.5	1.67
Feed Income (Dollars)	266.52	252.00	14.52	461.00
Average (Dollars)	8.33	12.60	1.21	14.41
Percentage of Cropland Income (Percent)	1.36	2.6	1.5	1.41
Total Cropland Income (Dollars)	19,629.89	9,851.74	9,778.15	31,947.65
Average (Dollars)	613.43	492.59	814.85	998.36

(Continued)

Table 8. Summary Table: Land Use, Lucien Oil Field  
and Control, 1946

	: Total : Field : Area	: Producing : Field : Area	: Non-Producing : Field : Area	: Control : Area
Dairy Cattle Income (Dollars)	1,514.00	800.00	714.00	2,824.50
Average (Dollars)	47.31	40.00	59.50	88.50
Percentage of Livestock Income (Percent)	2.29	1.76	3.44	6.08
Beef Cattle Income (Dollars)	40,878.50	28,758.50	12,120.00	19,159.00
Average (Dollars)	1,277.45	1,437.93	1,010.00	508.72
Percentage of Livestock Income (Dollars)	61.83	63.43	58.34	41.25
Chicken Income (Dollars)	3,436.40	2,279.20	1,157.20	476.52
Average (Dollars)	107.39	113.96	96.43	14.89
Percentage of Livestock Income (Percent)	5.20	5.03	5.57	1.03
Miscellaneous Animal Income (Dollars)	1,712.60	1,657.60	55.00	4,938.00
Average (Dollars)	53.52	82.88	4.58	154.31
Percentage of Livestock Income (Percent)	2.59	3.66	0.003	10.63
Milk Income (Dollars)	2,790.00	2,105.00	685.00	-
Average (Dollars)	87.19	105.20	57.08	-
Percentage of Livestock Income (Percent)	4.22	4.64	3.30	-
Cream Income (Dollars)	4,940.00	3,115.00	1,825.00	11,739.00
Average (Dollars)	154.38	155.75	152.08	366.84
Percentage of Livestock Income (Percent)	7.47	6.87	8.78	25.27
Egg Income (Dollars)	10,845.00	6,625.00	4,220.00	7,310.00
Average (Dollars)	338.91	331.25	351.67	228.44
Percentage of Livestock Income (Percent)	16.40	14.61	20.31	15.74
Pasture or Rent Income (Dollars)	265.00	185.00	80.00	145.00
Average (Dollars)	82.81	9.25	6.67	4.50
Percentage of Gross Agricultural Income (Percent)	0.3	0.3	0.2	0.1

(Continued)

Table 8. Summary Table: Land Use, Lucien Oil Field  
and Control, 1946

	: Total : Field : Area	:Producing: : Field : : Area :	:Non-Producing: : Field : : Area :	:Control : Area :
Total Cropland Income (Dollars)	19,629.89	9,851.74	9,778.15	31,947.45
Average (Dollars)	613.43	492.59	81.48	99.83
Percentage of Gross Agricultural Income (Percent)	22.8	17.79	31.92	40.2
Total Livestock Income (Dollars)	66,116.50	45,340.30	20,776.20	47,451.02
Average (Dollars)	2,066.14	2,267.02	1,731.35	1,482.84
Percentage of Gross Agricultural Income (Percent)	76.9	81.88	67.82	59.7
Gross Agricultural Income (Dollars)	86,011.39	55,377.04	30,634.35	79,543.47
Total Expense (Dollars)	52,548.00	36,276.00	16,272.00	34,189.00
Average (Dollars)	1,642.12	1,813.80	1,356.00	1,068.40
Net Agricultural Income (Dollars)	33,463.39	19,101.04	14,362.35	45,354.47
Average (Dollars)	1,045.73	955.05	1,196.86	1,417.33
Percentage of Net Income (Percent)	58.4	45.5	93.4	85.9
Off-Farm Agricultural Income (Dollars)	1,225.00	975.00	250.00	2,960.00
Average (Dollars)	38.28	48.75	20.83	92.50
Percentage of Net Income (Percent)	2.1	2.3	1.6	5.6
Oil Income (Dollars)	15,968.00	15,648.00	320.00	2,399.00
Average (Dollars)	499.00	782.40	26.67	74.97
Percentage of Net Income (Dollars)	27.9	37.3	0.2	4.5
Off-Farm Non-Agricultural Income (Dollars)	6,670.00	6,220.00	450.00	2,114.00
Average (Dollars)	208.44	311.00	37.50	66.06
Percentage of Net Income (Percent)	11.6	14.8	2.9	4.0
Total Net Income (Dollars)	57,326.39	41,944.04	15,382.15	52,827.47
Average (Dollars)	1,791.45	2,097.20	1,281.85	1,650.85

Table 9. Summary Table: Length of Tenure,  
Lucien Oil Field and Control, 1946

Time on Present Farm	Number of Operators	
	Field Area	Control Area
(Years)	(Number)	(Number)
No Years	1	1
1 to 3	3	9
4 to 7	6	7
8 to 11	2	5
12 to 15	9	4
16 to 19	2	1
20 to 23	0	0
24 to 27	2	0
28 to 31	3	2
32 to 35	1	2
36 to 39	2	0
40 and over	1	1

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