

A STUDY OF THE EFFECT OF OIL AND GAS DEVELOPMENT UPON
LAND UTILIZATION IN THE GARBER OIL FIELD,
GARFIELD COUNTY, OKLAHOMA

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GARFIELD COUNTY, OKLAHOMA

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CHAPTER I. INTRODUCTION

The Problem

The problem under investigation is an effort to analyze to what extent oil and gas development determines land use within a given area. The problem is based entirely upon the economic aspects of the land use in an area of oil and gas development. That oil and gas development brings social change of one nature or another is not questioned. No attempt is made to determine if such is true or to measure such change should it exist.

In order to have a rough measure of the influence of oil and gas development an effort is made in this study to show the differences in land use in an area of oil development and in an area free from oil and gas development. The income, tenure, and the type of farming are compared in the two areas to develop the effect of oil and gas upon land utilization.

This study seeks to examine the hypothesis that, "The discovery and subsequent production of oil and gas alters the basic land utilization in an area of oil and gas development." Corollary to this hypothesis a series of three minor hypotheses have been postulated. The first of these states that, "Oil and gas development tends to increase owner operatorship and to decrease tenancy," the second states that, "Oil and gas development tends to shift the enterprise emphasis from cash cropping to livestock farming," and the third states that, "Oil and gas development tends to enhance income (agricultural and non-agricultural) of farmers in the area of development."

Location of Study

The location of this study is in the eastern part of Garfield County, Oklahoma. Garfield County lies in the north central part of the State of Oklahoma, and is separated from Kansas on the north by Grant County. Enid, a city of approximately 40,000 population, is the county seat, and lies 70

miles northwest of Oklahoma City and 110 miles west of Tulsa. The county is rectangular in shape and has an area of 1,061 square miles or 679,040 acres.¹

The prevailing type of farming in Garfield County is cash grain. The county lies in the Red Beds Plains region of the Western Prairies. The growing season is from 200 to 210 days in length and there has been 50 twenty-day droughts in the past twenty years.²

The annual mean temperature for the county for the past fifteen years is 61.02° Fahrenheit, ranging in the summer as high as 118° Fahrenheit to as low as 6° below zero in the winter. The mean average rainfall for the same period of time is 28.76 inches.³ The dominant type of soil in the area is Kirkland Silt Loam which is a soil that is well suited to growing wheat.⁴

The people living in the area of this study are mainly German, Czech, or Southeast European stock. They show evidence of being hard workers, seem to be frugal, and take great pride in their holdings and in the fact that they are farmers. They are a friendly people and religious interest is evidenced by numerous country churches.

The study area was chosen because of the concentration of oil and gas production in the Garber oil field. The Garber field is old, having been discovered in 1916. Since that time it has produced 56,992,750 barrels of crude petroleum. The field embraces a proven area of 4,690 acres of land

¹ Fitzpatrick, E. G., "Soil Survey Garfield County, Oklahoma," United States Department of Agriculture, Bureau of Chemistry, 1939, p. 1.

² Burrill, Meredith F., "A Socio Economic Atlas of Oklahoma," Oklahoma Agricultural Experiment Station, June 1936, p. 4, Et. Passim.

³ Climatological Data, United States Department of Commerce, Weather Bureau.

⁴ Fitzpatrick, E. G., op. cit.

lying between Covington on the south and Garber on the north. Since discovery in 1916 there have been 978 wells drilled in the field.⁵

No production figures for the field were published until 1921 at which time the annual production of crude petroleum amounted to 3,973,000 barrels.⁶ The field developed and expanded until peak production was reached in 1926 when 10,920,000 barrels were produced.⁷ Production since that date has dropped steadily as new wells ceased to come in at a faster rate than old ones went out of production. In 1933 the production had fallen to 571,550 barrels.⁸ Yearly production since that time has remained fairly constant with production in 1944 amounting to 612,328 barrels.⁹ This stability of production would seem to indicate that extensions of the field are a remote possibility. The area of development is thus deemed stable in terms of potential expansion.

It follows then, that a comparison between farming in this area and farming in an area having no oil and gas development will be a valid comparison provided the physical characteristics of the two areas show a high degree of similarity.

⁵ Oil and Gas Field Development In The United States, Yearbook 1945, National Oil Scouts and Landmens Association, Vol. 15, pp. 525-527.

⁶ The Oil Weekly, Vol. 84, No. 7, January 25, 1937, The Gulf Publishing Co., Houston, Texas, p. 136.

⁷ Ibid., p. 136.

⁸ Ibid., p. 136.

⁹ Oil and Gas Field Development In The United States, op. cit.

The Study Area

Information for this study was obtained by using identical quarters along double transverses six miles in length emanating from the center of oil production east and west and north and south. The control area was designed similarly with the center chosen for physical similarity.¹⁰

The study area is twenty miles in length and twelve miles wide. It reaches into eight different townships of the county. The southern half of the study area will hereafter be referred to as the Area of Development. The northern half which is devoid of oil development is to be known as the Control Area.

The location of the Control Area was placed in close proximity to the Area of Development for a number of reasons. The first was its nearness and the ease with which it could be reached from the Area of Development. Second, the physical characteristics are very similar, both areas having a small creek flowing through them. The predominant soil type of the Control Area is Kirkland Silt Loam which is the same in the Area of Development. Also, the type of farming in the Control Area is representative of the type of farming in the county. In Table I, classification of all land in the Area of Development and Control Area shows that there exists very little difference in percentage of land in the major classes of land for both areas. Table I, Appendix, shows that the townships lying mostly in the Control Area do not have an appreciably higher percentage of total land in farms than do the townships immediately within the Area of Development. Total cropland in the townships in the Area of Development, however, is considerably smaller than in the Control Area.

¹⁰ See Figure I, p. 5.

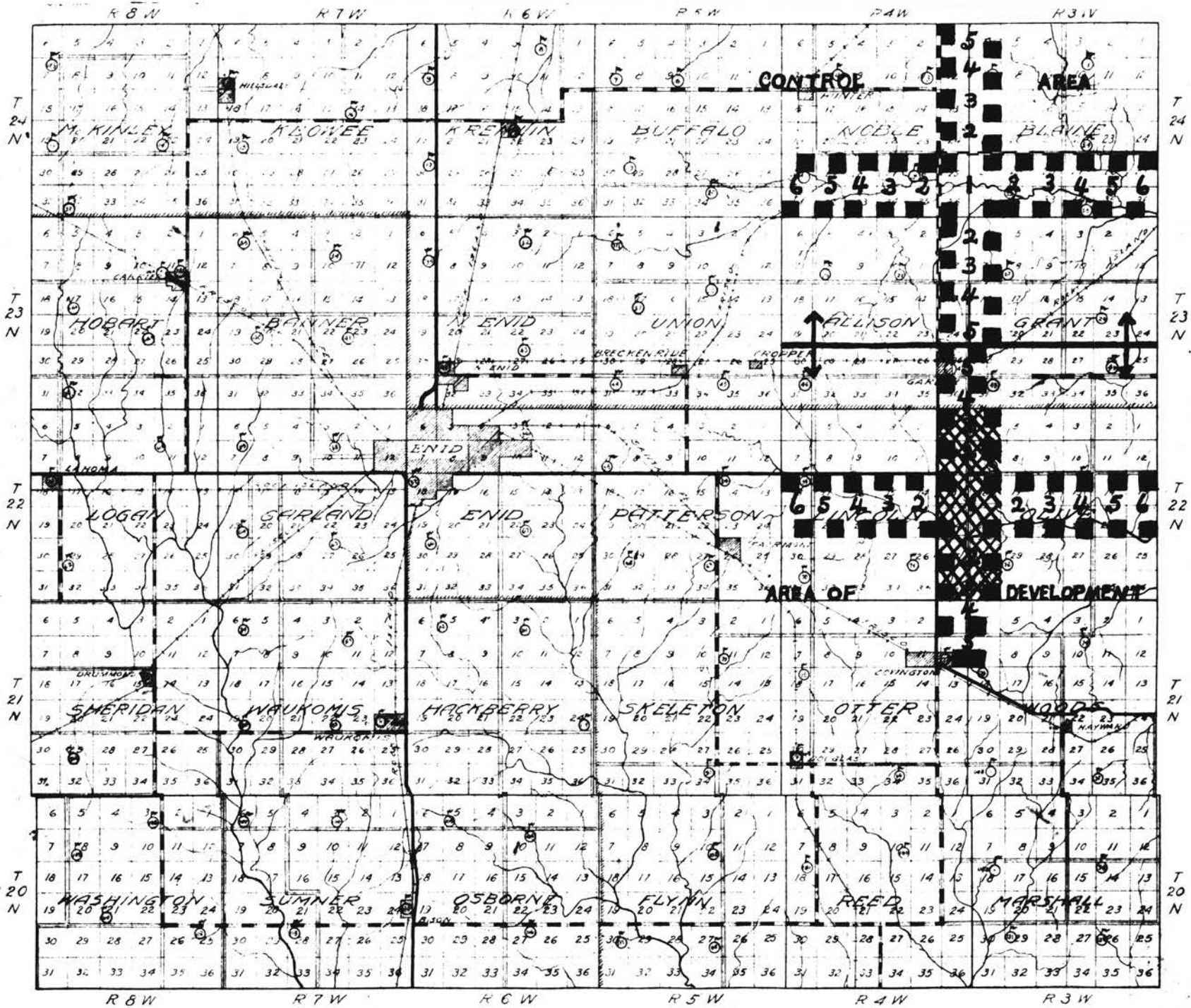


Figure I. Map of the Study Areas, Garfield County, Oklahoma ● Study Quarters
 ■ Area of Actual Oil Production

Table I. Land Classification of the Area of Development
and Control Area, By Quarter Section

		: Area of		: Control		
		:Production:	Development	: Area		
		: (Bushels):	Acres:Percent:	Acres:Percent		
A	1st grade prairie land	18-20	80	1.3	20	.3
B	2nd grade prairie land	15-17	827	13.0	1,035	16.2
C	Good rolling land	15-17	631	9.9	1,103	17.2
D	Slope land, slight erosion	12-15	1,019	16.0	1,110	17.3
E	Slope land, bad erosion	10-12	1,336	21.0	416	6.5
F	Thin land	8-10	190	3.0	217	3.4
G	Good sandy land	15-17	0	0	0	0
H	Fair sandy land	10-12	0	0	0	0
I	1st grade bottom land	18-20	0	0	158	2.5
J	2nd grade bottom land, overflow	15-18	287	4.5	285	4.5
K	Flat land, frequent water damage	10-14	115	1.8	89	1.4
L	Pasture only		1,818	28.6	1,914	29.9
M	25 percent waste		25	.4	40	.6
N	50 percent waste		30	.5	5	.1
O	75 percent waste		10	.2	4	.1
Total			6,368	100.2	6,396	100.0

SOURCE: County Tax Assessor's Office, Enid, Oklahoma.

One noticeable feature of Table I, Appendix, is the fact that one of the townships in the Area of Development has a higher percentage of cropland in wheat than found in any other township in the study. Thus, it would seem that the only major physical difference between the two areas is that the Area of Development has production of gas and oil, while the Control Area does not.

The use of a Control Area is readily apparent, since it is necessary to determine what constitutes normal development of farming operations in this area. The Control Area is used as comparison, in order to ascertain deviations caused by the production of oil and gas and to determine the causes of these deviations.

Both areas have been further subdivided into numbered zones.¹¹ The center of Zone 1 in the Area of Development is the center of the oil field. The extent of production of oil and gas decreases as one leaves the center of the field and moves toward the periphery. The center of Zone 1 in the Control Area corresponds in physical location to Zone 1 in the Area of Development and all zones are numbered similarly and embrace the same number¹² of quarter sections of land listed for the study.

Source of Data

This investigation is based on the farming carried on during the crop year of 1945 by farmers who operated the quarter sections of land listed for the study. Information for this study was not only taken for the study quarter section but for the entire farm unit operated in conjunction with the quarter as well.

Information used in this study was collected by the survey method. A personal interview was held with each operator of the quarter section. Important questions in the interview concerned the acreage of the quarter section, acreage of total farm unit, acreage and yield of each crop grown, amount and value of crops sold, value of livestock and livestock products sold, and what the operator's out-of-pocket cash operating expenses were for all reasons for the crop year. The interview schedule is reproduced as Exhibit A, page 76, Appendix.

It was found that only a very few farmers keep farm account books. In instances where a farmer had kept his farm account book, the reliability of the figures given were not questioned. Due to the fact that the survey was

¹¹ See Figure I, p. 5.

¹² Ibid., p. 5.

conducted in the busy season of grain harvest, many interviews were held at night after working hours with both the operator and his wife. Interviews of this nature were believed to be fairly reliable. Many times the operator would refer the interviewer to his wife for production, income, and expense data because the wife is the family bookkeeper.

Many farmers were reluctant to part with this type of information because they thought the Office of Price Administration or Bureau of Internal Revenue agents were checking up on them. Some very few were openly hostile and expressed their feelings in just that manner, but after considerable explanation it is felt that a true and accurate schedule was obtained in all interviews.

Previous Work

Previous research work done in this field, bearing directly upon the relationship between oil development and land use, has been of a different nature than the treatment followed in this study. No research dealing directly with the problem as it is handled in this study could be found. The only publications treating oil development in relation to land use available can be found listed in the bibliography.

Since no previous work along the line of this study could be found, it is believed this is, methodologically, an original study on the effect of oil and gas development upon land utilization.

Procedure

The method of comparison was used in analyzing the data used in this study. The study attempts to reduce all the variables to a comparable basis, then to determine what causes variations in land use within and between the areas.

The tenure pattern was determined for each area by zones, thus affording cross classification. In studying the tenure pattern, tenure stability was used to see if there was any significance between stability of tenure and tenants renting from relatives. Landowner's occupation of tenant operated farms was checked to see if it was a factor in stability of tenure.

The ownership pattern was approached from the standpoint of years that land has been owned, age at which present owner became the owner, and means by which he acquired the land. The problem of mortgages was studied by areas in an effort to determine if there was any significant difference in the manner in which owners came to be owners.

Land use within the areas was broken down into various actual uses by owner and tenant operated farms for comparison. Land use was further broken down in the same uses but by zones within the areas and by tenure also.

The income of farms within each area was broken down as to type of farm, the income accruing to each item, type of income, agricultural or non-agricultural, and also as to whether the farm was tenant or owner operated.

An effort has been made in this study to control as many of the variables as possible in order to test the effect of the presence of oil and gas development. This was done in an effort to obtain valid conclusions relating to the major premise.

CHAPTER II. TENURE

The first minor hypothesis to be tested is that oil and gas development tends to increase owner operatorship and to decrease tenancy. This chapter will treat this hypothesis in relation to the data observed in the field only. Among other aspects of the problem of tenancy this chapter deals with tenure within the oil area and between the two areas. The stability of tenure, its causes, and ownership by areas is investigated in an effort to determine what causes the present pattern.

Prevalence of Tenancy

The prevalence of tenancy by zones for the entire Area of Development is shown in Table II. Of the 40 farms in the Area, 29 of them, or 72.5 percent, are tenant operated. The percentage of tenancy for the Area varied from a high of 87.5 percent in Zones 3 and 4 to a low of 25.0 percent in Zone 6. The low percentage of tenancy in Zone 6 is attributed to the fact that it is near the edge of the Area of Development. Being near the edge of the Area of Development it is believed to be less influenced by the effects of the development of oil and gas. Zone 2 is the next low zone in order of tenancy with 62.5 percent of tenancy for the zone. This is not unusually low but being near the center of development bears investigation. Owners in Zone 2 have been owners a much longer period of time than tenants. These owners became owners in some cases before discovery of the field and have been reluctant to move away and leave the farm to a tenant. These farms show a high percentage of land in cropland and are located in the outlying part of Zone 2, and have no oil development on them.

In the Control Area, as in the Area of Development, tenancy again was the dominant pattern. The overall average of tenancy for the Control Area was 57.5 percent, leaving 42.5 percent of the quarters owner operated.

Table II. Tenure Within the Area of Development By Zones,
From the Center of the Area

Zone	Total	Owner Operators		Tenants	
		Number Per Zone	Percent	Number Per Zone	Percent
1	4	1	25.0	3	75.0
2	8	3	37.5	5	62.5
3	8	1	12.5	7	87.5
4	8	1	12.5	7	87.5
5	8	2	25.0	6	75.0
6	4	3	75.0	1	25.0
Total	40	11	27.5	29	72.5

Owner operatorship is considerably higher in the Control Area than the 27.5 percent for owner operators in the Area of Development (Table III). Percentage of tenancy for the Control Area ranged from 25.0 percent in Zone 1 to 75.0 percent in Zones 5 and 6. There seems to exist a definite pattern of tenancy in the Control Area also, with tenancy increasing as one leaves the center of the Area. This would lead one to believe that oil and gas development does not tend to increase owner operatorship and to decrease tenancy but results in decreased owner operatorship and increased tenancy.

Table III. Tenure Within the Control Area By Zones,
From the Center of the Area

Zone	Total	Owner Operators		Tenants	
		Number per Zone	Percent	Number Per Zone	Percent
1	4	3	75.0	1	25.0
2	8	4	50.0	4	50.0
3	8	3	37.5	5	62.5
4	8	4	50.0	4	50.0
5	8	2	25.0	6	75.0
6	4	1	25.0	3	75.0
Total	40	17	42.5	23	57.5

Sale of Land

Examination of Table IV will show that land has moved in the Control Area somewhat more freely since 1916 than in the Area of Development. Owners of tenant operated quarters in the Control Area became owners in 60.9 percent of the cases subsequent to 1916, the date of discovery of the Garber oil field. Owners of tenant operated quarters in the Area of Development became owners in only 48.3 percent of the cases subsequent to 1916. This might very well lead one to believe that an element exists in the Area of Development that makes it difficult to become an owner in this area.

Table IV shows further that the same number of quarters came into the hands of owners in the Area of Development and Control Area subsequent to 1916. This can only be seen to be significant when viewed from the standpoint of the type of buyer. Of the 29 tenant operated quarters in the Area of Development, 18 of them, or 62.5 percent, are owned by people other than farmers. The remaining 37.5 percent are owned by farmers who have either retired on direct agricultural benefits from production on the quarters or from indirect benefits which accrued as a result of the physical location of the quarters within an area producing oil and gas.

Table IV. Date of Ownership of Tenant Operated Quarters, By Areas

	: Area of Development :		: Control Area :	
	: Number :	: Percent :	: Number :	: Percent :
Owned prior to 1916	15	51.7	9	39.1
Owned subsequent to 1916	14	48.3	14	60.9

In the Control Area, 12 of the 23 tenant operated quarters, or 52.1 percent, are owned by farmers. This leaves 47.9 percent of the purchases subsequent to 1916 to be made by people other than farmers and who are still the

owner. This vast difference in percentage of purchases by farmers between the two areas would seem to indicate a higher land value in the Area of Development than in the Control Area.

In the Area of Development 51.7 percent of the purchases by present owners were made prior to 1916. In the Control Area only 39.1 percent of the purchases by present owners were made prior to 1916. Apparently, the reluctance of owners to sell their land has been due to the possibility of discovery of oil and gas on their property. No such barrier has existed or exists in the Control Area with the result that land has moved somewhat more freely. This movement has enabled more people, and most of them farmers, to become owners in the Control Area. The reluctance of owners to sell and the high percentage of non-farmer buyers in the Area of Development has made it difficult for a farmer to become an owner in the Area of Development.

Tenure Stability

Tenure stability within the two areas is shown in Table V. In the Area of Development only two lengths of tenure groups are significantly different from the other groups. Six out of 29 or 20.6 percent of farmers staying on rented farms came within the classification of from 2 to 3 years. These are the better farms in the area and the tenants stay on these farms somewhat longer than most of the tenant operated farms in the area in an effort to accumulate enough capital to become an owner. The other tenure group of significance in the Area of Development is the one with length of tenancy over 10 years. Of 29 tenant operated quarters, 12 or 41.3 percent have been operated by the same tenant for a period of 10 years or longer.

This is believed to be attributable in part to the fact that 15 of the 29 tenant farmers in the Area of Development report an annual income of \$6,872 from part-time work in the oil field. This is an average of \$458.13

Table V. Number of Years Tenant Has Rented Quarter
and Tenants Who Own Additional Land

Length of Tenure (Years)	Area of Development			Control Area		
	None Owned	Owner Additional	Total Number Tenants	None Owned	Owner Additional	Total Number Tenants
0 to 1	3	0	3	3	1	4
2 to 3	5	1	6	4	0	4
4 to 5	1	2	3	2	5	7
6 to 7	1	1	2	1	0	1
8 to 9	1	2	3	1	1	2
Over 10	8	4	12	3	2	5
Total	19	10	29	14	9	23

per tenant and is believed to be enough to help maintain a fair standard of living and to induce the tenant to remain in the area. Another possible reason is the inertia and dislike of a family to move away from a community where they have friends. In this same group of farms 4, or 33.3 percent, are operated by farmers who own additional land. From the above, indications seem to be that tenant operated farms in the Area of Development are operated by tenants in the strictest sense having no other alternatives. Most land that has moved in the Area of Development since 1916 has been bought by people other than farmers. Therefore, tenants are either content to remain or are forced to remain tenants, thus causing a high degree of tenure stability in this area due to the immobility of movement of land. When land moves in this area, it is usually between people other than farmers.

In the Control Area there are three significant tenure groups. Two of these groups have the same number of tenants in them. The 1-year group has in it 4 tenants or 17.3 percent of the tenants in the area renting for only a 1-year period. The 2 to 3 year group likewise has 4 tenants or 17.3

percent of the tenants in the area in it. Combined, these two groups have 8 tenants or 34.7 percent of all tenants in the area renting for a very short period of time. Farmers falling within these two groups, stay on these farms only long enough to find a better and bigger farm or long enough to set themselves up in farming to the point where they are able to operate a larger farm, after this they move on to a different location or a few of the more successful might conceivably be in a position to become owners.

Seven of the 23 tenants in the area, or 30.4 percent, fell within the time group of 4 to 5 years. This is the largest group in the area and it is felt that more fell within this group because of the time element. That is, it is believed that since 1940, 4 to 5 years has been sufficient time for a tenant to accumulate enough capital to make a down payment on a farm. Further evidence of this is shown by the fact that 52.1 percent of the land that has moved within this area since 1916 has been bought by farmers. Further, out of this group, 5 of the 7 quarters in the 4 to 5 year time group or 71.5 percent are operated by men who own other land and need this additional land to enable them to have an operating unit large enough to operate at maximum efficiency. This would seem to indicate that these quarters are being rented to men who are stable in the eyes of the landlord as far as staying in the community is concerned.

The other time group of significance in the Control Area is the time group of 10 years or more. Of the 23 tenant operated farms in the area, 5 or 21.7 percent fell within this group. The class of farmers on these farms are men who have such good arrangements with their landlords that they have never felt that it would be profitable to become owners. Many are livestock men and are more willing to make an investment in livestock or machinery than attempt to pay for a farm that may fluctuate in value even before it is

paid for. In this group, 2 of the 5 quarters or 40.0 percent are operated by men who own additional land. These quarters are rented by owners who have been owners in the area for a number of years and have been content, for various reasons, to rent instead of buying the additional land necessary to round out the size of the operating unit they feel best fits their needs. This would seem to indicate that a tenant does not have a number of limiting factors preventing him from becoming an owner in the Control Area.

The blood or marital relationship between tenant and landlord is shown in Table VI. In the Area of Development four farms are operated by sons of the landlords. These are farms from which the owner has retired, although still living on the farm in some instances, and left the farm to a son. The father still retains ownership though the operator has complete control of the farm and may reap the total benefits from production as though he were owner. The landlord retains ownership presumably because of the latent possibility of oil discovery on his property. This makes for stable tenure but is not a true picture of the tenure pattern because the tenant knows that at some time in the future he will become the owner. Neither is this representative of how tenants become owners.

Table VI. Number of Tenants Renting From Relatives and Degree of Relationship, If Any

	: Area of Development :	Control Area
Father	4	2
Father-in-law	1	2
Mother-in-law	1	0
Son-in-law	0	1
Uncle	1	0
Grandmother	1	0
Family heirs	4	0
No relation	17	18

In the classification of family heirs, four tenants came under this heading. These are farms on which there has been and in some cases still is some oil or gas production. The farm is still in estate because of production, potential production, or the unwillingness of some member of the heirs to sell. This class of owner is content to live on the farm, regardless of return from agricultural production, and live on his return from oil and gas production because this is where his main interest lies. This owner may also be content to live off his income from oil and gas production and live in town and rent his farm and never help the tenant or move him. This makes for stable tenure but is not representative of the tenure pattern in the area.

The largest group, 17 of the 29 tenants in the Area of Development, or 58.6 percent had no family relationship to their landlord. In the Control Area, only two tenants were operating quarters owned by their father. These quarters were being operated by the youngest son in anticipation of buying at a later date, or the landlord had retired and some member of the family was renting the farm. Fathers-in-law in this area owned two of the tenant operated farms. The farms are operated by sons-in-law in a very similar pattern to those owned by fathers of the operator.

Of a total of 23 tenants in the Control Area, 78.2 percent or 18 were not related to their landlords. In the Control Area as well as the Area of Development, therefore, family relationship of operator to landlord is a factor in the tenancy pattern. There seems to be a higher degree of family relationship in the Area of Development, but there is no way of determining whether or not this follows from the development of oil.

Ownership

Length of ownership, age at time of acquisition, and means of acquisition of owner operated quarters in both areas are shown in Table VII. Age at time of acquisition and means of acquisition do not seem to vary between the two areas.

Table VII. Length of Ownership, Age of Acquisition, and Means of Acquisition of Owner Operated Quarters

	: Area of	: Control
	: Development	: Area
Number of Years Quarter Has Been Owned:		
0 to 4	2	7
5 to 9	3	3
10 to 19	4	3
20 to 39	2	4
40 and over	0	0
Age at Time of Acquisition:		
Under 20	0	0
20 to 29	2	3
30 to 39	4	7
40 years and over	5	7
Means of Acquisition:		
Patent	1	2
Purchase	9	14
Inherit	1	1

The only difference of significance shown by Table VII is in the number of years that the quarter sections of land have been owned. Quarters have been owned longer in the Area of Development than in the Control Area. This is a result of the reluctance of owners to sell land in this area because of the potentiality of development of oil and gas on their property.

The use of credit in purchasing land in the two areas is shown in Table VIII. The Area of Development has had many more cash purchases due to the type of buyer who in most instances was not a farmer. Credit was used more

Table VIII. Number of Mortgages at Time of Purchase
of Owner Operated Farms

	: Area of : Development	: Control : Area
Purchase money mortgages	1	10
Release of purchase money mortgages	0	7
Mortgages subsequent to purchase and not released	1	1

liberally in the Control Area. It is felt that this is a result of the purchases in the area, in most instances, being made by a farmer who was forced to make use of credit. The record of payment of these mortgages, however, has been good.

Table IX shows landlord's occupation by residence of tenant operated quarters for both areas. As would be expected of good farming areas, real estate men are not an important class of owners in either area.

Owners whose occupation still is farming, number about the same for each area. Retired farmers number about the same for both areas though some higher for the Area of Development. This may be due in some cases to increased income either directly or indirectly from production of oil and gas.

Business men own nearly the same number of quarters in each area. Retired business men own more land in the Area of Development than in the Control Area. This land no doubt was acquired prior to or during the oil boom and is being held in hopes of a revival of activity in the field. In the Control Area evidently no such incentive to retain ownership has existed or exists at present, with the result that only one quarter is owned in the area by a retired business man.

Table IX. Landowner's Occupation by Resident of Tenant Operated Quarters

Occupation	Area of Development					Control Area				
	Living in	Living in	Living in	Total	Percent	Living in	Living in	Living in	Total	Percent
	Garfield County	Oklahoma	Outside Oklahoma			Garfield County	Oklahoma	Outside Oklahoma		
	County	County	County			County	County	County		
Real estate	0	0	0	0	0	2	0	0	2	8.7
Lawyer	0	0	0	0	0	0	0	1	1	4.3
Doctor	1	0	0	1	3.4	1	0	0	1	4.3
Farmer	2	1	0	3	10.3	1	1	0	2	8.7
Retired farmer	7	0	0	7	24.1	5	0	0	5	21.7
General business	4	0	0	4	13.8	1	2	0	3	13.1
Retired business	4	0	0	4	13.8	1	0	0	1	4.3
Estate	5	0	1	6	20.7	0	0	1	1	4.3
Housewife	2	1	0	3	10.3	1	1	0	2	8.7
State of Oklahoma	1	0	0	1	3.4	1	0	0	1	4.3
Unknown	0	0	0	0	0	0	1	3	4	17.4
Total	26	2	1	29	99.8	13	5	5	23	99.8
Percent	89.7	6.9	3.4	100		56.6	21.7	26.7	100	

The other class of owners of any importance was the owners of those quarters held in estate. In the Area of Development they numbered six with only one such quarter in the Control Area. The reason for this is believed to be that in the Area of Development some of these quarters have oil and gas production on them and each member of the family is reluctant to sell his share. This results in the farm being held in estate which makes for better administration.

Location of residence of owners is significantly different between the two areas. By far the greatest majority of owners in the Area of Development live in Garfield County with practically all the remaining owners living within the State of Oklahoma. In the Control Area a greater number of owners live outside Garfield County and the State. If location of landowner's residence is an indication of speculative ownership, there would seem to be less speculative ownership in the Area of Development than in the Control Area.

Summary

In the Area of Development tenancy is the dominant tenure pattern. In Zone 1 at the center of the field the degree of tenancy reaches 75.0 percent. Going outward from Zone 1 at the center of development, tenancy increased until Zone 4 was reached. From Zone 4 outward to the edge of the field tenancy decreased. The overall average was 72.5 percent tenancy for the area.

In the Control Area as in the Area of Development tenancy was the predominant tenure pattern. The percentage of tenancy is lowest at the center of the area and increased by zones as the edge of the area is reached. The average percentage of tenancy for the entire area is 57.5 percent. The indications are that as one moves away from the center of an area of oil and

gas development, owner operatorship tends to increase and tenancy to decrease.

Stability of tenure was much higher in the Area of Development than in the Control Area. Part-time work in the oil field coupled with the apparent inability of tenants to become owners and a high percentage of tenant quarters operated by owner additional help to establish a high degree of tenure stability within the area. While stability of tenure in the Control Area is very good it does not approach that reached in the Area of Development. Tenants either change farms often or become owners in the Control Area. The chief factor of stability in the Control Area is that 71.0 percent of tenant operated quarters, in the time group of 4 to 5 years, are operated by owner additional who are stable in terms of moving from the area. The blood relationship of tenant to owner is associated apparently with tenure stability in the areas studied as revealed in the Area of Development.

Land has moved more freely in the Control Area than in the Area of Development. The presence of oil and gas development has apparently been the reason owners have been reluctant to sell or land has remained in an estate in the Area of Development, thus causing less land to move in this area.

Length of ownership of owner operated quarters varies but little between the Area of Development and Control Area. Means of acquisition differed between the two areas only in that more cash purchases were made in the Area of Development than in the Control Area. Retired farmers was the highest occupational classification for owners of tenant operated quarters in both areas, with estates being the next high in the Area of Development.

There is a significantly greater number of landlords living in Garfield County who own land in the Area of Development than in the Control Area.

From the above, one can conclude that oil and gas development does not tend to decrease tenancy but rather it tends to retard owner operatorship.

CHAPTER III. ENTERPRISES

The second minor hypothesis to be tested is, that oil and gas development tends to shift the enterprise emphasis from cash cropping to livestock farming. This chapter treats the problem first from the standpoint of primary and secondary land use.¹ Primary and secondary land use by zones and by areas was studied for the Area of Development and Control Area. Variations in land use between areas and differences between zones in the light of the differences between the two areas was shown.

The next step in enterprise analysis was to show what the enterprises were by study quarter and by total farm unit by tenure. This shows how tenure affects the enterprises and what the enterprise pattern was when tenure is held constant.

The last step in analysis of enterprises was a study of farm organization. Income was used to classify the farms as to type of organization. The farms were then divided into tenure groups and the major enterprise on each type of farm was determined. The differences that exist in enterprise emphasis was determined and an effort was made to find the causes of these differences when tenure and organization was held constant.

Primary and Secondary Land Use

Primary and secondary land use by zones for the Area of Development and the Control Area is shown in Table X. Information on primary and secondary land use is presented in percentage distribution and number of livestock per acre of land in farms. Each corresponding numbered zone in the Area of

¹ Primary land use is the use made of the land for production of crops. Secondary land use is use made of land for livestock production.

Development and Control Area is composed of the same number of study quarters. The acreage for each zone and the two areas varies only in so far as there are variations in size of study quarters. The variation is small, as the study quarters vary only a few acres in size in most cases. Thus, the two areas are very similar as to the number of acres in study quarters in the two areas.

Comparisons were first made of the primary and secondary land use in the two areas in an effort to determine what the differences between areas were and the underlying causes of these differences. Sharp differences exist between the Area of Development and Control Area in land use (Table X). The Area of Development shows 60.4 percent of its land in cropland and 36.4 percent in pastureland. The Control Area has considerably more land in cropland, 65.6 percent and correspondingly less pastureland, 30.4 percent. This difference exists because more land in the Control Area is adapted to crops than in the Area of Development (Table I). In some instances land in the Area of Development that might otherwise be placed in cropland is, of necessity, often used as pasture because of the existence of pump stations, shackle rod lines, and other oil field equipment which interferes with the use of agricultural machinery. Small areas of salt or oil waste may be in such close proximity to each other that it may not be feasible to cultivate the area because of these many small waste spots. Man-made ditches or gullies caused by erosion after the removal of vegetation incidental to oil operations are numerous in the area immediately adjacent to oil and gas development. Many times this necessitates using the land for pasture.

Zone 1 in the Area of Development being particularly subject to oil and gas development, shows a radical departure from the average percentage

Table X. Primary and Secondary Land Use In Percentage of Land In Quarters, By Zones, and Livestock In Number Per Acre of Land In Farms

Zones	Area of Development							Control Area						
	1	2	3	4	5	6	Total	1	2	3	4	5	6	Total
	(Percent)							(Percent)						
Land In Quarters	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Cropland	43.6	63.5	57.9	64.9	62.1	63.4	60.4	58.9	67.4	74.0	64.7	65.4	54.1	65.6
Pasture	51.6	33.2	39.0	32.7	34.4	33.4	36.4	36.5	30.5	24.3	32.4	24.1	44.7	30.4
Farmstead	.9	2.0	1.9	1.6	1.3	1.6	1.6	2.1	1.9	.8	1.8	.7	1.2	1.4
Waste	3.0	1.3	1.3	.9	2.1	1.6	1.6	2.5	.2	.8	1.1	9.8	.0	2.6
Percent of Crop-land In:														
Wheat	68.4	85.6	85.3	77.1	77.1	68.3	78.9	73.7	93.3	89.6	81.6	77.6	83.8	84.5
Oats	17.6	2.6	9.5	11.7	8.6	17.6	9.8	9.9	3.0	6.6	6.5	12.1	2.9	6.9
Alfalfa	3.2	.0	.0	5.6	6.3	5.9	2.9	8.0	.9	.0	4.4	.8	7.2	2.5
Sudan	.0	11.8	1.1	.0	2.0	2.5	3.4	1.3	1.1	.5	2.4	2.0	4.3	1.7
Sorghums ¹	.0	.0	2.7	7.0	.0	2.9	2.3	.0	1.0	3.2	.0	1.2	1.7	1.3
Miscellaneous	10.8	.0	1.4	.6	6.0	2.7	2.7	7.0	.5	.0	5.1	6.3	.0	3.0
	2	Livestock Per Acre of Land In Farm												
Livestock Enterprises		(Number)												
Dairy cattle and calves	.053	.037	.028	.017	.019	.049	.029	.032	.010	.011	.019	.019	.007	.015
Beef cattle and calves	.087	.068	.034	.054	.093	.080	.065	.105	.058	.064	.096	.077	.047	.074
Swine	0	.014	0	.001	0	0	.003	.012	.006	0	.004	.002	.051	.009
Sheep and lambs	0	0	0	.011	.026	.086	.013	.124	.031	0	.011	.042	.057	.031
Workstock	.010	.002	0	.002	.001	.008	.003	0	0	.002	.001	.003	0	.001
Chickens	.817	1.022	.769	.944	.747	1.704	.912	.918	.676	.897	.773	.515	1.045	.733

¹ Miscellaneous crops include all crops grown on the farm for any purpose not listed.

² Livestock shown in this Table are taken as a current inventory.

distribution of cropland and pastureland for the Area of Development. Cropland in Zone 1 of this area occupies only 43.6 percent of the land with pastureland taking 51.6 percent of the land in the zone. Zone 1 is in the center of oil and gas development in the study, and, if the hypothesis is correct, one would expect much land in pasture and less in cropland.

Size of farmsteads vary but little between the Area of Development and Control Area. The Control Area shows more land in waste than the Area of Development which is a departure from what would be expected. The Area of Development shows only 1.6 percent of its land in waste compared to 2.6 percent in the Control Area. This can be explained by examination of Zone 5 of the Control Area which shows that 9.8 percent of its land is in waste. This was caused by gas development on one of the study quarters in Zone 5 of the Control Area. This quarter alone was over half wasteland from slushpits, salt water damage, ditches, lease houses, and oil field supply equipment. This is more typical of the kind of wasteland found in the Area of Development than the Control Area. Zone 1 in the Area of Development, however, shows 3.0 percent land in waste which is much more than the Area average of 1.6 percent but comparable to the average of 2.6 percent for the Control Area as a whole. However, if Zone 5 of the Control Area were omitted from the average, the Control Area would show only .93 percent of its land in waste.

Primary and secondary land use follows a somewhat different pattern in the Area of Development than in the Control Area. Wheat occupies 78.9 percent of the cropland of the Area of Development which is considerably less than the 84.5 percent of the cropland used for wheat production in the Control Area (Table X). This is necessitated in part by the secondary land use or livestock program practiced in the two areas. The Area of Development shows that oats occupy 9.8 percent, alfalfa 2.9 percent, sudan 3.4 percent, sorghums

2.3, and miscellaneous crops 2.7 percent of the cropland or a total of 21.1 percent of the cropland devoted to feed crops. The Control Area devotes less cropland to feed crops with oats occupying 6.9 percent, alfalfa 2.5 percent, Sudan 1.7 percent, sorghums 1.3 percent, and miscellaneous crops 3.0 percent or a total of 15.4 percent of the cropland in feed crops.

The livestock program of the Area of Development differs somewhat from that of the Control Area. Dairy cattle number .029 head per acre of land in farms which is nearly twice as great as the .015 head per acre in the Control Area. The Control Area showed somewhat more beef cattle with .074 head per acre of land in farms, as compared with .065 head per acre in the Area of Development. The Control Area has a much more important sheep program with .031 head per acre compared to .013 head per acre of land in farms in the Area of Development. The dairy enterprise probably is more important in the Area of Development because of its nearness to the Enid Market. There is more land in pasture, and the amount of time available for chores may be greater because farms are smaller in the Area of Development. Oats are an important feed crop in the Area of Development and are an important dairy feed. In the Control Area less cropland is used for production of feed crops and more beef cattle are raised than in the Area of Development. Following an extensive type of farming in the Control Area less time is made available for chore-type livestock production, thus beef cattle production is more important than production of dairy cattle. Poultry is about as important in the Area of Development as in the Control Area. Farm flocks are about the same size in both areas. There seems to be little, if any, relationship between size of farms and size of farm flocks.

Table X shows that primary land use in Zone 1 of the Area of Development differs greatly from that of the area as a whole. Wheat occupies 68.4 percent of cropland in Zone 1 compared to 78.9 percent of the cropland in

wheat for the area as a whole. A high percentage of cropland in the zone is utilized for feed crops. Oats occupy 17.6 percent of the cropland which is much higher than the 9.8 percent in oats for the Area of Development as a whole. There exists a high degree of relationship between primary land use and the livestock program. Table X shows the dairy program to be very important in Zone 1. Dairy cattle average .053 head per acre of land in farms which is much higher than any other zone in the Area and the Area average of .029 head per acre of land in farms. The dairy program is much more important in Zone 1 than in the Control Area, which shows only .015 head of dairy cattle per acre of land in farms. Beef cattle also are important in Zone 1 with .087 head per acre of land in farms compared to .065 head per acre of land in farms for the Area of Development.

Zone 2, near the center of oil and gas development, deviates considerably from what one would expect near the center of development where intensity of production is greatest. One would expect the percentage of land in cropland to be higher as one moved away from the center of development but not to the extent shown in Zone 2. Table X shows Zone 2 to have 63.5 percent of land in cropland which is higher than the average of 60.4 percent for the Area of Development. Wheat in Zone 2 is also unusually high, occupying 85.6 percent of the cropland, this too is considerably higher than the average of 78.9 percent of cropland in wheat on study quarters in the Area of Development. The reasons for these sharp differences lie in the fact that the study quarters in Zone 2 are not typical of study quarters in the Area of Development. Owner operatorship is substantially higher in Zone 2, being 37.5 percent compared to 12.5 percent in Zone 3 (Table II). These owner operated study quarters have been operated by the owners longer than tenant operated quarters in Zone 2. None of the farms had oil development on them. The quality of land

in Zone 2 as measured by assessed value is higher than on any other study quarter in the Area of Development (Table XI). All of these factors tend to cause a more important wheat program than one would expect. Sudan takes up an unusually large amount of cropland occupying 11.8 percent in Zone 2. This high percentage of cropland in sudan is due to one study quarter having an important beef cattle program and the only crop grown on this quarter was sudan. This was not typical of the cropping system on study quarters in the Area of Development or Control Area.

Table XI. Average Assessed Value in Dollars Per Acre of Land In Study Quarters, By Zones

Zone	Area of Development		Control Area	
	Average Assessed Value	Percent of Area	Average Assessed Value	Percent of Area
	(Dollars)	(Percent)	(Dollars)	(Percent)
1	17.11	88	19.36	102
2	20.99	108	18.78	99
3	18.55	95	16.08	85
4	20.79	107	20.21	107
5	19.62	101	20.04	106
6	16.85	87	20.06	106
Area	19.38	100	18.97	100

Zone 3 also deviates from the expected pattern. Wheat occupies 85.3 percent of the cropland in this zone which is much higher than the Area average and higher than the 84.5 percent cropland devoted to wheat in the Control Area as a whole. It is felt that wheat is more important in Zone 3 because of the relatively low percentage of land in cropland, moreover the livestock program is of less importance in Zone 3 than in any other zone in the Area of Development.

Cropland used for production of sorghums in Zone 4 is high but it is not significant, due to the fact that virtually all sorghum production is found on one farm.

Zone 6 of the Area of Development deviates from the expected pattern having less cropland devoted to wheat and more cropland devoted to feed crops. Cropland occupies 63.4 percent of the land in Zone 6, which is more than the average of 60.4 percent for the Area of Development. It also is more than the 54.1 percent of land in cropland in Zone 6 of the Control Area but less than the average of 65.6 percent for the Control Area as a whole (Table X). Cropland used for production of wheat is 68.3 percent in Zone 6 which is the lowest for any zone in the Area of Development and much lower than the 78.9 percent cropland devoted to wheat in the Area of Development as a whole. The cropland in Zone 6 of the Area of Development used for production of wheat is small because livestock is the most important enterprise in the zone. Examination of Table XI will also show that the quality of land in Zone 6 is even lower than the quality of land found in Zone 1. The per acre value of land in Zone 6 is only 87 percent of the Area average per acre value. Oats occupy a very important place in the cropping program taking up 17.6 percent of the cropland and alfalfa 5.9 percent of the cropland. Both these are much higher than the Area average. There is a high degree of relationship between the livestock program and the use made of cropland. Dairy cattle are more important in Zone 6 than any zone other than Zone 1, in the Area of Development. The dairy enterprise is of importance in Zone 6 because the outlying farms on the west side of Zone 6 produce Grade A milk and are near a market in Enid. Beef cattle and sheep are also important in Zone 6 numbering .080 and .086 head per acre of land in farms respectively. Pastureland and the cropland devoted to production of feedstuffs help to make the livestock program

important in Zone 6. Oats and alfalfa are especially good feed crops for dairy cattle and sheep. Sheep are important in Zone 6 because there are several owner operators in the zone who have the facilities for production of sheep. Moreover, the land is relatively free of underbrush and oil field obstructions making it favorable for production of sheep.

Land Use By Tenure

The size of the farm unit varied significantly, by tenure, for the Area of Development. Owner operated farms averaged 249.5 acres per farm while tenant operated farms averaged 391.9 acres each (Table XII). The average number of acres in cropland per farm differed greatly with the owner operated farms having 161.2 acres while tenant operated farms averaged 255.7 acres. This seems to be a significant discrepancy but it is readily shown to be a false picture by examining Table XIII. For the study quarters alone, those that are owner operated show a higher percentage of land in cropland than do tenant operated quarters; 65.7 percent land in cropland for owner operated quarters to 58.3 percent for tenant operated quarters. Very little difference exists, however, in percentage of land in cropland for the total farm unit with tenant operated farms having a slight edge 65.2 percent to 64.6 percent for owner operated farms in the Area of Development.

Owner operated farms in the Area of Development show an average of 82.1 acres of land in pasture to 125.4 acres in pasture per farm on tenant operated farms. On a percentage basis, however, owner operated farm units have 32.9 percent of land in pasture and tenant operated farms 32.0 percent in pasture (Table XIII). The tenant operated study quarters show a higher percentage of land in pasture with 38.5 percent compared to 31.3 percent on owner operated study quarters. Farmsteads and waste take up about the same amount

Table XII. Primary and Secondary Land Use for Total Farm,
By Tenure

	Area of Development				Control Area			
	Owner		Tenant		Owner		Tenant	
	Number : Farms : Reporting	Average : in : Acres	Number : Farms : Reporting	Average : in : Acres	Number : Farms : Reporting	Average : in : Acres	Number : Farms : Reporting	Average : in : Acres
	(Number)	(Acres)	(Number)	(Acres)	(Number)	(Acres)	(Number)	(Acres)
Size of Farm	11	249.5	27	391.9	17	413.7	22	432.6
Acres in Cropland	11	161.2	27	255.7	17	269.2	22	298.8
Acres in Pasture	11	82.1	27	125.4	17	138.2	22	121.8
Acres in Farmstead	11	3.6	27	3.4	17	4.1	22	3.7
Acres in Waste	2	14.5	11	18.0	7	5.4	11	14.8
Acres in Wheat	11	127.8	25	236.7	17	215.2	22	262.5
Acres in Oats	8	27.2	20	29.9	14	21.5	12	38.2
Acres in Alfalfa	4	18.2	3	14.5	11	13.5	6	12.0
Acres in Sudan	2	20.0	5	31.6	2	7.5	8	14.2
Acres in Sorghums	2	7.5	4	25.0	3	24.0	10	13.8
Acres in Miscellaneous	3	7.0	4	21.7	8	20.0	2	17.5
Livestock Enterprises		Number		Number		Number		Number
		Per Farm		Per Farm		Per Farm		Per Farm
Dairy Cattle	10	9.4	25	12.1	12	10.9	20	7.6
Beef Cattle	9	21.0	22	33.7	14	39.5	21	33.8
Swine	1	3.0	3	15.0	4	8.0	4	8.0
Sheep and Lambs	3	43.6	3	20.6	8	54.0	3	70.6
Workstock	5	2.6	9	2.8	3	2.0	6	3.3
Chickens	10	393.5	26	335.9	15	403.3	23	331.7

Table XIII. Land Use By Tenure, By Areas in Percentage of Crops In Cropland and Number of Livestock Per Acre of Land In The Farm Unit

	Area of Development				Control Area			
	Owner		Tenant		Owner		Tenant	
	Study	Total	Study	Total	Study	Total	Study	Total
	Quarter	Farm	Quarter	Farm	Quarter	Farm	Quarter	Farm
	(Percent)				(Percent)			
Total Land	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Cropland	65.7	64.6	58.3	65.2	63.6	65.1	67.1	68.8
Pasture	31.3	32.9	38.5	32.0	33.8	33.4	27.9	28.5
Farmstead	2.2	1.5	1.4	.9	1.7	1.0	1.1	.9
Waste	.8	1.0	1.9	1.9	.9	.5	3.9	1.8
Percent Cropland in:								
Wheat	74.5	79.3	79.7	85.7	80.9	84.3	89.1	87.8
Oats	13.4	12.3	8.2	8.7	8.3	6.5	6.0	6.7
Alfalfa	6.3	4.1	1.5	.6	4.2	3.4	1.4	1.2
Sudan	4.3	2.3	3.0	1.5	.9	.3	2.3	2.2
Sorghums	.4	1.2	1.5	1.4	1.7	2.4	1.0	1.8
Miscellaneous Crops	.9	.8	6.2	2.1	3.9	3.1	.2	.2
	Number of Livestock Per Acre of Land In Farms							
Livestock Enterprises								
Dairy Cattle		.034		.028		.021		.013
Beef Cattle		.069		.070		.082		.066
Swine		.001		.004		.023		.002
Sheep		.048		.006		.054		.022
Workstock		.005		.002		.000		.002
Chickens		1.435		.786		.868		.760

of land on owner operated farms and quarters as they do on the farms and quarters that are tenant operated (Tables XII and XIII).

Owner operated farms in the Area of Development averaged 127.8 acres of cropland in wheat while tenant operated farms averaged 236.7 acres. This difference is shown to be significant upon examination of Table XIII. On owner operated farm units 79.3 percent of the cropland was in wheat compared to 85.7 percent of the cropland on tenant operated farms. The difference was not so great by study quarters with owner operated quarters having 74.5 percent of cropland in wheat and tenant operated quarters showed 79.7 percent cropland in wheat.

Feedstuffs in the Area of Development differed somewhat between owners and tenants with most of the feedstuffs being grown by owner operators. This was true not only of the study quarters but of the whole farm unit as well. Secondary land use followed the same pattern with more livestock of all types being found on owner operated farms than those farms operated by tenants.

The livestock program seems to be of more importance on owner operated farms than on tenant operated farms in the Area of Development. The proportion of cropland being used on owner operated farms to grow feedstuffs is 15.7 percent as compared to 12.1 percent on tenant operated farms. Tenant operated farms have .070 head of beef cattle, .028 dairy cattle, and .006 head of sheep per acre of land in farms. This is a total of .104 head of livestock per acre of land in farms. Owner operators show .069 head of beef cattle, .034 dairy cattle, and .048 head of sheep per acre of land in farms. This is a total of .151 head of livestock per acre of land in farms. It is felt that owner operators could afford to utilize cropland for feedstuffs, livestock being the result, better than tenants who were forced to use most of their cropland for a cash crop.

The size of farms is much greater in the Control Area than in the Area of Development but there is less difference in the size of owner operated and tenant operated farms in the Control Area than in the Area of Development. Owner operated farms average 413.7 acres and tenant farms 432.6 acres in the Control Area (Table XII). The small difference in size of owner and tenant operated farms in the Control Area is due in part to many of the tenants being owner additional, which seems to indicate that the difference in amount of land that owners and tenants can operate most efficiently does not vary greatly. Also, the number of owners and tenants is more nearly the same in the Control Area. An extensive type of farming is practiced in the Control Area with emphasis on crop production and a tenant is better able to compete with owners for land than if an intensive type of agriculture predominated where much capital outlay and hand work are necessary.

Owners average 269.2 acres per farm compared to 298.8 acres on tenant farms in the Control Area (Table XII). This difference is shown by Table XIII not to be significant with total farm unit of owner operated farms having 65.1 percent in cropland compared to 68.8 percent in cropland on tenant farms. Nearly the same difference exists for the study quarters with owner operated quarters showing 63.6 percent in cropland and tenant quarters 67.1 percent in cropland.

There is more pastureland in the Control Area per farm for owner operated farms. This is readily evident upon inspection of Table XIII, which shows 33.4 percent in pastureland as compared to 28.5 percent of the land in pasture on tenant farms. The study quarters show the same relationship with quarters operated by owners having 33.8 percent in pastureland compared with 27.9 percent for tenant operated quarters.

Owner operated quarters and farms in the Control Area have a somewhat larger farmstead and less land in waste than tenant operated quarters and farms in the same Area (Tables XII and XIII). It is felt that the underlying reason for this is that owners put up more improvements and thus need more land for farmsteads. Owners also tend to put forth more effort than a tenant to utilize land that would otherwise be classified as waste.

In the Control Area the average number of acres of cropland in wheat and the percentage of cropland in wheat can be seen to differ somewhat upon examination of Tables XII and XIII. Owner operated farms show 84.3 percent of their cropland in wheat with 87.8 percent of the cropland in wheat on tenant operated farms. The study quarters alone show a greater difference with owner operated quarters having 80.9 percent of the cropland in wheat as compared to 89.1 percent on tenant operated quarters. The remainder of cropland was taken up by feedstuffs with oats being the dominant crop. The tenant farm unit as a whole showed a slight difference of 6.7 percent of its cropland in oats compared to 6.5 percent for owner operated farms. The owner operated quarters, however, showed 8.3 percent in oats while tenants only had 6.0 percent of their cropland in oats.

Tenant operated farms in the Control Area showed more cropland in feedstuffs in only two instances. This, tied in with the fact that owner operated farms had 33.4 percent of their land in pasture and tenant operated farms had only 28.5 percent in pasture, would lead one to believe that livestock in the Control Area play an important part in owners' cropping systems. Owner operators had .082 head of beef cattle, .021 head of dairy cattle, and .054 head of sheep per acre of land in farms. Tenant livestock program show .066 head of sheep per acre of land in farms. The poultry industry seems to be more pronounced on owner operated farms.

Average size of owner operated farms in the Area of Development is 249.5 acres compared with 413.7 acres in owner operated farms in the Control Area (Table XII). Percentage of land in cropland did not differ substantially between owners in the Area of Development and owners in the Control Area. Percentage of land in pasture did not differ greatly between owners in both areas.

The proportion of cropland devoted to wheat differs substantially between areas. Owner operators in the Area of Development devote less cropland to wheat than owners in the Control Area. This may be partially due to the type of farming predominantly practiced in the two areas. Cropland used in production of feed crops is significantly higher on owner operated farms in the Area of Development than on owner operated farms in the Control Area. Partial explanation for cropland in feed crops in the Area of Development can be seen by examination of the livestock program (Tables XII and XIII).

Most phases of the livestock program do not differ greatly between owner operators in the Area of Development and Control Area. However, dairy cattle are far more important on owner operated farms in the Area of Development than on owner operated farms in the Control Area (Table XIII). This is evidenced by the emphasis put on the growing of oats and alfalfa. The proximity to market of owners in the Area of Development probably is also a factor in the emphasis placed on dairy production. For the other important livestock enterprises, beef cattle and sheep, owner operators in the Control Area have a slight edge in numbers.

The size of tenant operated farms in the Area of Development is 391.9 acres which is slightly less than the 432.6 acres in tenant operated farms in the Control Area. Percentage of land in cropland is also greater in the Control Area for tenant operated farms than on tenant operated farms in the

Area of Development but not significantly greater (Tables XII and XIII).

Tenant operated farms in the Area of Development show slightly more land in pasture than is shown for tenant operated farms in the Control Area. This area in pastureland is partially due to the existence of shackle rod lines and other oil field obstructions which make it necessary to use the land for pasture.

Percentage of cropland in wheat does not differ greatly for tenant farmers in the Area of Development and Control Area, though somewhat greater in the Control Area. Table XIII also shows that percentage of cropland devoted to wheat is significantly higher for tenant operated study quarters in the Control Area than for tenant operated study quarters in the Area of Development. The negligible difference in percentage of cropland in wheat for the total farm unit probably exists because tenants in the Area of Development operating the study quarters also operate additional land that has a high percentage of cropland available for wheat. Feed crops on tenant operated farms in the Area of Development occupy more cropland than feed crops on tenant farms in the Control Area (Table XIII).

The livestock program is of more importance in the Area of Development than the Control Area. Tables XII and XIII show little difference in the beef cattle program of tenants in the Control Area and tenants in the Area of Development. However, tenants in the Area of Development, practicing a more intensive type of agriculture, have substantially more dairy cattle and sheep than tenants in the Control Area.

Organization

This section is an attempt to show the organization of each study quarter and farm in the Area of Development and Control Area. It is an effort to determine the differences, and the causes of these differences, that exist between different types of farm within and between the Area of Development and Control Area. An effort is also made to determine what the major production enterprise is for each type of farm. In order to do this, it was necessary to classify the farms as to their major source of income.

The major sources of income of farmers in the study area from operation of their farms is either from sale of grain or sale of livestock and livestock products. Farms receiving 40.0 percent or more of their gross income from sale of grain were classified as cash grain farms. Farms receiving 40.0 percent or more of their gross income from sale of livestock products were classified as livestock farms. In some cases grain and livestock each contributed 40 percent or more to the farm income. In such cases, the farms were classified according to the source from which the greatest proportion of income came.

Size of owner operated cash grain farms in the Area of Development is not appreciably greater than owner operated livestock farms in the Area of Development (Table XIV). Land in cropland, however, is significantly higher, 70.1 percent, for owner operated cash grain farms than for owner operated livestock farms which have only 54.3 percent of their land in cropland. This leaves more land for pasture on owner operated livestock farms than on owner operated cash grain farms.

Both types have about the same percentage of cropland in wheat. However, contrary to what might be expected, cash grain farms show 5.3 percent of their cropland in alfalfa compared to 1.1 percent devoted to alfalfa on owner

operated livestock farms. This might indicate that owner operated cash grain farms in the Area of Development sell some alfalfa. Owner operated livestock farms grow more feed crops than do owner operated cash grain farms in the Area. The livestock program is reflected in the amount of cropland used to grow feedstuffs (Table XIV). Livestock production is an important enterprise on both types of farms but is more important on owner operated livestock farms, in relation to the amount of land in cropland and the amount of that cropland devoted to production of wheat, than on owner operated cash grain farms in the Area of Development.

The average size of tenant operated cash grain farms in the Area of Development is much larger, 483.3 acres, than tenant operated livestock farms, 307.1 acres, in the Area of Development (Table XIV). Tenant operated cash grain farms and study quarters are significantly higher in percentage of land in cropland than tenant operated livestock farms in the Area of Development. Tenant operated cash grain farms devote a much higher percentage of their cropland to wheat than tenant operated livestock farms. A considerable proportion of the cropland is used to grow feed crops on tenant operated livestock farms. Tenant operated livestock farms show more livestock of all types per acre of land in farms than do tenant operated cash grain farms.

In the Control Area owner operated cash grain farms are smaller, 399.9 acres, than owner operated livestock farms, 458.5 acres. However, owner operated cash grain farms and owner operated livestock farms show more difference in size than farms of the same type in the Area of Development (Table XIV). Both types of farms are much smaller in the Area of Development than in the Control Area.

Owner operated cash grain farms in the Control Area have slightly more of their cropland, 85.1 percent, in wheat than owner operated livestock farms

which have 81.9 percent of their cropland in wheat. Livestock farms have a slight edge in percentage of cropland in feedstuffs and somewhat more land in pasture (Table XIV).

Tenant operated cash grain farms in the Control Area are about the same size as tenant operated cash grain farms in the Area of Development but are much larger (471.6 acres) than tenant operated livestock farms (215.0 acres) in the Control Area. The difference in size is greater between tenant operated cash grain farms and tenant operated livestock farms in the Control Area than in the Area of Development. This may be due to a more extensive type of farming in the Control Area, especially on cash grain farms (Table XIV). Percentage of land in cropland does not differ greatly between tenant operated cash grain and livestock farms in the Control Area, however, the percentage of cropland in wheat is much higher for tenant operated cash grain farms than for the smaller tenant operated livestock farms.

Dairy and beef cattle numbers are greater on tenant operated livestock farms in the Control Area than on any other type of farm in the area. This is a result of a few large tenant operators who emphasize production of dairy and beef cattle. Beef cattle production is the only phase of livestock production of importance on tenant operated cash grain farms in the Control Area.

The size of owner operated cash grain farms in the Area of Development is significantly smaller than tenant operated cash grain farms in the Area of Development. This may result from less extensive operations on owner operated than on tenant operated farms in the area. The percentage of land in cropland and in pasture varies only .2 percent between the tenant and owner operators in the Area of Development (Table XIV). However, the percentage of cropland in wheat varies significantly with tenant operated cash grain farms

devoting much more cropland to wheat, 90.2 percent, than did owner operated cash grain farms with 79.6 percent in wheat.

Owner operated cash grain farms show more of their cropland in feedstuffs than tenant operated cash grain farms in the Area of Development. The importance of livestock in the farm organization has a significant relationship to the cropland used for growing feed crops. Livestock, especially dairy cattle, are of more importance on owner operated cash grain farms than on tenant operated cash grain farms in the Area of Development. The livestock program, however, is not of more importance than growing grain for marketing as a major source of income. The livestock program on owner operated cash grain farms is not as important as it is on either owner or tenant operated livestock farms in the Area of Development.

Owner operated livestock farms in the Area of Development average 240.0 acres per farm which is considerably less than the 307.1 acres per farm for tenant operated livestock farms in the Area of Development (Table XIV). Tenant operated livestock farms have a slightly higher percentage of land in cropland though it is low for both owner and tenant operated livestock farms in the Area of Development. This leaves a high percentage of pastureland for both farms (Table XIV).

The percentage of cropland in wheat differs but little with owner operated livestock farms devoting 78.7 percent cropland to wheat, while tenant operated livestock farms used 77.8 percent of their cropland for wheat. The remainder of the cropland on both farms was used for growing feedstuffs. The livestock program differed very little with tenant operated farms showing slightly more livestock per acre of land in farms than did owner operators. This is perhaps due to the increased size of tenant operated farms which could support more livestock.

In the Control Area cash grain owner operated farms average 399.9 acres per farm. Tenant operated cash grain farms in the Control Area are substantially larger, averaging 471.6 acres per farm. Owner operated cash grain farms have 66.8 percent of their land in cropland and 31.5 percent in pastureland. Tenant operators have slightly more cropland, 68.6 percent and less pastureland, 28.7 percent (Tables XIII and XIV).

The larger tenant operated cash grain farms have substantially more of their cropland in wheat than owner operated cash grain farms. Substantially higher percentage of cropland is used for feedstuffs on owner operated cash grain farms. Owner operated cash grain farms also lead in numbers of livestock per acre of land in farms. Production of beef cattle is the most important livestock enterprise on either farm but it is of less importance than on owner or tenant operated livestock farms in the Control Area.

Owner operated livestock farms in the Control Area average 458.5 acres. This is much larger than tenant operated livestock farms which average only 215.0 acres. This discrepancy may be due to sampling errors. The percentage of land in cropland is substantially higher for tenant operated livestock farms than for owner operated livestock farms.

Significantly less cropland is devoted to growing wheat on owner operated livestock farms than on tenant operated livestock farms. This may be due in part to the need for cash income and lower tenure security. Owner operated livestock farms do, however, devote a substantial part of their cropland to feedstuffs. Dairy and beef cattle are significantly higher in numbers per acre of land on tenant operated livestock farms than on owner operated livestock farms.

Owner operated cash grain farms in the Area of Development average 255.0 acres. Owner operated cash grain farms in the Control Area are much larger

averaging 399.9 acres. The smaller owner operated cash grain farms in the Area of Development have a slightly higher percentage of land in cropland, 70.1 percent, than owner cash grain farms in the Control Area which have 66.8 percent of their land in cropland (Table XIV).

Cropland used for wheat takes up 85.1 percent of all cropland on the larger owner operated cash grain farms in the Control Area. Wheat occupies only 79.6 percent of the cropland on owner operated cash grain farms in the Area of Development. This difference can be attributed to a more intensive livestock program in the Area of Development. A high degree of relationship can be seen to exist between feed crops grown and the emphasis placed on production of livestock. Livestock production is less important than wheat production on owner operated cash grain farms in the Area of Development but it is more important than the livestock production on owner operated cash grain farms in the Control Area (Table XIV). The difference may be accounted for in terms of more time available for work with livestock. The extreme difference in dairy cattle numbers may be partially due to proximity to the Enid market.

Examination of Table XIV will show owner operated livestock farms in the Area of Development to average 240.0 acres per farm. This is only a little larger than owner operated livestock farms in the Control Area, which average 215.0 acres per farm. Owner operated livestock farms have a higher percentage of land in cropland, 70.1 percent and lower percentage of pastureland, 27.1 percent than owner operated livestock farms in the Area of Development. Owner operated livestock farms in the Area of Development have only 54.3 percent of land in cropland and 44.2 percent in pastureland. Much land in the Area of Development is used for pastureland because of waste spots, shackle rod lines, and other oil field obstructions that render it unsuitable for use

as cropland. A higher percentage of cropland is used for growing wheat in the Area of Development than in the Control Area; however, the percentage is low in both cases. Both owner operated livestock farms in the Area of Development and owner operated livestock farms in the Control Area have much of their cropland in feed crops. Owner operated livestock farms in the Control Area show a higher percentage of cropland in feed crops than owner operated livestock farms in the Area of Development (Table XIV).

The livestock program as reflected by number of livestock per acre of land in farms is not as important in the Area of Development on owner operated livestock farms, though it is definitely the major enterprise, as it is on owner operated livestock farms in the Control Area.

Tenant operated cash grain farms in the Area of Development average 483.3 acres per farm which is only slightly larger than the average of 471.6 acres per farm for tenant operated cash grain farms in the Control Area. This would indicate that tenant operated cash grain farms are approaching their optimum size for operating efficiency. Tenant cash grain farms in the Area of Development have a slightly higher percentage of land in cropland, 70.1 percent, than tenant cash grain farms in the Control Area, which show 68.6 percent land in cropland (Table XIV).

Tenant operated cash grain farms in the Area of Development show a very high percent, 90.2, cropland in wheat. In the Control Area tenant operated cash grain farms also show a high percentage, 90.4 percent, cropland in wheat. The amount of cropland used for growing feed crops is almost the same in both areas on tenant operated cash grain farms. Livestock numbers are low on tenant operated cash grain farms.

Tenant operated livestock farms in the Area of Development average 307.1 acres. Tenant operated livestock farms in the Control Area are smaller

averaging only 215.0 acres. The percentage of land in cropland on tenant livestock farms in the Area of Development is much less than on tenant operated livestock farms in the Control Area (Table XIV). This difference may be partially due to the presence of oil field obstructions that cause more land to be utilized as pasture in the Area of Development than in the Control Area.

The larger tenant operated livestock farms in the Area of Development with less land in cropland show more of that cropland in wheat than do tenant operated livestock farms in the Control Area. Tenant operated livestock farms in the Control Area being considerably smaller must have a considerable proportion of their cropland in feed crops to support the livestock program. With percentage of land in pasture very high and much cropland used for growing feed crops on tenant operated livestock farms in the Area of Development, an important program of livestock production is to be expected. Tenant operated livestock farms in the Control Area have more livestock numbers per acre of land in farms than tenant operated livestock farms in the Area of Development. This may be accounted for by the presence in the Control Area of two tenant livestock farmers who have larger dairy and beef cattle herds.

Summary

Primary and secondary land use differs between the Area of Development and Control Area. The Area of Development has more land in pastureland and less land in cropland than the Control Area. More cropland is used for growing wheat in the Control Area than in the Area of Development. More cropland is used for production of feed crops in the Area of Development than in the Control Area. The Control Area leads slightly in total livestock production but the Area of Development leads in production of dairy cattle.

Starting at the center of the Area of Development one would expect, if the hypothesis being tested were true, the zonal pattern of primary and secondary land use to take the form of a low percentage of land in cropland, a high percentage of land in pasture, a low percentage of cropland in wheat, a high percentage of cropland in feed crops, and large numbers of livestock per acre of land in farms. As one leaves the center of development and approaches the periphery of the field where the effect of oil and gas development should be less intense one would expect to see, assuming uniform quality of land, the percentage of land in cropland rise, percentage of land in pasture lower, a higher percentage of cropland in wheat, less cropland in feed crops, less dairy cattle per acre of land in farms. The zonal pattern of the Area of Development follows this trend with some deviations. Zone 2, in the Area of Development, is not typical of that pattern. Zone 2 has a very high percentage of land in cropland and a very high percentage of that cropland in wheat. This is due to a high degree of owner operatorship in the zone, length of ownership, and lack of development of oil and gas in some of the study quarters within the zone, and unusually high quality of land. Livestock numbers were somewhat lower than in Zone 1. Zone 6, at the extreme edge of the field of development, also deviates from the pattern with the lowest percentage of cropland in wheat for the entire Area of Development and much cropland in feed crops. This is due partially to the livestock program on the smaller number of study quarters in Zone 6, and the low quality of land in these quarters. The number of dairy cattle is high because of some Grade A milk producers in Zone 6 who are near the Enid milk market.

Within the Area of Development owner operated farms are smaller than tenant operated farms. Tenant farms grow more wheat than owner operated farms. Tenants seem to rely mostly upon a cash grain crop, while owners

grow about the same amount of wheat and have an important livestock program as well. Owners have a more important dairy program in the Area of Development than tenants.

The same conditions prevailed in the Control Area as tenant operated farms were larger than owner operated farms. However, less difference existed in size than existed between tenant and owner operated farms in the Area of Development. The small difference in size of farms in the Control Area is due to the uniformity in the type of farming. The amount of land in this area that can be operated efficiently does not seem to vary much for owners and tenants. Tenant operated farms show a higher, though not significantly higher, percentage of cropland in wheat in the Control Area. Cropland used to grow feed crops is about the same for owners and tenants. Owner operators in the Control Area have an important livestock program but still place major emphasis upon wheat production.

Owner operated farms in the Area of Development are significantly smaller than owner operated farms in the Control Area. Cropland in wheat is substantially more important in the Control Area than in the Area of Development. More dairy cattle are raised on owner operated farms in the Area of Development than on owner operated farms in the Control Area. More beef cattle, though not significantly more, are raised by owner operators in the Control Area than in the Area of Development.

Tenant operated farms in the Control Area are somewhat larger than tenant operated farms in the Area of Development. A higher percentage of land is used for cropland in the Control Area than in the Area of Development. The Control Area leads, but not significantly, in percentage of cropland used for production of wheat. Cropland used for production of feed crops differs but little with the Area of Development having a lightly higher percentage

of cropland in feed crops. Very little difference exists in numbers of livestock per acre of land in farms between tenant operated farms in the Area of Development and Control Area. The dairy cattle enterprise is of much more financial importance in the Area of Development than in the Control Area.

Differences exist in enterprise emphasis due to organization between types of farm within the Area of Development and Control Area. Owner operated cash grain farms in the Area of Development are smaller, have a higher percentage of land in cropland, uses less cropland for growing wheat, and have a higher percentage of cropland in feed crops than owner operated cash grain farms in the Control Area. Owner operated cash grain farms in the Control Area have a very important wheat production program but raise few livestock. Owner operated cash grain farms in the Area of Development have a very important livestock program and are a little larger than owner operated livestock farms in the Area of Development and show a higher percentage of land in cropland. Owner operated cash grain farms, however, have only slightly more cropland in wheat, almost as much cropland in feed crops, have a higher ratio of livestock per acre of land in farms than do owner operated livestock farms in the Area of Development. Owner operated cash grain farms in the Area of Development are much smaller than tenant operated cash grain farms in that area but have considerably less cropland in wheat than do tenant operated cash grain farms. The livestock program is not as important on tenant operated as on owner operated cash grain farms in the Area of Development. Owner operated cash grain farms in the Control Area are somewhat smaller than owner operated livestock farms in the Control Area. They have substantially more land in cropland; devote more cropland to wheat. Owner operated cash grain farms are substantially smaller than tenant operated cash grain farms in the Control Area. These farms show less cropland in

wheat, more for growing feed, and a more important program of livestock production than tenant operated cash grain farms in the Area of Development.

Owner operated livestock farms in the Area of Development are significantly smaller than owner operated livestock farms in the Control Area and have less land in cropland. Owner operated livestock farms in the Area of Development have less cropland in wheat and more cropland in feed crops as well as more livestock per acre of land in farms than owner operated livestock farms in the Control Area. Owner operated livestock farms in the Area of Development are considerably smaller than tenant operated livestock farms in this Area. Owner and tenant operated livestock farms follow very similar farming practices with wheat relatively unimportant on both but with tenant operated livestock farms having more livestock per acre of land in farms. Owner operated livestock farms in the Control Area are much larger than tenant operated livestock farms in the Control Area, have considerably less land in cropland but use much more of that cropland for production of wheat. Tenant operated livestock farms are significantly higher in numbers of livestock per acre of land in farms and use much of their cropland to grow feed crops.

In the Area of Development, tenant operated cash grain farms are slightly larger than tenant operated cash grain farms in the Control Area. The percentage of cropland in wheat is about the same in both areas. Tenant operated cash grain farms in the Area of Development have a more important livestock program, however, than do tenant operated livestock farms in the Control Area. This is the most significant variation between the Areas. Tenant operated cash grain farms in the Area of Development are significantly larger than tenant operated livestock farms in the area.

Tenant operated livestock farms in the Area of Development are much larger and have much more land in cropland than tenant operated livestock farms

farms in the Control Area. Tenant operated livestock farms in the Area of Development have more cropland in wheat and less cropland in feed crops than tenant operated livestock farms in the Control Area.

In the light of the foregoing, it appears that primary and secondary land use differs between the Area of Development and Control Area. More land is used for the production of cash grain crops in the Control Area than in the Area of Development. Farming becomes more extensive as one leaves the center of the Area of Development and approaches the periphery of the area. In the Area of Development land is utilized more intensively for livestock production with greater emphasis upon dairy production than that found in the Control Area. In the latter one finds extensive farming with emphasis upon grain production and beef cattle.

A study of tenure shows that tenants operate larger farms and tend to depend more upon a single cash grain crop than upon production of livestock. However, in the Area of Development tenant operated farms have a livestock program nearly as intensive as that found on owner operated farms in the same area and of significantly greater intensity than that found on tenant operated farms in the Control Area.

Organization shows that the prevailing type of farming differs between the Area of Development and Control Area. There were fewer cash grain farms in the Area of Development and these stressed livestock production much more than the livestock farms in the Control Area who have an important wheat program. Livestock farms in the Area of Development placed greater emphasis upon intensive livestock production, especially dairy, and less emphasis upon wheat production than did livestock farms in the Control Area.

There are more tenant operated farms in the Area of Development and of these farms a significantly larger proportion were livestock farms than in

the Control Area. There is little difference in the organization of owner operated cash grain farms and owner operated livestock farms in the Area of Development but rather wide differences in their organization in the Control Area. There were evidences of difference between tenant operated cash grain farms and tenant operated livestock farms in the Area of Development.

It appears therefore that one can form the following conclusions. First, in the Area of Development farms are smaller in size, have an important livestock program, and have a less important wheat production program. This is contrary to the normal pattern, which presumes an intensification of cash cropping when size diminishes. Second, in the Area of Development tenants have nearly as many units of livestock per acre of land in farms as do owners. This also is contrary to the normal pattern. Third, in the Area of Development there is a narrow difference in primary and secondary land use when viewed from the standpoint of tenure and organization as contrasted to the wider range of differences expected and as evidenced in the Control Area.

Therefore, having attempted to eliminate the effects of tenure and type of farming organization, it would appear that the presence of oil and gas development tends to shift the enterprise emphasis in farming from extensive cash cropping to intensive livestock, i. e., dairy farming.

CHAPTER IV. INCOME

The third and final hypothesis to be tested states that, oil and gas development tends to enhance income (agricultural and non-agricultural) of farmers in an area of oil and gas development. The sources, differences, and causes of these differences between agricultural and non-agricultural income are presented in this chapter by type of farm and by tenure. This is done in an effort to show the relationship between oil and gas development and income and why such relationship exists.

Income for the farms in this study was calculated on the basis of the gross production on the farm. All out-of-pocket cash operating expenses were determined by interview with the operator. Work exchanged with neighbors or work done by members of the family was not counted as an expense of operation. Proper allowances and deductions were made for payment of government subsidies and for grain used on the farm as feed and seed. Information concerning government subsidies was obtained at the office of the County Agricultural Adjustment Administrator. Amount and weights of livestock sold was determined by interviewing each farmer in the study and taking an average of the weights of different type of livestock sold by that farmer during the year. A list of all commodities bought and sold by farmers in the study area and the prices paid and received for these products is presented in the Appendix as Exhibit C. All prices are an average for these products for Oklahoma for the year of 1945 as reported by the United States Department of Agriculture, Bureau of Agricultural Economics, Agricultural Prices, unless otherwise indicated on the list. Share rent was deducted from gross physical production prior to calculation of net income.

Agricultural Income

Agricultural income per acre was lower in the Area of Development (\$10.38) than in the Control Area (\$11.83) (Table XV). This may be partially explained by the greater number of tenant operated farms in the Area of Development.

Livestock farms in the Area of Development have higher per acre income than cash grain farms. This was true also in the Control Area. The income per acre was higher for both cash grain and livestock farms in the Control Area, with significantly higher returns on cash grain farms in the Control Area, as contrasted with cash grain farms in the Area of Development. This may be partially explained by the fact that cash grain farms in the Control Area are substantially larger than cash grain farms in the Area of Development (Table XIV). The per acre income of livestock farms in the two areas was larger than on cash grain farms but less difference between them existed in the Control Area than in the Area of Development. Here again, size of farms may have been a factor and the presence of dairy cattle may have increased the income per acre on the smaller farms in the Area of Development. Owner operators in both the Area of Development and the Control Area have a higher per acre income than tenants (allowing \$4.00 an acre rent on owner operated farms as an opportunity cost). This difference is partially due to the livestock program of owners. Owner operators in the Control Area have slightly higher per acre income than owners in the Area of Development. This would cause one to believe that the larger size of farms in the Control Area was offset somewhat by the livestock program of owners in the Area of Development. Tenant operators have very little difference in per acre income between the two areas.

Table XV. Net Agricultural Income Per Farm and
Per Acre, By Type and Tenure

	: Number :	:	Total Net :	Per :	Per :
	Farms :	Acres :	Income :	Farm :	Acre :
	(Number)	(Acres)	(Dollars)	(Dollars)	(Dollars)
<u>Area of Development</u>					
Cash grain farms	22	9,121	88,481.83	4,021.90	9.70 ¹ (8.92)
Livestock farms	18	5,260	60,731.56	3,373.97	11.54 ¹ (10.82)
Owner operators	11	2,745	40,881.28	3,716.48	14.89 ¹ (10.89)
Tenants	29	11,636	108,332.07	3,735.59	9.31
Area	40	14,381	149,213.35	3,730.33	10.38 ¹ (9.61)
<u>Control Area</u>					
Cash grain farms	32	14,780	172,473.53	5,389.79	11.67 ¹ (10.26)
Livestock farms	8	2,694	33,982.27	4,247.78	12.61 ¹ (9.89)
Owner operators	17	7,033	105,138.59	6,185.21	14.95 ¹ (10.95)
Tenants	23	10,441	101,307.21	4,404.66	9.70
Area	40	17,474	206,455.80	5,161.39	11.83 ¹ (10.21)

¹ Allowing \$4.00 per acre rent on owner operated farms.

The per acre difference in value of products realized as usable income between owners and tenants can best be shown on a capitalized basis. Table XIV shows a high degree of similarity between owner operated cash grain farms and tenant operated cash grain farms in the Control Area. Table XVI shows the difference in net agricultural income per acre between owner and tenant operated cash grain farms in the Control Area to be \$3.71 in favor of owners. This figure capitalized at 5 percent will give a per acre value of land to be \$74.20. The net agricultural income per acre between owner operated and tenant operated cash grain farms in the Area of Development is \$4.56 greater for owners, which capitalized at 5 percent gives a per acre land value of \$91.20. Relating these approximations to actual observation in the study area, it is evident that this range is indicative of the value of land in the study area with \$80.00 per acre a fair average land value for all farms. This value would give a rental of \$4.00 per acre. Therefore, it will be presumed that the elimination of rent from owner operator income would reduce these per acre income figures by roughly \$4.00

Owner operated cash grain farms have \$13.37 per acre income which is significantly higher than \$8.81 per acre on tenant operated cash grain farms in the Area of Development (Table XIV). Making allowance for rent, this difference can be explained by the importance of the livestock program of owners. However, owner operated cash grain farms in the Control Area have higher per acre income than owners in the Area of Development due partially to their size (Table XIV). Size of farm, again, is the cause of tenant cash grain farms in the Control Area having a higher per acre income than tenant cash grain farms in the Area of Development. Owner operated livestock farms in the Area of Development have significantly higher per acre income than tenant operated livestock farms in the area. This is partially due to owners

Table XVI. Agricultural Income

	: : Number : : Farms :	: : Acres :	: : Crop : : Income :	: : Livestock : : Income 1 :	: : Total : : Agricultural : : Income :	: : Total : : Expense :	: : Net : : Agricultural : : Income :	: : Net Agricultural : : Income : : Per Acre :
	(Number)	(Acres)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)
<u>Area of Development</u>								
Cash Grain Farms								
Owner Operators	7	1,785	20,326.93	9,066.59	29,393.52	5,517.29	23,876.37	13.37 ² (9.37)
Tenant Operators	15	7,536	63,154.40	23,161.07	84,378.37	24,721.17	64,608.46	8.81
Livestock Farms								
Owner Operators	4	960	5,739.90	14,973.11	20,713.01	3,708.10	17,004.91	17.71 ² (13.91)
Tenant Operators	14	4,300	18,745.73	42,621.20	61,366.89	17,640.24	43,726.65	10.17
Area Total	40	14,381	107,966.96	89,821.97	195,851.79	51,586.80	149,216.39	10.38 ² (9.61)
<u>Control Area</u>								
Cash Grain Farms								
Owner Operators	13	5,199	56,469.57	28,453.20	84,922.77	11,738.16	73,184.61	14.07 ² (10.07)
Tenant Operators	19	9,581	83,146.23	43,676.24	126,822.24	27,533.55	99,288.92	10.36
Livestock Farms								
Owner Operators	4	1,834	10,036.83	20,649.89	30,686.72	4,801.74	25,884.98	14.11 ² (10.11)
Tenant Operators	4	860	3,796.92	7,092.52	10,889.44	2,471.15	8,418.29	9.79
Area Total	40	17,474	153,449.55	99,871.85	253,321.40	46,544.60	106,776.80	11.83 ² (10.21)

¹ Includes livestock products.

² Allowing \$4.00 per acre rent on owner operated farms.

having more dairy cattle and more efficient use being made of them in terms of production of Grade A milk instead of cream. Also, owner livestock farms in the Area of Development have significantly higher per acre income than tenant livestock farms in the Control Area. This difference in per acre income is due also to a high concentration of dairy cattle on owner operated farms and sale of whole milk and rental payment by tenants. Owner operated livestock farms in the Area of Development also have significantly higher per acre net income than owner operated livestock farms in the Control Area. This is due to emphasis placed upon growing livestock in the Area of Development and the fact that wheat has an important place on livestock farms in the Control Area. However, tenant operated livestock farms in the Area of Development have only slightly higher per acre income than tenant livestock farms in the Control Area because of similarity of organization.

Non-Agricultural Income

Income attributable to oil and gas development is less important in the Control Area than in the Area of Development (Table XVII). In the Area of Development 5.4 percent of the total non-agricultural income is attributable to income from bonus and lease rent, and 44.8 percent is attributable to oil field work. In the Control Area 38.9 percent of the total non-agricultural income can be attributed to bonus and lease rent, but there was no income from oil field work. However, only 9 of the 40 farms in the Area of Development report income from work in the oil field and two of the men operating these farms work full time as well as farm. This is 9 out of 80 in the entire area that have income from work in the oil field. Income from work in the oil field is important in relation to total non-agricultural income in the Area of Development. However, when averaged for all farms in the area its relationships to total income is unimportant and does not affect total income

Table XVII. Non-Agricultural Income

	: Number : Farms In: : Group	: Number : Farms : : Reporting:	: Acres : In Farms: : Reporting:	: Lease : Bonus :	: Rental : :	: Royalty: : Rights :	: Total Income: : From Mineral: : Rights :	: Work : In Oil : Field	: Total Income : : Attributable To: : Oil Development:	: Other	: Total : Non-Agricultural: : Income	: Non- : Agricultural : Income Per Acre
	(Number)	(Number)	(Acres)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)
<u>Area of Development</u>												
Cash Grain Farms:	22	9										
Owner Operators	7	2	477	514.00	157.00	0	471.00	0	471.00	2,400.00	2,871.00	6.02
Number of Farms Reporting			2	1	1		1		1	1	2	
Tenant Operators	15	7	2,302	0	0	0	0	1,700.00	1,700.00	850.00	2,550.00	1.10
Number of Farms Reporting			7					5	5	2	7	
Livestock Farms:	18	8										
Owner Operators	4	1	160	0	160.00	0	160.00	0	160.00	0	160.00	1.00
Number of Farms Reporting			1		1		1		1		1	
Tenant Operators	14	8	2,181	0	200.00	0	200.00	5,172.00	5,372.00	4,380.00	9,752.00	4.47
Number of Farms Reporting			8		2		2	4	6	3	8	
Area Total	40	18	5,120	514.00	517.00	0	831.00	6,872.00	7,703.00	7,630.00	15,333.00	3.00
Total Farms Reporting			18	1	4	0	4	9	13	6	18	
Percent of Total Non-Agricultural Income				2.0	3.4	0	5.4	44.8	50.2	49.8		
<u>Control Area</u>												
Cash Grain Farms:	32	11										
Owner Operators	13	9	3,784	1,990.00	1,400.00	0	3,390.00	0	3,390.00	4,370.00	7,760.00	2.05
Number of Farms Reporting			9	3	6		6		6	5	9	
Tenant Operators	19	2	1,040	0	0	0	0	0	0	1,120.00	1,120.00	1.08
Number of Farms Reporting			2							2	2	
Livestock Farms:	8	3										
Owner Operators	4	2	914	400.00	320.00	0	720.00	0	720.00	0	720.00	0.79
Number of Farms Reporting			2	1	2		2		2		2	
Tenant Operators	4	1	160	0	0	0	0	0	0	960.00	960.00	6.33
Number of Farms Reporting			1							1	1	
Area Total	40	14	5,918	2,390.00	1,720.00	0	4,110.00	0	4,110.00	6,450.00	10,560.00	1.78
Number Farms Reporting			14	4	8		8		8	8	14	
Percent of Total Non-Agricultural Income				22.6	16.5		38.9		38.9	61.1		

from all sources significantly. Income from lease bonus, rentals, and royalties in the Area of Development equals only 5.4 percent of the total non-agricultural income from all sources and is relatively unimportant. However, this source of income is important in the Control Area where it composes 38.9 percent of the total non-agricultural income from all sources. The fact that a greater proportion of non-agricultural income in the Control Area comes from bonuses and lease rental is due to the relative stability of the Area of Development in terms of expansion of oil production and discovery of new oil production adjacent to the Control Area. New development is found at two points adjacent to the Control Area.

While lease bonus and rentals are an important source of non-agricultural income in the Control Area, they are not an important source of income on most of the farms in the area. Only 8 of the 40 farms in the Control Area report income from such sources. Income from other non-agricultural sources is important in the Area of Development (48.9 percent of total non-agricultural income). Owner operators in the Control Area receive more non-agricultural income than owners in the Area of Development because of more leasing activity in the Control Area. Tenants have high non-agricultural incomes in the Area of Development because of the increased opportunity for work in the oil field. Income from other sources seems to follow a fairly narrow pattern in relation to all farms in the Area of Development and Control Area. Income from other sources was important in the Area of Development because one man had a very large income from use of a hay baler which came under the heading of income from other sources. In the Control Area much of the income under this heading was reported by three men. One of these men ran a road grader on county roads as well as farm. One of these two along with the third party is a member of the County Agricultural Adjustment

Administration and County Farm Security Loan Committee. This indicates that income from other sources is not widespread but is concentrated in the hands of a few in both the Area of Development and Control Area. It further seems evident that income from other sources is not important in relation to total income of either the Area of Development or Control Area. Only 6 farms in the Area of Development and 8 farms in the Control Area report income from non-oil sources. If this income were spread, in the form of an average, over all farms in both areas, it would be relatively unimportant to total income for each farm in both areas.

Mineral income is much more important in the Control Area than in the Area of Development. This is due to the fact that expansion of the oil field in the Area of Development has stopped. Income attributable to oil and gas development from work in the oil field is important only in the Area of Development. Income from other sources is important in both areas but it is not general in terms of all farms reporting such income in either area. Non-agricultural income from all sources does seem to be important in both areas inasmuch as 18 farms in the Area of Development and 14 farms in the Control Area reported receiving non-agricultural income from some source.

As shown in Table XVIII, per acre non-agricultural income is more important (\$3.00) in the Area of Development than in the Control Area (\$1.78). This is due in part to the greater amount of oil field work in the Area of Development. Cash grain farms in the Area of Development are significantly lower in per acre non-agricultural income than livestock farms in the area. This can be partially explained by the fact that two operators of livestock farms are tenants who work full time in the oil field. Cash grain farms in the Control Area have a slightly higher per acre non-agricultural income than livestock farms in the Control Area. This is due to the leasing and oil

Table XVIII. Non-Agricultural Income Per Farm and Per Acre,
By Type and Tenure

	: :Number: : Farms:Reporting:	: Number : : Farms : : Reporting:	: Acres :	:Total Net Non-: :Agricultural : : Income :	: Per : : Farm :	: Per : : Acre :
	(Number)	(Number)	(Acres)	(Dollars)	(Dollars)	(Dollars)
<u>Area of Development</u>						
Cash grain farms	22	9	2,779	5,421.00	602.33	1.95
Livestock farms	18	9	2,341	9,912.00	1,101.33	4.23
Owner operators	11	3	637	3,031.00	1,010.33	4.76
Tenants	29	15	4,483	12,302.00	820.13	2.74
Area	40	18	5,120	15,333.00	851.83	3.00
<u>Control Area</u>						
Cash grain farms	32	11	4,824	8,880.00	807.27	1.84
Livestock farms	8	3	1,094	1,680.00	560.00	1.54
Owner operators	17	11	1,220	2,080.00	189.09	1.71
Tenants	23	3	4,698	8,480.00	2,826.67	1.81
Area	40	14	5,918	10,560.00	754.29	1.78

rental activity in the area and more cash grain than livestock farms in the Control Area. Cash grain farms in the Area of Development have a slightly higher per acre income than cash grain farms in the Control Area. This can partially be explained by the fact that cash grain farms in the Area of Development are smaller than in the Control Area (Table XIV). Livestock farms in the Area of Development have significantly higher per acre non-agricultural income than livestock farms in the Control Area. This is due in part to the availability of work in the oil field in the Area of Development. Owner operators in the Area of Development have much higher income per acre of land than tenants in the area. However, this is a blurred picture because only three owner operators in the Area of Development report non-agricultural income. Owner operators in the Control Area have slightly lower per acre income than tenants in the Control Area. This, again, is a blurred picture because none of this income is mineral income, only three tenant operated farms report income, and all the non-agricultural income of tenants in the Control Area is from other sources. Owner operators in the Area of Development have significantly higher per acre non-agricultural income than owners in the Control Area. This is because one of the owners in the Area of Development had an unusually high income from use of his hay baler. Tenant operators in the Area of Development have a decidedly higher per acre income than tenants in the Control Area. This is due to the availability of work in the oil field in the Area of Development which does not exist in the Control Area. Except for tenants' income being higher in the Area of Development than in the Control Area, the per acre non-agricultural income does not vary greatly for either area.

Net Agricultural and Non-Agricultural Income

As shown in Table XIX, the net income per acre was higher in the Control Area (\$12.42) compared to (\$11.44) for the Area of Development. This difference is not great but can partially be explained by the smaller farms in the Area of Development and the increased income from lease bonus and rentals in the Control Area. Cash grain farms in the Area of Development have substantially lower per acre income than livestock farms in the area. This difference is due to the increased income received by the livestock farmers for work in the oil field. Cash grain farms in the Control Area have a higher per farm income but a smaller per acre income than livestock farms in the Control Area. Cash grain farms in the Area of Development have a smaller per farm and per acre income than cash grain farms in the Control Area. This is due to the larger size of farms and increased income from leases and rentals in the Control Area. Livestock farms in the Area of Development have only a slightly higher per acre income than livestock farms in the Control Area. Lack of difference is perhaps due to similarity of organization. Owner operators in the Area of Development have a lower per farm income but a much higher per acre income than tenants in the Area of Development. This difference is due to tenants working in the oil field, a much smaller number of owners than tenants, and an unusually large non-agricultural income for one of the owners in the Area of Development. Owner operators in the Control Area have a higher per farm and a significantly higher per acre farm income than tenant operators in the Control Area. This difference is due in part to the increased income owners in the Control Area received from leases and rentals that tenants do not. Owner operators in the Area of Development have a much lower per farm income but somewhat higher per acre income than owner operators in the Control Area. Per farm income is higher in the Control Area

because of larger farms. Per acre income is higher in the Area of Development because of a large income attributable to non-agricultural sources. Tenant operated farms have higher per farm and per acre income in the Control Area than in the Area of Development. This is due to the larger farms in the Control Area, which stress production of the cash grain crop, wheat.

Owner operators in the Area of Development have a higher per acre income than tenants in the Area of Development. Table XX shows owner operators' per acre income from all sources to be \$15.99 compared to \$10.37 for tenants. This difference is not important when one remembers that tenants have a \$4.00 per acre rental fee to pay that owner operators do not. Very little difference is evident in net non-agricultural income per acre between owners and tenants in the Area of Development. This difference is small because income from sources other than work in the oil field helped owners to a few cents more per acre non-agricultural income than tenants. Net agricultural income is higher, \$14.99 per acre, for owners than for tenants which show only \$9.31 per acre in the Area of Development. This difference can be attributed to the more important livestock program of owners than tenants, as well as the \$4.00 per acre rental fee charged to tenants. Net agricultural income per acre rose rather uniformly by zones from the center of the area at Zone 1 outward to Zone 6 in all cases except in Zone 2 and Zone 6. These zones have previously been seen to be not typical of other zones in the area. Zone 2, which has a high percentage of cropland in wheat, deviates considerably from the pattern with \$11.75 net agricultural income per acre. This is due to the high degree of land in cropland and this cropland in wheat (Table X). Quality of land in Zone 2 is also high (Table XI). Zone 6 also not typical of other zones in the Area (Table X) had \$11.17 net agricultural income per acre which

Table XIX. Net Income (Agricultural and Non-Agricultural)
Per Farm and Per Acre, By Type and Tenure

	: Number :		: Total Net :	: Per :	: Per
	: Farms :	Acres :	Farm Income :	Farm :	Acres
	(Number)	(Acres)	(Dollars)	(Dollars)	(Dollars)
<u>Area of Development</u>					
Cash grain farms	22	9,121	93,902.79	4,268.31	10.30 (9.52) ¹
Livestock farms	18	5,260	70,643.56	3,924.64	13.43 (12.71) ¹
Owner operators	11	2,745	43,912.28	3,992.03	16.00 (12.00) ¹
Tenants	29	11,636	120,634.07	4,159.80	10.36
Area	40	14,381	164,546.35	4,113.66	11.44 (10.67) ¹
<u>Control Area</u>					
Cash grain farms	32	14,780	181,353.53	5,667.30	12.27 (10.86) ¹
Livestock farms	8	2,694	35,662.27	4,457.78	13.24 (10.52) ¹
Owner operators	17	7,033	107,228.59	6,307.56	15.25 (11.25) ¹
Tenants	23	10,441	109,787.21	4,773.35	10.51
Area	40	17,474	217,015.80	5,425.40	12.42 (10.80) ¹

¹ Allowing \$4.00 an acre rent on owner operated farms.

Table XX. Net Income Per Acre By Zones and Tenure In the Area of Development

	: Net : Agricultural : Income (Dollars)	: Net : Non-Agricultural : Income (Dollars)	: Total : Net : Income (Dollars)	: Net Agricultural : Income : Per Acre (Dollars)	: Net Non-Agricultural : Income : Per Acre (Dollars)	: Net : Income : Per Acre (Dollars)	: Acres (Acres)
Zone 1							
Owners	3,596.69	0	3,596.69	14.98	0	14.98 (10.98) ¹	240
Tenants	5,788.27	3,552.00	9,340.27	8.04	4.93	12.97	720
Total	9,384.96	3,552.00	12,936.96	9.77	3.70	13.47 (12.48) ¹	960
Zone 2							
Owners	18,262.24	0	18,262.24	15.22	0	15.22 (11.22) ¹	1,200
Tenants	17,690.41	780.00	18,470.41	9.51	0.42	9.93	1,859
Total	35,952.65	780.00	36,732.65	11.75	0.26	12.01 (10.44) ¹	3,059
Zone 3							
Owners	2,746.50	0	2,746.50	17.16	0	17.16 (13.16)	160
Tenants	30,751.56	680.00	31,431.56	9.36	0.21	9.57	3,286
Total	33,498.06	680.00	34,178.06	9.72	0.20	9.92 (9.73)	3,446
Zone 4							
Owners	2,055.22	0	2,055.22	12.84	0	12.84 (8.84) ¹	160
Tenants	27,400.17	500.00	27,900.17	9.62	0.18	9.80	2,848
Total	29,455.39	500.00	29,955.39	9.79	0.17	9.96 (9.75) ¹	3,000
Zone 5							
Owners	6,821.52	2,400.00	9,221.52	21.32	7.50	28.82 (24.82) ¹	320
Tenants	24,792.67	4,630.00	29,422.67	9.00	1.68	10.68	2,755
Total	31,614.19	7,030.00	38,644.19	10.28	2.28	12.57 (12.15) ¹	3,075
Zone 6							
Owners	7,399.11	631.00	8,030.11	11.12	0.95	12.07 (8.07) ¹	665
Tenants	1,909.03	2,160.00	4,069.03	11.36	12.86	24.22	168
Total	9,308.14	2,791.00	12,099.14	11.17	3.55	14.52 (11.33) ¹	833
Total - Owners	40,881.28	3,031.00	43,912.28	14.89	1.10	15.99 (11.99) ¹	2,745
Total - Tenants	108,332.11	12,302.00	120,634.11	9.31	1.06	10.37	11,636
Area Total	149,213.39	15,333.00	164,546.39	10.38	1.66	11.44 (10.67)	14,381

¹ Allowing \$4.00 per acre rent on owner operated farms.

followed fairly closely the expected pattern but was somewhat high for the quality of land in the zone, but this was due to the important livestock program in Zone 6.

As might be expected the net non-agricultural income per acre was higher in Zone 1 than in any other zone in the area. Non-agricultural income was high in Zone 1 partly because much of the income was attributable to work of tenants in the oil field. Leaving the center of the field and approaching the edge of the field, non-agricultural income per acre became less in all zones except Zones 5 and 6. In Zone 5 the per acre income was high due mostly to work of tenants in the oil field in the zone and income from a hay baler of an owner. Zone 6 deviated greatly, being second high to Zone 1 with \$3.35 non-agricultural income per acre. It was high in Zone 6 because one of the tenants in the zone was a full-time employee in the oil field as well as a farmer.

Owners in the Area of Development have a higher per acre net income and higher net agricultural income in all zones than tenants in the area. This is because owners do not have a \$4.00 per acre rental fee to pay and they usually place more emphasis upon livestock production than tenants. Tenants have higher per acre non-agricultural income in all zones except Zone 5, which was caused by an owner receiving a large income from use of his hay baler and by tenants working in the oil field.

Summary

Net agricultural income per acre is higher on owner operators and on livestock farms than on tenants or cash grain farms in the Area of Development. The same is true in the Control Area but there is less difference than in the Area of Development. Owner operators on cash grain farms and livestock farms have higher per acre income than tenants on cash grain and

livestock farms in the Area of Development. The same is true in the Control Area, but again with a smaller difference than in the Area of Development.

Non-agricultural income which is a result of oil and gas development is greater in the Area of Development than in the Control Area. However, speculative mineral income itself is of more importance in the Control Area than in the Area of Development. Income from work in the oil field is the important source of income in the Area of Development and was not found in the Control Area. Income from other non-oil sources is of more importance in the Control Area than the Area of Development. Non-agricultural income is more important on livestock farms and owner operated farms than on tenant or cash grain farms in the Area of Development. Very little difference in per acre non-agricultural income exists in the Control Area between owners, and tenants and cash grain and livestock farms. Thirty-five to 45 percent of all the farms reported some non-agricultural income.

Total net income agricultural and non-agricultural is higher on owner operated farms and livestock farms in the Area of Development than on tenant farms or cash grain farms in the Area. It is also higher than the net income of owners and livestock farms in the Control Area. Non-agricultural income decreases by zones and agricultural income increases by zones as one leaves the center of the Area of Development and approaches the Control Area.

It appears that owners and tenants' per acre agricultural income is slightly higher in the Control Area than in the Area of Development. Tenant operated livestock farms have higher per acre agricultural income than tenant cash operated grain farms in the Area of Development and livestock farms without regard to tenure have a higher per acre agricultural income than cash grain farms in the same area. Cash grain farms in the Control Area have higher per acre agricultural income than cash grain farms in the Area of

Development. Income from work in the oil field is more important in the Area of Development than Control Area, but the reverse is true for bonus and lease rent--in the Control Area significantly high.

It would seem that oil and gas development results in a lower per acre agricultural income because of its impact upon tenure and farm organization. Speculative mineral income from rentals, bonus, and royalties is of less importance as a source of non-agricultural income in the Area of Development, than in the Control Area. Income from oil field work is large in total in the Area of Development but is important on only a few farms. Other sources of income are sizable in total and are found on from a third to a half of the farms.

Therefore, oil and gas development does not seem to enhance either the agricultural or non-agricultural income of the average farmer in the Area of Development.

CHAPTER V. SUMMARY

This study has been made in an effort to build a foundation upon which to base further research work on oil and gas development in a farming area. It has not been the purpose of this thesis to form definite policies for the guidance of people contemplating the purchase of a farm, in selecting the area in which to purchase. The greatest value of this study lies in the development of basic information concerning utilization of land in an area of oil and gas development.

The procedure followed in this study has been a comparative analysis of tenure, farm enterprises, and income as they relate to a farming area in which there is oil and gas development and in an area devoid of such development. The major hypothesis upon which the study is based states that, "The discovery and subsequent production of oil and gas alters the basic land utilization in an area of oil and gas development." Tenure was analyzed by testing the minor hypothesis that, "Oil and gas development tends to increase owner operatorship and to decrease tenancy." The problem of enterprise emphasis was tested by the minor hypothesis that, "Oil and gas development tends to shift the enterprise emphasis from cash cropping to livestock farming." The minor hypothesis used to analyze income states, "Oil and gas development tends to enhance the income (agricultural and non-agricultural) of farmers in an area of development."

Analysis of tenure showed that while tenancy is the dominant tenure pattern in both areas studied, tenancy is more prevalent (72.5 percent) in the Area of Development than in the Control Area (57.5 percent). Owners in the Area of Development have owned farms longer than owners in the Control Area. Income, as will be shown later, is less per acre in the Area of Development than in the Control Area. Tenants have rented farms in the Area

of Development longer than tenants in the Control Area and a much higher degree of tenure stability exists in the Area of Development than in the Control Area.

Enterprises in both areas follow a pattern of extensive farming with production emphasis upon grain and livestock. Farms in the Area of Development are more intensively operated, placing greater production emphasis upon feed crops and livestock, especially dairy cattle. Tenants in both areas operate larger farms and tend to depend more upon a single cash grain crop than do owners but in the Area of Development tenants have more livestock and feed crops than do tenants in the Control Area. Owners in both areas farm more intensively than tenants, growing more feed grains and producing livestock but owners in the Area of Development place greater emphasis upon production, especially dairy cattle, while owners in the Control Area tend to emphasize production of wheat.

Agricultural income per acre, after making allowance for rent, is somewhat lower in the Area of Development than that realized in the Control Area. Owner operators have a higher per acre agricultural income in both areas than tenants. Livestock farms have a higher per acre agricultural income than cash grain farms and the difference is greater in the Area of Development than Control Area.

Income per acre arising from potential speculative mineral income is more important in the Control Area than in the Area of Development where the expansion of the field in terms of leasing and drilling has stopped. Work in the oil field is of importance to a few farmers in the Area of Development and does not exist in the Control Area. Total non-agricultural income from all sources is of more importance in the Control Area than in the Area of Development. However, total non-agricultural income as well as

mineral income and income from work in the oil field is important on only a few farms and not in terms of all farms in either area.

Conclusions

Based upon the foregoing data, these conclusions seem to follow:

1. Oil and gas development tends to retard owner operatorship and to maintain tenancy.
2. Oil and gas development in a farming area tends to shift enterprise emphasis from cash cropping to livestock farming.
3. Oil and gas development does not tend to enhance agricultural income of farmers in the area. While oil and gas development does tend to enhance the non-agricultural income of a few farms it is not important in terms of all farms in the area of oil and gas development.

Therefore, the discovery and subsequent production of oil and gas alters the basic land utilization in an area of oil and gas development directing the pattern of agriculture toward greater tenancy, toward greater emphasis upon diversified farming, and livestock production and as a result toward slightly lower income for the average farmer.

APPENDIX

EXHIBIT A

EXHIBIT B

Appendix Table I. Land Use By Civil Townships In and Adjacent
To The Area of Development and Control Area 1

	: Allison :	Blaine :	Grant :	Lincoln :	Noble :	Olive :
Total land area	23,040	23,040	23,040	23,040	23,040	23,040
Total land in farms	23,168 ²	19,847	21,915	19,087	22,449	20,194
Percent of total land area in farms	100.5	86.1	95.1	82.8	97.4	87.6
Average size of farm (Acres)	224	251	300	225	261	240
Total cropland	15,532	13,880	12,830	13,021	16,296	10,653
Percent of land in farms in cropland	67.0	69.9	58.5	68.2	72.6	52.7
Other land in farms ³	7,636	5,967	9,085	6,066	6,153	9,541
Principal crops in percent of cropland						
Wheat	79.7	73.7	78.2	84.0	78.3	72.9
Oats	1.4	3.3	1.5	3.1	2.1	5.6
Alfalfa	.4	1.0	1.1	.9	.8	1.0
Sorghum	1.8	.6	3.1	.5	.9	1.0
Livestock Enterprises	Number of Livestock Per Acre of Land in Farm					
Beef cattle ⁴	.051	.037	.055	.048	.048	.056
Dairy cattle	.019	.019	.015	.018	.016	.017
Sheep	.015	.052	.022	.028	.042	.013
Hogs	.006	.025	.010	.014	.011	.007
Workstock	.005	.005	.004	.007	.006	.006
Chickens	.30	.25	.27	.40	.24	.27

¹ Agricultural Census, 1940.

² Farms from adjoining township reported in Allison Township.

³ Includes pasture, woodland, waste and farmstead.

⁴ Census did not break, have breakdown on beef cattle therefore, figure shown was derived by deducting dairy cattle milked from total number shown over three months old.

Appendix Table II. Primary and Secondary Land Use In Acres of Land In Quarters By Zones
and Number of Livestock on Farms By Zones

Zones	Area of Development							Control Area						
	1	2	3	4	5	6	Total	1	2	3	4	5	6	Total
	(Acres)													
Land In Farms	960	3,059	3,446	3,008	3,075	833	14,381	1,333	2,737	4,307	3,927	3,210	1,960	17,474
Land In Quarters	640	1,279	1,271	1,277	1,260	637	6,364	633	1,280	1,267	1,279	1,292	640	6,391
Cropland	279	812	736	829	783	404	3,843	373	863	937	827	845	346	4,191
Pasture	336	424	496	417	434	213	2,320	231	391	308	415	311	286	1,942
Farmstead	6	26	24	20	17	10	100	13	24	11	23	9	8	88
Waste	19	17	17	11	26	10	100	16	2	11	14	127	0	170
Wheat	191	695	628	639	604	276	3,033	275	805	840	675	656	290	3,541
Oats	49	21	70	97	67	71	375	37	26	62	54	102	10	291
Alfalfa	9	0	0	30	49	24	112	30	8	0	36	7	25	106
Sudan	0	96	8	0	16	10	130	5	10	5	20	17	15	72
Sorghums	0	0	20	58	0	12	90	0	9	30	0	10	6	55
Miscellaneous	30	0	10	5	47	11	103	26	4	0	42	53	0	125
Livestock Enterprises: ¹														
Dairy Cattle and Calves	51	113	98	53	59	41	415	42	28	48	76	61	13	268
Beef cattle and Calves	84	209	118	163	287	67	928	141	160	274	376	246	92	1,289
Swine	1	43	0	4	0	0	48	16	18	0	15	5	100	154
Sheep and Lambs	0	0	0	32	79	72	183	166	85	3	43	135	112	544
Workstock	10	7	3	7	4	7	38	2	2	9	5	8	0	26
Chickens	785	3,125	2,650	2,840	2,300	1,420	13,120	1,225	1,850	3,865	3,035	1,655	2,050	13,680
Turkeys	0	200	0	0	0	0	200	0	0	0	0	20	0	20

¹ Livestock shown in this table are taken as a current inventory.

EXHIBIT C

EXHIBIT C

Prices of commodities bought and sold by farmers in the study area for the year of 1945. All prices are the average Oklahoma prices received for all products bought and sold for the year as reported in the United States Department of Agriculture, Bureau of Agricultural Economics, Agricultural Prices for Oklahoma for 1945, unless otherwise indicated.

(Commodity)	(Unit)	(Dollars)	(Commodity)	(Unit)	(Dollars)
Wheat	Bu.	1.59	Whole Milk ²	Lb.	1.45
Oats	Bu.	0.71	Butterfat ³	Lb.	0.615
Corn	Bu.	1.15	Eggs	Doz.	0.344
Barley	Bu.	0.98	Wool	Lb.	0.346
Beef Cattle	Cwt.	10.66	Alfalfa Hay ⁴	Ton	18.00
Calves	Cwt.	12.82	Prairie Hay ⁵	Ton	14.00
Sheep	Cwt.	5.71	Baby Chick Mash ⁶	Cwt.	4.00
Lambs	Cwt.	13.05	Lay Mash ⁷	Cwt.	4.05
Hogs	Cwt.	13.77	Cottonseed Meal	Cwt.	3.08
Hens	Lb.	0.23	Baby Chicks ⁸	Each	0.13
Fryers ¹	Lb.	0.30			

¹ Fryers prices determined by contacting produce houses.

² Prices paid were figured on the basis of 4.0 percent butterfat at \$0.90 per pound plus Government subsidy of \$0.55 per pound for butterfat in the milk.

³ Prices paid for cream was taken from produce houses.

⁴ Going price in study area.

⁵ Going price in study area.

⁶ As given by farmers themselves.

⁷ As given by farmers themselves.

⁸ As given by farmers themselves.

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