A STUDY OF FARM CHARACTERISTICS, INCOME, AND CAPITAL GROWTH: FARMERS HOME ADMINISTRATION BORROWERS IN SOUTHEASTERN OKLAHOMA

By

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CHAPTER I

SITUATION FOR FARMING IN GENERAL

The period since the beginning of World War II presents a record of remarkable progress in agriculture as shown by the farm balance sheet for the nation (Figure 1). Total assets of the nation's farmers have grown from $53 billion in 1940 to $186.7 billion in 1958.[1*] Even more indicative of farm progress, however, is the growth in owners' equities from $43 billion in 1940 to $166.5 billion in 1958.[2] Thus, relative to total assets, the total indebtedness of farmers is proportionately small.

This increase in farmers' assets relative to indebtedness does not appear to be associated with any general shortage of credit. The trends of both non-real estate loans and farm real estate mortgage loans have been strongly upward since the mid-1940's (Figures 2 and 3). There have been times during these years when credit has been less readily available, but in general this has been a period during which farmers could expand their operations and otherwise meet their financial needs through the medium of readily available credit.

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[1] The Balance Sheet of Agriculture 1958, Bulletin No. 201, (U.S.D.A., Washington, D. C., November, 1958) p.2.

[*] Part of the gain in total assets is, of course, the result of changes in the level of prices. The change in value of certain physical assets may, in fact, largely reflect only changes in price levels but when the element of changing prices is removed by expressing values of physical assets in terms of 1940 prices, the value still shows a gain of 24.4 percent. (See The Balance Sheet of Agriculture, 1958, p. 3).

[2] Ibid., p. 2.

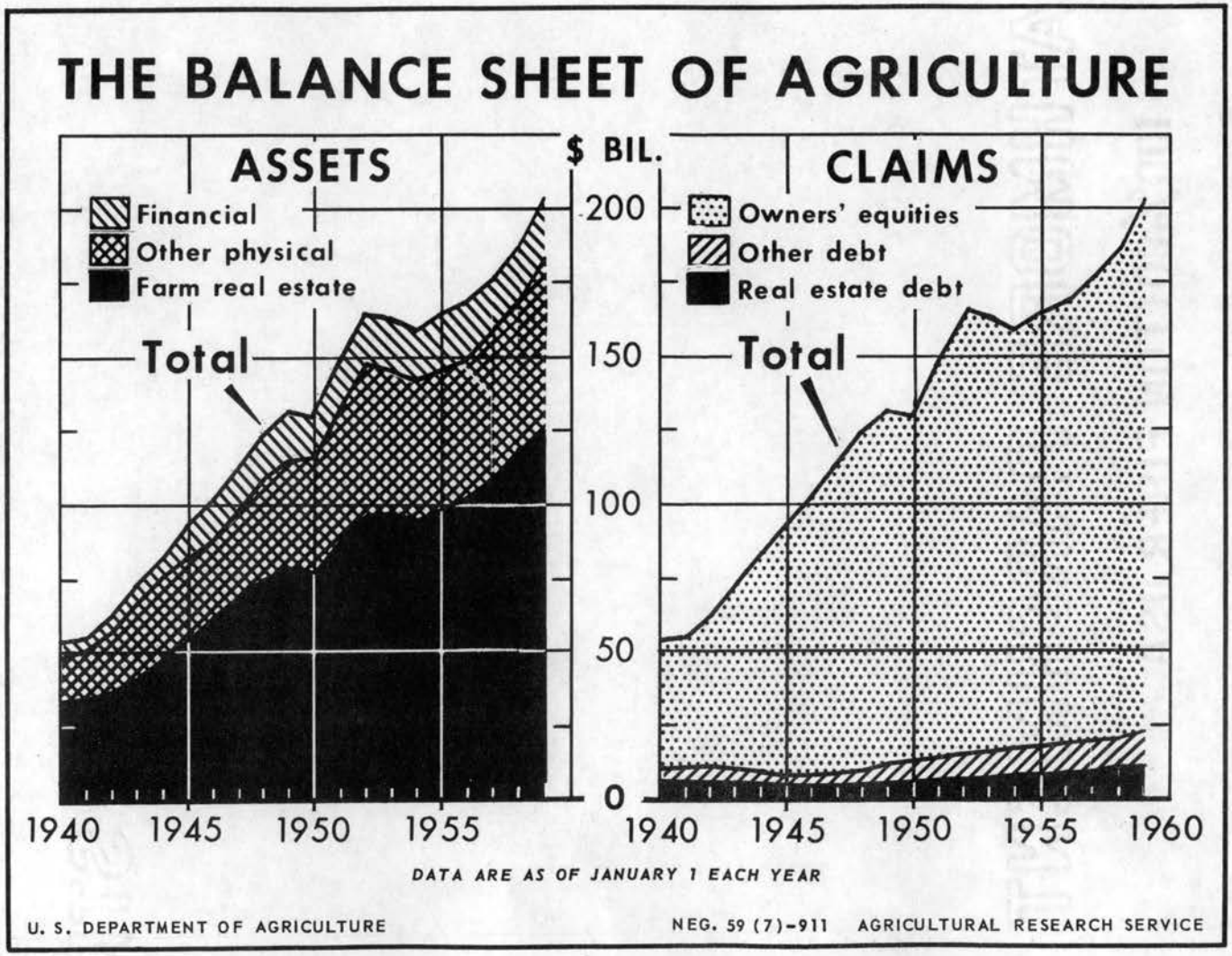

Figure 1. Farm Balance Sheet, United States

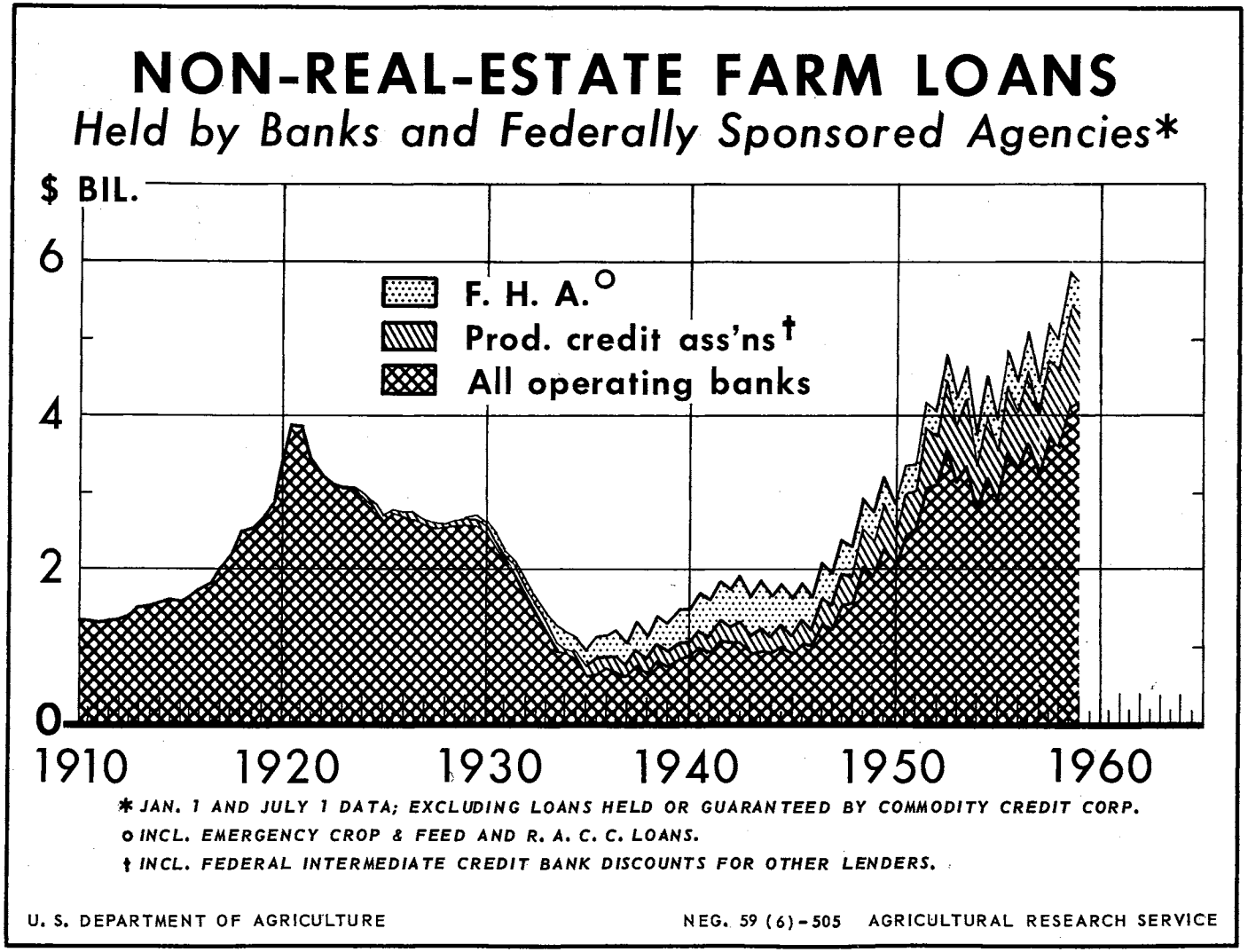

Figure 2. Non-Real-Estate Farm Loans, United States

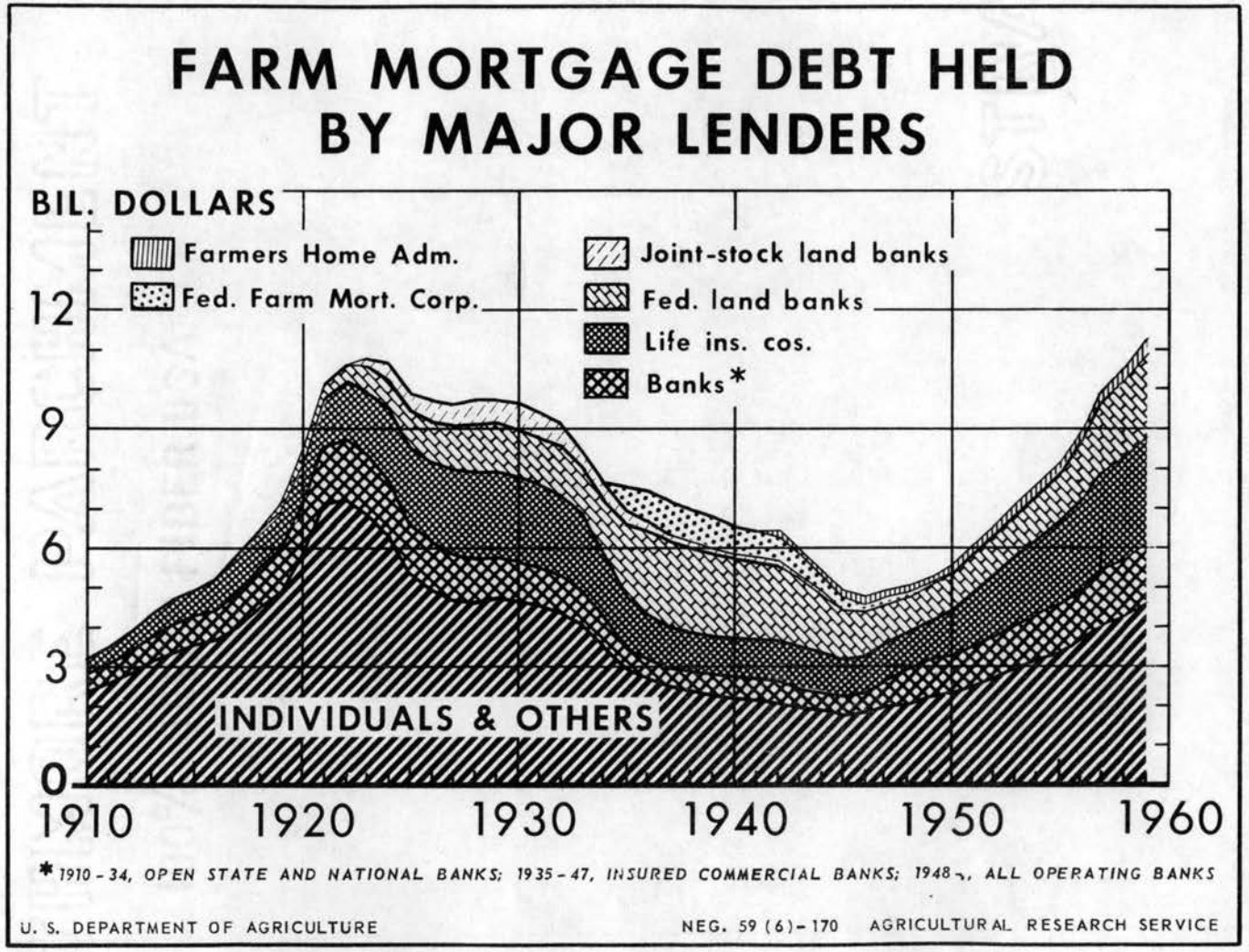

Figure 3. Farm Mortgage Debt, United States

Situation for Farmers Who Cannot Qualify for Regular Credit

In contrast to this generally favorable situation, however, many individual farmers have faced serious credit rationing. Studies by Reiss,[3] by Pond, Swanson, and Cavert,[4] and by Kristjanson and Brown[5] among others indicate that many farmers, or would-be farmers, have been severely limited in their operations by capital rationing partly because they are unable to meet the credit requirements of lenders whose businesses are designed only to make sound loans.

Facilities Provided for This Fringe Segment

This is not a new problem and for many years society in the United States has had to face the question whether to allow these farmers to fail, or to operate on an inadequate basis, because credit was not available to them at all or was not available under reasonable terms.

Wall points out that as early as 1918 the Federal Government made direct seed loans available to farmers whose needs could not be served by regular lending agencies. Beginning in 1921 by special appropriation or authorization, Congress made funds available for seed loans in eleven different years.[6] By 1929 the emergency crop and feed loans had become

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[3] F. J. Reiss, They Did Not Get Loans, University of Illinois, Department of Agricultural Economics, Research Report No. 4, 1955.

[4] George A. Pond, Henning W. Swanson, and William L. Cavert, Starting Farming Today, Minnesota Agricultural Experiment Station, Bulletin No. 428, 1955, pp. 9-10.

[5] Baldur H. Kristjanson and Jacob A. Brown, The Farmers Home Administration Approach to Farm Credit Problems, North Dakota Agricultural Experiment Station, Bulletin No. 388, 1954, p. 6.

[6] Norman J. Wall, Federal Seed-Loan Financing and Its Relation to Agricultural Rehabilitation and Land Use, U.S.D.A., Technical Bulletin No. 539, 1936, p. 3-4.

a regular institution of government.[7]

The original seed loans were granted to assist drouth striken farmers in getting a new start. Later the basis for extending emergency credit spread from the need for meeting physical disasters to the problem of meeting economic disasters. After 1929, financial distress resulting from general depression served as the basis for many annual feed and seed loans.[8]

In 1932, the Emergency Relief and Reconstruction Act was passed by Congress which provided for two temporary but important emergency financing facilities. One provision was the subscription by the treasury of $125 million to provide additional capital stock in the Federal Land Banks, and the other was to provide for the establishment of twelve Regional Agricultural Credit Corporations for the purpose of making production loans to farmers. Both of these provisions recognized that, at that time, a great many farmers who previously had adequate credit were no longer able to acquire it.[9]

The Federal Emergency Relief Administration was organized in 1933 when the government found it necessary to furnish large sums for rural relief as a result of the depression. In place of relief, a means of improving the living conditions for low income farmers resulted in the development of the Resettlement Administration.

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[7]William G. Murray, Agricultural Finance, (Ames: Iowa State College Press, 1953, 3rd Edition), p. 377.

[8]Ibid., p. 378.

[9]Emil S. Troelston, Principles of Farm Finance, (St. Louis: Educational Publishers, Inc., 1951), pp. 124-126.

The recognition of the place of the low income farmer eventually showed in the organization of the Farm Security Administration which, in 1937, superceded the Resettlement Administration. Emphasis was shifted from the resettlement of poor farmers in new areas to means of making them more economically secure on land in their respective areas.

In an effort to strengthen and broaden direct lending from the Federal Treasury to low income farmers, an act providing for the creation of the Farmers Home Administration was passed in 1946. The purpose of this act was to consolidate under one agency all direct lending from the Federal Treasury to low income farmers.[10]

Farmers Home Administration Program

To qualify for FHA credit the farmer or rancher must not be able to obtain credit elsewhere at reasonable rates and terms. Most of the loans made by the FHA are to owners and operators of family-type farms. However, owners of farms that are smaller than family-type farms may obtain loans to develop their farms and refinance debts incurred for agricultural purposes. The basic objective of the credit program is to enable farm families to become soundly established in a successful, well-balanced system of farming.

Part-time farmers may receive operating loans provided that they spend most of their time operating the farm on which the loan is made.

In addition to the loan, borrowers also receive assistance from county FHA supervisors in preparing farm and home operating plans, in keeping farm

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[10] Ibid., p. 131 and 136.

records, and also can obtain advice relating to other farm problems.

Applications for loans are made at county offices of the FHA which generally are located at county seat towns. In Oklahoma, 77 counties are served by 66 supervisors (Figure 4). Nine supervisors serve two counties each and one serves three counties.

The applicant's eligibility is determined by a county committee consisting of three people, two of whom must be farmers. The committee also certifies as to the value of farms to be bought or improved, and reviews the progress made by the borrowers. Loans made by the FHA are secured by liens on crops, chattels, and real estate so that the government's interest may be protected. Regulations require the borrowers to refinance their loans as soon as they can obtain credit elsewhere at reasonable rates and terms.[11*]

Credit Rationing

Credit rationing is normally thought of as being either internal or external. Internal credit rationing occurs when the farmer places a self-imposed restriction on the amount of capital he is willing to borrow. External credit rationing refers to the restrictions which a lending agency places on the amount of capital it will lend to a customer.[12]

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[11] Thumbnail Sketch of the Farmers Home Administration, (U.S.D.A., Washington, D. C., PA-255, 1956).

[*] (For a description of the types of loans available through the FHA see Appendix.)

[12] Lawrence A. Bradford and Glenn L. Johnson, Farm Management Analysis, (New York, John Wiley and Sons, Inc., 1953), pp. 398 and 401.

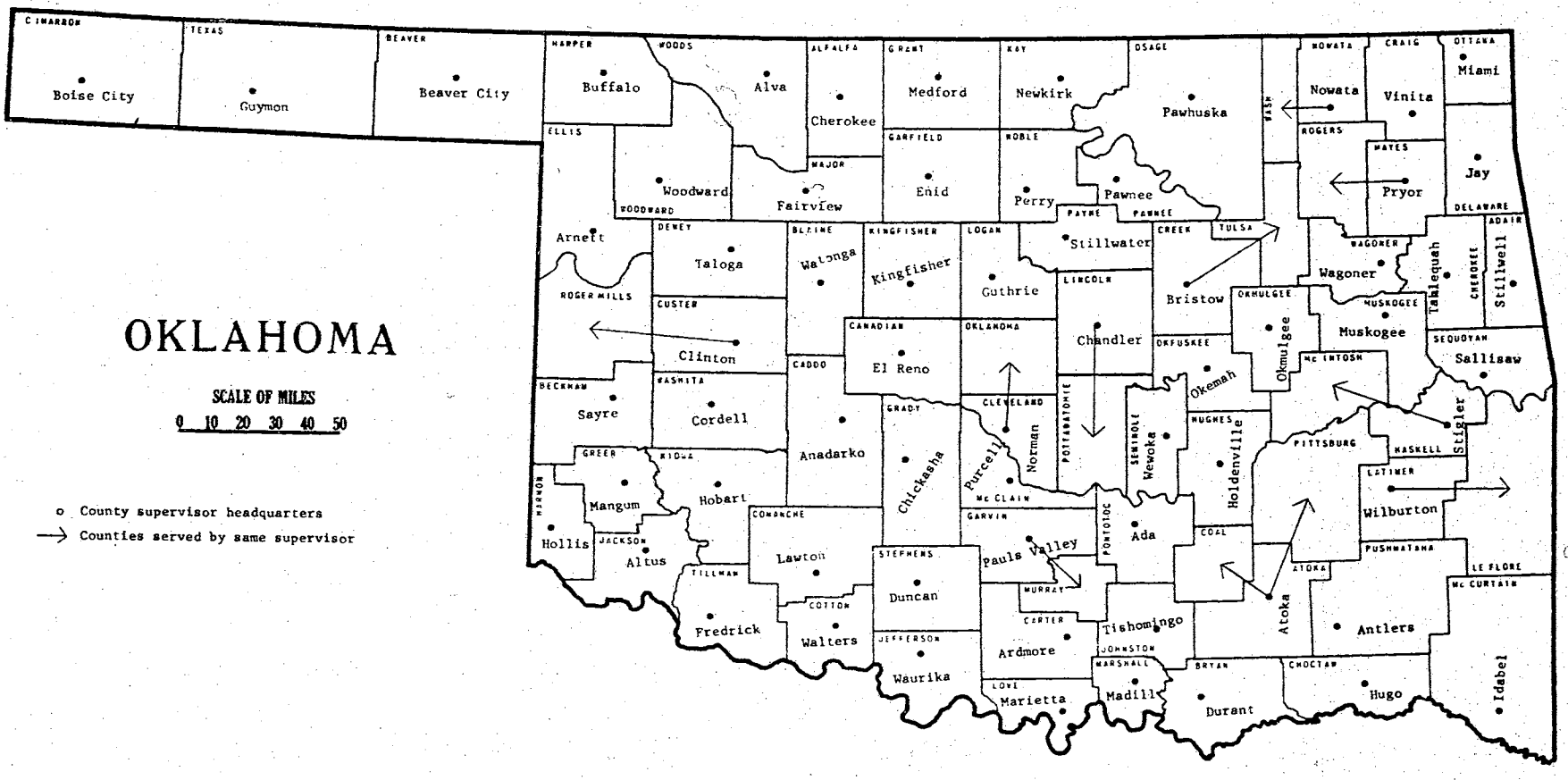

Figure 4. Location of FHA county supervisors' headquarters and counties served by each supervisor.

Some of the credit rationing on the small farms in this study may be due not only to the lack of availability of credit to the farmers but also to risk aversion on the part of the farmers or to custom or to other factors which would tend to cause them to fail to use some of the credit which otherwise would be available to them. It is interesting to note along this line that 41.2 percent of the borrowers in this study indicated that they had no source of credit before they applied for the FHA loan. It is not certain whether this was the result of internal or external credit rationing. The other 58.8 percent had utilized some credit source prior to becoming eligible for FHA financing on the condition that they could no longer obtain adequate amounts of credit to meet their needs at reasonable rates.

This study is concerned only with farmers who were subject to external credit rationing to the extent that they had to turn to the FHA for capital. The study does not provide data on any internal credit rationing which may have existed. This discussion deals only with the general causes and effects of external credit rationing.

Lending agencies face numerous types of uncertainty. Credit rationing is largely a response to these uncertainties. There is the possibility that the borrower may never repay the loan. Another type of uncertainty faced by the lending agency is the ability of the borrower to utilize the funds efficiently. Also the lender is faced with the same uncertainties as the borrower in determining what particular investments offer the best profit possibilities. In agriculture there is the uncertainty of conditions of nature as well as the uncertainty of prices.

Because of these uncertainties the lending agency tries to make sure that interest and principal are repaid by placing restrictions on

the amount of borrowed funds. One method of doing this is to keep its rate of return on loans at a high level. Another is to keep the ratio of the client's borrowed capital to his owned capital below a certain level.

Another characteristic of agriculture that causes lending agencies to place limits on the amount borrowed is the close relationship of the household and the firm. As a result of this, it is difficult to separate production and consumption loans.

As a result of credit rationing, the efficiency of resource allocation on farms may be affected. Credit rationing may affect efficiency by influencing the quantity and quality of resources available and by affecting the combination of resources used in production. If capital is limited then resources may have to be utilized in a less than optimum combination. The effect of credit rationing may be reflected in the scale of operations. As a result of credit rationing firms may not be able to expand their operations to employ the desirable quantity of resources.[13]

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[13] D. Gale Johnson, Forward Prices for Agriculture, (The University of Chicago Press, Chicago, Illinois, 1947), pp. 62-65.

CHAPTER II

PROBLEM SITUATION

It has long been recognized that some of the counties in Southeastern Oklahoma are low farm income counties. This is further pointed up by Table I which shows the average farm income for five sections of Oklahoma and the average for Oklahoma. This data was based on the section, "Value of All Farm Products Sold" in the 1954 Census of Agriculture. The average farm income in the southeastern section of Oklahoma was $1,325 as compared with $2,260 in the northeastern section, $3,677 in the central, $4,942 in the northwestern, and $5,537 in the southwestern section. The average for the southeastern section is also $2,116 less than the Oklahoma average of $3,441.

TABLE I

THE AVERAGE FARM INCOME FOR FIVE SECTIONS OF OKLAHOMA AND OKLAHOMA, 1954

	South-western	North-western	Central	North-eastern	South-eastern	Okla-homa
Average farm income per farm in dollars	5537	4942	3677	2260	1325	3441

Source: U. S. Census of Agriculture, 1954.

It has been assumed that among the reasons for this is the inefficient utilization of resources due to insufficient capital.

Thirty-seven counties in Oklahoma have been classified by the United States Department of Agriculture as rural low income counties (Figure 5).

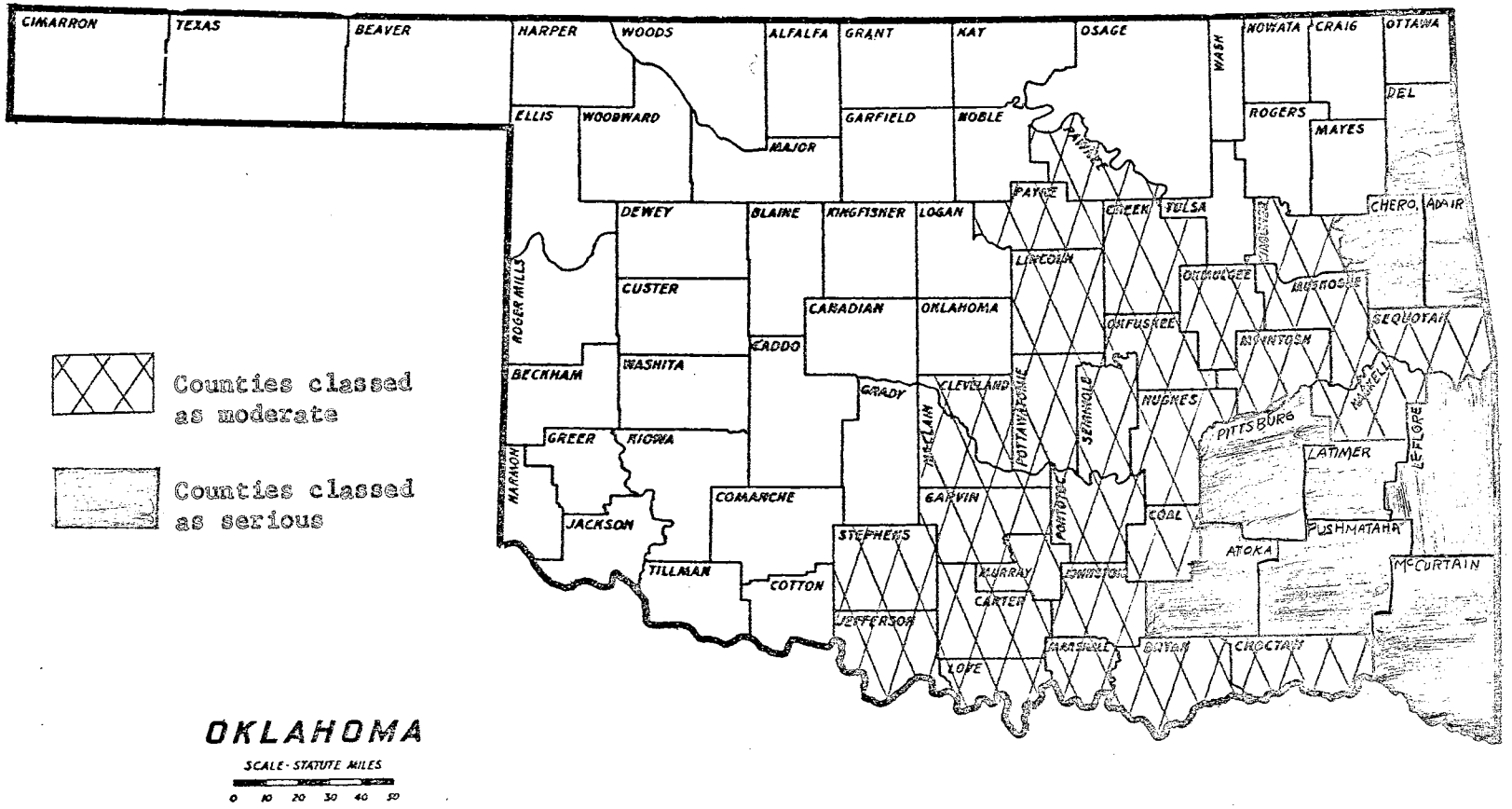

Figure 5. Counties in Oklahoma with Serious and Moderate Low Income Problem

Three criteria have been developed by the United States Department of Agriculture for classifying counties with respect to family incomes and standards of living.

An economic area is designated as low income of some degree if it is characterized by:

1. "A residual farm income to operator and family labor in 1949 of less than $1,000 provided the state economic area had a level of living index below the average for the region and had 25 percent or more of its commercial farms classified as 'low production'." (Residual farm income to operator and family labor represents the income, including value of home use, above operating expenses and a return to capital invested in land and machinery.)

2. "A level of living index in the lowest fifth of the nation." (Items in the index include (a) percentage of farms with electricity, (b) percentage of farms with telephones, (c) percentage of farms with automobiles, (d) average value of products sold.)

3. "'Low production' farms comprising 50 percent or more of the commercial farms." (Low production farms are those with sales of $250-$2,499 with the operator not working off farm as much as 100 days and farm sales exceeding family income from other sources.)[14]

These three criteria are used to classify counties as moderate, substantial, or serious low income areas. The area is classified as having moderate low income if it is characterized by only one of these three criteria. On the basis of this standard, 28 counties in Oklahoma are classified as moderate. All of these are in the central or eastern portion of the state as indicated by the cross-hatched area in Figure 5.

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[14] Development of Agriculture's Human Resources, 84th Congress, 1st Session, House Document No. 149, United States Government Printing Office, Washington, D. C., 1955, p. 8.

To be classified as substantial low-income, the area must be characterized by two of the criteria. No counties are classified in the category "substantial low income" in Oklahoma.

When an area is characterized by all three criteria it falls into the class of serious low income. Nine counties, in Oklahoma, are classified in the category of serious low income as shown by the shaded area in Figure 5.

CHAPTER III

PURPOSE AND METHOD OF STUDY

The generalized purpose of this study was to accumulate and analyze data to test the effectiveness of the Farmers Home Administration as a means of alleviating the capital rationing problem among a randomly selected sample of farmers in Southeastern Oklahoma.

In approaching this problem the following hypotheses were tested: (1) Most Farmers Home Administration borrowers have inadequate capital when they first apply for credit. If credit is made available and is used effectively, the capital structure of the farm should improve and the results should become evident in net farm income over the period of years, (2) with an increase in the use of credit and the reinvestment of increased net cash income in the farm, the farmer's total capital should increase.

The technique used was to determine the capital position of the borrower at the time the loan was made and to determine his progress over a period of years and then to see if his capital position had improved.

Sampling Procedure

Twelve counties in the low income area were selected to be used in this study. Four were in the serious low income classification[15] and

[15]The four counties classified as serious were: Atoka, Cherokee, McCurtain, and Pittsburg.

eight were in the moderate low income.[16]

From the state office of the Farmers Home Administration, a list of all active borrowers as of March, 1958 was obtained for each of the 12 counties. This list was sent to each county FHA office and checked for accuracy and to determine if each person listed was actually still an active borrower. The corrected list was used as the population from which the sample was selected. A sample of one-third of the borrowers from each county was selected in the following manner. The procedure followed for each county was to arrange the borrowers in alphabetical order and then assign each borrower a number beginning with zero and continuing until each borrower had a number. The numbering was consecutive and followed the alphabetical listing.

A starting point was selected in a table of random numbers[17] and the numbers were read down from the starting point and those numbers corresponding to the borrowers numbers in the population were selected for the sample. This procedure was continued until the one-third sample of each county was selected. The total number of loans in the twelve counties was 1056 and after the one-third sample was obtained from each county the total sample size was 352 (Table II).

In each county FHA office a photographic reproduction was made of the following records for each client: (1) the original application for

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[16]The eight counties classified as moderate were: Choctaw, Creek, Hughes, Okfuskee, Okmulgee, Seminole, Sequoyah, and Wagoner.

[17]George W. Snedecor, Statistical Methods, (Iowa State College Press, 1956, Chapter I, Section 1.5) pp. 10-13.

TABLE II

BREAKDOWN OF FHA LOANS IN 12 OKLAHOMA COUNTIES, MARCH, 1958

County	Total Loans	1/3 Sample Size	Loans Other Than Operating or Farm Ownership	Loans Left for Analysis	Loans Discarded Because of Discrepancy	Loans Used in This Study
Atoka	81	27	5	22	15	7
Cherokee	90	30	11	19	19	0
Choctaw	168	56	6	50	36	14
Creek	21	7	1	6	6	0
Hughes	150	50	2	48	28	20
McCurtain	123	41	3	38	25	13
Okfuskee	78	26	2	24	13	11
Okmulgee	96	32	2	30	14	16
Pittsburg	33	11	2	9	9	0
Seminole	51	17	4	13	7	6
Sequoyah	63	21	4	17	11	6
Wagoner	102	34	2	32	18	14
Total	1056	352	44	308	201	107

the loan, (2) the original business plan for the farm as shown in the FHA Form 14,[18] (3) the Form 14 for every third year following the date of application, and (4) the most recent Form 14 completed. This was to provide the means of determining the capital position of the borrower at the time of application for the loan and then to check his progress over the years and determine his present capital position. Collection of the data covered the period August, 1958 to December, 1958.

Of the original 352 borrowers in the sample, 44 had only loans other than farm operating or farm ownership loans (Table II). Records on these "other loans" were so incomplete as to be unuseable. The elimination of these "other loans" reduced the number of borrowers in the sample to 308.

Limitations in the Records

Closer examination of the records of the remaining 308 borrowers revealed the fact that many of these could not be used for that part of the analysis covered by this thesis.

The FHA Form 14 makes provision for a specific plan of operation at the beginning of the year and for the results at the end of the year. The records of 201 of these 308 borrowers failed to show the information on actual production, expenses, and receipts and therefore were unuseable for complete analysis although they did contain much information which may be used in portions of the broader study which lies outside the scope of this thesis.

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[18] The Form 14 is an annual Farm and Home Plan filled out at the beginning of each year by the county supervisor and the borrower. It shows the borrower's financial statement and what his plans and expectations are for the coming year. At the end of the year the form is completed from the borrower's records for that year. The completed form will show a complete summary of the year's business.

In three[19] of the twelve counties there were no borrowers in the one-third sample whose Form 14 records contained enough of the actual annual results to be used in the study.

To compensate for the reduction in numbers of borrowers, the plan of using only the records for every third year was abandoned and the remaining nine counties[20] were revisited to obtain the records for all years during which the clients had FHA loans. Even for these, however, in a few cases the data for occasional individual years were incomplete.

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[19]These three counties were Cherokee, Creek, and Pittsburg.

[20]The nine counties were Atoka, Choctaw, Hughes, McCurtain, Okfuskee, Okmulgee, Seminole, Sequoyah, and Wagoner.

CHAPTER IV

CHARACTERISTICS OF AREA STUDIED

All of the nine counties from which records were used would be designated as either serious or moderate low income areas on the basis of the United States Department of Agriculture criteria.

To show the general types of farming in the study, the counties have been classified into types of farming areas as shown by Figure 6. Area I comprising Hughes, Okfuskee, and Seminole counties, is characterized by cotton, general farming, self-sufficing, and dairy (an area of generally poor soil, except on small bottoms). Area II comprising Okmulgee, Sequoyah, and Wagoner counties, characterized by cotton, some dairy, potatoes, commercial vegetables, and self-sufficing farms. Area III which includes only Atoka county is classed as cotton, self-sufficing, and livestock, (rough, mountain, and wooded area). Area IV including Choctaw and McCurtain counties is characterized by cotton and general farming.[21]

Size of Farms

By farm type areas as delineated for this study, the average size of farms in the nine counties as shown by the 1954 Census of Agriculture ranged from 158.5 acres in Area IV to 267.5 acres in Area III (Table III).

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[21] Area I for this study lies within Preliminary Type-of-Farming Map of Oklahoma, Area 8; Area II lies within Type-of-Farming Map of Oklahoma, Area 9; Area III within Type-of-Farming Map of Oklahoma, Area 14; and Area IV lies within Type-of-Farming Map of Oklahoma, Area 16 (See Figure 7).

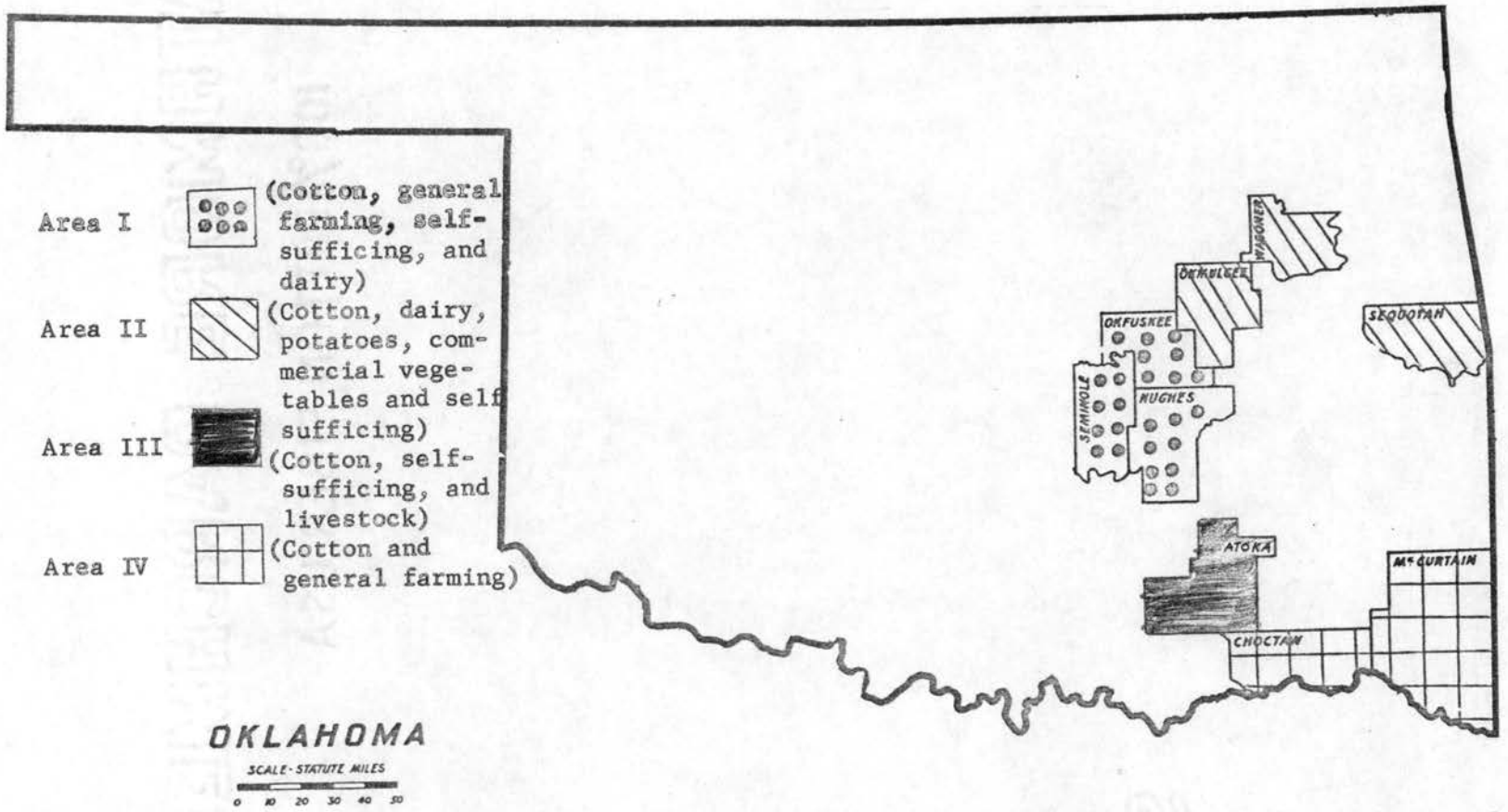
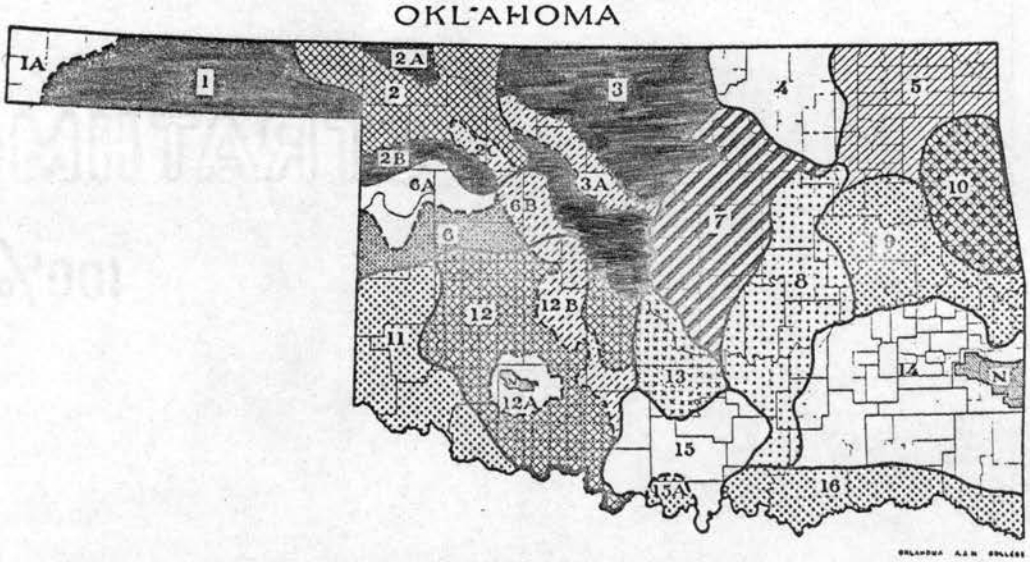


Figure 6. Location of the Four Types of Farming Areas

PRELIMINARY TYPE-OF-FARMING MAP OF OKLAHOMA



Area Description of Counties by Type-of-Farming Areas in Oklahoma

Area 1: Beaver, Cimarron, Texas	1. Cash grain and Livestock. 1A.—Largely range livestock.	**Area 6:** Blaine, Custer, Dewey, Roger Mills	6. Cash grain, general farming, cotton, livestock. 6A.—Rough, sandy area, scarcely any farming some range livestock. 6B.—Wooded area, general farming, and cotton.	**Area 11:** Beckham, Greer, Harmon, Jackson, Tillman	11. Cotton, supplemented with cash grain, livestock, dairy, and poultry.
Area 2: Ellis, Harper, Woods, Woodward	2. Somewhat broken topography—some small grains, feed crops, livestock. 2A.—Cash wheat primarily. 2B.—Cash wheat primarily. 2C.—Sandy area, general farming.	**Area 7:** Cleveland, Lincoln, Logan, Oklahoma, Pawnee, Payne, Pottawatomie	7. General farming, cotton, livestock, dairy, and poultry.	**Area 12:** Caddo, Comanche, Cotton, Grady, Kiowa, Stephens, Washita	12. Cotton, cash grain, livestock, some dairy and poultry. 12A.—Range livestock. 12B.—Sandy, wooded section, cotton, general farming.
Area 3: Alfalfa, Canadian, Garfield, Grant, Kay, Kingfisher, Major, Noble	3. Cash grain, general farming. 3A.—A wooded area of sandy soil, general farming, some cotton produced on this strip.	**Area 8:** Creek, Hughes, Okfuskee, Pontotoc, Seminole	8. Cotton, general farming, self-sufficing, dairy, (An area of generally poor soil, except on small bottoms).	**Area 13:** Garvin, McClain	13. Cotton, livestock, general farming, broomcorn.
Area 4: Osage	4. Range livestock—some general farming.	**Area 9:** Haskell, LeFlore, McIntosh, Muskogee, Okmulgee, Sequoyah, Wagoner	9. Cotton, some dairy, potatoes, commercial vegetables, self-sufficing.	**Area 14:** Atoka, Coal, Latimer, Pittsburg, Pushmataha	14. Cotton, self-sufficing, livestock (rough, mountain and wooded area).
Area 5: Craig, Mayes, Nowata, Ottawa, Rogers, Tulsa, Washington	5. General farming, livestock, dairy, poultry and self-sufficing.	**Area 10:** Adair, Cherokee, Delaware	10. Some fruit, general farming, dairy and poultry, self-sufficing, (rough wooded land).	**Area 15:** Carter, Jefferson, Johnston, Love, Murray	15. Range, livestock, general farming, self-sufficing. 15A.—Cotton.
				Area 16: Bryan, Choctaw, Marshall, McCurtain	16. Cotton, general farming.
				N—National Forest	

Figure 7. Types of Farming in Oklahoma

TABLE III

AVERAGE SIZE OF ALL FARMS IN RESPECTIVE AREAS AS COMPARED WITH AVERAGE SIZE OF FARMS OF 107 FHA BORROWERS BY TYPE OF FARMING AREAS STUDIED AND FOR OKLAHOMA, 1954

Areas	Average Total Acres per Farm		Average Crop Acres per Farm	
	All Farmers	FHA Clients	All Farmers	FHA Clients
I	209.8	334.1	93.9	112.4
II	174.6	263.1	87.6	126.1
III	267.5	489.7	53.9	84.0
IV	158.5	213.1	61.8	82.7
Average of Four Areas	189.3	289.9	78.9	107.5
Average of All Farms in Oklahoma	299.5		148.3	

Source: U. S. Census of Agriculture, 1954.

The average size of all farms in the entire nine county area was 189.3 acres. The average size of farms in each of these areas was smaller than the 299.5 acre average of all farms in Oklahoma.

Table III also shows the average size of farms of the 107 FHA borrowers in these four areas as compared with the average size of all farms in the areas. By type of farming areas the size of farms of the 107 FHA borrowers ranged from 213.1 acres in Area IV to 489.7 acres in Area III. The average size of farms of all 107 FHA borrowers was 289.9 acres which is larger than the 189.3 acres average of all farms in the area. This 289.9 acres average of the 107 FHA borrowers compares closely with the average size of all farms in Oklahoma.

The average acres of cropland in the nine counties in the study was smaller than the average for the state. By type of farming areas the average acres of cropland ranged from 53.9 acres in Area III to 93.9 acres in Area I with 78.9 acres the average for all four areas combined as compared with 148.3 acres for the state. The average acres of cropland for the 107 FHA borrowers was higher in each area than the average of all farms. The average acres of cropland of the 107 FHA borrowers in the four areas ranged from 82.7 acres in Area IV to 126.1 acres in Area II with an average of 107.5 acres for all four areas. This is less than the state average of 148.3 acres.

Value of Farms

The average value of farms in the four types of farming areas ranged from $5,913 in Area III to $10,326 in Area IV as shown by Table IV. The average value of all farms in the nine counties was $8,211. This was 43.3 percent of the Oklahoma average value which was $18,913.

TABLE IV

VALUE OF LAND AND BUILDINGS, AVERAGE PER FARM BY TYPE OF FARMING AREAS AND FOR OKLAHOMA, 1954

Area I	Area II	Area III	Area IV	Average of Four Areas	Average of Oklahoma
$8,260	$8,346	$5,913	$10,326	$8,211	$18,913

Source: U. S. Census of Agriculture, 1954.

Types of Tenure

The distribution of types of tenure for the four areas, severally and combined, and for Oklahoma are shown in Table V. In the four areas

combined, 58 percent of the farmers were full owners, 20.1 percent were part owners, 21.3 percent were tenants, and .6 percent were managers. The range of full owners was from 50.5 percent in Area I to 69.5 percent in Area IV. The range of part owners was from 15.0 percent in Area IV to 22.9 percent in Area I. For tenants the range was from 15.0 percent in Area IV to 26.1 percent in Area I. In no area was the percentage of managers greater than one percent.

TABLE V

TYPES OF FARM TENURE BY TYPE OF FARMING AREAS STUDIED AND FOR OKLAHOMA, 1954

Type of Farming Areas	Percent of Total Farms			
	Full Owner	Part Owner	Tenants	Manager
Area I	50.5	22.9	26.1	.5
Area II	57.1	20.1	22.4	.4
Area III	55.1	22.2	21.7	1.0
Area IV	69.5	15.0	15.0	.5
Four Areas Combined	58.0	20.1	21.3	.6
Oklahoma	48.9	26.3	24.3	.5

Source: U. S. Census of Agriculture, 1954.

With the exception of Area IV, the tenure patterns within the four areas are rather similar. Full ownership in the four areas combined is about nine percent higher than for the state as a whole but as indicated by Tables III and IV, both the average size and the average values are lower for this nine county area than for Oklahoma as a whole.

Distribution of Farms by Economic Class

As shown by Table VI almost 70 percent of the farms in the four types of farming areas in the study are in economic classes V and VI.[22] That is to say that almost 70 percent of all farms in the area studied sold farm products valued at $2,499 or less. For the state as a whole only 41 percent of the farms sold products valued within this range.

TABLE VI

DISTRIBUTION OF COMMERCIAL FARMS BY ECONOMIC CLASSES BASED ON VALUE OF FARM PRODUCTS SOLD; FOUR TYPE OF FARMING AREAS AND OKLAHOMA, 1954

Economic Class	Percent of Total Farms					
	Area I	Area II	Area III	Area IV	Four Areas Combined	Oklahoma
Class I ($25,000 or more)	1.2	1.6	.9	1.2	1.2	2.1
Class II ($10,000 to 24,999)	2.7	5.6	2.7	4.4	3.8	10.8
Class III ($5,000 to 9,999)	8.6	10.5	7.9	9.6	9.2	20.3
Class IV ($2,500 to 4,999)	18.5	20.1	15.7	14.3	17.2	25.6
Class V ($1,200 to 2,499)	34.1	29.5	30.5	23.6	29.4	24.3
Class VI ($250 to 1,199)	34.9	32.7	42.3	46.9	39.2	16.9

Source: U. S. Census of Agriculture, 1954.

[22] Class I farms comprise those selling $25,000 or more of farm products per farm per year; Class II from $10,000 to $24,999; Class III from $5,000 to $9,999; Class IV from $2,500 to $4,999; Class V from $1,200 to $2,499; and Class VI from $250 to $1,199.

Thirty-nine percent of the farms in the area had product sales of only $1,199 or less compared with slightly less than 17 percent for the state.

When classified by economic class, more farms in the areas sampled fall into class VI than in any other class. In contrast, for the state as a whole a larger proportion falls in class IV than in any other.

Value of Farm Products Sold

Income deficiencies of the areas sampled are indicated by Table VII which shows that the average value of farm products sold per farm in these four types of farming areas was $1,309 as compared with a state average of $3,441.

TABLE VII

AVERAGE VALUE OF ALL FARM PRODUCTS SOLD PER FARM BY TYPE OF FARMING AREAS STUDIED AND OKLAHOMA, 1954

Area I	Area II	Area III	Area IV	Four Areas Combined	Oklahoma
$1,326	$1,651	$1,253	$1,004	$1,309	$3,441

Source: U. S. Census of Agriculture, 1954.

Summary of Characteristics of the Area

The average size of farms in the nine county area is 110.2 acres smaller than the average size of all farms in Oklahoma. The average size of farms of the 107 FHA borrowers in the study was 289.9 acres which was comparable with the state average.

The average acres of cropland per farm for farms in this area was 69.4 acres less than the average for the state. This was only slightly

more than half the state average. The average acres of cropland of the 107 FHA borrowers in the study was 28.6 acres or 36 percent higher than the average of all farms in this area but still 40.8 acres or 27 percent less than the average acres of all farms in the state.

The average value of all farms in the nine county area was $10,702 less than the average for all farms in the state.

The distribution of types of tenure in the area showed a higher percentage of full owners than for the state as a whole. The percentage of part-owners and tenants was slightly less than for the state but the percentage of managers showed only .1 percent difference.

The distribution of commercial farms by economic class in the nine counties showed a larger percentage in classes V and VI while for the state the largest percentage was in classes IV and V.

The average value of all farm products sold in the nine county area was $1,309 as compared with the average for the state of $3,441.

CHAPTER V

GENERAL CHARACTERISTICS OF THE 107 FHA BORROWERS

From the original FHA application forms certain information has been summarized to characterize the 107 FHA borrowers in the sample.[23] Applications for the loan were not all made at the same time so the figures denoting these characteristics are drawn over time.

Age of Borrowers at Time of Application

The range of ages of the borrowers was from 21 to 62 years. The average age was 41 years (Table VIII). Almost 55 percent of the borrowers were over 40 years of age at the time they applied for the loan. Seventeen percent were under 30 years of age. There is no clear indication that the age distribution is related to the type of farming engaged in.

Engaged in Farming at Time of Application

Of the 107 borrowers, 100 (93.5 percent) indicated that they were presently engaged in farming operations at the time they applied for the loan (Table IX). For each area more than 85 percent of the applicants were farming at the time of application. Seven of the borrowers (6.5 percent indicated that they were not engaged in farming at the time they applied for the loan. However, these seven were not new to farming for they indicated they had from 7 to 30 years of farming experience.

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[23] Some of the information was not available so the borrowers were omitted from the analysis of that particular characteristic.

TABLE VIII

RANGE IN THE AGES OF 107 FHA BORROWERS AT TIME OF APPLICATION

Age	Area I		Area II		Area III		Area IV		Four Areas	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Less than 25 years	1	2.7	3	8.7	0	0.0	2	7.4	6	5.7
25-30	5	13.5	4	11.4	1	14.3	2	7.4	12	11.3
31-35	3	8.1	6	17.1	1	14.3	4	14.8	14	13.2
36-40	4	10.8	7	20.0	1	14.3	4	14.8	16	15.1
41-45	12	32.5	4	11.4	1	14.3	7	26.0	24	22.6
46-50	6	16.2	6	17.1	3	42.8	2	7.4	17	16.0
51-55	3	8.1	4	11.4	0	0.0	2	7.4	9	8.5
Older than 55 years	3	8.1	1	2.9	0	0.0	4	14.8	8	7.6
Total	37	100.0	35	100.0	7	100.0	27	100.0	106*	100.0
Average age	42		40		40		42		41	

*Information was not available for one borrower in Area II.

TABLE IX

FARMING AT TIME OF APPLICATION FOR FHA LOANS;
107 FHA BORROWERS

	Yes	Percent of Total	No	Percent of Total
Area I	34	91.9	3	8.1
Area II	35	97.2	1	2.8
Area III	6	85.7	1	14.3
Area IV	25	92.6	2	7.4
Four Areas	100	93.5	7	6.5

Years of Farming Experience at Time of Application

When the borrower applied for the loan he stated the years of farming experience he had. Data for 16 borrowers were not available. The years of farming experience ranged from 3 to 45. Fourteen borrowers (15 percent) indicated they had been farming all of their lives (Table X). Only 2 percent had fewer than six years of farming experience. The largest proportion (26 percent) of the borrowers had from six to ten years farming experience.

Type of Tenure at Time of Application

Nearly 44 percent of the borrowers were tenants, 39 percent were part owners, and 17 percent were owners (Table XI). The percentage of tenants varied more by type of farming area than part owners and owners.

The range in percentage of tenancy was from 28.6 percent in Area III to 56.8 percent in Area I.

TABLE X

YEARS OF FARMING EXPERIENCE AT TIME OF APPLICATION:* 107 FHA BORROWERS

Years	Area I		Area II		Area III		Area IV		Four Areas	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1-5	-	-	2	6.9	-	-	-	-	2	2.2
6-10	6	18.2	7	24.1	4	57.1	7	31.8	24	26.4
11-15	5	15.2	4	13.8	-	-	-	-	9	9.9
16-20	6	18.2	1	3.4	-	-	6	27.3	13	14.3
21-25	5	15.2	3	10.3	1	14.3	2	9.1	11	12.1
26-30	6	18.2	4	13.8	2	28.6	2	9.1	14	15.4
Over 30	1	3.0	2	6.9	-	-	1	4.5	4	4.4
"All of Life"	4	12.1	6	20.7	-	-	4	18.2	14	15.4

*Information was not available for 16 borrowers.

The percentage (16.8 percent) of the 107 FHA borrowers who were full owners was considerably less than the percentage (58 percent) of full owners among all farmers in the nine county area (Table V). However, the percentage (39.3 percent) of FHA borrowers who were part-owners was larger than the percentage (26.3 percent) of part owners in the total area. Likewise, the percentage (43.9 percent) of FHA borrowers who were tenants was larger than the percentage (24.3 percent) of tenants for the nine counties.

TABLE XI

TYPE OF TENURE AT TIME OF LOAN APPLICATION: 107 FHA BORROWERS

	Tenant		Part Owner		Owner	
	Number	Percent	Number	Percent	Number	Percent
Area I	21	56.8	13	35.1	3	8.1
Area II	14	38.9	15	41.7	7	19.4
Area III	2	28.6	4	57.1	1	14.3
Area IV	10	37.0	10	37.0	7	26.0
Average of Four Areas	47	43.9	42	39.3	18	16.8

Type of Lease at Time of Application

The most common type of lease was the crop-share(Table XII). It was used by 65 percent of the borrowers in the four areas. The cash lease was used by 27 percent of the borrowers. The cash-crop share was used by only seven percent of the borrowers and the livestock-crop share was used only by one borrower.

TABLE XII

TYPE OF LEASE AT TIME OF LOAN APPLICATION: 107 FHA BORROWERS

Type of Farming Area	Cash		Crop-Share		Livestock-Crop-Share		Cash-Crop Share	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Area I	11	32.4	20	58.8	1	2.9	2	5.9
Area II	8	27.6	19	65.5	0	0.0	2	6.9
Area III	1	16.7	3	50.0	0	0.0	2	33.3
Area IV	4	20.0	16	80.0	0	0.0	0	0.0
Four Areas Combined	24	27.0	58	65.2	1	1.1	6	6.7

Purpose of Loan

To receive a loan the borrower must stipulate the use he intends to make of the loan funds. The intent to purchase machinery and equipment was expressed by 2.9 percent of the borrowers, 3.8 percent intended to refinance existing debts, 8.6 percent to purchase land, 9.5 percent intended to use the funds for operating expenses, and 10.5 percent for the purchase of livestock (Table XIII).

The intent to use the loans for a combination of two or more of the above purposes, with the exception of purchasing land, was expressed by 64.7 percent of the borrowers.

Size of Loan

The size of loans in the four farm type areas ranged from $1,075 in Area IV to $18,000 in Area II. The average size of loan for all four

TABLE XIII

INTENDED USE OF LOAN FUNDS AS EXPRESSED BY 107 FHA BORROWERS*

Use of Loan Funds	Area I		Area II		Area III		Area IV		Four Areas	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Refinance indebtedness	3	8.3	1	2.8	-	-	-	-	4	3.8
Livestock purchase	2	5.6	1	2.8	2	33.3	6	22.2	11	10.5
Machinery and equipment purchase	1	2.8	1	2.8	-	-	1	3.7	3	2.9
Operating expense	5	13.9	1	2.8	1	16.7	3	11.1	10	9.5
Two or more of above uses	23	63.8	29	80.5	3	50.0	13	48.2	68	64.7
Land purchase	2	5.6	3	8.3	-	-	4	14.8	9	8.6

*Information was not available for two borrowers.

areas was $6,775 (Table XIV). Almost 50 percent of the loans were in the range from $3,000 to $7,000. Loans of over $10,000 constituted only 15.8 percent of the total loans made.

Source of Credit Before Applying for FHA Loan

Forty-four of the borrowers (41.2 percent) used no credit before they applied for the FHA loan (Table XV). Fifty-five of the borrowers (51.4 percent) used commercial banks as sources of credit before borrowing from the FHA. Private individuals as a source of loan funds were indicated by 3.7 percent of the borrowers. Loan funds from production credit associations were used by 2.8 percent of the borrowers and .9 percent used funds from the Federal Land Bank.

TABLE XV

SOURCES OF CREDIT USED BY 107 FHA BORROWERS BEFORE COMING FHA CLIENTS

Source of Credit	Area I		Area II		Area III		Area IV		Four Areas	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
No credit	10	27.0	13	36.1	5	71.4	16	59.3	44	41.2
Commercial bank	25	67.6	21	58.3	2	28.6	7	25.9	55	51.4
Private individual	1	2.7	-	-	-	-	3	11.1	4	3.7
Production credit associations	1	2.7	1	2.8	-	-	1	3.7	3	2.8
Federal Land Bank	-	-	1	2.8	-	-	-	-	1	.9
Total	37	100.0	36	100.0	7	100.0	27	100.0	107	100.0

Of the 63 borrowers who specified some source of loans before receiving the FHA credit, 87.4 percent used commercial banks, 6.3 percent

TABLE XIV

SIZE OF ORIGINAL LOAN COMMITMENT TO 107 FHA BORROWERS: BY NUMBER AND PERCENTAGE OF TOTAL IN EACH SIZE GROUP

Loan Commitment (Dollars)	Area I		Area II		Area III		Area IV		Four Areas	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Less than $1,000	-	-	-	-	-	-	-	-	-	-
$1,000 - 1,999	2	5.4	-	-	-	-	2	7.4	4	3.7
$2,000 - 2,999	-	-	5	13.8	1	14.3	4	14.8	10	9.3
$3,000 - 3,999	5	13.5	9	25.0	-	-	1	3.7	15	14.1
$4,000 - 4,999	6	16.3	3	8.3	2	28.5	2	7.4	13	12.1
$5,000 - 5,999	7	18.9	3	8.3	1	14.3	3	11.1	14	13.1
$6,000 - 6,999	3	8.1	4	11.1	-	-	4	14.8	11	10.4
$7,000 - 7,999	3	8.1	1	2.8	1	14.3	1	3.7	6	5.7
$8,000 - 8,999	3	8.1	4	11.1	1	14.3	2	7.4	10	9.3
$9,000 - 9,999	1	2.7	2	5.6	1	14.3	3	11.1	7	6.5
$10,000 - 10,999	1	2.7	-	-	-	-	1	3.7	2	1.9
$11,000 - 11,999	-	-	1	2.8	-	-	-	-	1	.9
$12,000 - 12,999	2	5.4	-	-	-	-	1	3.7	3	2.8
$13,000 - 13,999	2	5.4	-	-	-	-	1	3.7	3	2.8
$14,000 - 14,999	1	2.7	-	-	-	-	-	-	1	.9
$15,000 - 15,999	1	2.7	2	5.6	-	-	-	-	3	2.8
$16,000 - 16,999	-	-	-	-	-	-	1	3.7	1	.9
$17,000 - 17,999	-	-	-	-	-	-	1	3.7	1	.9
$18,000 - 18,999	-	-	2	5.6	-	-	-	-	2	1.9
Average Size of Loan	6,896		6,523		6,329		7,059		6,775	

used private individuals, 4.8 percent used production credit associations and 1.5 percent used the Federal Land Bank. It should be pointed out however, that to become FHA borrowers funds from these other sources must have become unavailable to them. Regulations require that all debts be consolidated and only the FHA used as the source of loan funds.

Number of Children

Eighteen of the borrowers (16.9 percent) had no children and two borrowers (1.9 percent) had nine children (Table XVI). The largest proportion, 26.4 percent of the borrowers had two children. The average number of children in each family was 2.7.

Type of Operation at Time of Application

The type of operation was based on the major source from which income was derived. The farms were classified into seven different types: livestock, dairy, poultry, cotton, field crops, cash grain, and general. Fifty percent of farm income must be derived from one source before the farm was classified into a particular type. The classification of "general" includes those farms that did not derive 50 percent of their income from one source.

The two major types of operation found in the four areas were general and livestock (Table XVII). The general classification accounted for 38.2 percent of the farms and 24.3 percent were classified as livestock. Cotton operations comprised 15.9 percent and field crops 13.1. The field crops type of operation consisted mostly of peanuts. The two types least found were poultry and cash grain. Both were 1.9 percent.

TABLE XVI

NUMBER AND PERCENT OF BORROWERS WITH SPECIFIED NUMBERS OF CHILDREN AT TIME OF APPLICATION: 107 FHA BORROWERS

	Area I		Area II		Area III		Area IV		Four Areas	
Children	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
0	6	16.2	4	11.1	1	14.3	7	26.9	18	16.9
1	6	16.2	6	16.6	0	0	3	11.6	15	14.2
2	10	27.1	11	30.5	2	28.6	5	19.3	28	26.4
3	5	13.5	2	5.6	2	28.6	4	15.4	13	12.3
4	5	13.5	3	8.3	0	0	4	15.4	12	11.3
5	1	2.7	4	11.1	1	14.3	1	3.8	7	6.6
6	1	2.7	1	2.8	0	0	1	3.8	3	2.8
7	2	5.4	2	5.6	0	0	0	0	4	3.8
8	0	0	2	5.6	1	14.3	1	3.8	4	3.8
9	1	2.7	1	2.8	0	0	0	0	2	1.9
Total	37	100.0	36	100.0	7	100.0	26	100.0	106*	100.0
Average number of children	2.6		3.1		3.3		2.3		2.7	

*Information was not available for one borrower.

TABLE XVII

TYPE OF FARMING OPERATION AT TIME OF APPLICATION: 107 FHA BORROWERS

Type of Operation	Area I		Area II		Area III		Area IV		Four Areas	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Livestock	8	21.6	7	19.4	4	57.1	7	25.9	26	24.3
Dairy	-	-	4	11.1	-	-	1	3.7	5	4.7
Poultry	2	5.4	-	-	-	-	-	-	2	1.9
Cotton	2	5.4	4	11.1	-	-	11	40.8	17	15.9
Field crops	9	24.3	1	2.8	2	28.6	2	7.4	14	13.1
Cash grain	1	2.7	1	2.8	-	-	-	-	2	1.9
General	15	40.6	19	52.8	1	14.3	6	22.2	41	38.2
Total	37	100.0	36	100.0	7	100.0	27	100.0	107	100.0

Cash and Bonds on Hand

Only four borrowers stated they had some cash and/or bonds on hand at the time they applied for loans. The amounts ranged from $120 to $1,000.

Net Income Year Preceding Loan

The net income of the borrowers the year preceding the loan ranged from -$1,478 to $7,780. The average net income for all borrowers was $1,084 (Table XVIII). Seventy-five of the borrowers (80.5 percent) had a net income the year preceding the loan of less than $2,000. Fifteen of the borrowers (16.1 percent) had a net income of less than zero.

TABLE XVIII

NET INCOME YEAR PRECEDING LOAN APPLICATION: 107 FHA BORROWERS

Dollars	Area I		Area II		Area III		Area IV		Four Areas	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Less than zero	8	27.6	4	12.1	1	16.7	2	8.0	15	16.1
0-499	7	24.1	9	27.3	2	33.3	5	20.0	23	24.7
500-999	5	17.2	4	12.1	-	-	6	24.0	15	16.1
1000-1499	5	17.2	3	9.1	1	16.7	2	8.0	11	11.8
1500-1999	2	6.9	6	18.2	-	-	3	12.0	11	11.8
2000-2499	-	-	3	9.1	-	-	2	8.0	5	5.4
2500-2999	1	3.5	-	-	2	33.3	-	-	3	3.2
3000-3499	1	3.5	2	6.1	-	-	2	8.0	5	5.4
3500-3999	-	-	1	3.0	-	-	1	4.0	2	2.2
4000-4499	-	-	-	-	-	-	-	-	-	-
4500-4999	-	-	1	3.0	-	-	-	-	1	1.1
6000-6499	-	-	-	-	-	-	1	4.0	1	1.1
7500-7999	-	-	-	-	-	-	1	4.0	1	1.1
Total	29	100.0	33	100.0	6	100.0	25	100.0	93*	100.0
Average net income	581		1104		1095		1619		1084	

*Information was not available for 14 borrowers.

Capital Invested at Time of Application

The amount of total capital invested by the borrowers at the time application for loan was made ranged from $115 to $54,000. The average of capital invested was $8,710 (Table XIX). This average varied from $7,700 in Area III to $10,188 in Area II.

Net Worth at Time of Application

The net worth of the borrowers ranged from minus $2,717 to $47,900. The average net worth for all borrowers was $5,453 (Table XX). The average net worth in the four areas ranged from $4,400 in Area I to $6,530 in Area III.

Summary of General Characteristics of the 107 FHA Borrowers at the Time They Applied for the Loan

The average age of the borrowers at the time they applied for the loan was 41 years. The range of ages was from 21 to 62 years.

One hundred of the borrowers were farming at the time application for the loan was made. The seven who were not presently farming were not "new" farmers for they had from 7 to 30 years of farming experience. The range of farming experience for all 107 borrowers was from 3 to 45 years.

Nearly 44 percent of the borrowers were tenants, 39 percent were part-owners, and only 17 percent were owners.

The crop-share type of lease was used by 65.2 percent of the borrowers and the livestock-crop-share was used by only 1.1 percent. The straight cash lease was used by 27 percent and the cash-crop-share type by 6.7 percent.

TABLE XIX

NUMBER AND PERCENTAGE OF BORROWERS WITH SPECIFIED RANGE OF CAPITAL INVESTED AT TIME OF APPLICATION: 107 FHA BORROWERS

Capital (Dollars)	Area I		Area II		Area III		Area IV		Four Areas	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
0-499	-	-	1	2.8	-	-	1	3.7	2	1.9
500-999	4	10.8	2	5.6	1	14.3	2	7.4	9	8.4
1000-1999	5	13.5	6	16.7	-	-	2	7.4	13	12.1
2000-2999	2	5.4	2	5.6	1	14.3	5	18.5	10	9.3
3000-3999	5	13.5	1	2.8	-	-	-	-	6	5.6
4000-4999	4	10.8	3	8.3	1	14.3	1	3.7	9	8.4
5000-5999	2	5.4	1	2.8	1	14.3	1	3.7	5	4.8
6000-6999	1	2.7	3	8.3	-	-	-	-	4	3.7
7000-7999	-	-	1	2.8	-	-	2	7.4	3	2.8
8000-8999	3	8.1	-	-	-	-	2	7.4	5	4.8
9000-9999	1	2.7	-	-	-	-	4	14.8	5	4.8
10000-10999	-	-	1	2.8	1	14.3	1	3.7	3	2.8
11000-11999	-	-	-	-	-	-	1	3.7	1	.9
12000-12999	3	8.1	3	8.3	1	14.3	-	-	7	6.5
13000-13999	1	2.7	2	5.6	-	-	1	3.7	4	3.7
14000-14999	1	2.7	2	5.6	-	-	-	-	3	2.8
15000-15999	1	2.7	1	2.8	-	-	-	-	2	1.9
16000-16999	-	-	1	2.8	-	-	-	-	1	.9
17000-17999	1	2.7	-	-	1	14.3	-	-	2	1.9
18000-18999	-	-	2	5.6	-	-	1	3.7	3	2.8
19000-19999	-	-	-	-	-	-	-	-	-	-
20000-20999	-	-	-	-	-	-	1	3.7	1	.9
21000-21999	1	2.7	-	-	-	-	-	-	1	.9
22000-22999	-	-	1	2.8	-	-	-	-	1	.9
26000-26999	1	2.7	1	2.8	-	-	-	-	2	1.9
30000-30999	-	-	1	2.8	-	-	1	3.7	2	1.9
32000-32999	-	-	-	-	-	-	1	3.7	1	.9
39000-39999	1	2.7	-	-	-	-	-	-	1	.9
54000-54999	-	-	1	2.8	-	-	-	-	1	.9
Total	37	99.9	36	100.4	7	100.1	27	99.9	107	100.0
Average	7774		10188		7700		8284		8710	

TABLE XX

NUMBER AND PERCENTAGE OF BORROWERS HAVING A SPECIFIED RANGE OF NET WORTH AT TIME OF APPLICATION*: 107 FHA BORROWERS

Net Worth (dollars)	Area I		Area II		Area III		Area IV		Four Areas	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Less than zero	4	10.8	1	2.9	-	-	-	-	5	4.7
0-999	9	24.4	9	25.4	1	14.3	6	22.2	25	23.7
1000-1999	4	10.8	6	17.1	1	14.3	3	11.1	14	13.3
2000-2999	2	5.4	3	8.6	-	-	3	11.1	8	7.6
3000-3999	-	-	2	5.7	1	14.3	2	7.4	5	4.7
4000-4999	6	16.2	-	-	1	14.3	3	11.1	10	9.4
5000-5999	3	8.1	1	2.9	-	-	-	-	4	3.8
6000-6999	1	2.7	2	5.7	-	-	1	3.7	4	3.8
7000-7999	1	2.7	1	2.9	-	-	2	7.4	4	3.8
8000-8999	1	2.7	2	5.7	-	-	-	-	3	2.8
9000-9999	2	5.4	1	2.9	1	14.3	4	14.9	8	7.6
10000-10999	-	-	-	-	-	-	-	-	-	-
11000-11999	1	2.7	3	8.6	-	-	-	-	4	3.8
12000-12999	-	-	-	-	1	14.3	-	-	1	.9
13000-13999	-	-	1	2.9	1	14.3	-	-	2	1.9
14000-14999	1	2.7	-	-	-	-	-	-	1	.9
15000-15999	-	-	1	2.9	-	-	-	-	1	.9
16000-16999	-	-	-	-	-	-	1	3.7	1	.9
17000-17999	1	2.7	-	-	-	-	1	3.7	2	1.9
18000-18999	-	-	-	-	-	-	-	-	-	-
19000-19999	-	-	-	-	-	-	-	-	-	-
20000-20999	-	-	-	-	-	-	-	-	-	-
21000-21999	1	2.7	-	-	-	-	-	-	1	.9
22000-22999	-	-	-	-	-	-	-	-	-	-
23000-23999	-	-	-	-	-	-	1	3.7	1	.9
30000-30999	-	-	1	2.9	-	-	-	-	1	.9
47000-47999	-	-	1	2.9	-	-	-	-	1	.9
Total	37	100.0	35	100.0	7	100.1	27	100.0	106	100.0
Average Net Worth	4400		6294		6530		5527		5453	

*Information was not available for one borrower.

The intended use of loan funds as indicated by the borrowers varied from 10.5 percent of the borrowers who borrowed for livestock purchase to 2.9 percent who borrowed for machinery and equipment purchase. Operating expense was cited as the purpose of the loan by 9.5 percent of the borrowers and refinancing of indebtedness by 3.8 percent. A combination of two or more of the above uses was expressed by 64.7 percent of the borrowers as the loan purpose and 8.6 percent intended to purchase land.

The size of the loans ranged from $1,075 to $18,000. The average size of loan was $6,775.

No credit was used by 41.2 percent of the borrowers before applying for FHA credit. Commercial banks were indicated as loan sources by 51.4 percent of the borrowers. Other credit sources used and the percentages accounted for were: private individuals, 3.7 percent; production credit associations, 2.8 percent; and the Federal Land Bank, .9 percent.

Eighteen of the borrowers had no children and two had nine each. The average number of children per borrower was 2.7.

The two major types of farming operation were general farming and livestock. Together, they accounted for 62.5 percent of the borrowers. Cotton and field crops (mostly peanuts) accounted for another 29 percent. The remaining 8.5 percent was spread over dairy, poultry, and cash grain types of operations.

Only four borrowers had some cash and/or bonds on hand at the time they applied for loans. The amounts ranged from $120 to $1,000.

The net income of the borrowers the year before they applied for the loan ranged from minus $1,478 to $7,780. The average net income the year preceding application was $1,084.

The amount of total capital invested by the borrowers at the time of application ranged from $115 to $54,000. The average of capital invested was $8,710.

The net worth of the borrowers at the time they applied for the loans ranged from minus $2,717 to $47,900. The average net worth of all borrowers was $5,453.

Characteristics for the Most Recent Loan Year Compared with Those at the Time of Application

A comparison is made of various pertinent characteristics at the time of application with the same characteristics for the most recent year of the loan. This is to determine whether the borrowers have made progress over the intervening years.

Size of Farms During the Most Recent Loan Year

The average size of farms for the most recent year of the loans in the four areas ranged from 311.7 acres in Area IV to 852.1 acres in Area III (Table XXI). The average size of farms for all four areas was 385.7 acres.

The average acres of cropland ranged from 102.9 acres in Area III to 128.9 acres in Area II (Table XXI). The average acres of cropland for all four areas was 125.4 acres.

TABLE XXI

AVERAGE SIZE OF FARM, LAST YEAR OF LOAN: 107 FHA BORROWERS

Type of Farming Area	Average Total Acres Per Farm	Average Acres Cropland Per Farm
Area I	422.7	127.2
Area II	313.5	128.9
Area III	852.1	102.9
Area IV	311.7	124.3
Average of Four Areas	385.7	125.4

Comparison of the Average Size of Farms and Average Acres of Cropland at the Time of Application and for the Last Year of the Loan

As shown by Figure 8 the average size of farms increased in all four areas during the loan period. The largest increase of 362.4 acres was in Area III. The smallest increase was in Area II which was 50.4 acres. The average size of farms of all 107 FHA borrowers increased from 289.9 acres to 385.7 acres or a gain of 95.8 acres.

As did the size of farm, the average acres of cropland also increased in all four areas during the period from the time of application to the most recent year of the loan. The largest increase was 41.6 acres in Area IV. Area II showed an increase of only 2.8 acres. The average acres of cropland for all borrowers increased during this period from 107.5 acres to 125.4 acres (Figure 9).

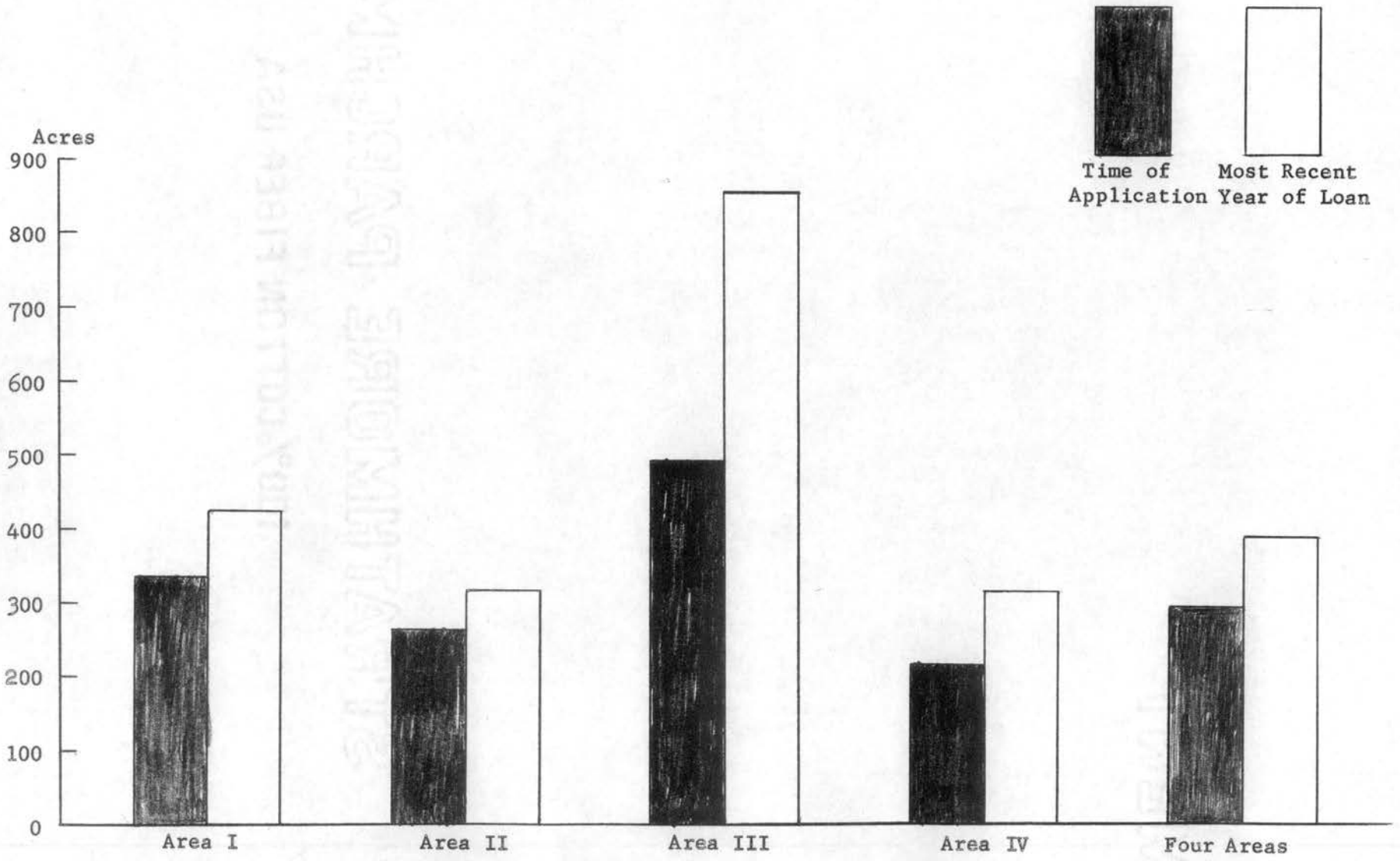

Figure 8. Comparison of Average Size of Farm at Time of Application and Most Recent Year of Loan: 107 FHA Borrowers

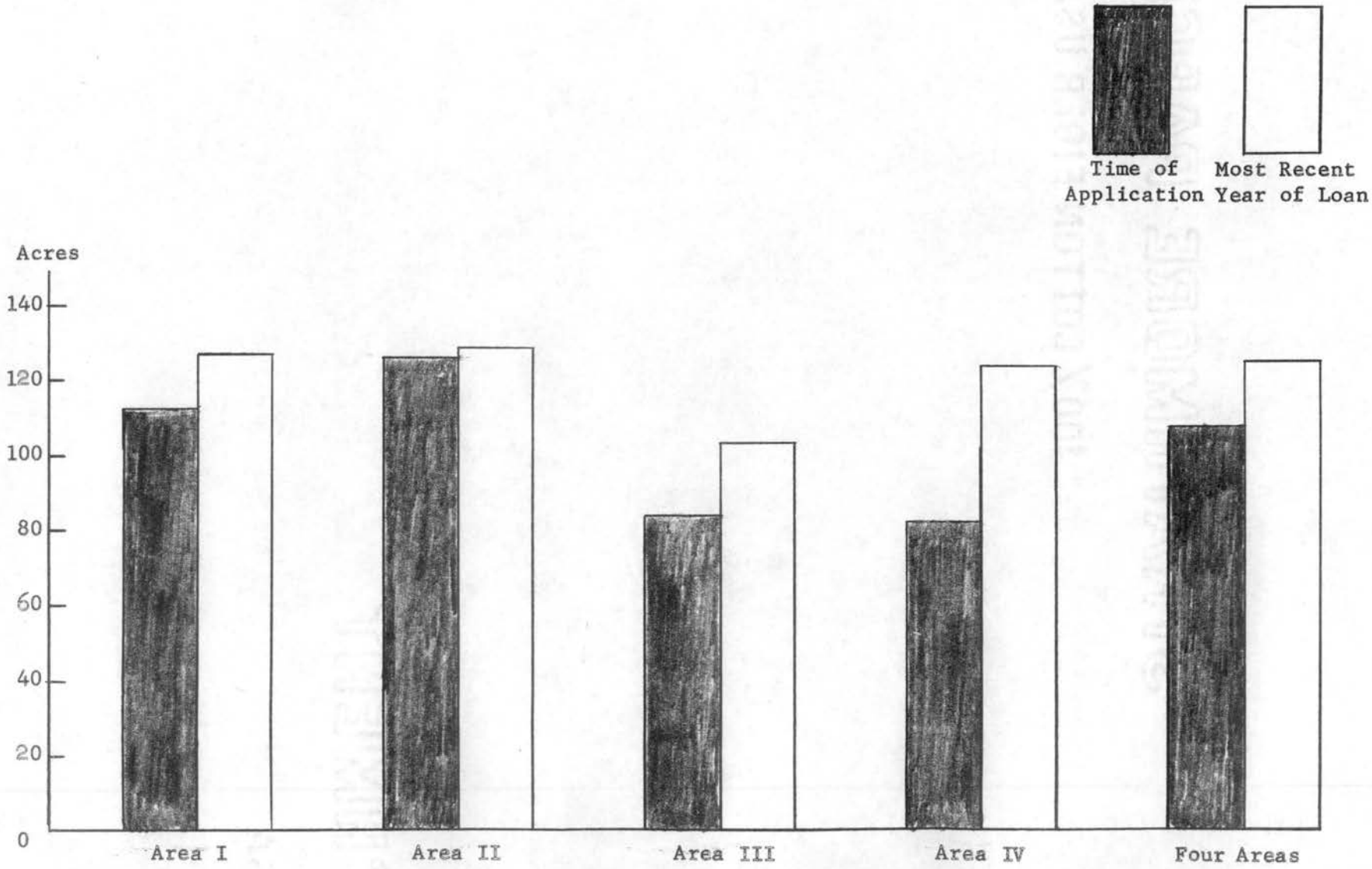

Figure 9. Comparison of Average Acres of Cropland at Time of Application and Most Recent Year of Loan: 107 FHA Borrowers

Comparison of Net Cash Farm Income at the End of the First and Last Years of Loan

Due to the fact that no figure for net cash farm income was available at the time of application, a comparison was made between the net cash farm income at the end of the first and last years of the loan. The average net cash farm income of the 107 borrowers at the end of the first year of the loan was $1,067 (Table XXII). This average had increased by $985 at the close of the last year of the loan to $2,052.

The average net cash farm income increased in each of the four areas (Figure 10). The largest amount of total increase was $1,476 in Area II. This was an increase of 183 percent. Area IV showed an increase of $1,102 which was a 333 percent increase. The smallest increase was $452 in Area III. This was only a 19 percent increase.

Comparison of Average Capital Invested Per Farm at Time of Application and the Most Recent Year of the Loan

The average capital invested per farm the last year of the loan ranged from $11,630 in Area I to $16,369 in Area II. The average capital invested for all four areas was $14,340 (Table XXIII). This average capital invested per farm of $14,340 compares with $8,710 at the time of application for the loans (Figure 11). This was a 65 percent increase. The largest amount of increase was $7,058 in Area IV. This was an increase of 85 percent. The smallest increase was $3,856 in Area I which was 49.6 percent.

TABLE XXII

COMPARISON OF NET CASH FARM INCOME FIRST AND LAST YEAR OF LOAN: 107 FHA BORROWERS

Net Cash Farm Income (Dollars)	Area I				Area II				Area III				Area IV				Four Areas			
	First Year		Last Year		First Year		Last Year		First Year		Last Year		First Year		Last Year		First Year		Last Year	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Less than zero	5	13.5	2	5.4	12	33.3	3	8.3	1	14.3	-	-	8	29.6	5	18.5	26	24.3	10	9.3
0-499	3	8.1	2	5.4	9	25.0	3	8.3	-	-	1	14.3	6	22.2	5	18.5	18	16.8	11	10.3
500-999	8	21.7	6	16.3	2	5.6	4	11.1	1	14.3	1	14.3	7	25.9	3	11.1	18	16.8	14	13.1
1000-1499	4	10.8	5	13.5	2	5.6	4	11.1	1	14.3	2	28.6	1	3.7	2	7.4	8	7.5	13	12.2
1500-1999	4	10.8	5	13.5	4	11.1	5	13.9	1	14.3	-	-	3	11.1	3	11.1	12	11.2	13	12.2
2000-2499	3	8.1	4	10.8	1	2.8	4	11.1	-	-	-	-	2	7.4	1	3.7	6	5.6	9	8.4
2500-2999	2	5.4	5	13.5	-	-	7	19.4	-	-	-	-	-	-	3	11.1	2	1.9	15	14.0
3000-3499	3	8.1	2	5.4	2	5.6	-	-	1	14.3	-	-	-	-	1	3.7	6	5.6	3	2.8
3500-3999	1	2.7	1	2.7	1	2.8	1	2.8	1	14.3	2	28.6	-	-	1	3.7	3	2.8	5	4.7
4000-4499	1	2.7	-	-	1	2.8	1	2.8	-	-	-	-	-	-	-	-	2	1.9	1	.9
4500-4999	1	2.7	2	5.4	1	2.8	1	2.8	-	-	-	-	-	-	-	-	2	1.9	3	2.8
5000-5499	1	2.7	2	5.4	1	2.8	-	-	-	-	-	-	-	-	-	-	2	1.9	2	1.9
5500-5999	-	-	1	2.7	-	-	-	-	-	-	-	-	-	-	2	7.4	-	-	3	2.8
6000-6499	-	-	-	-	-	-	1	2.8	1	14.3	-	-	-	-	-	-	1	.9	1	.9
6500-6999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7000-7499	-	-	-	-	-	-	1	2.8	-	-	-	-	-	-	1	3.7	-	-	2	1.9
7500-7999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8000-8499	1	2.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	.9	-	-
8500-8999	-	-	-	-	-	-	-	-	-	-	1	14.3	-	-	-	-	-	-	1	.9
9000-9499	-	-	-	-	-	-	1	2.8	-	-	-	-	-	-	-	-	-	-	1	.9
Total	37	100.0	37	100.0	36	100.2	36	100.0	7	100.1	7	100.1	27	99.9	27	99.9	107	100.0	107	100.0
Average	1612		2131		806		2286		2363		2815		331		1433		1067		2052	

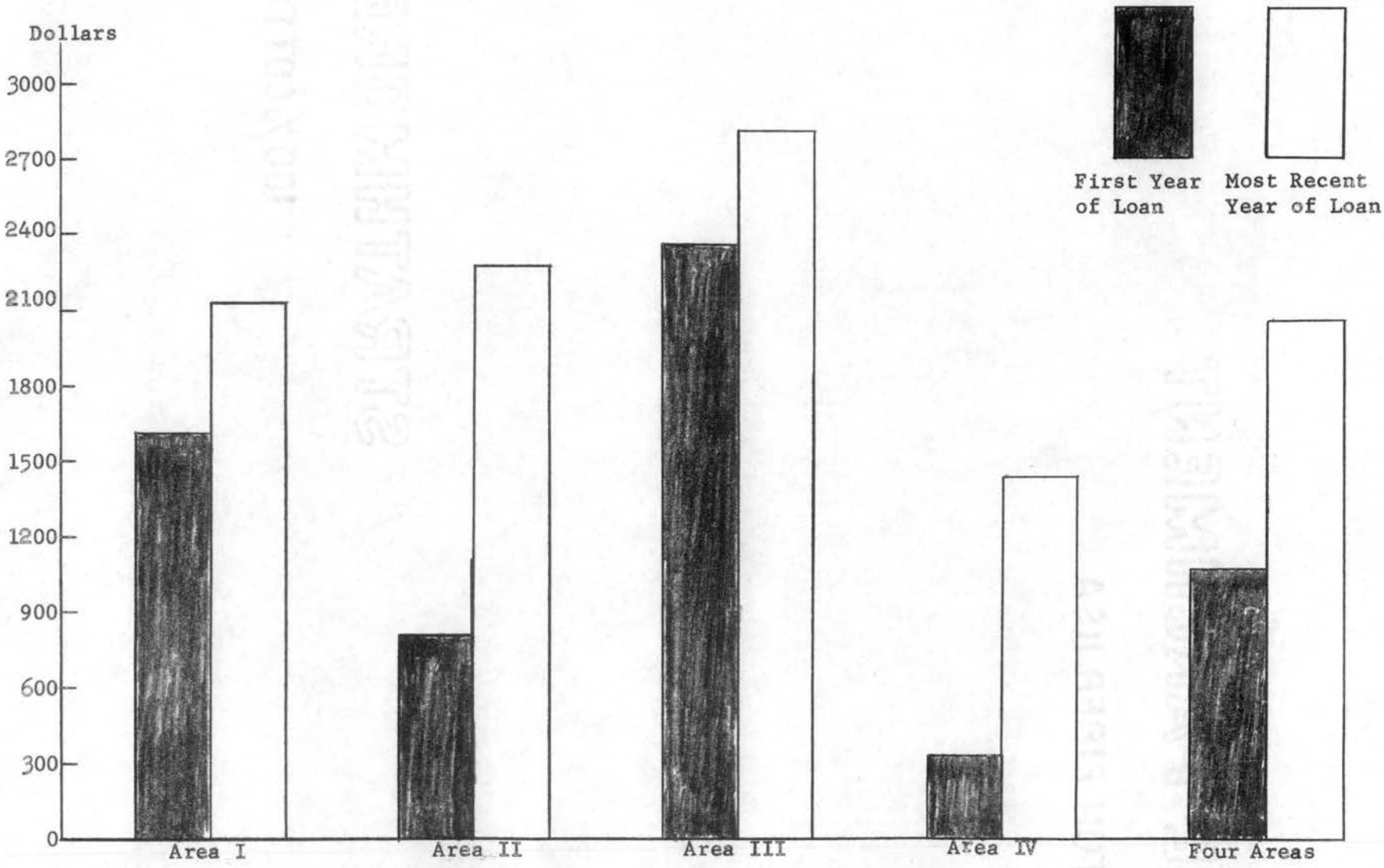

Figure 10. Comparison of Average Net Cash Farm Income First Year of Loan and Most Recent Year of Loan: 107 FHA Borrowers

TABLE XXIII

NUMBER AND PERCENTAGE OF BORROWERS WITH SPECIFIED RANGE OF CAPITAL INVESTED LAST YEAR OF LOAN: 107 FHA BORROWERS

Capital Invested (Dollars)	Area I		Area II		Area III		Area IV		Average of Four Areas	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
0-999	-	-	-	-	-	-	-	-	-	-
1000-1999	-	-	-	-	-	-	2	7.4	2	1.9
2000-2999	1	2.7	3	8.3	1	14.3	-	-	5	4.8
3000-3999	5	13.5	4	11.1	-	-	2	7.4	11	10.5
4000-4999	4	10.8	1	2.8	-	-	1	3.7	6	5.6
5000-5999	3	8.1	2	5.5	-	-	1	3.7	6	5.6
6000-6999	2	5.4	3	8.3	-	-	-	-	5	4.8
7000-7999	5	13.5	2	5.5	1	14.3	1	3.7	9	8.4
8000-8999	1	2.7	1	2.8	-	-	2	7.4	4	3.7
9000-9999	4	10.8	2	5.5	-	-	4	14.8	10	9.3
10000-10999	-	-	-	-	1	14.3	-	-	1	.9
11000-11999	2	5.4	-	-	1	14.3	2	7.4	5	4.7
12000-12999	-	-	-	-	-	-	1	3.7	1	.9
13000-13999	-	-	-	-	-	-	1	3.7	1	.9
14000-14999	2	5.4	1	2.8	-	-	-	-	3	2.8
15000-15999	1	2.7	2	5.5	-	-	-	-	3	2.8
16000-16999	-	-	-	-	1	14.3	-	-	1	.9
17000-17999	-	-	1	2.8	-	-	-	-	1	.9
18000-18999	-	-	1	2.8	-	-	-	-	1	.9
19000-19999	1	2.7	1	2.8	-	-	-	-	2	1.9
20000-20999	-	-	2	5.5	1	14.3	3	11.1	6	5.6
21000-21999	1	2.7	-	-	-	-	-	-	1	.9
22000-22999	-	-	1	2.8	-	-	-	-	1	.9
23000-23999	-	-	2	5.5	-	-	1	3.7	3	2.8
24000-24999	-	-	-	-	-	-	-	-	-	-
25000-25999	1	2.7	-	-	-	-	-	-	1	.9
26000-26999	-	-	-	-	-	-	1	3.7	1	.9
27000-27999	1	2.7	-	-	-	-	-	-	1	.9
28000-28999	-	-	-	-	-	-	-	-	-	-
29000-29999	-	-	-	-	-	-	1	3.7	1	.9
30000-30999	-	-	1	2.8	-	-	-	-	1	.9
31000-31999	-	-	1	2.8	-	-	-	-	1	.9
32000-32999	-	-	1	2.8	1	14.3	-	-	2	1.9
33000-33999	-	-	-	-	-	-	1	3.7	1	.9
34000-34999	-	-	-	-	-	-	2	7.4	2	1.9
35000-35999	-	-	1	2.8	-	-	-	-	1	.9
36000-36999	-	-	-	-	-	-	-	-	-	-
37000-37999	1	2.7	1	2.8	-	-	-	-	2	1.9
38000-38999	1	2.7	-	-	-	-	1	3.7	2	1.9
39000-39999	-	-	-	-	-	-	-	-	-	-
40000-40999	-	-	-	-	-	-	-	-	-	-
41000-41999	1	2.7	-	-	-	-	-	-	1	.9
46000-46999	-	-	1	2.8	-	-	-	-	1	.9
65000-65999	-	-	1	2.8	-	-	-	-	1	.9
Total	37	99.9	36	99.9	7	100.1	27	99.9	107	99.9
Average	11630		16369		14371		15342		14340	

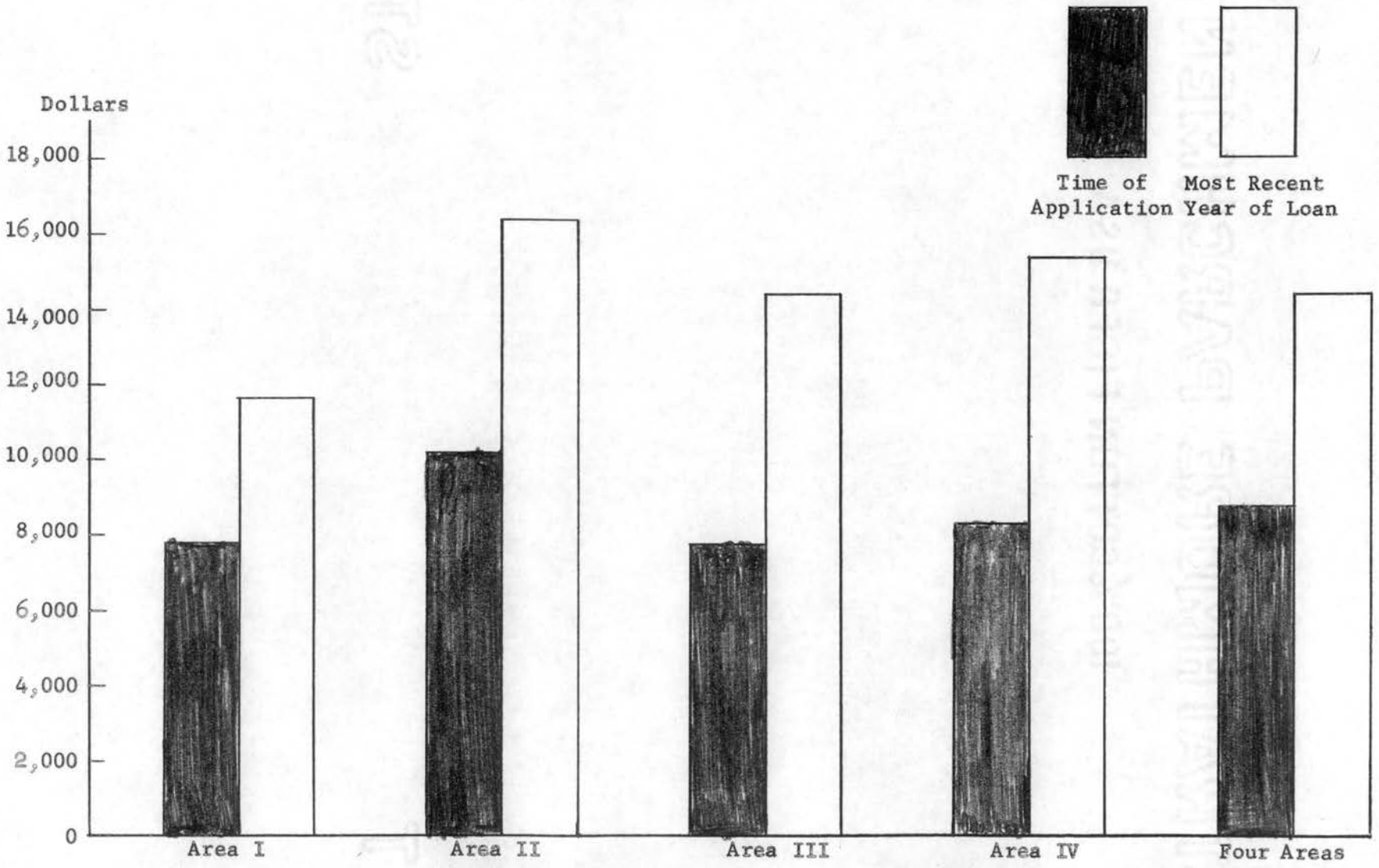

Figure 11. Comparison of Average Capital Invested at Time of Application and Most Recent Year of Loan: 107 FHA Borrowers

Comparison of Average Net Worth at Time of Application and for the Most Recent Year of the Loan

The average net worth the last year of the loan ranged from $6,241 in Area I to $9,744 in Area III (Table XXIV). The average net worth for all four areas was $7,756 which compares with $5,453 at the time of application (Figure 12). This was a 42 percent increase in net worth. The largest amount of increase was $3,214 in Area III which was 49 percent. The smallest increase was $1,547, 28 percent, in Area IV.

TABLE XXIV

NUMBER AND PERCENTAGE OF BORROWERS HAVING A SPECIFIED RANGE OF NET WORTH LAST YEAR OF LOAN: 107 FHA BORROWERS

Net Worth (Dollars)	Area I		Area II		Area III		Area IV		Four Areas	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Less than zero	2	5.4	-	-	-	-	2	7.4	4	3.7
0-999	3	8.1	4	11.1	1	14.3	4	14.8	12	11.2
1000-1999	7	18.9	6	16.6	-	-	-	-	13	12.3
2000-2999	3	8.1	1	2.8	1	14.3	-	-	5	4.7
3000-3999	4	10.8	5	13.8	1	14.3	1	3.7	11	10.4
4000-4999	1	2.7	2	5.6	1	14.3	4	14.8	8	7.5
5000-5999	5	13.5	-	-	1	14.3	-	-	6	5.6
6000-6999	1	2.7	-	-	-	-	3	11.1	4	3.7
7000-7999	1	2.7	1	2.8	-	-	3	11.1	5	4.7
8000-8999	2	5.4	1	2.8	-	-	1	3.7	4	3.7
9000-9999	1	2.7	2	5.6	-	-	1	3.7	4	3.7
10000-10999	2	5.4	1	2.8	-	-	-	-	3	2.8
11000-11999	-	-	3	8.3	-	-	1	3.7	4	3.7
12000-12999	-	-	2	5.6	-	-	-	-	2	1.9
13000-13999	-	-	1	2.8	-	-	2	7.4	3	2.8
14000-14999	-	-	2	5.6	1	14.3	-	-	3	2.8
15000-15999	1	2.7	-	-	-	-	-	-	1	.9
16000-16999	-	-	1	2.8	1	14.3	2	7.4	4	3.7
17000-17999	1	2.7	-	-	-	-	1	3.7	2	1.9
18000-18999	-	-	-	-	-	-	1	3.7	1	.9
19000-19999	1	2.7	-	-	-	-	-	-	1	.9
20000-20999	-	-	1	2.8	-	-	-	-	1	.9
21000-21999	-	-	-	-	-	-	-	-	-	-
22000-22999	-	-	-	-	-	-	-	-	-	-
23000-23999	-	-	-	-	-	-	-	-	-	-
24000-24999	-	-	-	-	-	-	-	-	-	-
25000-25999	-	-	-	-	-	-	-	-	-	-
26000-26999	1	2.7	-	-	-	-	1	3.7	2	1.9
27000-27999	-	-	-	-	-	-	-	-	-	-
28000-28999	1	2.7	-	-	-	-	-	-	1	.9
29000-29999	-	-	-	-	-	-	-	-	-	-
30000-30999	-	-	-	-	-	-	-	-	-	-
31000-31999	-	-	1	2.8	-	-	-	-	1	.9
32000-32999	-	-	-	-	-	-	-	-	-	-
33000-33999	-	-	1	2.8	-	-	-	-	1	.9
49000-49999	-	-	1	2.8	-	-	-	-	1	.9
Total	37	99.9	36	100.2	7	100.1	27	99.9	107	99.9
Average Net Worth	6241		9437		9744		7074		7756	

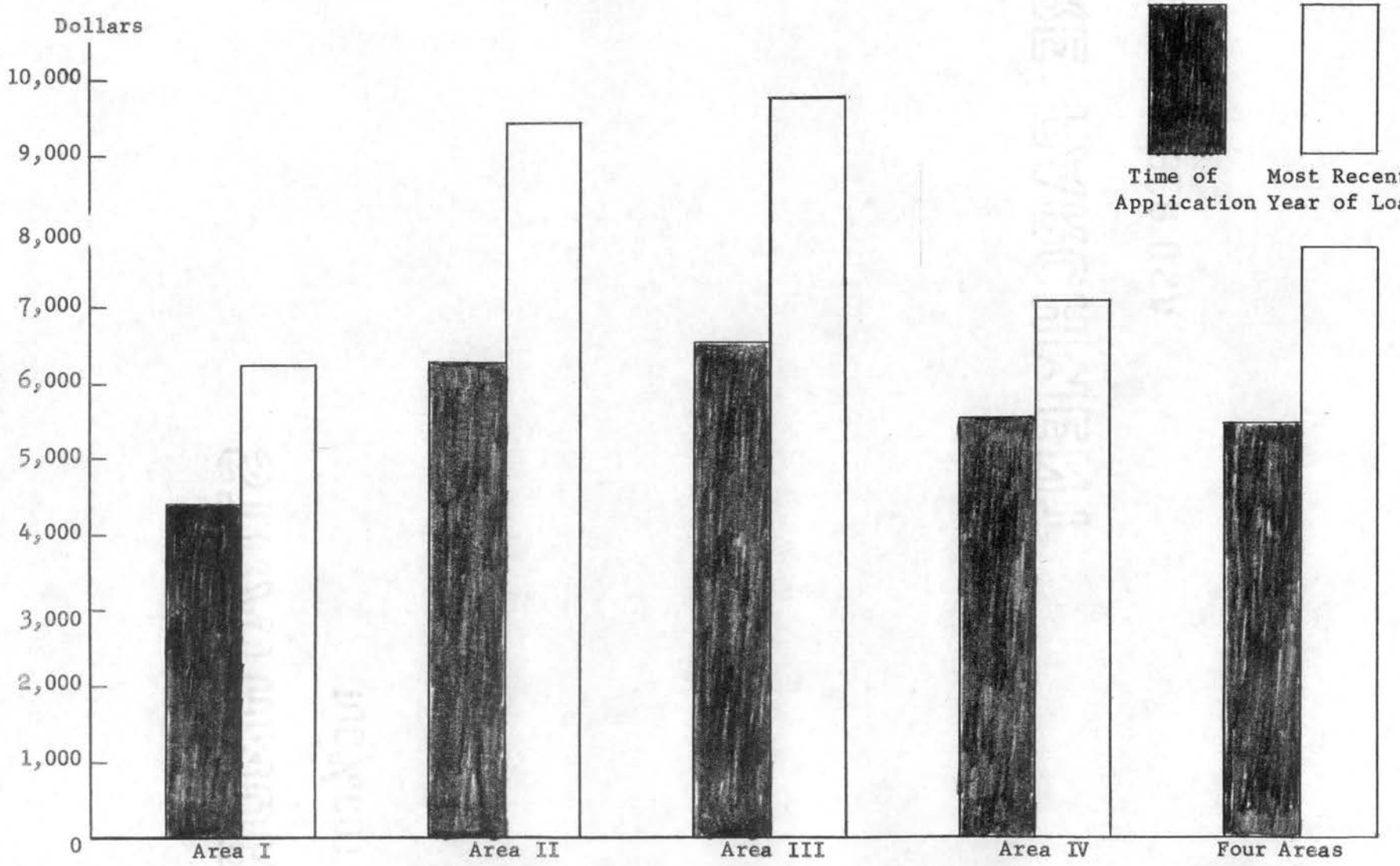

Figure 12. Comparison of Average Net Worth at Time of Application and Most Recent Year of Loan: 107 FHA Borrowers

CHAPTER VI

CORRELATION AND REGRESSION ANALYSES OF DATA

Data Included in Correlation and Regression Analyses

Although the records of the 107 FHA borrowers contained data sufficiently complete to be used in the general analysis and perhaps eventually to be included in further statistical analysis, it was thought to be desirable for this thesis study to limit the correlation and regression analysis to the records of those borrowers having not less than six consecutive years of loan experience with the Farmers Home Administration. This decision was due, in part, to the desirability of having loan histories sufficiently long to allow reasonable opportunity for the FHA loans and supervision to be reflected in capital growth on the farms and, in part, because of the peculiar distribution of the borrowers over time. As shown by Table XXV the largest number of borrowers had the shortest loan histories. Of the 107 borrowers, 7 had only one year of FHA loan history, 31 had only two years, 19 only three years, and 20 had only four years of loan history. Thus, cumulatively, 77 of the 107 borrowers had been FHA clients for only four years or less. This, along with the fact that 1954, 1955, and 1956, during which the majority of the borrowers first became FHA clients, were years of serious drought. Without some adjustment of data to correct for these unusually unfavorable conditions, the heavy concentration of cases during these years would have had undue influence on the results had the unadjusted data been included in the statistical analysis.

TABLE XXV

NUMBER OF BORROWERS BY YEAR OF LOAN APPLICATION: 107 FHA BORROWERS

Year of Application	Number of Borrowers
1951	8
1952	9
1953	13
1954	20
1955	19
1956	31
1957	7
Total	107

In retrospect it appears probable that the 1953 data might better have been included in the correlation and regression analyses in order to include more cases even though these records would have had one year less of loan history. The decision, however, was to make a pilot study of those borrowers having had FHA loans for at least six years. This decision restricted the correlation and regression analyses to 92 records of 17 borrowers. Later, an inconsistency in the credit record of one borrower caused him to be dropped from the analysis, thus leaving only 86 records of 16 borrowers to be used in the analysis for this portion of the study.

Correlation Analysis

Correlation analyses were made to measure the interrelationship of various factors thought to have an influence on capital growth (Table XXVI).

TABLE XXVI

RESULT OF SIMPLE CORRELATION ANALYSIS OF THIRTEEN FACTORS: 16 FHA BORROWERS

	Changes in Capital X_1	Total Capital X_2	Net Cash Farm Income X_3	Credit Used X_4	Capital at Application X_5	Debt Repayment X_6	Income from Livestock X_7	Income from Crops X_8	Operating Expenses X_9	Total Acres X_{10}	Farming Experience X_{11}	Living Expense X_{12}	Non-Farm Income X_{13}
Changes in Capital X_1	1.0000	.7000	.2157	.3629	-.4153	.0956	.3510	.1810	.3295	.2238	-.2585	.6042	.2467
Total Capital X_2		1.0000	.3079	.2620	.3589	.2743	.6073	.0143	.3837	-.0116	-.0447	.5858	.2965
Net Cash Farm Income X_3			1.0000	.1975	.1102	.0451	.5490	.3745	.0240	-.2391	.0824	.2782	-.3919
Credit Used X_4				1.0000	-.1406	.3379	.1675	.5040	.4630	-.0954	-.1672	.3973	-.0054
Capital at Application X_5					1.0000	.2245	.3148	-.1710	.0581	-.3054	.2808	-.0436	.0554
Debt Repayment X_6						1.0000	.2611	.3742	.5679	.1816	-.1501	.4912	.2336
Income from Livestock X_7							1.0000	-.0288	.4898	-.0266	-.0440	.5421	-.0788
Income from Crops X_8								1.0000	.5748	.0526	-.2512	.4532	-.0362
Operating Expense X_9									1.0000	.2304	-.3487	.7180	.2288
Total Acres X_{10}										1.0000	-.2601	.1654	.3158
Farming Experience X_{11}											1.0000	-.2647	-.2140
Living Expense X_{12}												1.0000	.3844
Non-Farm Income X_{13}													1.0000

Correlation Between Changes in Capital and Other Factors

Eight factors were statistically significant at the 5 percent level as having positive correlation with the changes in capital growth. The change in capital growth was the annual change between the capital the borrower had at the time of application for the loan and the total capital at the end of the year. Those factors significantly correlated with the changes in capital were net cash farm income, amount of credit used, livestock income, operating expenses, total acres, total capital, non-farm income and living expenses. With the exception of operating expense and living expense, it would seem logical that as each of the above increased there would likewise be an increase in capital. The positive correlation between changes in capital and both operating expenses and living expenses may appear inconsistent with theory in that as either or both of these expenses increase they would absorb gross income and thus reduce the amount of savings which could contribute to capital growth.

Two negative correlations were significant at the 5 percent level. One was farming experience and the other capital at time of application. This negative correlation would indicate that for each year of farming experience the borrowers would experience a decrease in the amount of capital change. It would also indicate that the greater the amount of capital that the borrower had at the time of application, the less would be the change in capital.

The data do not explain these inconsistencies but it is conceivable that these factors may be related to other factors which influence capital growth but are not included in the study.

Correlation Between Total Capital and Other Factors

Total capital was the measure of all the capital the borrower had at the end of each year.

At the 5 percent level of significance nine factors were positively correlated with total capital. These were net cash farm income, credit used, livestock income, operating expenses, change in capital, capital at time of application, non-farm income, living expenses, and debt repayment.

A positive correlation between total capital and either living expenses or debt repayment does not seem logical because as either of these increase, total capital might logically be expected to decrease.

Correlation Between Net Cash Farm Income and Other Factors

If net cash farm income is expected to increase as a result of the FHA loan then it would be helpful to determine what factors were correlated with net cash farm income.

Factors which had a positive correlation with net cash farm income were livestock income, crop income, and total capital.

Total acres showed a negative relationship. That is, the more acres the borrower had the less was his net cash farm income.

This relationship may not be illogical in this study due to the quality of land involved. General observation suggests that the more total acreage a farmer has the lower is the quality of the land and smaller is the amount of crop income. As a result of this, net cash farm income might conceivably be less with more acres rather than with somewhat fewer acres. Another influence may stem from the fact that the

year 1952 was one of low prices for cattle which tend to be a more important enterprise on the larger farms.

Regression Analysis

The objectives of the regression analysis in this study were, first, to show the relationship between the values of specified dependent variables (Y_i) and unit changes in various selected independent variables (X_i) and to obtain a measure of this relationship and, second, to provide a basis for making predictions of Y_i from X_i.[24]

The statistical criteria used to determine goodness of fit of the regression equations were the R^2 and t_{b_i} values. The t_{b_i} is the symbol for the Student t-test of the estimated coefficients. The purpose of this test is to determine whether the b_i values are significantly different from zero at a given probability level. The b_i values are the regression coefficients that measure the effect of Y_i per unit change in X_i. A b value which is significant at the 5 percent level justifies a 95 percent confidence that the b value is significantly different from zero. If the β of the population actually is zero, then for repeated samples the b value, which is an estimate of β, would not be significantly different from zero 95 times out of 100. When the β value is significant at the 1 percent level, 99 percent confidence that the b value is significantly different from zero is indicated. If the b value is significant at the 5 percent level then for repeated samples from the population, for 19 out of 20 times, the b value $\pm$ two standard deviations will

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[24] George W. Snedecor, op. cit., p. 122.

not encompass zero. With a 1 percent level of significance then, for 19 out of 20 times, the b value $\pm$ three standard deviations will not encompass zero. R^2 is the symbol for the coefficient of determination which indicates the proportion of the squared variability in Y_i explained by the factors X_i. The coefficient of non-determination $(1-R^2)$ is the proportion of squared variability not explained. R is the multiple correlation coefficient and indicates the degree of association between Y_i and factors X_i.[25]

The goodness of fit or how well the equation fits the data is indicated by the size of the R^2. Once the significance of the b_i values is determined, the statistical test is based primarily on the size of the R^2.

As R^2 approaches 1.0 the fit is improved and if $R^2 = 1.0$, then the fitted equation would pass through every observed point and would characterize the data perfectly.

Simple Regression Analysis

Simple regressions between sets of two factors each were run successively to determine the relationship of changes in specific independent variables and the value of given dependent variables.

Relationship of Factors to Changes in Capital

The first simple regressions were to determine the relationship of unit changes in various independent variables to changes in the capital

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[25] Frank A. Pearson and Kenneth R. Bennett, Statistical Methods Applied to Agricultural Economics, (John Wiley and Sons, Inc., New York, 1942), p. 176.

of farms in the sample. In order to find a factor which would reflect the cumulative effect of changes in resources over the entire time covered by the analysis, the difference between the borrower's capital at the time of application and the capital at the end of each year was selected as the measure of capital change.

The results of this regression analysis are shown in Table XXVII. The regression coefficients of three factors, living expenses, capital at application, and credit used, were significant at the one percent level. Two factors, net cash farm income and non-farm income were significant at the five percent level.

TABLE XXVII

RESULTS OF SIMPLE REGRESSION ANALYSIS OF THE EFFECT OF CHANGES IN CAPITAL AND VARIOUS FACTORS: 86 RECORDS FOR 16 FHA BORROWERS, 1951-1958

Dependent Factor	Independent Factor	"a" value	b value	S_b	t_b	R^2
Changes in capital	Net cash farm income	2460.37	.7482*	.3766	1.9867	.0449
Changes in capital	Debt repayment	2323.20	.3249	.3692	.879	.0091
Changes in capital	Living expenses	-4327.47	6.6205**	.9526	6.950	.3651
Changes in capital	Non-farm income	2064.17	1.5394*	.6599	2.333	.0608
Changes in capital	Capital at application	6307.35	-.5428**	.1297	4.184	.1725
Changes in capital	Credit used	1609.02	.7714**	.2161	3.569	.1317

*Significant at the five percent level.

**Significant at the one percent level.

Relationship of Factors to Net Cash Farm Income

Simple regression analyses were also made to determine the relationship of various factors to net cash farm income. These factors were total capital, income from livestock, income from crops, operating expenses, total acres, farming experience, and credit used. The results are shown in Table XXVIII. Three factors, total capital, income from livestock, and income from crops, were significant at the one percent level. Total acres were significant at the five percent level but the b value was negative.

TABLE XXVIII

RESULTS OF SIMPLE REGRESSION ANALYSIS OF THE EFFECT OF NET CASH FARM INCOME AND VARIOUS FACTORS: 86 RECORDS FOR 16 FHA BORROWERS, 1951-1958

Dependent Factor	Independent Factor	"a" value	b value	S_b	t_b	R^2
Net cash farm income	Total capital	224.01	.0895**	.0302	2.966	.0948
Net cash farm income	Income from livestock	145.07	.4803**	.0803	5.984	.3014
Net cash farm income	Income from crops	395.52	.3505**	.0947	3.701	.1402
Net cash farm income	Operating expenses	964.69	.0216	.0948	.228	.0006
Net cash farm income	Total acres	2083.59	-4.5089*	1.998	-2.257	.0572
Net cash farm income	Farming experience	546.27	17.7222	23.4009	.757	.0068
Net cash farm income	Credit used	771.94	.1187	.0644	1.845	.0389

*Significant at the five percent level.

**Significant at the one percent level.

Relationship Between Credit and Capital Growth

A regression analysis was made between total capital at the end of each year and the annual amount of credit used but the results were not significant at the five percent level.

Another simple regression analysis which allowed for the cumulative influence of credit was between the final changes in capital and the total amount of credit used. The final change in capital was determined by taking the difference between the amount of capital the borrower had at the time he applied for the loan and the amount of capital he had the last year of the loan for which records were available. Total credit used was the accumulative amounts of credit the borrower used over the period of years. The results of this regression were significant at the one percent level.

Multiple Regression Analysis

Relationships with Changes in Capital

The first multiple regression analysis was to determine the relationship of various factors (X_i) to changes in capital (Y_1) and was of the following nature:

$$Y_1 = f(X_1, X_2, X_3, X_4, X_5, X_6)$$

Y_1 = changes in capital

X_1 = capital at time of application

X_2 = non-farm income

X_3 = living expenses

X_4 = debt repayment

X_5 = net cash farm income

X_6 = credit used.

The change in capital was computed by taking the difference in capital the borrower had at the end of each year and the amount of capital he had when he applied for the loan.

The following equation was determined from the available data.

$$\hat{Y}_1 = -804.89 - .4793\ X_1 + 1.1268\ X_2 + 5.4509\ X_3 - .5517\ X_4 + .5967\ X_5 + .2892\ X_6$$

$$\text{Standard Error} = (.1063)^* \quad (.6225) \quad (1.2113)^* \quad (.3153) \quad (.3409) \quad (.1808)$$

The coefficient of determination (R^2) was .5678 which shows that these factors accounted for almost 57 percent of the variation in the changes in capital.

Only two of the factors, capital at time of application (X_1) and living expenses (X_3) had significant b values. Again the sign of living expenses is positive when economic logic suggests that the sign should be negative.

Relationships with Total Capital

A second multiple regression was computed to determine the relationship of certain factors to total capital. This total capital was the capital at the end of each year.

$Y_2 = f\ (X_1, X_2, X_3, X_4, X_5, X_6, X_7)$

Y_2 = capital at end of year

X_1 = capital at beginning of year

X_2 = net cash farm income

X_3 = credit used

X_4 = percent living expense is of total income

X_5 = percent debt repayment is of total income

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*Significant at the five percent level.

X_6 = non-farm income

X_7 = percent operating expense is of total income

$$\hat{Y}_2 = -3946.15 + .9358\ X_1 + .6517\ X_2 + .2177\ X_3 + 52.7515\ X_4 - .8219\ X_5 + .5028\ X_6 + 39.2607\ X_7$$

$$\text{Standard Error} = (.0818)^* \quad (.3523) \quad (.1196) \quad (25.9859)^* \quad (6.8492) \quad (.4699) \quad (19.9293)$$

The R^2 value was .7854 which indicates that these factors explained almost 79 percent of the variation in the total capital at the end of the year.

Only two of the factors, capital at beginning of the year (X_1) and living expenses (X_4) were significant at the five percent level.

Once again there is a positive relationship between living expenses and total capital which is not consistent with economic theory.

To try to remove this factor of inconsistency, the percent that living expense is of total income (X_4) and also the percent that debt repayment is of total income (X_5) and the percent that operating expense is of total income (X_7) were removed from the analysis.

$Y_2 = f\ (X_1, X_2, X_3, X_4$

Y_2 = capital at end of year

X_1 = capital at beginning of year

X_2 = net cash farm income

X_3 = credit used

X_4 = non-farm income

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*Significant at the five percent level.

As a result of this the following equation was obtained.

$$\hat{Y}_2 = 564.34 + .9687\ X_1 + .0138\ X_2 + .2837\ X_3 + .0112\ X_4$$

Standard Error = (.0799)* (.2464) (.1153)* (.4308)

The R^2 value was .7613. Two of the b values were significant at the five percent level.

Relationships with Net Cash Farm Income

Another multiple regression analysis was made to determine the relationship of different factors to net cash farm income. It was set up in the following manner:

$Y_3 = f\ (X_1, X_2, X_3, X_4, X_5, X_6)$

Y_3 = net cash farm income

X_1 = income from livestock

X_2 = income from crops

X_3 = farm operating expense

X_4 = total acres

X_5 = farming experience

X_6 = total capital available

From the available data the following equation was determined:

$$\hat{Y}_3 = -.005 + 1.0\ X_1 + 1.0\ X_2 - .9999\ X_3 - .0000003\ X_4 + .00002\ X_5 - .0000001\ X_6$$

The square of the standard deviation for this equation had a negative value as did the square of all the t values. This was thought to be the result of factors $X_1 + X_2 - X_3$ being an identity with Y_3.

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*Significant at the five percent level.

The regression was revised as follows:

$Y_3 = f(X_1, X_2, X_3, X_4, X_5)$

Y_3 = net cash farm income

X_1 = total capital available at the beginning of each year

X_2 = number of acres

X_3 = years farming experience

X_4 = farm operating expense

X_5 = percent crop income is of total farm income.

The equation determined was:

$$\hat{Y}_3 = 341.37 + .1424\ X_1 - 3.6545\ X_2 - 2.6182\ X_3 - .1048\ X_4 + 16.4027\ X_5$$

$$\text{Standard Error} = (.0397)^*\quad (1.9969)\quad (74.4778)\quad (.3392)\quad (7.7738)^*$$

The coefficient of determination (R^2) was .2014 which shows that the considered variables only explained 20 percent of the variation in net cash farm income.

Only two of the b values were significant at the five percent level. These were the total capital available (X_1) and the percent crop income is of total farm income (X_5).

Since years farming experience (X_3) and farm operating expense seemed to account for very little of the variation they were dropped and the equation computed again.

$Y_3 = f(X_1, X_2, X_3)$

Y_3 = net cash farm income

X_1 = total capital available at beginning of each year

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*Significant at the five percent level.

X_2 = number of acres

X_3 = percent crop income is of total farm income

$$\hat{Y}_3 = 365.31 + .1241\ X_1 - 4.1676\ X_2 + 14.2113\ X_3$$

Standard Error = (.0347)* (1.8773)* (7.4405)

Total capital available and number of acres are significant at the five percent level. The number of acres is shown to have a negative relationship with net cash farm income. The percent which crop income is of total farm income was significant at the 6 percent level.

The R^2 is .1913 which shows that these factors account for only 19 percent of the variation in net cash farm income.

Summary of Multiple Regression Analysis

A regression analysis was made to determine the relationship of various factors to changes in capital of the FHA borrowers. Of these factors only two, capital at time of application and living expenses were significant at the five percent level. The R^2 was .5678.

Another regression was computed to see what relationship certain factors had to the total capital at the end of the year. Again only two factors, capital at the beginning of the year and living expenses, were significant. The R^2 was .7854. In both cases, due to the positive sign on the b value, living expenses failed to be consistent with logic and economic theory.

In an effort to remove this inconsistency, living expense and two other factors were removed from the analysis and another regression run.

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*Significant at the five percent level.

Two factors were significant at the five percent level. These were the capital at beginning of year and credit used. The R^2 value was .7613.

More regressions were made to determine the relationship of certain factors to the net cash farm income of the borrowers. Probably because three of the important factors formed an identity with net cash farm income, no interpretation could be made.

In the second regression, two factors, total capital available and the percent which crop income is of total farm income, were significant at the five percent level. The R^2 value, however, was only .2014.

The two factors accounting for the smallest amount of variation were removed and another regression was made. This time the total capital available and number of acres were significant at the 5 percent level. The sign of the b value for number of acres was negative. The percent which crop income is of total farm income was approaching the level of significance and was significant at about the six percent level. The R^2 value was .1913.

CHAPTER VII

SUMMARY AND CONCLUSIONS

Remarkable progress has been made in agriculture during the last eighteen years. This, generally, has been a period during which farmers could expand their operations and meet their financial needs through the medium of readily available credit. Even during this period, however, many farmers were limited in their operations because they were unable to meet the credit requirements of commercial lenders. As a result of this credit rationing problem, many farmers turned to the Farmers Home Administration for credit. The Farmers Home Administration is a government lending agency designed to meet the needs of farmers who cannot obtain adequate credit elsewhere with reasonable rates and terms.

The purpose of this study was to analyze data to test the effectiveness of the Farmers Home Administration in alleviating the capital rationing problem among a random sample of FHA borrowers in Southeastern Oklahoma.

Twelve counties in Southeastern Oklahoma were selected to be used in the study. Four of the counties were in the serious low income classification and eight were in the moderate low income. As a result of limitations in records of borrowers in three of the counties, data from only nine counties were used in the final analysis.

The average size of all farms in the area covered by the study was 110.2 acres smaller than the average size of all farms in Oklahoma. The

average size of farms of the FHA borrowers included in the study was larger than the average size of farms in the area and was comparable with the state average.

The average value of all farms in the area was 57 percent less than the state average of $18,913. The average value per farm of farm products sold in the area was $2,132 less than the average value of the state.

The records of 107 FHA borrowers were used for analysis in the study. From these records certain characteristics of the borrowers were obtained. The average age of the borrowers when they applied for loans was 41 years. Almost 94 percent of the borrowers were farming at the time of application. Forty-four percent of the borrowers were tenants, 39 percent were part-owners, and 17 percent were owners.

In their applications, borrowers specified the purpose for which loan funds would be used. The purchase of machinery and equipment was indicated as the purpose by 2.9 percent of the borrowers; 3.8 percent intended to refinance existing debts; 9.5 percent intended to use the funds for operating expenses; 10.5 percent for the purchase of livestock; and 64.7 percent indicated two or more of the above purposes. Land purchase was the objective of 8.6 percent of the borrowers. The average size of loans made to the 107 borrowers was $6,775.

Forty-four of the borrowers indicated they had no source of credit before they applied for the FHA loan. Fifty-five of the borrowers had previously used commercial bank credit, four had borrowed from private individuals, three had obtained funds from Production Credit Associations, and one from the Federal Land Bank.

A comparison was made between certain factors at the time the borrower applied for the loan and the same factors for the most recent year. The average size of farms of the 107 FHA borrowers had increased from 289.9 acres at the time of application to 385.7 acres the last year of the loan. The average acres of cropland increased during this period from 107.5 acres to 125.4 acres. The average net cash farm income during the first year of the loan was $1,067 as compared with $2,052 for the last year of the loan. The average amount of capital invested per farm increased from $8,710 at the time of application to $14,340 the last year of the loan.

The average net worth of the borrowers increased $2,303 during this period. At the time of application the average net worth was $5,453 and had increased to $7,756 the last year of the loan.

In relative terms the average size of farm during this period increased by 33 percent, the average amount of capital invested per farm by almost 65 percent, and the net cash farm income by 92 percent. The average net worth of the borrowers increased 42 percent during the loan period.

Correlation analyses were made to measure the interrelationship of various factors thought to have an influence on capital growth. Eight factors, net cash farm income, amount of credit used, income from livestock, operating expenses, total acres, total capital, non-farm income, and living expenses, were significant as having positive correlation with changes in capital at the 5 percent level. Two factors, farming experience and capital at time of application, were negatively correlated with changes in capital and were significant at the 5 percent level.

Nine factors were positively correlated at the 5 percent level with total capital. These were net cash farm income, amount of credit used, income from livestock, operating expenses, changes in capital, capital at time of application, non-farm income, living expenses, and debt repayment. Income from livestock, income from crops, and total capital had a positive correlation with net cash farm income and the factor of total acres was negatively correlated with net cash farm income at the 5 percent level of significance.

Simple regression analyses were made between changes in capital and six factors thought to be related to the changes in capital. Five factors, net cash farm income, living expenses, non-farm income, capital at time of application, and amount of credit used, had significant regression coefficients. The sign of the b value of capital at time of application was negative.

Seven factors were thought to be related to net cash farm income so simple regressions were run between net cash farm income and these factors. Four of these factors had significant regression coefficients. These factors were, total capital, income from livestock, income from crops, and total acres. The sign of the b value of total acres was negative.

A simple regression analysis which allowed for the cumulative influence of credit was made between the final changes in capital and the total amount of credit used. The results were significant at the one percent level.

Multiple regression analysis was made to determine the relationship of six factors in combination to changes in capital. The R^2 was

.5678 which indicated that these factors in the regression equation explained almost 57 percent of the variation in the changes in capital. Two of the factors, capital at time of application and living expenses, had significant b values.

Another regression analysis was made to determine the relationship of seven factors to total capital at the end of each year. Two factors, capital at the beginning of the year and the percent which living expense is of total income, had significant b values. However, due to the fact that the sign of the b value of living expense was positive which is not consistent with economic logic, living expense was removed from the analysis. Debt repayment and operating expenses were also removed and as a result capital at the beginning of the year and amount of credit used had significant regression coefficients. The R^2 was .7613.

Regression analyses were run to determine the relationship of different factors to net cash farm income. Two factors, total capital available at the beginning of each year and percent which crop income is of total farm income, had significant b values but the R^2 was only .2014. Two of the factors that accounted for very little of the variation were dropped from the analysis. The total capital available and number of acres were significant at the 5 percent level and percent which crop income is of total farm income was significant at the 6 percent level. The sign of the b value of total acres was negative. The R^2 was only .1913 which shows that only 19 percent of the variation was explained.

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A P P E N D I X

APPENDIX

Types and Terms of FHA Loans

I. Farm Operating Loans

1. Purpose--Operating loans may be obtained to buy livestock, farm and home equipment, pay farm operating and family living expenses, make minor real estate improvements, and refinance debts on livestock and farm equipment.
2. Eligibility--The borrower must be a citizen of the United States, of legal age, unable to obtain adequate credit from other lenders at reasonable terms, be of good character, have farm experience or training, own or be able to rent a suitable family type farm, earn the major part of his income from farming, and spend the major part of his time farming.
3. Terms of Repayment--Total operating loan indebtedness may not exceed $20,000. The amount borrowed for operating expenses is to be repaid from the current year's income, but that borrowed for capital goods may be scheduled for repayment in annual installments over a period not to exceed 7 years.
4. Interest Rate--Five percent is charged on the unpaid balance.
5. Security for Loans--Specific security is a first mortgage on all crops to be produced and on all livestock and

machinery purchased with loan funds, a mortgage on other chattel property owned, and in special cases an assignment of a portion of expected income.

6. Other Obligations--Borrower must keep accurate business records and must prepare and follow farm and home plans developed with the FHA supervisor.

II. Farm Ownership Loans

1. Purpose--Real estate mortgage loans are made to buy efficient family type farms, or to enlarge or to improve inadequate farms, and to refinance existing debts.

2. Eligibility--Veterans, farm tenants, sharecroppers, farm laborers, and owners of inadequate units are eligible; borrowers must be citizens of the United States, and unable to obtain suitable credit from other sources at reasonable rates.

3. Terms of Repayment--Loans are amortized up to 40 years, payments are due on January 1 each year and borrowers are encouraged to build reserves by paying ahead of schedule. They are expected to refinance through other sources at rates and terms prevailing in the community when able to do so.

Loan limits on farm ownership loans vary from county to county based on the county average value of efficient family type farms. The loan limits in the counties of Oklahoma were as follows:

COUNTY	LOAN LIMIT	COUNTY	LOAN LIMIT
Adair	$25,000	LeFlore	$23,000
Alfalfa	40,000	Lincoln	25,000
Atoka	23,000	Logan	30,000
Beaver	40,000	Love	26,000
Beckham	40,000	McClain	25,000
Blaine	35,000	McCurtain	25,000
Bryan	28,000	McIntosh	23,000
Caddo	35,000	Major	40,000
Canadian	35,000	Marshall	26,000
Custer	28,000	Mayes	30,000
Cherokee	25,000	Murray	25,000
Choctaw	25,000	Muskogee	27,000
Cimmaron	40,000	Noble	35,000
Cleveland	25,000	Nowata	30,000
Coal	20,000	Okfuskee	22,000
Comanche	30,000	Oklahoma	30,000
Cotton	28,000	Okmulgee	25,000
Craig	30,000	Osage	35,000
Creek	20,000	Ottawa	35,000
Custer	40,000	Pawnee	30,000
Delaware	25,000	Payne	30,000
Dewey	40,000	Pittsburg	25,000
Ellis	40,000	Pontotoc	26,000
Garfield	40,000	Pottawatomie	25,000
Garvin	30,000	Pushmataha	20,000
Grady	35,000	Roger Mills	40,000
Grant	40,000	Rogers	30,000
Greer	40,000	Seminole	20,000
Harmon	40,000	Sequoyah	25,000
Harper	40,000	Stephens	30,000
Haskell	23,000	Texas	40,000
Hughes	26,000	Tillman	40,000
Jackson	40,000	Tulsa	30,000
Jefferson	28,000	Wagoner	30,000
Johnston	26,000	Washington	30,000
Kay	40,000	Washita	40,000
Kingfisher	35,000	Woods	40,000
Kiowa	40,000	Woodward	40,000
Latimer	23,000		

4. Interest Rate--4 1/2 percent is charged on the unpaid principal.

5. Security for Loans--A first or second real estate mortgage.

6. Other Obligations--Borrower must pay title insurance and loan closing costs, must keep accurate farm and home business records, and prepare and follow farm and home plans.

III. Soil and Water Conservation Loans

1. Purpose--Provided to carry out approved soil conservation practices, develop irrigation systems, develop and improve permanent pastures, and develop drainage systems.
2. Eligibility--Borrower must be a citizen of the United States and be of legal age, unable to obtain credit elsewhere, and be an owner or operator of a farm.
3. Terms of Repayment--Total indebtedness cannot exceed $25,000, repayable in 1 to 20 years, with repayment scheduled on equal annual installments.
4. Interest Rate--4 1/2 percent is charged on the unpaid principal.
5. Security for Loans--Loans may be secured by either real estate or chattel mortgage.

IV. Farm Housing Loans

1. Purpose--Farm housing loans may be used to build, improve, alter, repair or replace buildings essential to the operation of the farm.
2. Elibigility--Borrower must be a citizen of the United States and be of legal age, unable to obtain credit from other sources, and must own a farm that is in production.
3. Terms of Repayment--Annual payments may cover period up to 33 years.

4. Interest Rate--Four percent is charged on the unpaid balance.

5. Security for Loans--Loans are covered by adequate real estate security on the farm being improved and on other real estate when necessary.

V. Emergency Loans

1. Purpose--Emergency loans are designed to assist farmers in emergency areas to continue farming.

2. Eligibility--The borrower must be a farmer in a designated emergency area, temporarily unable to obtain credit elsewhere, and have reasonable prospects of repayment.

3. Terms of Repayment--Loans for production of crops are to be repaid as crops are sold, loans for feed repaid as livestock or livestock products are sold. Repayment of loans for replacement of equipment, building repairs, or similar purpose are scheduled over a longer period according to the borrower's ability to repay.

4. Interest rate--Three percent is charged on the unpaid balance.

5. Security for Loans--First lien is taken on crops produced and on livestock and equipment purchased with loan funds.

VI. Insured Loans

1. Purpose--Insured loans are made from funds advanced by private lenders and insured by the Farmers Home Administration for basically the same purposes as direct loans in the farm

ownership and soil and water conservation loan programs.

2. Eligibility--The same requirements apply to this type of loan as to the comparable direct loan.
3. Terms for Repayment--The terms are the same as for direct loans.
4. Interest Rate--The rate is four percent and, in addition, there is a one percent charge for administrative expenses and insurance.
5. Security for Loans--Mortgages on insured loans are held by the FHA but this note is made payable to the lender and endorsed by the FHA to fully guarantee payment of any unpaid principal and interest to the lender in case of default. FHA does all servicing on these loans and sends payments to the lender when they are due. The borrower gives the same type of security as for direct loans.
6. Maximum Loan Ratio--In the case of insured loans, borrowers must make a 10 percent down payment. This is in contrast to direct FHA loans which may be made up to 100 percent of the appraised value of the mortgaged property.

VITA

Thomas Kenneth Hunter

Candidate for the Degree of

Master of Science

Thesis: A STUDY OF FARM CHARACTERISTICS, INCOME, AND CAPITAL GROWTH: FARMERS HOME ADMINISTRATION BORROWERS IN SOUTHEASTERN OKLAHOMA

Major Field: Agricultural Economics

Biographical:

Personal Data: Born near Bixby, Oklahoma, February 6, 1933, the son of Fred and Selma Hunter.

Education: Received elementary and secondary education at Bixby, Oklahoma. Graduated from Bixby High School in May, 1950. Received the Bachelor of Science Degree from Oklahoma State University, Stillwater, Oklahoma, in January, 1958; completed requirements for the Master of Science Degree in September, 1959.

Professional Experience: Served in the United States Army as a commissioned officer from May, 1953 to May, 1956. Research Assistant, Oklahoma State University, September, 1958 to September, 1959.