

32
FARM STRUCTURE AND SMALL FARMS:
A STUDY OF THE UNITED STATES AND KANSAS
DURING THE 1970s

by

NEIL C. HAVERMALE
B.S., COLORADO STATE UNIVERSITY, 1975

A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

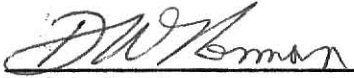
MASTER OF SCIENCE

Agricultural Economics
Department of Economics

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1982

Approved by:


Major Professor

LD
2668
T4
1982
H385
C. 2

ALL202 665629

LIST OF ABBREVIATIONS

AHP	Allegheny Highlands Project
ASCS	Agriculture Stabilization and Conservation Service (USDA)
CAA	Western Dairyland Community Action Agency
CAP	Western Dairyland Community Action Program
CES	Cooperative Extension Service
CPI	Consumer Price Index
CSA	Community Service Administration
ELF	Emergency Land Fund
ESCS	Economics, Statistics, and Cooperatives Service
FmHA	Farmers Home Administration (USDA)
FY	Fiscal year
IPM	Integrated Pest Management
NRC	National Rural Center
NSF	National Sharecroppers Fund
SEA	Science and Education Administration (USDA)
SCDP	Southern Cooperative Development Program
SFAC	Small Farm Assistance Committee
SFRC	Small Farm Research Center (USDA)
SFWG	Small Farm Working Group
SSFC	State Small Farm Committee
TDN	Total Digestible Nutrients
TVA	Tennessee Valley Authority
UNMEX	University of Mexico Cooperative Extension Service
UWEX	University of Wisconsin Cooperative Extension
WVU	West Virginia University

TABLE OF CONTENTS

CHAPTER I	INTRODUCTION	Page
1.1	Purpose	1
1.2	Organization	1
1.3	Definitional Concepts	2
CHAPTER II THE FARM STRUCTURE DEBATE		
2.1	Agriculture's Changing Resources	3
2.1.1	Introduction	3
2.1.2	Land	5
2.1.3	Cultivation techniques	8
2.1.4	Energy	10
2.2	Farm Structure Defined	13
2.2.1	Farm structure and policy goals.....	13
2.2.2	Farm definition	15
2.3	Trends and Causes of Agricultural Structural Concentration ...	18
2.3.1	Introduction	18
2.3.2	Trends in size, ownership, and organization of U.S. farms	18
2.3.2.1	Trends in farm acreage	18
2.3.2.2	Trends in farm tenure	22
2.3.2.2	Trends in farm organization	26
2.3.2.4	Inequalities in gross receipts, production costs, net income, and government payments	30
2.3.2.5	An example of structural change: Broilers	32
2.4	Causes of Structural Change: A Model	37
2.5	Conclusions	53
	References	54
CHAPTER III SMALL-FARMS: A STRUCTURAL ISSUE		
3.1	Small-Farms Introduction	59
3.1.1	Background	59
3.1.2	Definition and types	62
3.1.3	Location	66
3.2	The Importance of Part-time Farming to Expectations and Migration for Small-farms	70
3.2.1	Background	70
3.2.2	Expectations of part-time farmers	76
3.2.3	Small-farms and migration out of farming	81

3.3	Small-farms/Family Farms and the Small Rural Town	81
3.4	Research and Extension for Small-Scale Agriculture	88
3.4.1	Background	88
3.4.2	Research for small scale/farm agriculture	90
3.4.2.1	Determining the research priorities	90
3.4.2.1.1	Discriptive data	93
3.4.2.1.2	Production efficiency and productivity	94
3.4.2.1.3	Energy and resources	95
3.4.2.1.4	Marketing	96
3.4.2.1.5	Tax, income and credit policies	98
3.4.2.2	Reasons for small-farm specific research	99
3.4.2.3	Small-farm research within the USDA Science and Education Administration and Land Grant Institutions	100
3.4.2.4	Small-farm research within the private sector	107
3.4.2.4.1	Traditional-scaled research	107
3.4.2.4.2	Whole-earth research	111
3.4.3	Outreach programs and the small-farm operator	114
3.4.3.1	Background	114
3.4.3.2	Small-farm development via cooperatives in the South	115
3.4.3.3	State Cooperative Extension Service programs for small-farms	120
3.4.3.3.1	Background	120
3.4.3.3.2	Classification of small-farms	123
3.4.3.4	Examples of state small-farm extension programs	126
3.4.3.4.1	Tennessee and Tennessee Valley Authority (TVA)	126
3.4.3.4.2	Wisconsin	128
3.4.3.4.3	Missouri	130
3.4.3.4.4	West Virginia	134
3.4.3.5	Current USDA small-farm policy and assistance projects	136
	References	147

CHAPTER IV KANSAS FARM STRUCTURE DURING THE 1970s

4.1	Introduction	159
4.2	Selected Economic Characteristics of Kansas Agriculture in the 1970s	159
4.2.1	Shifts in the rural economy	159
4.2.2	Farm numbers and size	161
4.2.3	Land use	164
4.2.4	Farm tenure	166
4.2.5	Farm family income	174
4.2.5.1	Farm sales	176

4.2.5.2	Farm expenses	183
4.2.5.3	Net farm income	186
4.2.5.4	Other family income	188
4.2.5.4.1	Farm-related income	191
4.2.5.4.2	Off-farm income	194
4.2.6	Farm assets	200
4.2.7	Farm debt	203
4.2.8	Other aspects	205
4.2.8.1	State distribution of large, medium, and small farms	205
4.2.8.2	Age of farmers	205
4.2.8.3	The Kansas Farm Management Associations (KMAR)	209
4.3	Conclusions	214
	References	216
CHAPTER V	SUMMARY AND CONCLUSIONS	218
APPENDIX A	A-1
	References	A-9

LIST OF TABLES

TABLE	Page
2.1 Public domain lands released between 1862-1900	5
2.2 Selected U.S. population statistics, 1790-1979	6
2.3 Number and acreage of U.S. farms, 1850-1978	7
2.4 Number, horsepower and value of wheeled and crawler tractors in the U.S., 1910-1978	9
2.5 Energy use in the United States food system 1947, 1958, and 1970	12
2.6 U.S. Census of Agriculture's definition of a farm for enumeration, 1959-1978	16
2.7 Percent distribution of farm numbers versus land in farms, 1920-1978	20
2.8 Annual percent change in farm numbers and their total acreage operated by farm acreage category	21
2.9 Occupation of landowners: farm and ranch land, 1978	23
2.10 Tenure of U.S. farm land, 1900-1978	24
2.11 Tenure structure by farm sales class, 1964-1974	25
2.12 Average size of U.S. farms by acreages of land operated and by tenure, 1935, 1954, and 1974	26
2.13 Form of farm organization versus form of land tenure, 1969 and 1974	27
2.14 Proportion of specified farm commodities produced by the largest and smallest 10 percent of farm and distribution by organization for those farms reporting that commodity as their major enterprise, 1974	28
2.15 Value of farm sales by organization, 1969-1974	30
2.16 Indices indicating degree of concentration of income, expenses, and direct government payments, 1960, 1964, 1969, 1974, and 1978	31
2.17 Changes in relative importance of broiler production costs ...	34
2.18 Regional share of U.S. broiler production, 1940-1978	35
2.19 Broiler marketing arrangement, 1955-1977	36

2.20	Distribution by size of broiler farming units with sales of \$2,500 or more, 1974	37
2.21	Illustration of the effects of the Gross Ratio on variability in net income	43
2.22	Capital gains of the farm sector accruing to farm operators versus non-operator landlords, 1979	49
2.23	Gini ratios and Indices for capital gains in farming by farm numbers	49
3.1	Proportion of farms having gross annual sales under \$20,000 by state, 1974	68-69
3.2	OLS time trend regression estimates for income per farm operator family by major sources and by value of sales class in constant dollars (1967 = 100, CPI), 1960-1979	75
3.3	Relationship of off-farm employment to farming expectations for high-income (\$ gross farm sales => \$10,000) and low-income (gross farm sales < \$10,000) farmer and all farmers in Illinois, 1970	80
3.4	Loss of farm numbers between 1964 and 1978 by gross farm sales class	82
3.5	Number of urban and rural places by population size, 1970	84
3.6	Research effort distribution within the state agricultural experiment stations, FY 1979	102
3.7	Total publicly funded agricultural research effort compared with research activity directly related to small-farms	103
3.8	Small-farm research projects in land grant institutions by area of emphasis, 1977	104
3.9	In-house and extramural USDA-SEA small-farm research in process, FY 1981	106
3.10	Prior involvement of small-farm program participants in extension activities, by annual farm sales, Southern region, 1977	122
3.11	Oklahoma Small-farm Family Intensive Assistance Project, 1980 estimated funding	142

4.1	Percent distribution of all farms by farm sales class, Kansas and the U.S., 1974 and 1978	163
4.2	Kansas land use by major standard industrial classification for all farms 1974 and 1978	165
4.3	Distribution of land tenure by farms and land operated, Kansas, 1974 and 1978	168
4.4	Land tenure distribution for all Kansas farms by farm sales class, 1974 and 1978	170
4.5	Proportion of all farms and annual gross receipts from farm marketings by sales class, Kansas, 1974 and 1978	177
4.6	Standard industrial classification of all Kansas farms distributed according to gross farm sales class, 1974 and 1978	178
4.7	Percent of farms versus percent of sales by major farm enterprise types for 1974 and 1978 and their measures of concentration in 1974, Kansas	180
4.8	Kansas average farm sales and variable production expenses by major sources within standard industrial farm classifications, 1974 and 1978	181
4.9	Gini Ratios of concentration for variable versus all production expenses by major S.I.C. farm enterprise groups, 1974	185
4.10	Kansas net farm income before deducting fixed costs, by gross farm sales class, 1974 and 1978	187
4.11	Average farm-related and off-farm income for farms reporting these income sources by gross farm sales class, Kansas, 1974	192
4.12	Off-farm work of 200-or-more days versus non-farm occupation farm operators, all farms by Kansas counties, 1974 and 1978	196
4.13	Average per-farm and per-acre value of land, buildings, machinery and equipment by farm sales class, Kansas, 1974 and 1978	201
4.14	Annual Return on assets before deducting fixed costs (Table 4.10), Kansas, 1974 and 1978	202

4.15	Distribution of farms according to S.I.C. farm enterprise type for large, medium and small farms within the State and type, Kansas, 1978	206
4.16	Age of Kansas farm operators within gross sales class, 1974 and 1978	209
4.17	Distribution of the K-MAR-105 farm record data-base versus all Kansas farms by sales class, 1974 and 1978	213
A.1	A hypothetical simple income distribution	A-7

LIST OF FIGURES

FIGURE	<u>Page</u>
2.1 Farm output as a function of energy input to the United States food system, 1920-1970	11
2.2 Firm and industry solutions in a free market: the theory of the treadmill	39
2.3 How the supply curve of the farm firm shifts	41
2.4 Average cost curves for irrigated cotton farms, Texas High Plains, 1967	41
2.5 Long-run average cost of farm production by economic class of farms in 1970	46
2.6 The treadmill solution with government intervention and cannibalism	46
2.7 Distribution of total direct costs of production, wheat farms, 1977	51
3.1 Pentile rank-ordered distribution of states according to their total small-farm (gross annual farm sales under \$20,000) population, 1974	67
3.2 Farm versus nonfarm per-capita disposable income, 1943-1979	71
3.3 Income per farm operator family by farm sales class, 1978	71
3.4 Net farm income as a percent of total farm family income including off-farm sources, 1960-1979	72
3.5 Constant dollar (1967 = 100 CPI) trends for net farm income, off-farm income, and total farm family income by sales class, 1960-1980	74
3.6 Effects due to shifts in costs of transportation and/or economies of size for retail sales	86
3.7 Comparison of average farm size to net income per farmer and economic activity in rural areas	86
3.8 Clientele matrix for a small-farm program	124
3.9 Limited resource farmer classification system	125

3.10	Organization chart for U.S.D.A. Small Farm Assistance Projects, 1980	138
4.1	Total Kansas farms, 1945-1978	162
4.2	Average farm acreage, Kansas, 1945-1978	162
4.3	Selected indices of prices received by U.S. farmers, 1970-1978	166
4.4	Proportion of owned farm land to owned farm land rented to others within farm acreage class, Kansas, 1974	168
4.5	Distribution of land tenure relationships according to farm acreage, 1978: Charts A, B, C	169
4.6	Kansas average farm family income from all sources by farm sales class and acreage, 1974: Chart A and B	175
4.7	Food and feed grain per acre yields for cash grain (S.I.C) farms by farm sales class, 1974 and 1978: Charts A, B and C	182
4.8	Kansas net farm income, 1967-1978	186
4.9	Comparison of proportional distribution of farms with sales of \$2,500 or more for farm numbers, gross farm sales, and reported off-farm income by farm sales class, Kansas, 1974	195
4.10	Proportional distribution of farm operators reporting any days worked off-farm, Kansas, 1974-1978	195
4.11	Proportional distribution of farms with farm sales of \$2,500 or more and the proportion of those operators considered as part-time farmers (days of work off-farm of 200-or-more) by farm acreage class, 1974	197
4.12	Proportion of farm operators reporting a non-farm occupation by farm acreage class, 1974 and 1978	197
4.13	Scatter diagram of the relationship between the proportion of small-farms (farm sales under \$20,000) and the proportion of operators reporting a non-farming occupation for eleven S.I.C. farm enterprise types, 1974 and 1978	199

4.14	Comparison of the total per-farm value of land and buildings and equipment for cash grain versus livestock S.I.C. farm enterprise type by farm sales class, farms with sales of \$2,500 or more, Kansas, 1974	200
4.15	Long and short term credit use for cash grain and livestock S.I.C. enterprise type for farms with sales of \$2,500 or more by farm sales class, Kansas, 1974	204
A.1	A Lorenz Curve	A-3
A.2	Equality and inequality curves cognate to Lorenz diagram of Figure A.1	A-8

LIST OF MAPS

MAP	Page
3.1 Location of small-farms (gross annual farm sales under \$20,000) by state, 1974	67
4.1 Shifting pattern of agricultural counties (at least 20 percent of county's labor and proprietor's income from farming) between 1950 and 1975-1977, Kansas	160
4.2 Percent of all farms that were part owner operations by Kansas county, 1978	171
4.3 Percent of all farms operated by tenants by Kansas county, 1978	172
4.4 Percent change in tenant farm, 1978 versus 1974 for Kansas counties	173
4.5 Average gross farm sales by Kansas county, 1978	189
4.6 Average net farm income before deducting fixed costs by Kansas county, 1978	190
4.7 Proportional distribution of large (\$100,000 and over in sales), medium (\$20,000-99,999 in sales), and small (sales of \$20,000 and under) farms for Kansas counties, 1978	207
4.8 Kansas counties showing a significant change in large, medium, and small farm proportional distribution (Map 4.7) between 1974 and 1978	208

CHAPTER I

INTRODUCTION

"Ada padi, sema jadi."

- a Malay farmer proverb*

1.1 Purpose

The goal of the following thesis is to review issues surrounding and contributing to the farm structure debate arising during the decade of the 1970s. Important to understanding the control and organization of national food and fiber production is the continued predominance and perserverance of the small family farm in an economic sector increasingly dominated by a small proportion of relatively large economic units. In this relation, the position, characteristics, and future of the small-farm are also reviewed.

1.2 Organization

This report is outlined around three interrelated topic areas. Chapter II, The Farm Structure Debate, reviews current perceptions of influential factors leading to changes in the organization of the national farm sector. Chapter III, Small-farms: A Structural Issue, expands on characterization of the small-farm within the ag-sector, the role of public and private-scaled research specific to small-farms, and a summary of unique cooperative organization, public and private programs and projects aimed at assisting the small-farm. Chapter IV, Kansas Farm Structure during the 1970s, provides an introduction to farm structure during the 1970s in Kansas while

* Literal translation: Have rice (or rice fields), all is.

providing a more detailed examination of structural factors as they vary across the Kansas farm population. Chapter V, Summary and Conclusions, draws together the important findings of this thesis.

1.3 Definitional Concepts

Farm structure - is simply the control and organization of resources needed for food and fiber production. Its dimensions include: the number and size of farming units by commodity and location, their degree of specialization and technology employed, ownership and control of the productive resources employed, barriers to entry and exit in farming, and social, economic, and political situations of farmers.

Farm size - can be based on classification of farm operations according to gross annual farm sales, number of acres operated, number and type of farm animals present on the operation, value of assets, and/or any combination of factors relevant to the researcher.

Most generally, farm size has been expressed in terms of gross annual farm sales. During the 1970s, farm size was conceptualized in the following manner:

Small-farms were operations with gross annual farm sales under \$20,000.

Moderate-farms were operations with gross annual sales of \$20,000 to \$40,000.

Large-farms were operations with gross annual farm sales over \$40,000.

CHAPTER II

THE FARM STRUCTURE DEBATE

2.1 Agriculture's Changing Resources

2.1.1 Introduction

In 1910, then President Theodore Roosevelt, wrote as introduction to the Report of the Commission on Country Life,^{1*} a benchmark work on United States agricultural life and the requisite infrastructures to enhance it, the following:

"We were founded as a nation of farmers, and in spite of the great growth of our industrial life it still remains true that our whole system rests upon the farm, that the welfare of the whole community depends upon the welfare of the farmer. The strengthening of country life is the strengthening of the whole nation."²

The current farm structure debate initiated by the Carter administration hopes to re-test this vision of the Jeffersonian belief in the family farmer and the rural way of life, for the dependence of not only our nation but the global community relies ever increasingly upon the stability of this system.

2.1.2 Land

The structure of the rural economy has dominated public policy from the earliest days of colonial life. To initiate settlement of colonies, the various Kingdoms of Europe claiming North American territories generally granted land to (i) either a single proprietor or a small group of

* This is the reference number for the source which is listed at the end of the individual chapters.

proprietors (these grants have been referred to as colonies), (ii) corporate groups (grants of smaller acreages but still substantial--usually made to a church congregation), or (iii) via headright (the granting of land to any colonist who could transport himself to the "new" land). In all cases but (iii) the receivers of such grants were eventually forced toward the breakup of the large feudalistic land grants in favor of individual farms with provision of fee title*, based in most cases on the family unit living as subsistence operators.³

With the Revolution of 1776, a model for the amalgamation of the settlers to form a new nation that would be morally and politically sound was based on Jefferson's idealization of a nation of implied family farmers who were "basically subsistence operators, buying and selling as little as possible; doing their own work and making their own managerial decisions; and who owned their land in fee simple."⁴

The structure of the early rural scene basically followed this vision although the role of marketing in a trade economy increasingly dominated the farmer's outlook. Public policy continued to encourage the ideal of a nation of family farms through release of an estimated 500 million acres of public domain during the period between 1860 and 1900. Such farms were created for the most part not as a result of the Homestead Act of 1862, nor lands granted to war veterans, nor via various Timber and Desert Acts of the 1870s, but from the auction of land to speculators or through grants of land to the railroads and states who in turn resold the land to settlers.⁵

As indicated in Table 2.1, the bulk of new lands released generally fell initially into the hands of wealthy speculators and the railroads who would resell the land to other smaller speculators or to true farmers. Land

* This title referring to ownership without limitation to any particular class of heirs or restriction upon alienation; at the common law.

speculation was not unique to non-farmers. In fact, established farmers themselves jumped on the wagon in increasing numbers. This resulted in the rise of farm tenancy as the labor to land ratio was more or less fixed by the cultivation technology of the day. Farm tenancy by 1930 had become near equal in numbers to full owners resulting in a major departure from Jefferson's model.

Table 2.1 Public domain lands released between 1862-1900

	Millions of Acres
Homestead Act	80
Public Auction	108
Grants to States and Railroads	300

Source: W.W. Cochran, The Development of American Agriculture--A Historical Analysis (Minneapolis: University of Minnesota Press, 1979), p. 85.

Brewster, a USDA historian quotes that "Henry C. Taylor, a major figure in United States agricultural economic history declared in 1929: 'Now that agriculture has become largely commercial, the basis of the farmer's welfare and independence is no longer land ownership, but income'."6 The shift in emphasis away from ownership towards income as the basis for defining a farm was cemented into the Census of Agriculture's farm definition from 1925.7

The years between 1900 and World War II may be characterized as a period when the rapid gains in agricultural productivity due to extensification slowed primarily due to the reduction of new lands added. It was a period of increasing scientific achievement and understanding, the establishment of a rural credit system, defined organization of commodity markets, improved transportation, and the rise of farmer organizations such as cooperatives and associations. During these several decades there was growing farmer experimentation with new and sophisticated agri-technologies

Table 2.2 Selected U.S. population statistics, 1790-1979

Year	Farm Employment ^{a,1}	Farm Population ^{b,2}	Rural Population ^{b,3}	Urban Population ^{b,4}	Total Population
(millions)					
1790	NA	NA	3.7	0.2	3.9
1820	NA	NA	8.9	0.7	9.6
1850	NA	NA	19.6	3.5	23.2
1880	10.1 (est)	22.0 (est)	36.1	14.1	50.2
1910	13.6 (est)	32.1 (est)	50.2	42.1	92.2
1920	13.4	32.0	51.5	54.3	105.7
1930	12.5	30.5	54.0	69.2	123.2
1940	11.0	30.5	57.5	74.7	132.2
1950	9.9	23.0	54.5	96.8	151.3
1960	7.1	15.6	54.1	125.3	179.3
1970	4.6	9.7	54.3	149.3	203.8
1979 ^c	4.7	7.6	62.0 (est)	165.1	220.1

Sources:

^a Years 1880-1970 see W.W. Cochrane, The Development of American Agriculture--A Historical Analysis (Minneapolis: University of Minnesota Press, 1979), Table 17.1, p. 340.

^b Years 1790-1970 see Kathryn Ziemitz, "Urban Pressure on Rural Land," in Rural Development Perspectives (Washington, D.C.: USDA-ESCS, Vol. 2, 1980), Table 1, p. 47.

^c USDA, A Time to Choose (Washington, D.C.: 1981), Table 4, p. 35.

NA Not Available

(est) Estimate

1 Sole or primary agriculture employment of persons 16 years old or older.

2 Since 1960, persons on places of 10 acres or more with at least \$50 of agriculture sales and on places under 10 acres with at least \$250 of agriculture sales. Prior to 1960, farm residence based on self-identification of the respondent.

3 Persons outside of urban areas in open country, on farms, and in places with a population of less than 2,500.

4 Persons residing in non-rural places.

Table 2.3 Number and acreage of U.S. farms, 1850-1978

Year	Farms		Total Acres ^a (millions)	Average ^a Acreage Per Farm (Acres)	Productivity ^b Index (1967=100)
	Number ^a (1,000)	Annual ^a Change (1,000)			
1850	1449	(X)	294	203	NA
1870	2660	61.6	408	153	41
1900	5737	117.2	839	146	55
1920	6518	15.7	956	147	52
1930	6546	2.8	987	151	51
1940	6350	-19.6	1061	167	60
1945	5967	-76.6	1142	191	68
1950	5648	-63.8	1202	213	71
1955	4654	-198.8	1202	258	78
1960	3962	-138.4	1177	297	90
1965	3340	-124.4	1142	342	100
1970	2924	-83.2	1121	383	102
1978	2480	-49.3	1031	416	117

Source:

^a Bureau of the Census, Statistical Abstract of the United States, various years, (Washington, D.C.: U.S. Department of Commerce).

^b USDA, Changes in Farm Production and Efficiency, 1978, Stat. Bull. 628, (Washington, D.C.: USDA-ESCS, 1980), p. 71.

NA Not Available

such as mechanical power, improved plant and animal varieties, and the beginnings of modern chemical agriculture. But it wasn't until the late 1930s and war years of the 1940s that American agriculture, fueled by an expanding credit system began a rapid technological and structural transformation. American agriculture was entering a period of intensification where output per acre became a dominant speculative factor resulting in an over abundance of production and depressed prices.

During the period from 1930 to 1979 the nation lost approximately 4.1 million farms (Tables 2.2 and 2.3). Those who did leave were generally individuals (i) from small farms, (ii) from areas marginally suitable for agriculture, (iii) who were tenant farmers, and/or (iv) who had been specialized producers of products which had undergone rapid changes in production technology.⁸

2.1.3 Cultivation techniques

In 1978, the total acreage in farms was only four percent greater than in 1930, but average farm size had increased by 275 percent (Table 2.3). Such a change in the operator to land ratio may be explained in large part by a 475 percent increase in tractor numbers and more than a 1,000 percent increase in numbers of combines and corn pickers.⁹ The seeming over-capitalization in equipment may be explained in part by a 228 percent increase in crop production per acre for the same period.¹⁰ Average horsepower per tractor in 1978 had also increased more than twice that of 1930, and the trend points toward fewer increasingly powerful tractive units (Table 2.4).

It is interesting to note that once farming had been more or less fully mechanized by the 1950s, average horsepower per acre steadily increased from 0.08 in 1950 to 0.23 in 1978. Such a relationship may be misleading due to

Table 2.4 Number, horsepower and value of wheeled and crawler tractors in the U.S., 1910-1978

Year	Total Tractors ^{a,1}	Total Horsepower ^{a,1}	Avg. Horsepower per Tractor	Value of Tractors		
	(1,000)	(million)		Gross ^b (million \$)	\$/tractor	\$/hp
			(hp)		(in 1967\$) ²	
1910	1	NA	--	NA		
1920	246	10 (est)	40.7	NA		
1930	920	25 (est)	27.2	NA		
1940	1567	42	26.8	503	765	29
1945	2354	61	25.9	1557	1227	47
1950	3394	93	27.4	2905	1187	43
1955	4345	126	29.0	4270	1254	42
1960	4688	153	32.6	5423	1304	40
1965	4787	176	36.8	5861	1296	35
1970	4619	203	43.9	7797	1489	34
1975	4469	222	49.7	14709	2042	41
1978	4370	238	54.5	20412	2367	43

Sources:

^a USDA, Balance Sheet of the Farming Sector, 1979, Supplement, Info. Bull. No. 430 (Washington, D.C.: USDA-ESCS, 1979), Table 10, p. 12.

^b USDA, Changes in Farm Production and Efficiency, 1978, Statistical Bull. 628 (Washington, D.C.: USDA-ESCS, 1980), Table 31, p. 71.

NA Not Available

¹ Includes both wheel and crawler types

² Deflated using CPI (1967=100)

declining use of animal traction and if more total operating horsepower was expended in 1950 versus 1978, e.g. tractor capital in 1978 had a greater idle-capacity. Greater idle-capacity, may be explained in part by a trade-off in capital utilization to provide timeliness in land preparation combined with increased power demands for wider cultivation implements.

The "farm problem" of excess land, characterized by capital and labor in agriculture earning a rate of return less than the rest of the economy, was formally identified in late 19th century. The subsequent rapid rise of industrialization and its associated employment opportunities has provided for the tremendous change in capital, labor, and land relationships in agriculture. Another resource which has only within the recent past become of concern and possibly equal to the traditional resources of capital, labor and land, is energy.

2.1.4 Energy

The role of energy as a fundamental resource in the world's economy is undergoing rapid evolution in definition of role, measurement, and use efficiency. As an infant discipline, there is little agreement on terms of definition, standardization and collection of data, and in methods to measure energy's role as a manageable resource. This last aspect, energy as a manageable resource, is most critical and one of current and future debate. Debates occur over the many types and forms of energy; but stem from the generalization of energy into two fundamental groups--nonrenewable such as fossil fuels versus renewable forms resulting from solar, tidal and geothermal elements. Agriculture sits in the center of this trade-off as it increasingly consumes nonrenewable energy forms in the production of renewable plant and animal forms. Evaluation of the substitution of renewable energy versus currently used nonrenewable forms is occurring at

every level of the agricultural sector, be it production agriculture, food processing, transportation, marketing, or household preparation.

There is growing evidence that the current system (structure) of United States farming is rapidly approaching inefficient utilization of energy. Fluck and Baird¹¹ present a table taken from Pimental, *et al.*¹² presenting total energy input versus output for United States corn production, 1945 through 1970. In summary, annual total per acre energy inputs from all sources for midwestern corn between 1945 and 1970 increased by 313 percent while corn yield, in energy terms, (output) only increased by 238 percent. Productivity indices (output/input) based on energy budgets were 3.7 in 1945 and 2.8 in 1970 with a relatively constant decrease in years between. The most dramatic increase was that of embodied energy in chemical fertilizers due to increasing per acre applications. Nitrogen showed a 16-fold rise over the period and may be attributed to two interrelated factors. First, more nitrogen per acre was being applied and second, the form applied shifted from a less energy intensive form to more intensive forms (urea versus anhydrous ammonia).

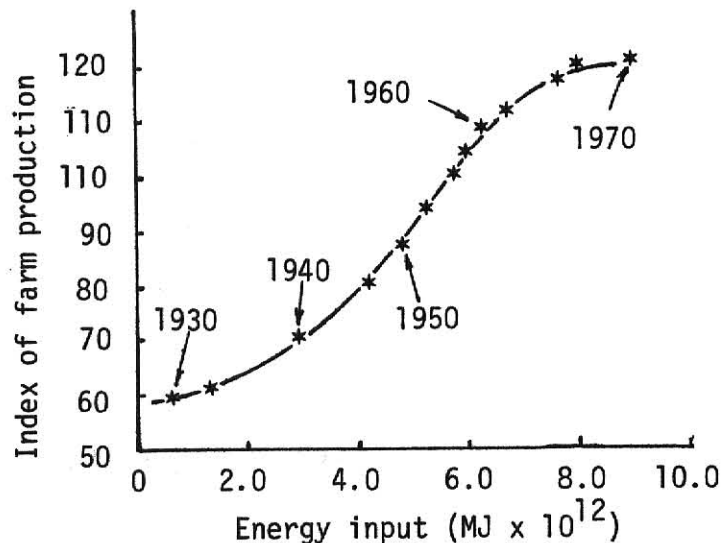


Figure 2.1 Farm output as a function of energy input to the United States food system, 1920-1970

Source: Richard C. Fluck and C. Direlle, Agricultural Energetics (Westport, Tenn.: AVI Publishing Company, Inc., 1980), Figure 3.4, p 26.

Table 2.5 Energy use in the United States food system,
1947, 1958 and 1970

Component	1947		1958		1970	
	10 ¹² Kcal.	%	10 ¹² Kcal.	%	10 ¹² Kcal.	%
----- On Farm -----						
Fuel (direct use)	136.0	50	179.0	50	232.0	44
Electricity	32.0	12	44.0	12	63.8	12
Fertilizer	19.5	7	32.2	9	94.0	18
Agricultural steel	2.0	1	2.0	1	2.0	--
Farm machinery	34.7	13	50.2	14	80.0	15
Tractors	25.0	9	16.4	5	19.3	4
Irrigation	22.8	8	32.5	9	35.0	7
SUBTOTAL	272.0	100(26)	356.3	100(26)	526.1	100(24)
Percent change			(+31)		(+48)	
----- Food Processing and Transportation -----						
Food processing industry	177.5	44	212.6	39	308.0	37
Food processing machinery	5.7	1	4.9	1	3.0	1
Paper packaging	14.8	4	26.0	5	38.0	5
Glass containers	25.7	6	30.2	6	47.0	6
Steel cans and containers	55.8	14	85.4	16	122.0	14
Transport (fuel)	86.1	21	140.2	26	249.9	30
Trucks and trailers (manufacture)	42.0	10	43.0	8	74.0	9
SUBTOTAL	407.6	100(40)	542.3	100(40)	841.9	100(39)
Percent change			(+33)		(+55)	
----- Commercial and Home -----						
Commercial refrigeration and cooking	141.0	40	176.0	38	263.0	33
Refrigeration machinery (home and commercial)	24.0	7	29.4	6	61.0	8
Home refrigeration and cooking	184.0	53	257.0	56	480.0	60
SUBTOTAL	349.0	100(34)	462.4	100(34)	804.0	100(37)
Percent change			(+32)		(+74)	
GRAND TOTAL	1028.6	(100)	1361.0	(100)	2172.0	(100)
Percent Change			(+32)		(+60)	

Source: J.S. Steinhart and C.E. Steinhart, "Energy Use in the U.S. Food System," Science, 184 (1974), pp. 307-316.

The relationship in Figure 2.1 between the index of national farm production and total energy used is interesting in that the freehand estimation of the relationship would forecast that future productivity gains, when output is expressed in terms of energy input, indicate increased production will come only with greater and greater energy input. As energy cost has rapidly escalated over the last several years, and will continue to do so, historic agricultural productivity gains based on energy intensive farming systems will no doubt be dampened. It should be noted that in 1976, agriculture production required directly only three percent of the total national electric, fuel oil, and natural gas consumption.¹³ Indirect consumption of embodied energy, as in fertilizer, pesticides, steel, etc., is not commonly accounted for, but if included along with associated downstream energy consumption, as in food processing, transportation, home preparation, etc., this three percent figure may be greatly altered (Table 2.5).

In addition, agriculture productivity and efficiency has been historically measured as ratio of dollars of output versus the value inputs of capital and labor. Yet the advancement of such indices has depended on the extraction of finite stock resources, such as oil, with little regard the effect the absence of these materials may have on future generations. Increasing energy cost shares and wider application of energy budgets may provide a proxy for these concerns. In this case, if an energy budget is used as proxy for non-renewable resources, the efficiency ratio of our current farming system might change radically.

2.2 Farm Structure Defined

2.2.1 Farm structure and policy goals

In its most simple form, farm structure may be defined as the relationship between the organization and control of resources used in the production of food and fiber.

After the initial scare of internationally tight food supplies of the early 1970s, pressing problems of energy, and conceptualization of United States food exports as a diplomatic weapon, there developed "a growing feeling in our culture that the era of cheap abundant food is over, and that the cornucopia has been a short-term marvel with long-term costs to our society."¹⁴

The era of "agriculture versus food policy" had arrived. This national and international dilemma as well as a recognition that past farm policy had treated our agriculture "as if all farmers were alike"¹⁵ created problems in our food and fiber production to a point where there has been a measured "loss of food quality, destruction of our rural culture and environment, a rise of centralized food monopolies, and tremendous social cost consequences due to the vast migration of people from farms to cities."¹⁶ Further, the 1977 Food and Agriculture Act, although reaffirming the historic policy role of encouraging the family farm (without defining it), finally legitimized that "programs should not be exclusively administered for the benefit of family farms."¹⁷

Food policy has dominated United States agriculture since the 1940s via preoccupation with acreage controls and price supports. As the Nation enters the last two decades of this century, the policy issues of a dispersed versus concentrated agricultural sector are being addressed. The questions are: how is farm production and marketing going to be organized, and who is going to control it? Is a dispersed system of relatively smaller farms and markets better or worse than a small number of large production units and integrated marketing networks? This is the essence of the farm

structure question and is only addressed by evaluating the system against desired goals in agriculture policy. Such goals, many of which overlap, should provide for:

- nutritional well being of the people,
- a reasonable level of income for farmers,
- equity in the distribution of power within and between suppliers and buyers of agricultural products and inputs,
- independence and self-determination,
- efficiency,
- resilience under stress and flexibility for the future,
- conservation of resources and protection of the environment,
- assured opportunity,
- and be consistent with other objectives of our society.¹⁸

It is through these farm economy goals that structure is addressed: is our diet becoming better balanced with fewer diseases related to contaminants/additives, can the young or inexperienced enter this economic sector, does it provide for future food and fiber demands without exploiting limited non-renewable resources?

2.2.2 Farm definition

Official definition of the farm has varied considerably through time by the United States Census and Census of Agriculture.* Since 1850 there have been eleven changes in the definition of a farm for purposes of enumeration in official census counts. Importantly, all counts made prior to 1974 were based on a given minimum acreage generating gross sales of a stipulated

* The Censuses of Agriculture have only been collected since 1920. Previous to 1920, information concerning farms were collected as part of the general census.

minimum amount. The departure from minimum acreage requirements in 1974 resulted in the loss of an estimated 302,000 farms in the less than \$2,500 gross sales category (class VI)* or approximately 11 percent of the total number of farms in 1974 (2.63 million, using the 1959 definition).

Table 2.6 U.S. Census of Agriculture's definition of a farm for enumeration, 1959-1978

<u>Years</u>	<u>Definition</u>
1959-1969	With 10 acres or more, \$50 worth of agricultural products sold, and under 10 acres, \$250 dollars of sales
1974-1978	\$1,000 dollars or more of agricultural sales

Source: David Brewster, "Some Historical Notes on Farm Definition," in Agricultural Economic Research, Vol. 29, No.1 (Washington, D.C.: USDA-AERS, 1977).

Definitions of the family farm for purposes of trend evaluation within the farm population and for comparison with part-time, smaller-than family farms, larger-than family farms, corporate farms, and a host of other classifications, are numerous. A recent publication concerned with small-farm issues identified more than 39 separate definitions used by government, land grant universities, in professional journals and other publications for family farms, part-time farms, and multiple income farm families.¹⁹ Cited were more than a dozen definitions used by USDA authors alone for the family farm. Most farm classifications in this

* USDA Farm Sales classes based on annual gross farm sales, 1978

<u>Farm Class</u>	<u>Gross Farm Sales</u>	<u>Farm Class</u>	<u>Gross Farm Sales</u>
(Ia)	\$100,000 and over	III	\$10,000 - 19,999
(Ib)	40,000 - 99,999	IV	5,000 - 9,999
I	40,000 and over	V	2,500 - 4,999
II	20,000 - 39,999	VI	Less than 2,500

publication differentiated farm types based on three elements: labor (being most cited due to its relative availability in the Census of Agriculture and other sources), risk, and management.

The evolution of the USDA family farm concept from the Jeffersonian ideals combining land ownership, labor, management and self-sufficiency, had by 1974, eliminated the need for landownership and self-sufficiency. Previous to 1974, the USDA described a family farm as "a farm on which the farm operator, devoting substantially full time to operations, with the help of other members of the family and without employing more than a moderate amount of outside labor, can make a satisfactory living and maintain the farm plant."²⁰

The standard definition used by the government since the late 1950s for a family farm was an operation that hired less than 1.5 man-years of labor annually versus the post-1940 stipulation that a family operator could not hire more than an undefined "moderate" amount of labor. Such a redefinition allowed the "proportion of family farms to rise from an estimated 56 percent under the old definition to around 95 percent under the new."²¹

Under the new family farm definition, many part-time farms and Class I farms (gross annual farm sales greater than \$40,000) were included as well as many non-commercial part-time and/or marginal farms not providing a "satisfactory living." The departure from Jefferson's vision of the family farm has created some benefit due to the demand via The 1977 Food and Agriculture Act for separate annual reports concerning family farms and small farms in order to redefine disappearing constituencies.

2.3 Trends and Causes of Agricultural Structural Concentration

2.3.1 Introduction

As the United States enters the decade of the 1980s, economic and technical trends resulting in an agriculture economy dominated by a few very large increasingly integrated producers, have become a vital issue to the family farm of moderate means and of increasing interest to consumer movements. The enlightenment of the consumer to this situation has been led by church groups and newly formed and traditional agriculture movements, representing the traditional family farm concept. The outcry from the farm groups resides in a growing conviction that agriculture is not purely economic in nature, but has fundamental social and political connotations as well. Further, they stress that the quality of rural life and its community is closely linked to the stability, scale and organization of the agricultural enterprises which surround it, which is closely related to the family farm and its size. Finally, the community structures enhanced by the presence of family farms are tied to the obvious fact that on a family farm, the work role and family/community role takes place concurrently.

2.3.2 Trends in the size, ownership, and organization of U.S. farms

2.3.2.1 Trends in farm acreage

The period between 1950 and 1955 represents the period of greatest acreage of land in farms in United States history, whereas the period of the greatest number of farms occurred in the early 1930s. Farm numbers in 1930 were thirteen percent greater than the 1950 level and operated only 82 percent of the land in utilization during the 1950-1955 period (1950=100). Average farm size in 1930 was only 71 percent of the 1950 level

and only 36 percent of the 1978 average farm (see Table 2.3, p.7).

Distribution of farms by acreage categories versus total acreage within the same categories since 1970 indicates a continual trend toward greater inequality between groups. Farms of 1,000 or more acres in size, representing only one percent of total farms in 1920, had by 1978 (preliminary estimates) increased to 6.6 percent of all commercial farms and were controlling 54.1 percent of all farm land. Gini Ratios of Relative Concentration and Indices of Inequality* may confirm this trend over time, although the 1978 preliminary distribution of farm numbers versus land in farms may indicate a significant reduction in the rate of change (see Table 2.7).

The greatest change in farm numbers and acreage that they control occurred in farms of less than 180 acres during the period 1920 to 1974. Between 1920 and 1954 there was a 33.5 percent decrease in farm numbers in this size category with a 36.5 percent drop in acreage controlled although total national acreage in farms increased by more than 21 percent. This trend intensified, possibly in part due to a 12.2 percent reduction in total acreage operated between 1954 and 1974, with reductions of 58.5 and 56.1 percent for farm numbers and their total acreage respectively. It is interesting to note that between 1974 and 1978 the two smallest farm acreage categories have shown an increase in numbers and total acreage controlled whereas the farm categories of 50 to 180 acres continue toward fewer farms controlling larger acreages.

* See Appendix A for discussion of these indices.

Table 2.7 Percent distribution of farm numbers versus land in farms, 1920-1978

Acres	1920 ^a		1940 ^a		1954 ^a		1974 ^a		1978 ^b	
	% of Farms ¹	% of Land ²	% of Farms	% of Land	% of Farms	% of Land	% of Farms	% of Land	% of Farms	% of Land
Less than 10	4.5	0.2	8.3	0.2	10.1	0.2	5.5	0.1	8.6	0.1
10-49	31.2	5.8	29.2	4.5	25.3	2.8	16.4	1.0	19.1	1.3
50-99	22.9	11.0	21.2	8.8	18.0	5.4	16.6	2.8	15.6	2.9
100-179	22.5	20.4	21.0	16.2	20.0	11.2	19.2	5.9	17.1	6.0
180-259	8.2	11.8	8.5	10.3	9.7	8.6	10.9	5.4	9.9	5.4
260-499	7.4	17.1	7.5	15.0	10.1	14.5	15.7	12.7	14.2	13.0
500-999	2.3	10.6	2.7	10.6	4.0	11.4	9.0	14.0	8.6	15.2
(1000 or more)	(1.0)	(23.1)	(1.6)	(34.3)	(2.7)	(45.9)	(6.7)	(58.1)	(6.4)	(56.1)
1000-1999	NA		NA		NA		4.0	12.4	3.9	13.7
2000 or more	NA		NA		NA		2.7	45.7	2.5	42.4
TOTAL	65184	9565	6350	1061	4782	1158	2528	1017	2476	1031
Gini Ratio ³	0.60		0.67		0.72		0.73		0.72	
Coefficient of Inequality ³	43.70		50.00		54.90		56.40		56.3	

Sources:

a Bureau of the Census, Statistical Abstract of the United States, various years, (Washington, D.C.: U.S. Department of Commerce).

b Bureau of the Census, 1978 Census of Agriculture, United States, Vol. 1, Part 16 (Washington, D.C.: U.S. Department of Commerce, 1981), Table 33, pp. 70-71.

NA Not Available.

1 All farms.

2 All land in farms.

3 See appendix A for discussion of these indices of inequality. Increasing inequality is indicated by an increasing value, a range of 0-1 for the Gini Ratio and 0 to 1000 for the Index of Inequality. Both indices are calculated using 8 acreage classifications.

4 Units of 1,000 farms.

5 Millions of acres.

Table 2.8 Annual percent change in farm numbers and their total acreage operated by farm acreage category.

Farm Acreage Category	1920-1954		1954-1974		1974-1978	
	Farm Numbers	Acreage Operated	Farm Numbers	Acreage Operated	Farm Numbers	Acreage Operated
--acres--	-----average annual percent change-----					
less than 180	-1.0	-1.1	-2.9	-2.8	+2.7	+0.5
180-499	-0.2	-0.1	-1.4	-1.7	-2.3	+2.1
500-999	+0.8	+0.9	+0.9	+0.4	-1.0	+2.6
more than 1000	-0.8	+4.1	+1.3	+0.6	-0.7	+1.1
<u>TOTAL</u>	<u>-0.8</u>	<u>+0.6</u>	<u>-2.4</u>	<u>-0.6</u>	<u>-1.9</u>	<u>+1.4</u>

Source: Calculated from Table 2.6

As may be seen in Table 2.8, similar pressure on farms in the 180-499 acre category has taken place, although during the 1974-1978 period, farm numbers continued to decrease, possibly at an increasing average annual rate. The positive change in total acreage operated within groups indicates continued trend toward fewer farms of larger average acreage; the arithmetic mean being greater than the mode of the category, or a skewed distribution within the farm acreage classification.

The trend since the 1920s, for the 500-999 and more-than-1,000 acre categories, is toward more farms with a greater overall proportional share of total acreage operated. There is an apparent reversal in the greater-than-1,000 acre group between 1974 and 1978 not fully obvious in Table 2.8 due to aggregation of the largest category, 2,000-or-more acres, which experienced a loss of farms, 5.6 percent, as well as a large loss of total operated acres of 11.7 percent (see Table 2.7).

Prospects for farm numbers and operated acreage for the remainder of this century indicates that the USDA generally believes, while total acreage operated will remain stable, total farm numbers will decline from 2.32 million in 1974 to 1.75 by year 2000 using the 1959-1974 more liberal farm definition.²² If the 1978 farm definition were used, the overall

decline would result in an estimated 1.54 million farms by year 2000, or an additional loss of 210,000 farms mainly in non-commercial smallest Class VI farms (less than \$2,500 annual gross sales). "Half of the farm land in year 2000 will be farmed by the largest 50,000 (3%) farms and almost all the land (98%) will be operated by the largest 1 million farms."²³ Farms of less than 220 acres will, by the end of the century, represent 65 percent of the commercial farms but will control only 8.5 percent of the operated total acreage.

2.3.2.2 Trends in farm tenure

There has been, since 1950, a continual erosion of owner-operators. This may be attributed to a number of important factors such as high land prices, improved landlord-tenant relationships, the cost and availability of credit, increased land values, and therefore, capital gains to owners. All of these factors combine to provide the landlord reason to continue ownership and farmers wanting to expand their acreages, reason to rent or lease.

In United States agriculture policy, there has traditionally been a democratic preference that those who work the land should own it. By 1978, ownership of ranch and farm land was not only highly unequal in distribution, the top one percent of the producers owning 32 percent of these lands,²⁴ but three-quarters of all farm and ranch landowners controlling 44 percent of ranch and farm lands, had occupations other than farming (see Table 2.9).

Table 2.9 Occupation of landowners: farm and ranch land, 1978

<u>Occupation</u>	<u>Percentage of Owners</u>	<u>Percentage of Acreage Owned</u>
Farmers	25.0	56.4
Retired	24.2	16.7
White Collar	20.7	14.3
Blue Collar	21.6	7.3
Other*	<u>8.5</u>	<u>5.3</u>
	100.0	100.0

Source: James A. Lewis, Landownership in the United States, 1978, Agriculture Information Bulletin No. 435 (Washington, D.C.: USDA-ESCS, 1980), Figure 7, p. 8.

*includes military, homemaker and unemployed

Full-owners have increased in proportion to all farms being operated (Table 2.10). The part-owner sector has shown the greatest rise in total acreage farmed, increasing from 25 percent in 1935 to 57 percent in 1978. The national percentage ratio of land owned to that rented for part-owner farms shows a trend toward greater reliance on rented land. Most land coming under control of these part-ownership farms appears to be the result of the large decline of tenant farms and the transfer of these land's leases toward non-operating land speculators who in-turn rent to the remaining farms or via farm expansion purchases by full and part-owners.

Tenure structure by sales class (Table 2.11) since 1964 indicates that full-owners dominate the smaller gross farm sales classes, whereas part-owner farms are most dominant in and continue to increase their numbers for the largest farm sales classes. Tenant farm numbers have increased most in the small and middle farm sales classes while remaining fairly constant in the large farm sales class. This information reinforces the theory that the smaller or medium-sized farms have provided much of the land flowing to the part-owners or expanding full-owners in their effort to increase farm

Table 2.10 Tenure of U.S. farm land, 1900-1978

Year	Distribution of Farm Numbers and Land by Tenure of Farm Operators ^a													Tenants & Managers
	Percent of Farm Land ^a		: :											

Sources:

a Robert F. Boxley and Larry Walker, "Impact of Rising Land Values on Agricultural Structure" in Structure Issues of American Agriculture, Agri. Econ. Rpt. 438 (Washington, D.C.: USDA-ESCS, 1979), Tables 1 and 2, pp. 97-98.

b Bureau of the Census, 1978 Census of Agriculture, Vol. 51 (Washington, D.C.: U.S. Department of Commerce, 1980)

NA Not Available

NR Not Reported

Table 2.11 Tenure structure by farm sales class, 1964-1978

<u>Small Farms</u>				
Less than \$20,000				
Gross Annual Sales, 1964-1978				
	<u>1964</u>	<u>1969</u> (percent of farms)	<u>1974</u>	<u>1978</u>
Full Owners	61.8	69.4	74.3	71.3
Part Owners	21.7	26.9	16.6	17.7
Tenants	16.5	17.1	9.1	11.0
<u>Moderate Farms</u>				
\$20,000 to \$99,999				
Gross Annual Sales, 1964-1978				
	<u>1964</u>	<u>1969</u> (percent of farms)	<u>1974</u>	<u>1978</u>
Full Owners	31.5	35.1	39.3	38.2
Part Owners	50.3	47.8	44.8	45.2
Tenants	18.1	17.1	15.9	16.6
<u>Large Farms</u>				
\$100,000 and over				
Gross Annual Sales, 1964-1978				
	<u>1964</u>	<u>1969</u> (percent of farms)	<u>1974</u>	<u>1978</u>
Full Owners	34.2	35.3	29.3	28.8
Part Owners	51.6	51.4	57.2	58.6
Tenants	14.1	13.3	13.5	12.6

Source: Bureau of the Census, Statistical Abstract of the United States, various years (Washington, D.C.: U.S. Dept. of Commerce).

size (Table 2.12). The cannibalization of smaller full-owner and tenant farms (due to operator retirement and/or enterprise marginality) by the part-owner farm has resulted in the part-owner farm averaging 100 percent larger in acres operated than the national mean farm size in 1974. Comparison of rates of growth in average farm acreage by tenure classification between 1935 and 1974 indicates full-owner farms are increasing on average 3.25 acres per year, tenant farms by 8.6 acres per year, and part-owners by 11 acres per year (Table 2.12).

Table 2.12 Average size of U.S. farms by acres of land operated and by tenure, 1935, 1954, and 1974

Year	Full Owner	Part Owner			Tenant
		Land owned	Land rented	Land farmed	
-----acres-----					
1935	122	191	195	368	118
1954	145	309	235	544	166
1974	252	443	409	852	468

Source: Bruce Hottel and David H. Harrington, "Tenure and Equity Influences on the Incomes of Farmers" in Structure Issues of American Agriculture, Ag. Econ. Rpt. 438. (Washington, D.C.: USDA-ESCS, 1979), Table 4, p. 99.

2.3.2.3 Trends in farm organization

The form of business organization as related to land tenure is dominantly sole proprietors or family operated farms. In 1974, almost nine of every ten farms nationally were -- in contrast to partnerships and corporations -- sole proprietorships, full-owners representing 55 percent, part-owners 33 percent, and tenants 12 percent (Table 2.13). Sole-proprietor farms come closest to representing the farm family, in that as a sole proprietorship, the farm relies on an individual or family as its source of management, which bears the risk or liability for capital and

provides the major source of labor.

Table 2.13 Form of farm organization versus form of land tenure, 1969 and 1974

Form of Organization	Form of Land Ownership						All Farms	
	<u>Full Owners</u>		<u>Part Owners</u>		<u>Tenants</u>		<u>1969</u>	<u>1974</u>
	1969	1974	1969	1974	1969	1974		
	- - - - - percent of all farm land- - - - -							
Sole								
Proprietorships	52.4	54.8	33.2	33.0	14.5	12.2	85.4	89.5
Partnerships	40.9	38.2	36.7	37.7	22.5	24.0	12.8	8.6
Corporations	47.6	50.4	33.5	35.6	18.9	14.0	1.2	1.7
Other*	47.5	55.8	18.6	20.8	34.0	23.4	0.6	0.2

Source: Bureau of the Census, 1969 and 1974 Census of Agriculture, Vol. II, Part 3, (Washington, D.C.: U.S. Department of Commerce).

* Estates, trusts, research and institutional farms

The status of change in farm business organization is neither easily evaluated nor compared due to changes in the Census of Agriculture definitions for partnership and corporations. In 1969, the Census of Agriculture placed husband and wife joint-ownership farms in the partnership classification, whereas in 1974 it included such 'closely-held' partnerships in the sole-proprietor class. This shift, in part, resulted in an apparent large decrease in partnerships (23.8 percent) between the 1969 and 1974 census. Further, breakdown by type of corporation and related information has changed substantially since the Bureau of the Census began collecting information on corporations.

Land in farms for sole proprietorships and partnerships represented 90 percent of all land in 1969 and 1974 which may confirm little or no change in overall farm organization due to the change in Census classification. Likewise, corporations only expanded their acreage operated

Table 2.14 Proportion of specified farm commodities produced by the largest and smallest 10 percent of farms and distribution by organization for those farms reporting that commodity as their major enterprise, 1974

Commodity	Production controlled by ^a : Distribution of Farms and Production by Organization ^b					
	Number of Farms	Smallest 10% of Farms	Largest 10% of Farms	Sole Proprietor Production	Partnerships Production	Other Corporations Production
	(1,000)	(percent)	(percent)			
<u>Most Concentrated</u>						
Fed Cattle	(210.7)	0.3	83.5	87	11	2
Vegetables	(58.6)	0.2	68.4	87	10	3
Broilers	(31.4)	--	23.6	94	5	1
<u>Concentrated</u>						
Cotton	(80.7)	0.5	51.6	89	9	2
Wheat	(502.6)	0.9	49.3	89	10	1
Beef Cows	(724.6)	1.0	48.2	90	9	1
<u>Least Concentrated</u>						
Corn	(857.8)	1.1	41.1	89	10	1
Hogs & Pigs	(393.3)	1.2	39.3	89	10	1
Milk Cows	(242.2)	0.8	38.2	89	10	1

Sources:

a Leo V. Mayer, Farm Income and Farm Structure in the United States, Report No. 79-1885 (Washington, D.C.: Congressional Research Service, 1979), Table A-1, p. 48.

b Bureau of the Census, 1974 Census of Agriculture, Vol. 11, Part 3 (Washington, D.C.: U.S. Department of Commerce, 1977).

(n) = number of animals

(ac) = number of acres

(ba) = number of bales

(bu) = number of bushels

by less than 16,000 acres over this five year period.²⁵ The emotional outcry by farm groups and organizations that corporate farming was "taking-over" is mostly unfounded at the national level, as 76 percent of farm corporations own 74 percent of corporation land (7.8 percent of all farm land) are basically family controlled (normally less-than ten shareholders).²⁶

This is not to say that agribusiness corporations which enter a community cannot trigger important social consequences. This problem has been documented in the irrigated fields of California,²⁷ vegetables in Florida,²⁸ and integrated hog operations in Southern states.²⁹ Overall, the problem of corporate structure is not one of land control but the efficiency with which they can invade certain agricultural sectors conducive to corporate management tax advantages and vertical and horizontal integrative capabilities. Such advantages may eventually lead to corporation domination of sales within that sector and/or region. For example, the fed cattle and vegetable sectors are considered concentrated industries; the top ten percent of the farms control 83.5 and 68.4 percent of national production of these two commodities respectively (Table 2.14). In example, in 1974, corporations representing two percent of the farms producing fed cattle controlled 47 percent of the fed cattle production nor is surprising that three percent of the vegetable farms were corporations which controlled 29 percent of the national vegetable acreage.

Table 2.15 Value of farm sales by organization, 1969 and 1974

Farm Sales Class ¹	Sole		Partnerships		Corporations		Other ⁴	
	1969	1974	1969	1974	1969	1974	1969	1974
	- - - - -percent- - - - -							
Ia	NA	2.0	NA	7.6	NA	26.8	NA	7.3
Ib	NA	5.2	NA	11.6	NA	18.2	NA	6.7
II	10.9 ²	18.5	20.8 ²	25.5	57.4 ²	19.7	10.7 ²	19.5
III	18.7	19.1	22.2	19.1	13.2	9.7	16.6	19.1
IV	23.0	18.7	22.6	15.7	10.5	6.9	21.4	18.2
V	23.2	18.3	18.9	11.9	9.2	4.7	24.8	15.2
VI	24.5	18.2	15.9	8.6	9.6	4.0	26.4	14.0
	100.0 ³	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Bureau of Census, Census of Agriculture (1969 and 1974), Vol. II, Part 3 (Washington, D.C.: U.S. Department of Commerce)

¹ See page 16 for definitions.

² \$40,000 and greater.

³ Totals may not equal 100 due to rounding errors.

⁴ Estates, trusts, research and institutional farms.

2.3.2.4 Inequalities in gross receipts, production costs, net income, and government payments

Since 1960, measurements of relative wealth concentration (Gini Ratio and Index of Inequality) may indicate a steady trend toward relative greater inequality (Table 2.16). The most recent calculation, 1978, for these indices provides a possible, although questionable, trend away from greater inequality in farm income, farm expenses, and direct government payments. It is interesting to note that although several measures of gross income show relatively larger inequality, analysis of net income prior to inventory adjustments indicates that farm expenses are also distributed more or less according to the gross income inequalities, resulting in significantly less overall inequality between sales classifications for net income (Table 2.16).

Table 2.16 Indices indicating degree of concentration of income, expenses and direct government Payments, 1960, 1964, 1969, 1974, and 1978^a

Number of Farms by Sales Class by:	Gini Ratio of Concentration*					Index of Inequality*				
	1960	1964	1969	1974	1978	1960	1964	1969	1974	1978
Cash receipts from farming including government payments and other farm income:	0.67	0.69	0.72	0.77	0.73	51.3	53.7	55.0	59.7	57.0
Gross farm income before inventory adjustments:	0.62	0.65	0.68	0.73	0.69	47.8	50.5	52.2	56.2	53.4
Farm Production Expenses:	0.68	0.69	0.72	0.75	0.72	52.7	47.8	55.5	58.9	55.8
Net income before inventory adjustment:	0.49	0.51	0.64	0.66	0.58	38.1	38.9	51.5	53.0	45.0
Direct government payments to farms:	0.47	0.48	0.54	0.51	0.49	36.4	37.7	42.2	38.4	41.2
Number of sales classes:	7	7	8	8	8	7	7	8	8	8

Source: Economic Indicators of the Farm Sector: Income and Balance Sheet Statistics, 1979, Stat. Bull. No. 650 (Washington, D.C.: USDA-ESCS, 1980), tables 92-96.

* See Appendix A for discussion of these indices of inequality. Increasing inequality is indicated by an increasing index, a range of 0-1 for the Gini Ratio and 0 to 100 for the Index of Inequality. Ratios and indices for 1960 and 1964 should not be directly compared to later census years due to differences in the number of reported sales classes. They do confirm a trend toward greater inequality.

Hieronimus and Good point out some fundamental problems in using static farm sales classifications in the analysis of structural changes.³⁰

First, gross annual farm sales classifications used to delineate farm size ignore some very significant differences of farms within such classifications. Some farms are labor intensive, some land intensive, and others capital intensive. As a result, farm size definition by sales class falls short of good definition of size. This problem is widely recognized but due to the lack of any other better proxy to determine differences accorded to farm size, gross annual farm sales remains the best measure.

Second, and more important, are apparent shifts of structure defined by gross annual farm marketings between years which fail to account for increasing price levels. "Even if farm structure remained exactly unchanged over time, the increasing price level would result in a larger number of farms appearing in the larger size brackets and fewer in the smaller brackets."³¹ Such price induced migration of individual farms may be reduced through deflation of the magnitude of the induced increase via an index of prices recieved, in this case, by individual farms.

Third, in the early stages of agricultural development most farm inputs originate from within the farm and as a result more farm output is retained by the farm. As farms integrate into the market and purchase more outside inputs and become less subsistence oriented through the substitution of purchased inputs for previous farm production, increased sales as a result of released production flowing to the market-place will create shifts in farm size, if farm size is strictly based on sales.

2.3.2.5 An example of structural change: Broilers

The broiler, fed-cattle and processing-vegetable agri-industries are examples of continued regional, scale and corporate concentration of

production.³² These three sectors, considered intensive systems, today are typified and are dominated by high capital to land and labor ratios.

Reimund, et al., indicate that the structural changes which have occurred in these agri-sectors are the result of external forces including changes in technology, markets, and public policy.³³ They further indicate four stages which accompanied these changes:

- Innovation and adoption of a new technology.
- Shifts in production to new geographical regions and/or to the more innovative producers.
- Production increases rapidly due to the changing technologies and related advantages.
- New risk reducing institutions evolve to handle the shifts along with buy/sell agreements.

For example, relative importance of broiler production input costs between the mid-1960s to mid-1970s for the United States changed substantially. Along with these changes in production costs, the broiler industry became more efficient. Deflated (1963-68=100) average broiler production costs for 1963-68 were 14.9 cents/pound which by 1976-78 had fallen to 10.1 cents/pound or a deflated unit production cost reduction of 32 percent.³⁴

The gain in efficiency was related to improvements in breeding, disease control, feed rations, and management. For example, by the mid-1970s mortality of broilers had been reduced by 60 to 75 percent compared with the mid-1950s, thereby reducing the number of chicks required.³⁵ Other technology induced productivity improvements have been manifested via genetics, health control, and nutritional interactions with feed conversion which, if held constant at 1940 levels, would have by 1978 required twice the amount of feed per animal (4.22 lbs. grain/lbs. of bird in 1940 versus 2.05 lbs. grain/lbs. of bird in 1977).³⁶

The greatest indicator of the role of improved technology has been the savings in labor requirements between 1940 and 1978. As example, if 1940 labor productivity were applied to 1978 bird numbers, there would have been a 5,000 percent increase in labor required.³⁷

Table 2.17 Changes in relative importance of broiler production costs

Input	mid-1960s	mid-1970s	Change in percent*
	- - - - percent- - - -		
Feed	64	73	+9
Chicks	18	12	-6
Labor/mgt.	7	6.5	-0.5
Energy	2	2	--
Other variable	4	2	-2.0
Overhead	5	4.5	-0.5
	100	100.0	

Source: George B. Rogers, "Poultry and Eggs" in Another Revolution in U.S. Farming? (Washington, D.C.: USDA, 1979), Table 4, p. 162.

* no significant difference at 0.05 level: $\chi^2 = 3.35$, df (1,5)

Lower capital facility requirements due to climatic advantages have been a major cause of the shift in the centers of broiler production away from the northern regions toward the southern regions (Table 2.17). This shift was much more pronounced prior to the early 1960s when the combined factors of cheap labor, nearness to feed grain production areas, deep freezing and refrigerated transportation allowed this industry's migration away from population centers.

Interregional industry migration toward the south (due to technological advantages requiring increased confinement) resulted from reduced capital requirements to protect flocks against inclement weather. An average

Southeastern broiler farm of 30,000 birds, producing five batches of 3.9 pound birds in 55-60 days would require a capital investment of "nearly \$60,000 for a pole barn, side curtains, dirt floor, individual brooders, manual feeding system and some ceiling insulation. Further north, or with fully environmentally controlled housing and increased automation, investment costs might be more than 50 percent higher."³⁸

Table 2.18 Regional shares of U.S. broiler production
1940-1978

Region	YEAR			
	1940	1955	1965	1978
	- - - percent of total birds - - - -			
North Atlantic	3.7	12.7	5.9	5.2
East North Central	9.7	7.0	2.1	1.4
West North Central	2.4	3.5	1.9	1.2
South Central	16.5	26.8	43.5	46.4
Total Birds Produced (millions)	143	1092	2334	3619

Source: Brooks, 1980, op. cit., Table 1, p. 213.

* significant difference from previous period at 0.01 level: $\chi^2 = 31.02$, 1940 vs 1955; $\chi^2 = 18.94$, 1955 vs 1965; no significant difference for 1965 vs 1978 (df = 5)

As may be seen in Table 2.19, by 1977, contract production and owner-integrated production dominated the industry with 98 percent of all broilers being produced under these arrangements versus 89 percent in 1955. The combined factors of changing technology, regional comparative advantage, and integrated input and final product marketing structures have resulted in the growth of vertical integration which has facilitated the trend toward fewer firms in the industry. According to Brooks, such concentration was most rapid in the 1960s and has been "relatively stable" since.³⁹

Table 2.19 Broiler marketing arrangements,
1955 - 1977

	<u>YEAR</u>					
	1955	1960	1965	1970	1975	1977
	- - - - - percent of operators- - - - -					
Contract production	87.0	90.0	90.0	90.0	90.0	88.0
Owner-integrated production	2.0	5.0	5.5	7.0	8.0	10.0
Contract marketing	1.0	1.0	1.5	2.0	1.0	1.0
Total*	90.0	96.00	97.0	99.0	99.0	99.0

Source: Rodgers, 1979, op. cit., Table 5, p. 168.

* Total may not equal 100% due to other marketing methods

Corporate structure was less dominant in this sector when compared to other most concentrated commodity sectors in 1974; one percent of the farms producing eight percent of the total broiler numbers (Table 2.14). This statistic may lead to a false impression of the industry. A look at average size of operation by organization provides some insight to the possible role that economies of size and scale due to improved technology may have in the future. Corporate farms in 1974 on average produced 8.7 times more birds per farm, indicating significant advantages of size.⁴⁰ This situation may lead to further erosion of the smaller producers with flocks of less than 100,000 birds who represent 69 percent of the producers but whom only produce 30 percent of the market sales (Table 2.20).

Table 2.20 Distribution by size of broiler farming units with sales of \$2,500 or more, 1974

	Flock Size				
	1 to 1,999 birds	2,000 to 29,999	30,000 to 59,999	60,000 to 99,999	100,000 or more
Broilers					
	Percent				
Farms (31,407)	24.4	8.5	15.6	20.9	29.7
Sales (\$2,436 mill)	0.1	1.7	8.6	19.7	70.0

Gini Ratio = 0.51, Index of Inequality = 39.3

Source: Bureau of the Census 1974 Census of Agriculture, Vol. I, Part 51 (Washington, D.C.: U.S. Department of Commerce, 1977), Table I-20.

The concentration in the broiler industry is not unique; it is a more obvious example of the many interrelated factors which have been and are driving agriculture toward increased concentration.

2.4 Causes of Structural Change: A Model

There appears to be no single model explaining in total reasons for the continued trend towards fewer farms of ever larger size and greater concentration of wealth within the declining farm population. The role of technology is considered a major determinant in the process to which the Land Grant system of research, development and extension have contributed significantly.⁴¹ The historic disparity favoring the urban over the rural sector as measured in income, employment opportunities, environment and living conditions provides another set of factors to be added to an overall explanation. A third factor, the impact of public policy in this economic sector, may have prolonged the inevitable, thus easing the transition and adjustment via attrition rather than forcing millions of families to leave farming.⁴² Harl summarizes, "the greatest threat to the small-farmer is and

will be the neighbor down the road who is operating at or near the minimum cost point and who is rapidly expanding his operation in an attempt to remain at the point of minimum cost on a volume scale."⁴³

The most common approach to the dynamics of structural change has been conceptualized by Willard W. Cochrane.⁴⁴ The following discussion of the treadmill, cannibalism and intervention models presented by Cochrane will be highlighted with appropriate empirical examples. The Experiment Station Committee on Organization and Policy in 1981 characterized these models in the following way:

"These [models] operate to eliminate the small, inefficient farmer and concentrate the productive resources of the farming sector where three conditions are satisfied: where there is rapid and widespread farm technological advance; where returns to size are constant over a wide range following the initial phase of increasing returns; and where farm product prices (or gross returns) are supported through the intervention of government."⁴⁵

The treadmill theory provides a firm and industry model to explain the elimination of laggard farmers due to the non-uniform rate of adoption of new technology which is both cost-reducing and output-increasing. The key in the model is the non-uniform adoption through time of new technology being first applied by operators characterized as aggressive, innovative risk takers, later applied by average, then laggard operators. The distribution of technological adoption through time can take on various forms depending on its cost, the universality of its availability or applicability by region, its relation to scale of operation as being either scale biased or neutral, the skill and management capabilities required to fully utilize the technology by the adopter, and other factors.

Referring to charts by Cochrane to depict these dynamics, Figure 2.2, Chart A indicates the effects an early adopter of cost reducing technology may achieve. In this case, adoption of the new technology has shifted the

average total unit cost curve (ATUC) downward from $ATUC_1$ to $ATUC_2$ and the early adopter has achieved an economic profit of rectangle P_1RST while increasing output by AB since this incremental addition to production has little or no depressing effect on P_1 . Such an advantage of lowered average unit cost and increased production will result in the most economic profit for the earliest adopters and progressively less for later adopters of the new technology and, due to the presence of economic profits, new entrants.

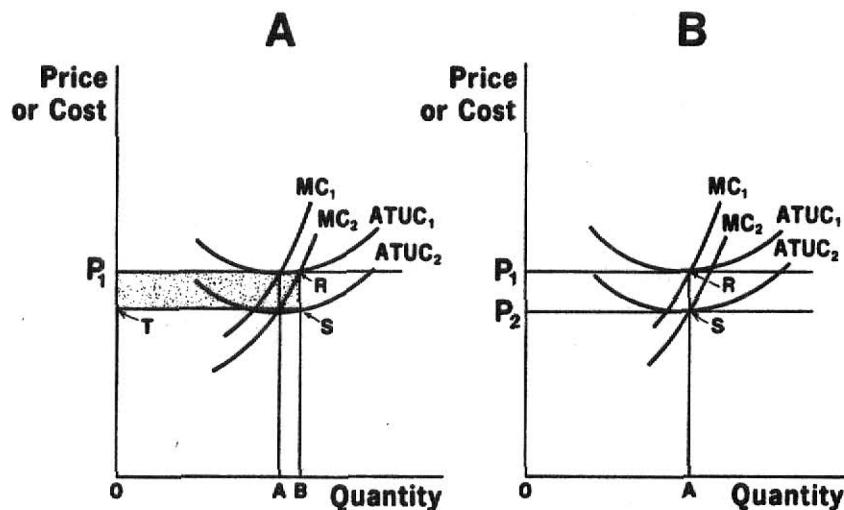


Figure 2.2 Firm and industry solutions in a free market:
the theory of the treadmill

Source: Willard W. Cochrane, The Development of American Agriculture, A Historical Analysis, (Minneapolis: University of Minnesota Press, 1979), Fig. 19.3, p. 389.

Due to the eventual additive increased productivity as more and more producers apply the new technology, P_1 is eventually depressed to the resulting lower, long-run equilibrium price of P_2 in Chart B. Likewise,

those laggard farmers not adopting the new technology now find themselves with losses of P_1RSP_2 and a cost structure of $ATUC_1$, or higher, while the long-run equilibrium production, OA, at price P_2 offers no economic or entrepreneurial profit until a new technology becomes available. In the long run, if the laggard farmers cannot achieve the $ATUC_2$ curve, losses must eventually force them into bankruptcy and out of farming.

As the laggard farmers leave farming, their productive assets have been typically bought up or leased by the aggressive technology adopters using their temporary economic profits resulting from successful application of the new technology. Such tactics are advantageous if the farm, by expanding in size, is moving downward along its long-run planning curve, the long-run average variable cost curve in Figure 2.3. In this case, the farmer finds that due to the characteristics of lumpy inputs such as tractors, implements, combines, and etc., size expansion results in lower per unit input costs and/or cost reductions in his variable costs. (His average variable unit cost (AVUC) structure declines, $AVUC_1$ to $AVUC_2$, as in Chart B of Figure 2.3). Therefore, both he and society benefit as long as those who leave farming have access to equal or better paying alternative jobs. The farmer is again earning an economic profit and society is gaining as less input is required per unit of output. "The aggressive innovative farmer has both increased production by the buying (or renting) of smaller farms as well as reduced his average unit costs by a wider application of new technology."⁴⁶

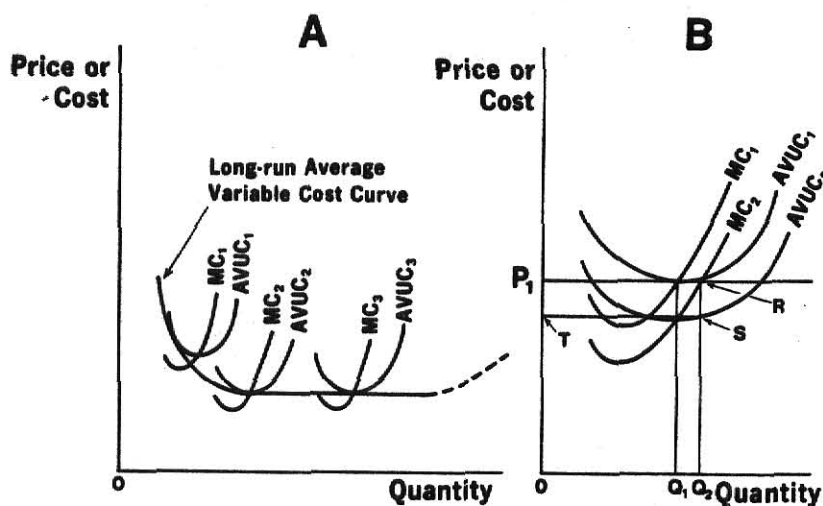


Figure 2.3 How the supply curve of the farm firm shifts

Source: Ibid, p. 366.

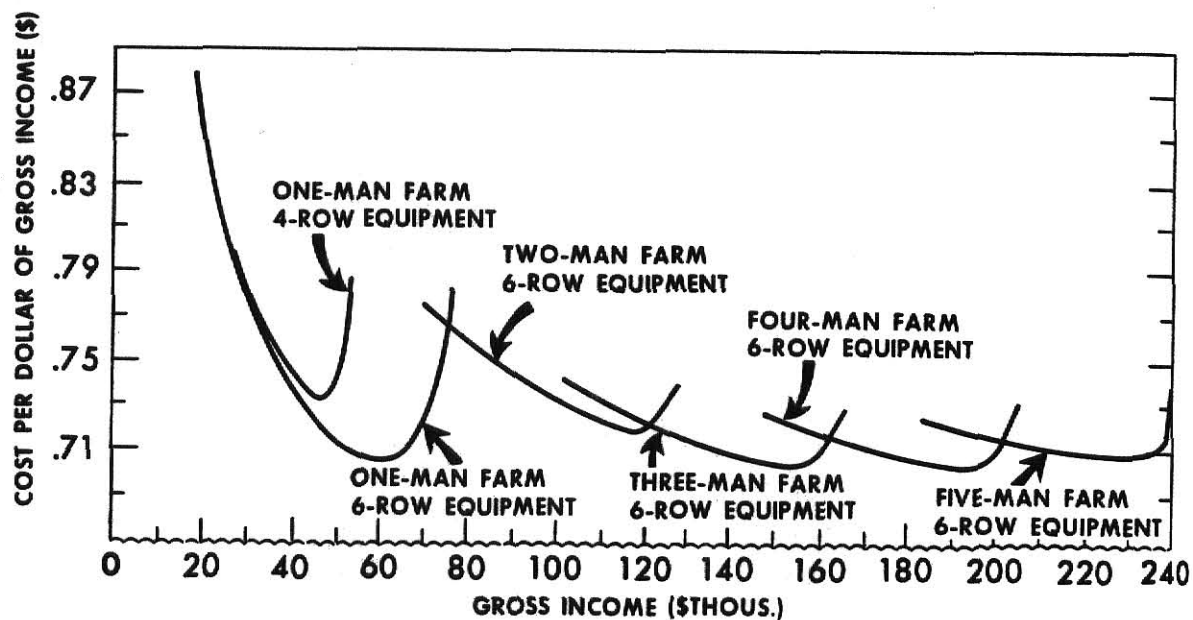


Figure 2.4 Average cost curves for irrigated cotton farms, Texas High Plains, 1967

Source: J. Patrick Madden, Economies of Size in Farming, AER No. 107 (Washington, D.C.: ERS-USDA, 1967), p. 44.

In the case of the farmer who is already at AVUC₂, expansion outward along the long-run planning curve to AVUC₃, the range of constant returns to size, provides future potential for increasing net income or profit as the farm size increases. Figure 2.4 depicts the relationship of returns to size for irrigated High Plains cotton and the effects of expansion upon net income. Expansion in this example, implies addition of land, which is purchased improves immediate wealth position if not immediate level of profits. On-the-other-hand, acreage expansion by rental improves expectation of greater net income. These expansions yield little in the way of social benefits as the ratio of farm input to output is constant. This dilemma is the root of the farm structure debate for "if economies of size are constant over some range of farm sizes, efficient food production may be possible under several alternative structures of the farm sector."⁴⁷

The demand for added net income is an important consideration. Farming assets have become increasingly less liquid since 1950. In example, the proportion of farm assets held in land and machinery has increased from 66.7 percent in 1950 to 84.2 percent by 1978.⁴⁸ This trend toward less liquidity in overall asset make-up plus a similar trend in the gross ratio (production expenses divided by gross farm income), 58.8 percent in 1950 versus 77.9 percent in 1978, has placed highly leveraged firms in a precarious position.*

* The larger the farm's sales class the higher the leverage ratios in 1978 (debts to asset ratio):

<u>Sales Class</u> ¹	<u>Leverage Ratio</u>	<u>Sales Class</u>	<u>Leverage Ratio</u>
Ia	22.7	IV	9.1
Ib	19.8	V	9.0
II	15.8	VI	6.3
III	14.9	All farms	16.3

Source: Balance sheet of the Farming Sector, Agri. Info. Bull. No. 430, (Washington, D.C.: USDA-ESCS, 1980), table 32, p. 46.

¹ Refer to the footnote on page 17 for definition of sales classes.

The following table provides some insight concerning this problem.

Table 2.21 Illustration of the effects of the Gross Ratio on variability in net income

Item	Gross Ratio*		
	50 percent	70 percent	85 percent
	----- \$1,000-----		
Gross Income:	60	100	200
Production Expenses:	30	70	170
Net Income:	30	30	30
Gross income reduced by 10 percent:	54	90	180
Net income with gross income reduced by 10 percent:	24	20	10
	----- percent-----		
Percentage reduction in net income due to 10 percent reduction in gross income:	20.0	33.3	66.7

Source: David A. Lins, "Credit Availability Effects on the Structure of Farming," in Structure Issues of American Agriculture, Agri. Econ. Rpt. 438 (Washington D.C.: USDA-ESCS, 1979), Table 7, p. 139.

* Ratio of production expenses to gross farm income

The incentive to expand net income via addition of land or by adoption of new technology is evident in Table 2.21. A ten percent variation in expected gross income due to changes in prices, weather, and/or pests results in large reductions in net income. It should be noted that short-term changes that increase production costs will affect net income in a similar manner. The expansion outward along the long-run variable cost curve is a justifiable response by the farmer to increase the probability of some minimum income level given expected or normal fluctuation in his gross income level and/or production costs.

Expansion in size will continue until average costs begin to increase.

Madden and Partenheimer indicate that the upturn in the long-run economy of size curve may be most related to losses of husbandry efficiency.⁴⁹ In such cases, the farmer with intimate knowledge of fertility or irrigation differences within a particular field or characteristics of individual farm animals can be significant sources of production efficiency. Therefore, as such heterogenous conditions are almost always present in any farm operation, husbandry skills and insights spread over ever larger acreages and/or animals, place an upper limit on farm size.⁵⁰

Since the late 1960s there have been comparatively few studies of economies of size.⁵¹ Wisner presents a discussion of a series of size and scale studies conducted between 1955 and 1978 by Iowa State University for corn and feed grain operations.⁵² In 1955, a two hundred acre farm using a two-bottom plow could capture all economies of scale. By 1962 similar constant returns to scale were realized with three or four bottom plows on 320 acre farms. In 1978, using 6, 8, and 12 row planting and tillage compliments and 3, 4, and 6 row harvesting equipment, it was found that there were significant cost savings up to 275 acres (the largest advantages were attained between 125 and 275 acres), marginal cost advantages upwards to 500 acres, and small, on the order of fifty cents per acre, savings between 500 and 775 acres.⁵³

A similar re-examination of shifts in the size of farming is being carried out by the Texas Agriculture Experiment Station as reported by Knutson et al.⁵⁴ on work done in 1967 by Madden⁵⁵ for cotton producers on the Texas High Plains (see Figure 2.4). Madden found in 1966 most economies of size were captured by six-row equipment on one man, 440 acre cotton farms. The current study being conducted by the Texas Experiment Station has found only farms of less than 320 acres now operate similar six-row equipment. This indicates the long-run average cost curve has

shifted to the left. The same study also found that although economies of size and scale for machine ownership exist throughout the acreage range, farms of 4,400 acres or more have a 40 percent per acre cost advantage in equipment ownership over 960 to 1,280 acre farms. It was further found that for farms of 3,500 acres or more that there were significant efficiencies due to be gained via integration into gin mills and equipment, fertilizer, and fuel dealerships which bypass middlemen and their margins.

Tweeten provides an estimate of the 1970 long-run average cost curve for United States farm production by dividing gross farm income by all costs of production including operator-family labor and management plus a seven percent current return to capital (see Figure 2.5).⁵⁶ Similarly shaped long-run average cost relationships by sales class for California farms using 1974 Agricultural Census data were found by Hall and LeVeene.⁵⁷

It can be concluded that, except for the major advantages of size and scale in animal agriculture, most economies of size in early 1970s were attainable by medium-size farms with gross sales of \$20,000 to \$100,000.⁵⁸ Further, farm expansion beyond this point was more likely a response by the operator to increase his probability of a minimum net income than it was to reduce average or marginal costs.

An important dimension of Cochran's treadmill and cannibalism model is the effect of governmental intervention via price supports. Under this scenerio, depicted in Figure 2.6, the aggressive early adopter of new technology has shifted his initial $ATUC_1$ downward to $ATUC_2$ after adoption of the new technology. P_1 represents the government's fixed price. As before, he captures an economic profit equal to P_1RST . As additional firms adopt the new technology and a cost structure similar to $ATUC_2$, the price does not fall, because of government support, to the long-run equilibrium price point as was shown in Chart B of Figure 2.2.

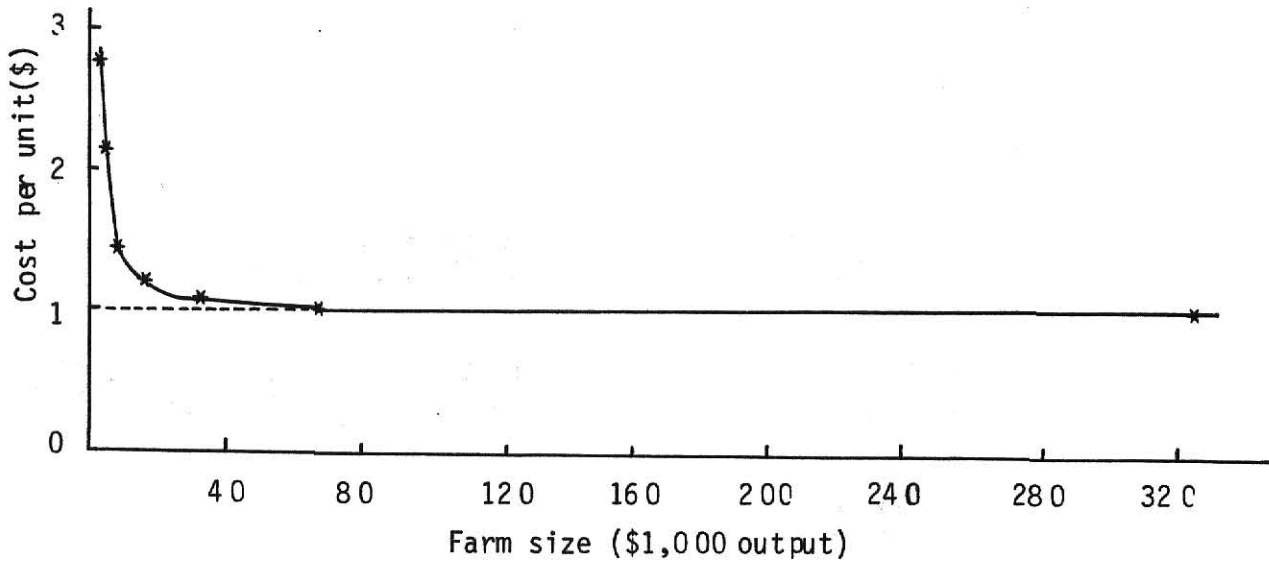


Figure 2.5 Long-run average cost of farm production, by economic class of farms in 1970

Source: Luther Tweeten, "Farm Commodity Price and Income" in Consensus and Conflict in U.S. Agriculture, Perspectives from the National Farm Summit (College Station: Texas A & M University Press, 1979), Figure 1, p. 67.

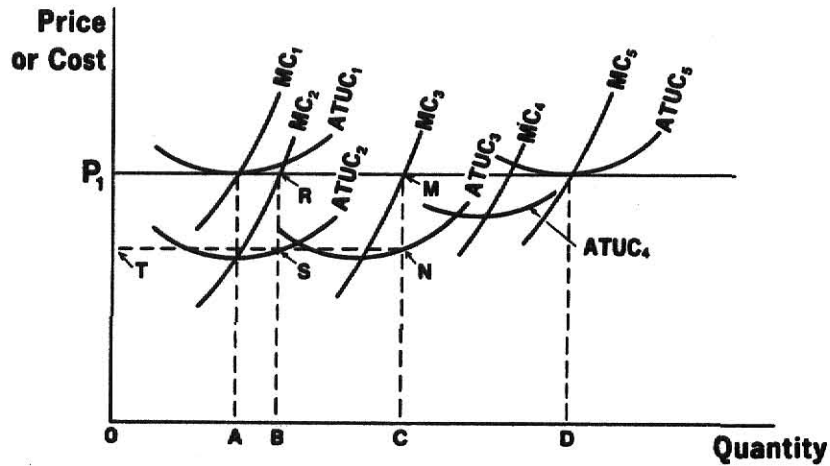


Figure 2.6 The treadmill solution with governmental intervention and cannibalism

Source: Cochran, op. cit., p. 391.

In the earliest stages, each aggressive risk taking farmer adopting the new technology can attain a profit level of P_1RST . The next logical step of the technology adopting farmer is to attempt to increase production and therefore his net income as long as the point MC equal to ATUC is less than P_1 . Initially, under constant returns to size early adopters move laterally, $ATUC_2$ to $ATUC_3$, as the unit costs of additional land and equipment remain unchanged during the early period of this round of technology adoption. The earliest adopters now attain profits equal to P_1MNT .

The average adopters of technology follow the aggressive farmers in the use of the new technology. They too see the advantages of size expansion under the supported price P_1 and use resulting profits to buy land from the weaker position laggard farmers. As land in farms since the 1940s has been for the most part stable or fixed (see Table 2.3), land becomes a relatively scarce resource. Increased bidding for its limited supply causes its price to rise. This raises average total unit costs as increased bidding occurs for the lands of laggard operators and as larger profits are capitalized into already owned land. Eventually, due to the increase in the cost of new land the innovative and expanding farmer will continue land acquisition until his cost function arrives at the $ATUC_5$ where he is back at the point of no economic profit.

An important aspect leading to an increase in the speed of the technological treadmill in the free market and government intervention models is the availability of capital gains to land owners resulting from the bidding up of land values with which other new technology or land purchases can be financed. Total capital gains on farm physical assets in 1978 amounted to \$75,736 million dollars, 74.6 percent of which was appreciation in land values alone, or more than 56 billion dollars against which credit could be extended.⁵⁹

Such capital gains in agriculture have resulted in comparatively high rates of return when compared in real dollar terms to common stock and long-term bonds. The combined greater real returns and the lower risk nature of land make investment in agriculture attractive to outside monies. Such capital gain advantages have increased since the mid-1960s such that for the period 1975-79 real capital gains for common stock was -4.09 percent, long term bonds a -12.06 percent, but a positive 5.10 percent was achieved for farm assets.⁶⁰ Such shelters from inflation may provide additional reason behind the increasing rate of non-operator landlord investments in agricultural land indicated in Table 2.10 and Table 2.22.

Capital gains have provided a continual source of additional capital for farm expansion and/or purchases of new technology. The more than \$164,000 of capital gains available on average to a Class Ia farm (gross farm sales over \$100,000) in 1979 can provide important capacity and stimulus to the aggressive, innovative, risk-taking farmer. The distribution of such windfalls since 1960 indicates growing inequality (Table 2.23). In 1960, the top 3 percent of all farms captured slightly more than 19 percent of all capital gains in agriculture. By 1978, the top 8 percent of all farms controlled more than 30 percent of such growth in wealth, while the smallest farm sales group, 25 percent of all farms,

realized only 12 percent of the growth in capital gains.⁶⁰

Table 2.22 Capital gains of the farm sector accruing to farm operators versus nonoperator landlords, 1979

Farm Sales Class ¹	Percent of Capital Gains Accruing to:		Capital Gains Per Farm ²
	Farm Operators	Nonoperator Landlord	
	- - - - (percent) - - - - -		- dollars -
Ia	58	42	164210
Ib	60	40	66118
II	66	34	40972
III	73	27	28010
IV	81	19	20452
V	83	17	17916
VI	<u>96</u>	<u>4</u>	<u>19565</u>
All farms	68	32	42858

Source: Balance Sheet of the Farming Sector, 1979 (Supplement), Agri. Info. Bull. 430 (Washington, D.C.: USDA-ESCS, 1980), Table 42 and 43, pp. 45-46.

¹ See footnote on page 16 for definition of farm sales classes.

² Calculated by dividing sales class capital gains by farm numbers within sales class from:
Economic Indicators of the Farm Sector: Income and Balance Sheet Statistics, 1979, Stat. Bull. No 650 (Washington, D.C.: USDA-ESCS, 1980), Table 92, p. 105.

Table 2.23 Gini Ratios and Indices of Inequality for capital gains in farming by farm numbers

Year	Gini Ratio	Index of Inequality	Number of Classes
1960	0.361	35.20	7
1969	0.475	36.50	7
1978	0.482	47.10	7

Sources: Capital gains - Balance Sheet of the Farming Sector, 1979 (supplement), Agri. Info. Bull. No. 430 (Washington, D.C.: USDA-ESCS, 1980) Table 39, p. 43.

Farm numbers - Economic Indicators of the Farm Sector: Income and Balance Sheet Statistics, 1979, Stat. Bull. No. 650 (Washington, D.C.: USDA-ESCS, 1980) Table 92, p. 105.

The apparent trend toward greater inequality in the distribution of capital gains towards the largest farms can be seen in the relative differences in average gains per farm by sales class. The growth of credit in constant dollars (1967=100) for farm real estate versus non-real estate or production orientated credit is significantly greater since 1945. In 1967 dollars, average annual farm real estate credit growth was \$833 million versus \$672 million for production or short-term credit (significantly different at a 0.01 percent level).*

Lins concludes that the "federally supported farm credit system has helped to develop a system that is very successful in acquiring loan funds for agriculture, which has facilitated a shift to fewer and larger farms, and a concentration of resource ownership and controls in large farm firms."⁶¹ Capital gains used to secure credit have helped to fuel the more rapid use of credit in the purchase of real estate versus production credit.

The acceleration of land prices will, as shown in Figure 2.6, eventually move the producer back to a point where marginal costs equal average unit costs which is also equal to the price. The model does not show the impact of continual innovation of other improved technologies and the differences in adoption thereof. As the models previously discussed concerned the single firm, the relative positions of the other producers

* OLS time series regression for constant dollar values (y) for non-real estate debt excluding CCC loans and real estate debt for years 1940, 1945, 1950, 1955, 1960, 1965, 1970, 1975, and 1979 (x) were fitted to the model $y = a + bx$. r^2 and slopes were significant at the 0.01 level. Intercepts were found to be not significantly different at a 0.05 confidence level.
Source of data: Balance Sheet of the Farming Sector, 1979 (supplement), op. cit., Table 18, p. 17.

were assumed for simple comparison purposes to point out certain dynamic characteristics. In the real world, due to heterogeneity of farms and the constant variation of technological adoption and innovation, knowledge of the dispersion about the long-run average cost curve which Figure 2.5 hides, will provide greater insight as "there is considerable variation in production costs among farms. The majority of farm operators have costs above the computed costs."⁶²

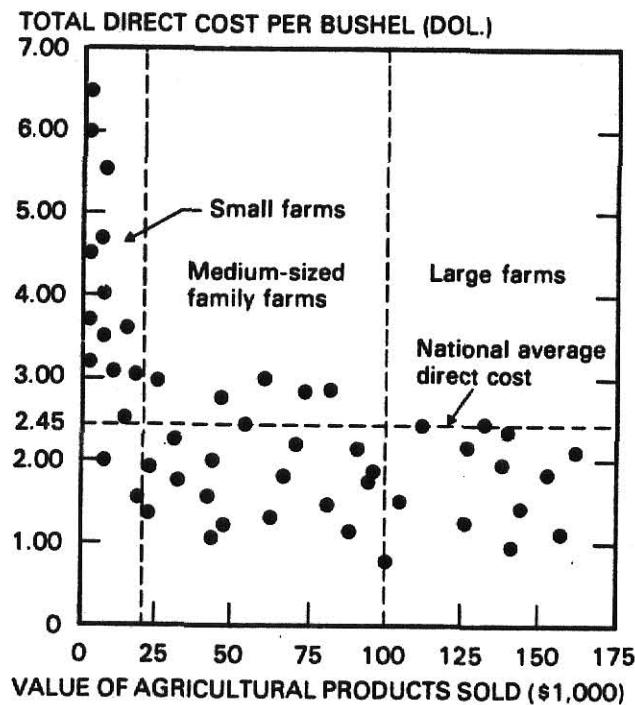


Figure 2.7 Distribution of total direct costs of production, wheat farms, 1977

Source: Thomas A. Miller, "Economies of Size and Other Growth Incentives" in Structure Issues of American Agriculture, Agri. Econ. Rpt. 438 (Washington, D.C.: USDA-ESCS, 1979), Figure 3, p. 111.

The importance of understanding the dispersion of costs by size category takes on increased importance when Figure 2.7 is considered. Figure 2.7 is a synthesis constructed by Miller with the following

properties:

- The arithmetic average of the 50 individual wheat farmer's costs is equal to the \$2.45 national average cost of production.
- The vertical distribution of costs have the same cumulative distribution as characteristics for wheat production as found by the USDA in 1974 but adjusted to 1977 values.
- The relationship between size and cost is representative according to farm class.
- The average annual sales of the 50 farms is \$64,000 which is comparable to the 1974 Census of Agriculture's estimate of \$62,100.⁶³

This synthesis, depicted in Figure 2.7, is therefore fairly representative and points out that the previous studies of economies of size, using sales as the major determinate of efficiency, have neglected other important aspects. Importantly, there is evidence that variation of costs within the medium and large size classifications is not related to the sales definition of size although variation in the small farm sales classification are. This suggests that in any sales class there are efficient and inefficient managers. This also implies that it is possible for efficient small-farms to predominate from a societal view of allocative efficiency.⁶⁴ Therefore, classification of farms by size, in this case by sales, for policy purposes has limited value. Sources of variation include differences in technologies used, the rate of adoption of technology, management ability, and resource productivity. Other variation due to weather/yield relationships, geographic distribution of prices, imperfect price expectations, and differences in productivity of fixed factors were also cited by Miller.⁶⁵

2.5 Conclusions

The pace of change in agriculture in the United States and its high productivity has endowed this nation and others with an abundant supply of food and fiber. Today's agricultural scene is far from that envisioned by the nation's early leaders. There is also a growing body of evidence that this system of capital and resource intensive agriculture may be at a point where continued change in its present direction is leading to greater ecological, social and productive instability.

In 1978, the USDA found that 75 percent of all private land in the United States was controlled by only five percent of the owners.⁶⁶ This is a misleading statistic when the estimated total number of land owners, 43 million, is compared against the 1978 national population of 203 million. Therefore, redefining in terms of the national population, less than one percent (0.8 percent) of our population controls 75 percent of all privately held land. Such inequality of land distribution is far from Thomas Jefferson's vision of freehold tenure of property as written to James Madison: "It is not too soon to provide by every possible means that as few as possible shall be without a little portion of land. The small landholders are the most precious part of the state."⁶⁷

Building a life on the land as envisioned by Jefferson, considering the strong trends away from an economical, small landholding, seems but a (American) dream. In fact, so little is known about entry problems into farming that the most currently cited study of it, as it concerns young people, is concluded by its authors, Hottel and Barry, in the following manner:

"Drawing conclusions on the entry of young farmers is somewhat difficult. Principal difficulties appear to be a lack of hard evidence which documents the severity of the problem and the appropriateness of the various vantage points for viewing the problem."⁶⁸

CHAPTER II

REFERENCES

1. Commission on Country Life, Report of the Commission on Country Life (New York: Sturgis and Walton Company, 1911).
2. Theodore Roosevelt, "Introduction" in Report of the Commission on Country Life (New York: Sturgis and Walton Co. 1911), p. 10.
3. Willard W. Cochrane, The Development of American Agriculture--A Historical Analysis (Minneapolis: University of Minnesota Press, 1979), Chapter 2, pp. 13-36.
4. David E. Brewster, "Changes in the Family Farm Concept" in Farm Structure, A Historical Perspective on Changes in the Number and Size of Farms, (96th Congress, 2nd session, Washington, D.C.: U.S. Government Printing Office, 1980), p. 19.
5. Cochrane, op. cit., p. 83.
6. Brewster, op. cit., p. 20.
7. David Brewster, "Some Historical Notes on Farm Definition" in Agricultural Economic Research, Vol. 29, No. 1 (Washington, D.C.: USDA-AERS, 1977), p. 29.
8. Changes In Farm Production and Efficiency, 1978, Stat. Bull. 628, (Washington, D.C.: USDA-ESCS, 1980), Table 31, p. 32.
9. J. B. Penn, "The Structure of Agriculture: An Overview of the Issue," in Structure Issues of American Agriculture, Agricultural Economic Report 438, (Washington, D.C.: USDA, 1979), p. 12.
10. Ibid., Table 13, p. 19.
11. Richard C. Fluck and C. Direll Baird, Agricultural Energetics (Connecticut: AVI Publishing Company, Inc., 1980), p. 39.
12. D. Pimentel, et al., "Food Production and the Energy Crisis" in Science, 182 (1973), pp. 443-448.
13. David Torgerson and Harold Cooper, Energy and U.S. Agriculture: 1974 and 1978, Stat. Bull. No. 632 (Washington, D.C.: USDA-ESCS, 1980), p. 11.
14. Richard Merril, ed., Radical Agriculture (New York: Harper & Row Publishers, 1976), p. (vi).
15. Bob Bergland, "Introduction" in A Time to Choose: Summary Report on the Structure of Agriculture (Washington, D.C.: USDA, 1981), p. 5.

16. Richard Merrill, loc. cit.
17. Bob Bergland, loc. cit.
18. A Time to Choose: Summary Report on the Structure of Agriculture (Washington, D.C.: USDA, 1981), pp. 17-18.
19. "Appendix" in Small-farm Issues: Proceedings of the ESCS Small-Farm Workshop, May 1980, ESCS-60 (Washington, D.C.: USDA-ESCS, 1979), pp. 63-73.
20. David Brewster, "The Family Farm: A Changing Concept" in Structure Issues of American Agriculture, Agri. Econ. Rpt. 438 (Washington, D.C.: USDA-ESCS, 1979), p. 76.
21. Ibid., p. 76.
22. William Lin, George Coffman, and J. B. Penn, U.S. Farm Numbers, Size, and Related Structural Dimensions: Projections to Year 2000, Tech. Bull. No. 1625 (Washington, D.C.: USDA-ESCS, 1980), p. 10.
23. Ibid., p. 14.
24. James A. Lewis, Landownership in the United States, 1978, Agri. Info. Bull. No. 435 (Washington, D.C.: USDA-ESCS, 1980), p. 6.
25. Donn Reimund, "Form of Business Organization", in Structure Issues of American Agriculture, Agri. Econ. Rpt. 438. (Washington, D.C.: USDA-ESCS, 1979), Table 2, p. 129.
26. Ibid., Table 5, p. 130.
27. see: E. Phillip LeVeen. "Enforcing the Reclamation Act and Rural Development in California" in Rural Sociology, 44(4) (Rural Sociological Society, 1979), pp. 667-690; and The U.S. Department of the Interior's Proposed Rules for the Enforcement of the Reclamation Act of 1902: An Economic Analysis, Staff Report ESCS-04 (Washington, D.C.: USDA-ESCS, 1978).
28. see: Donald L. Brooke, "Changes in the Structure of Florida Vegetable Farms 1945-1974" in Farm Structure: A Historical Perspective of Changes in the Number and Size of Farms, 96th Congress, 2nd Session, Committee Print (Washington, D.C.: Government Printing Office, 1980), pp. 358-363.
29. see: Chuck Hassebrook, "Will the Hog Industry Integrate Next," Nebraska's New Land Review, Spring 1980, p. 7.

30. Thomas Hieronymus and Darrell Good, "Relationship of Soybean Production to U.S. Farm Structure," in Farm Structure: A Historical Perspective on Changes in the Number and Size of Farms, 92nd Congress, 2nd Session Committee Print (Washington, D.C.: U.S. Government Printing Office), pp. 292-296.
31. Ibid., p. 293.
32. Donn A. Reimund, J. Rod Martin, and Charles Moore, Structural Change in Agriculture: The Experience for Broilers, Fed Cattle and Processing Vegetables, Tech. Bull. No. 1648 (Washington, D.C.: USDA-ESCS, 1981).
33. Donn Reimund, 1979, op. cit., pp. 128-133.
34. R. Charles Brooks, "Structure and Performance of the U.S. Broiler Industry," in Farm Structure: A Historical Perspective of Changes in the Number and Size of Farms, 92nd Congress, 2nd Session, Committee Print (Washington, D.C.: Government Printing Office, 1980), Table 2, p. 214.
35. Ibid., p. 203.
36. Ibid., p. 202.
37. Ibid., p. 211.
38. George B. Rogers, "Poultry and Eggs," in Another Revolution in U.S. Agriculture? (Washington D.C.: USDA, 1979), p. 180.
39. R. Charles Brooks, op. cit., p. 209.
40. Bureau of the Census, 1974 Census of Agriculture, Vol. I, Part 51 (Washington, D.C.: U.S. Department of Commerce, 1977).
41. see: Jim Hightower, Hard Tomatoes, Hard Times: A Report of the Agribusiness Accountability Project on the Failure of America's Land Grant College Complex. (Cambridge, MA: Schenkman Publishing Company, 1973).
42. J. B. Penn, op. cit., p. 3.
43. Neil E. Harl, "Agricultural Structure and Corporations--Economics and Emotions" in Corporate Farming and the Family Farm (Ames: Iowa State University Press, 1970), p. 10.
44. Willard W. Cochrane, The Development of American Agriculture, A Historical Analysis, (Minneapolis: University of Minnesota Press, 1979), Chapters 18, 19, 20, and 21, pp. 335-410.
45. Experiment Station Committee on Organization and Policy, Research and the Family Farm (New York: Cornell University, February 1981), p. 3.
46. Willard W. Cochrane, op. cit., p. 368.

47. Thomas A. Miller, "Economies of Size and Other Growth Incentives" in Structure Issues of American Agriculture, Agri. Econ. Rpt. 438 (Washington, D.C.: USDA-ESCS, 1979), p. 108.
48. Balance Sheet of the Farming Sector, Agri. Info. Bull. No. 430, (Washington, D.C.: USDA-ESCS, 1980), Tables 4 and 32, p. 6 and 36, respectively.
49. Pattric J. Madden and Earl J. Partenheimer, "Evidence of Economies and Diseconomies of Farm Size," in Size, Structure and Future of Family Farms (Ames: Iowa State University Press, 1972), pp. 100-104.
50. Experiment Station Committee on Organization and Policy, op. cit., p. 16.
51. Ronald D. Kuntson, Ed Smith, James W. Richardson, and Christina Shirley, "Maximizing Efficiency in Agriculture," in Increased Understanding of Public Problems and Policies-1980 (Oak Brook: The Farm Foundation, 1980), pp. 119-120.
52. Robert N. Wisner, "The Changing Structure of U.S. Corn and Feed Grain Farming" in Farm Structure, A Historical Perspective on Changes in the Number and Size of Farms, 96th Congress, 2nd Session Committee Print (Washington, D.C.: U.S. Government Printing Office, 1980), pp. 227-245.
53. Wisner, op. cit., pp. 233-236.
54. Kuntson, et al., loc. cit.
55. Patrick J. Madden, Economies of Size in Farming, AER-107 (Washington, D.C.: USDA-ERS, 1967).
56. Luther Tweeten, "Farm Commodity Prices and Incomes," in Consensus and Conflict in U.S. Agriculture-Perspectives from the National Farm Summit, B.L. Gardner and J.W. Richardson (eds.), (College Station: Texas A & M University Press, 1979), pp. 66-67.
57. Bruce F. Hall and E. Phillip LeVeen, Farm-size and Economic Efficiency: The Case of California, Department of Agricultural and Resource Economics Working Paper Series (California Agricultural Experiment Station: Giannini Foundation of Agricultural Economics, 1978), p. 10.
58. see: Kuntson, et al., op. cit., p. 121; and Miller, op. cit., p. 108.
59. Balance Sheet of the Farming Sector, 1979 (supplement), Agri. Info. Bull. 430 (Washington, D.C.: USDA-ESCS, 1980), Table 38 and 43, p. 42 and 46, respectively.

60. A Time to Choose: Summary Report on the Structure of Agriculture (Washington, D.C.: USDA, 1981), Table 15, p. 51.
61. Lins, op. cit., p. 141.
62. Tweeden, op. cit., p. 90.
63. Economic Research Service-USDA, Costs of Producing Selected Crops in the United States, Print 63-092 (Washington, D.C.: U.S. Senate Committee on Agriculture and Forestry, 1976).
64. David Seckler and R. A. Young, "Economic Implications of the 160-Acre Limitation in Federal Reclamation Law", American Journal of Agricultural Economics, 60 (4), 1978, pp. 575-588.
65. Miller, op. cit., p. 111.
66. Ibid, pp. 110-112.
67. As quoted in: Wendell Berry, The Unsettling of America, Culture and Agriculture (San Francisco: Sierra Club Books, 1977), p. 220.
68. J. Bruce Hottle and Peter J. Barry, "Issues Related to Entry of Young People into Farming", in Agricultural Finance Review, Vol. 38, May 1978 (Washington, D.C.: USDA-ESCS), pp. 6-12.

CHAPTER III

Small-Farms: A Structural Issue

3.1 Small-farms Introduction

3.1.1 Background

As the decade of the 1980s opens, U.S. agriculture sits at a crossroad. Structural issues and trends leading toward a production system dominated by fewer but ever larger firms are being questioned. The future role of the small-farm in such a changing economy has been assumed to point toward gradual elimination, although such farms have provided homes for millions, have produced significantly and have played a major role in the development of our rural heritage and national character.

Since the initiation of the agricultural technological revolution in the 1940s, small-farms have been considered as operations outside of profitable commercial agriculture. They have been considered as places incapable of supporting a family other than at a subsistence level, as a retirement residence, or as a part-time endeavor. By the late 1970s, farm operators on average had attained a level of income, public service, and a status more or less equal to the nonmetropolitan worker, but this is not to say that rural/urban differences had disappeared. "Nonmetropolitan America today contains 40 percent of the nation's poor and more than 50 percent of our substandard housing, but represents only 27 percent of the total population."¹ Further, a large part of this poverty group is associated in

some way with agriculture.²

In 1974, 1.5 million farms, or 66 percent of the nation's 2.3 million farms, had gross farm sales under \$20,000 dollars and, therefore, would qualify as small-farms as established by the Food and Agricultural Act of 1977.³ Further, 52 percent of the estimated 1.2 million small-farms in 1980 had total family incomes from all sources (farm and non-farm) below the median nonmetropolitan level (\$17,800 approximately).⁴ Larson and Lewis report that, as a group, small-farms in 1974 owned 31 percent of total farm assets, accounted for 29 percent of total land, but produced only 10 percent of all farm sales.⁵ The average 1974 small-farm of 184 acres and gross farm sales of \$20,000 or less was 12 percent more valuable per acre (including land and buildings) than large farms (defined as gross annual sales larger than \$100,000).

The mean age of a small-farm operator was about four years older than all farm operators with total family incomes greater than the median nonmetropolitan level. A fifth of all small-farm operators were older than 65 years old, but more than three-quarters of all farm operators in this age group were small-farm operators.

Three out of four small-farmers owned all of their land; only one in ten was a tenant.

Off-farm employment was important for seven of ten of these farmers and the proportion of those reporting off-farm family income varied inversely with the value of farm product sales. More than half of all small-farmers in 1974 considered their off-farm employment as their principal occupation.

Around 30 percent of small-farms were considered coarse grain produces with another 40 percent considered as livestock operations in 1974. Small-farms dominated (72 percent) tobacco farms and represented more than half of both fruit and nut farms (53 percent) as well as field crop farms

(52 percent). Nationally, dairy, poultry, vegetable and melon, and horticulture operations were least likely to be dominated by small-scale operations.

The heaviest concentration of small-farms was in the South and North Central regions (49 and 37 percent respectively). Five states--Iowa, Missouri, Minnesota, North Carolina, and Texas--each had more than 50,000 such families. Kansas in 1979 maintained 55 percent, or approximately 43,500 small-farms, ranking sixteenth in total numbers of such farms nationally in that year.

In general, small-farms may be the most durable of all family farms due to the fact most do not depend upon farm income exclusively and, therefore, have great staying power. But their greatest vulnerability in the future may be the availability of markets. As marketing structures change, these farms may not be able to produce enough volume to generate markets themselves, as small-farms ride along on markets set up to serve larger family farms.⁶ Projecting on the continued relative strength of the small-farm, resulting farm structure in the year 2000 is forecast to be "arranged in a bimodal distribution--a large proportion of small-farms, an ever increasing proportion of large-farms, and a declining proportion of medium-sized farms."⁷

The small-farm sector can only be characterized as heterogeneous; their operators being part-time and full-time, able-bodied and disabled, aged and young, with and without experience. Most importantly, no one policy will apply to all.

"Able-bodied, full-time, small-farm operators and some part-time operators need to be approached with a broad range of rural development options including information on expanding farm size, developing farming systems compatible

with off-farm employment, crops, job creation and human resource development programs, as well as technical production and marketing efforts."⁸

3.1.2 Definitions and types

With the increased attention of social scientists toward structural issues of agriculture, the need to disaggregate national and state data to provide a clearer picture of trends and the current situation of the farm sector, the small-farm and its definition has become a long-debated subject. This is due primarily to the large number of these operations and the wide heterogeneity of their character. Basically, there has been agreement on two general definitions of the small-farm: the small-farm business and low-income farm family.

The first general definition, the small-farm business, has its roots deeply established in the literature as a result of structural description requirements developed to interpret exsisting data as found in the Census of Agriculture. In this case, established census classifications for gross annual farm sales became the controlling characteristic for small and other farm size categories. The definition of the small-farm in this case resulted, for the most part, due to conceptualization of the small-farm as a low-volume business establishment normally incapable of adequately supporting a family.⁹ As the evaluation of the status of these farms depended upon disaggregation of the various Census of Agriculture data, gross farm sales became the best proxy for the necessary low-volume establishment characterization.

For the agricultural census year of 1969, the small-farm business was determined as those operations with under \$10,000 in gross farm product sales. Due to inflationary pressures, by 1976 the USDA staff generally had agreed that farms with sales under \$20,000 would meet criteria needed for

the small-farm, low-volume business. This definition was incorporated in the Food and Agriculture Act of 1977. Those who are currently involved with structural issues, and small-farms in particular, have strongly voiced the inadequacy of such generalization.*

The second definitional characterization, the low-income farm family, conceptualizes the small-farm operator or family as having a low level of well-being, again measured by income. The USDA as a result of deficiencies with small-farm classification strictly according to gross farm sales, have ammended their definition. The current USDA small-farm working definition includes all farm families:

- whose family net income from all sources (farm and non-farm)
is below the median, nonmetropolitan income of the state,
- who depend upon farming for a significant, though not
necessarily a majority of their income, and
- whose family members provide most of the labor and
management."¹⁰

This definition, therefore, departs from a format compatible for interpretation of census data. It does provide a more reasonable footing from which small-farm socio-economic studies will fill-in descriptive gaps. This definition is for the most part untested.

The National Rural Center (NRC) assisted in the refined small-farm definition now used by the USDA. Their low-income farm definition is substantially the same although they note some objection to the use of the media nonmetropolitan income of the state: "While this refinement of the

* See Section 2.3.2.4 for a discussion of problems with classification based strictly on gross annual farm sales.

original NRC definition seems reasonable for some purposes, if the income criterion is to be used to determine eligibility for program assistance, the national median is preferred as a matter of equity."¹¹

Carlin and Creink developed a comparative study of small-farms based on these two generalized small-farm definitions.* Comparison of the small-farm business versus the low-income farm family definition yielded some interesting results. Most importantly, the "analysis suggests that low-income farm operators are tied more closely to farming (both by occupation and income) than are operators of a small-farm business. In other respects, there is very little difference in population characteristics between the two groups."¹²

Further disaggregation of the small-farm sector under either definition becomes necessary in order to understand the heterogeneity of farm operators within this population. Bertrand argues that disaggregation must consider four basic farm characterizations: sources of income, days of work on- and off-farm, size of operation (as may be measured in acres, number of animals, gross sales, or a combination, e.g., a size classification relevant to the needs of the researcher) and the age of the operator.¹³ Thompson and Hepp, in a 1975 descriptive report concerning small-farms in Michigan, develop four small-farm categories in recognition of the varied opportunities and goals facing different small-farm groups. Their categories were defined as:

-Rural Residents - Person under 65 years of age, working more than 100 days/year in non-farm employment, with annual farm

* This study was made using the 1975 Farm Production Expenditures Survey conducted by the Statistical Reporting Service of the USDA for more than 5,700 farms.

sales less than \$2,500.

-Supplemental Income Farmers - Person under 65 years of age, working more than 100 days/year in non-farm employment, with annual farm sales between \$2,500 and \$20,000.

-Senior Citizen Farmers - Person receiving social security or over 65 years of age with annual farm sales of less than \$20,000.

-Full-time Small Farm Operators - Person under 65 years of age, working less than 100 days/year in non-farm employment, with annual farm sales of less than \$20,000.¹⁴

Saupe points out that use of farm family objectives can also provide "a useful scheme for disaggregating this heterogeneous, small-farm population."¹⁵ Lionberger, et al., in a recent study of Missouri rural farm and non-farm residents concerning reasons for living in the country, developed six abstracted types which may provide added insight as to the goals and expectations of the small-farm.¹⁶ The six ideological underpinnings of Missouri's rural citizens identified were:

-The committed farmers who believe that the family farm is the backbone of the nation and is important to the welfare of the society via provision of abundant cheap food and moral fiber.

-Reluctant residents who generally like the life in the country but who feel that this life is isolated, that the country life is not the source of the good life, and that rural residence is no more healthy than city life.

-Nature lovers which believe there is a unique and beneficial communion to be gained through rural life and its closer

association with nature.

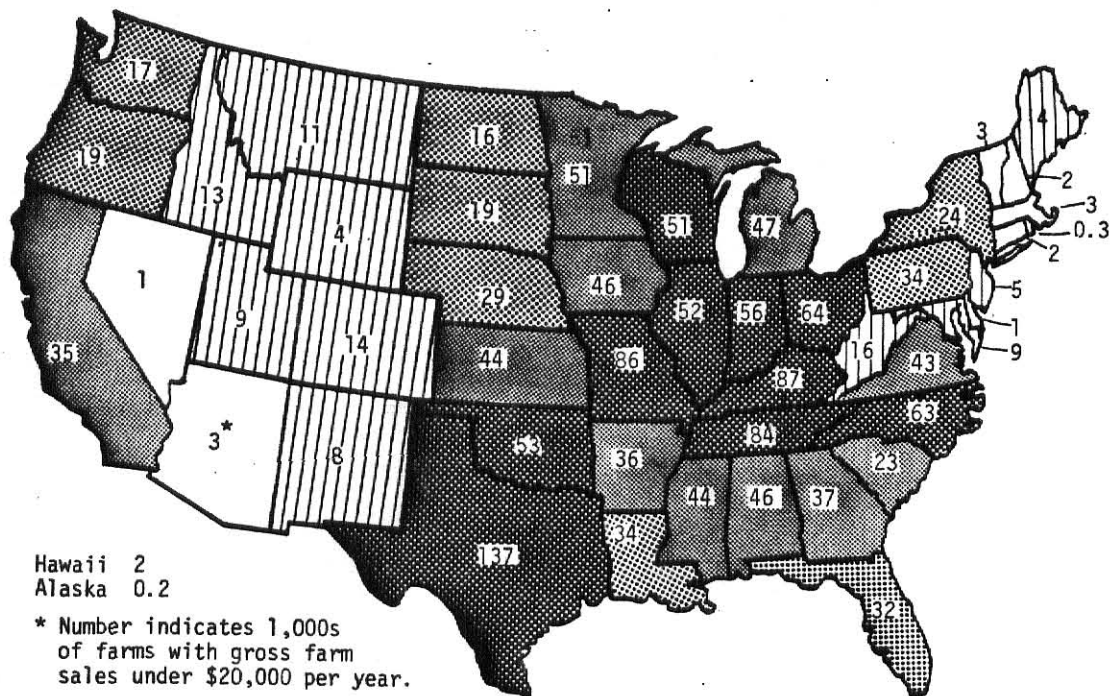
~~Guests of the country~~ whom are happy and content as a result of having the opportunity to live in a rural setting and are grateful for the closer personal and community ties which they find there.

~~Child raisers~~ who live in the country but who maintain careers in city or urban settings maintaining farming as a hobby mainly to provide relaxation for themselves and to give insight and a safe environment for their children.

~~Agrarian cornerstones~~ believe those on the land are the ones who will put things back together when they fall apart. That nature, not science, provides the meaning of life which creates self-reliance, thrift, and responsibility. They believe that through farming they learn how dependent they are for nature's gifts which reminds them of their similar dependence upon God.

3.1.3 Location

Distribution of small-farms within the United States during 1974, using the gross farm sales under \$20,000 definition, may be seen in Map and Table 3.1. This group comprised approximately 66 percent of all United States farms; farms with sales under \$2,500 representing 36 percent of all farms, or more than 50 percent of the small-farm category. As may be seen in Map 3.1, the North Central (37 percent) and the South (49 percent) regions contain the majority of small farms.¹⁷ Distribution of small-farms, by state total numbers, indicates that the 10 states with the largest small-farm populations accounted for 49 percent of these farms nationally (see Figure 3.1).



Map 3.1 Location of small-farms (gross annual farm sales under \$20,000) by state, 1974

Source: Table 3.1

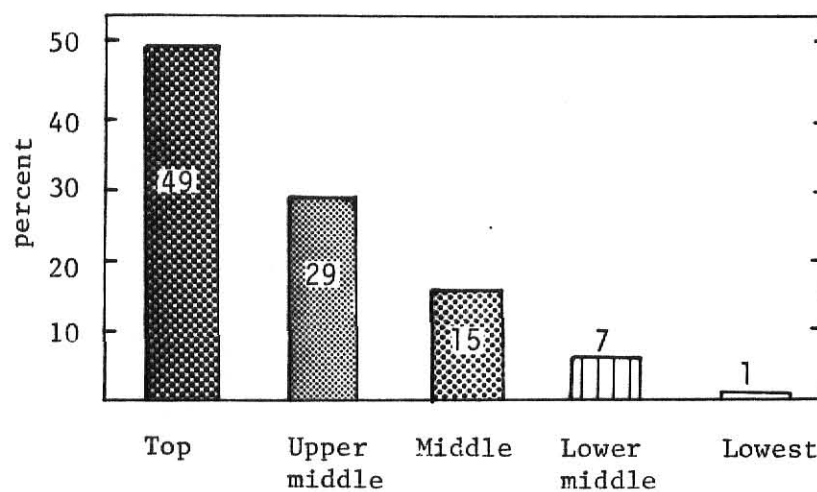


Figure 3.1 Pentile rand-ordered distribution of states according to their total small-farm (gross annual farm sales under \$20,000) population, 1974

Source: Table 3.1 and Map 3.1

Table 3.1 Proportion of farms having gross annual sales
under \$20,000 by state, 1974

State ¹	All farms	Farms with sales under \$20,000	Counties having 80% or more farms with sales under \$20,000	
	-----Number-----		-----Percent-----	
Texas	174,068	137,862	79.7	50.8
Kentucky	102,053	87,459	85.7	80.8
Missouri	115,711	86,205	74.5	42.1
Tennessee	93,659	84,293	90.0	89.5
North Carolina	91,280	67,730	74.2	44.2
Ohio	92,158	63,681	69.1	31.8
Indiana	87,915	56,617	64.4	18.5
Oklahoma	69,719	52,847	75.8	54.5
Illinois	111,049	52,526	47.3	3.9
Wisconsin	89,479	51,271	57.3	7.0
Minnesota	98,537	50,648	51.4	15.1
Michigan	64,094	46,596	72.7	36.4
Alabama	56,678	45,853	80.9	64.2
Iowa	126,104	45,776	36.3	-0-
Mississippi	53,620	44,237	82.5	78.0
Kansas	79,188	43,553	55.0	1.9
Virginia	52,699	43,529	82.6	60.0
Georgia	54,911	37,339	68.0	34.0
Arkansas	50,959	35,773	70.2	40.0
California	67,674	35,326	52.2	14.3
Pennsylvania	53,171	34,295	64.5	17.9
Nebraska	67,597	28,594	42.0	-0-
New York	43,682	24,462	56.0	-0-
Louisiana	33,240	24,298	73.1	47.6
Florida	32,466	24,155	74.4	30.8
South Carolina	29,275	22,893	78.2	56.5
Oregon	26,753	18,995	71.0	27.8
South Dakota	42,825	18,971	44.3	-0-
Washington	29,410	17,381	59.1	28.2
North Dakota	42,710	16,144	37.8	-0-
West Virginia	16,909	15,657	92.6	94.4
Colorado	25,501	13,822	54.2	13.6

(continued)

¹ States ranked ordered according to total number of farms with sales under \$20,000.

Table 3.1 Proportion of farms having gross annual sales
under \$20,000 by state, 1974
(continued)

State ¹	all farms	farms with sales under \$20,000	Counties having 80% or more farms with sales under \$20,000	
	-----Number-----		-----Percent-----	
Idaho	23,680	12,764	53.9	6.8
Montana	23,324	11,219	48.1	10.7
Maryland	15,163	9,234	60.9	21.7
Utah	12,184	8,858	72.7	27.6
New Mexico	11,282	8,022	71.1	41.9
New Jersey	7,409	4,645	62.7	-0-
Wyoming	8,018	4,402	54.9	-0-
Maine	6,436	3,608	55.2	12.5
Arizona	5,803	3,331	57.4	7.1
Massachusetts	4,497	2,833	63.0	8.3
Vermont	5,906	2,805	47.5	-0-
Hawaii	3,020	2,200	73.1	25.0
Connecticut	3,421	2,053	60.0	-0-
New Hampshire	2,412	1,645	68.2	10.0
Delaware	3,400	1,537	45.2	-0-
Nevada	2,076	1,217	58.6	6.3
Rhode Island	597	372	62.3	-0-
Alaska	291	228	78.2	75.0

Source: Donald K. Larson and James A. Lewis, "Small-farm Profile" in Small Farm Issues: Proceedings of the ESCS Small-farm Workshop, May 1978, ESCS-60 (Washington, D.C.: USDA-ESCS, 1979), Table 1, p. 11.

¹ States ranked according to total number of farms with sales under \$20,000.

3.2 The Importance of Part-time Farming to Expectations and Migration for Small-farms

3.2.1 Background

Central to the issues surrounding the small-farm and the farm sector in general is their level of income. The level of farm income is important from two perspectives: the level of well-being of farm people and the sustained economic viability of the farm business.⁴³ The farm sector has traditionally lagged behind in per capita disposable income when compared against non-farm per capita levels as illustrated in Figure 3.2. Further, net income from farm sources for the various farm sales classes reveals that for the small-farm sales classifications, net income from farm sales in 1978 did not begin to approach a level adequate to support the farm family (Figure 3.3).

As may be seen in Figure 3.3, by 1978 non-farm income had become more important by several times versus farm income sources for farms with sales under \$20,000. Moreover, "in the aggregate, non-farm income earned by all farm families (now) exceeds that earned from farming."¹⁹ This characterization of income sources for the farm sector has become more important over time as shown in Figure 3.4. Farmers increasingly have turned to off-farm employment to supplement their net farm incomes for all but the largest farms. In fact, for rural manufacturing, wholesale and retail trade, and professional services, the increased role of off-farm employment has radically altered the relative economic activity of the majority of rural counties.

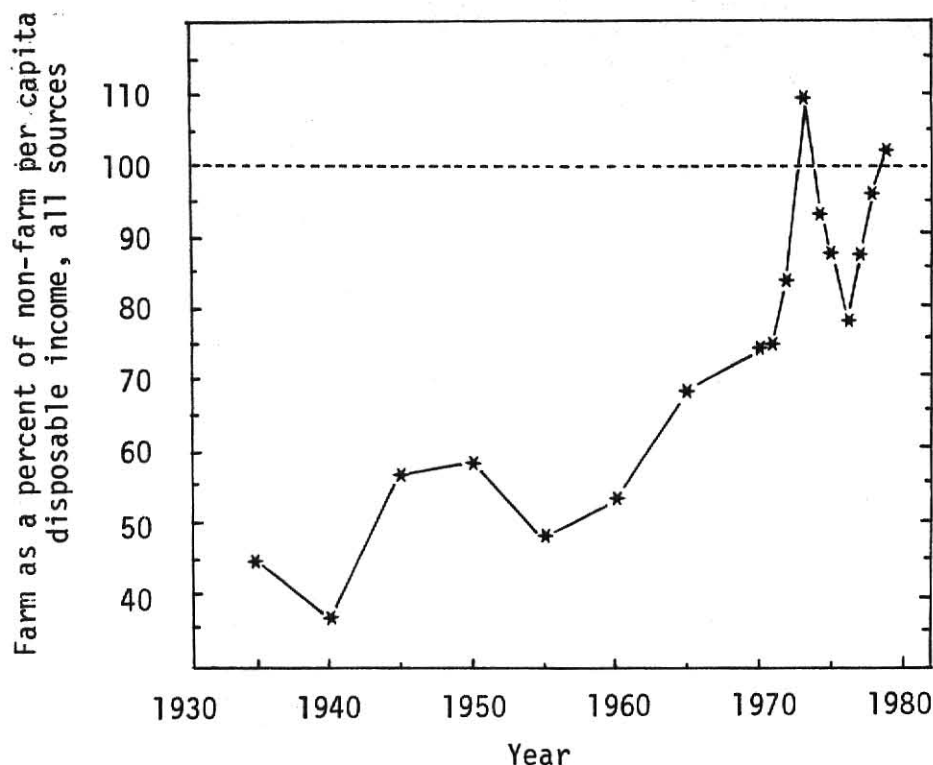


Figure 3.2: Farm versus nonfarm per-capita disposable income, 1943-1979

Source: USDA, Agricultural Statistics, 1980 (Washington, D.C.: U.S. Government Printing Office, 1980), Table 665, p. 463.

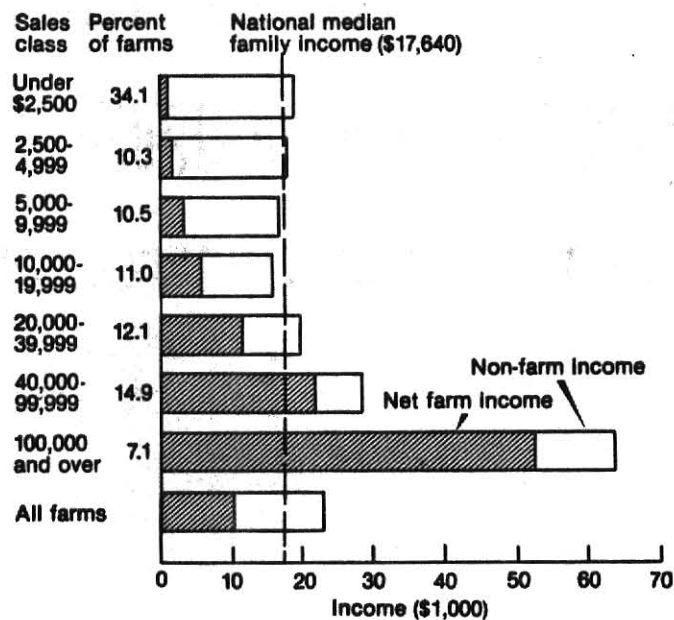


Figure 3.3: Income per-farm operator family by farm sales class, 1978

Source: USDA, A Time to Choose: Summary Report on the Structure of Agriculture, (Washington, D.C.: USDA, 1981), Figure 6, p. 45.

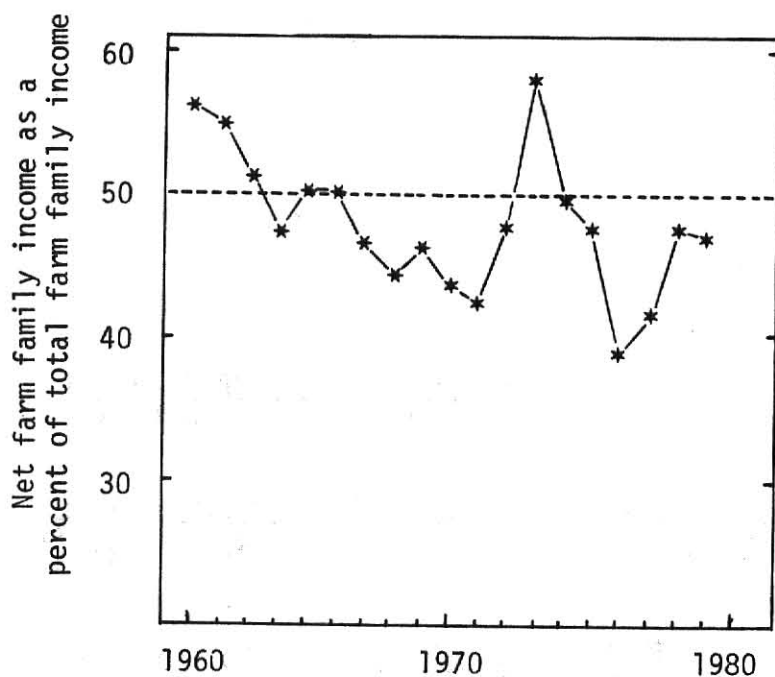


Figure 3.4: Net farm income as a percent of total farm family income, including off-farm sources, 1960-1979

Source: USDA, Agricultural Statistics, 1980 (Washington, D.C.: U.S. Government Printing Office, 1980), Table 657, p. 464.

In 1950 there were more than 2,000 agricultural counties, or counties where at least 20 percent of labor and proprietors' income came from farming. By 1975-1977 there remained less than 700 of such counties, with those which remained mainly located in the corn-belt and northern Great Plains.²⁰ In these counties, more than three-quarters of the farmers regarded farming as their principal occupation. Tenancy was more common and the average farmer was slightly younger.

Greater local opportunity for employment other than farming has become

an increasingly important part of small-farm family income. For example, it is estimated that farms with less than \$20,000 in gross farm sales (small-farms) received 70 percent of all off-farm income earned by farmers nationally and that, on average, this accounted for 87 percent of their family income (Figure 3.3). The relationship between farm and off-farm income by farm sales size may be seen in Charts A, B, and C from Figure 3.5 and Table 3.2. While farm income for small-farms in constant dollars has decreased since 1960, off-farm income has become increasingly more important. So important was off-farm income, that by 1979 the two smallest farm sales classes, VI and V, had exceeded total farm family income for the medium-sized farm group (sales class II or \$20,000-\$39,999 annual gross farm sales) due to income gained from off-farm sources!

The historical conceptualization of the small-farm as having little or no part in commercial agriculture, plus an increasing and major dependence upon non-agricultural income sources, has provided the Federal government reason to treat problems of the small-farm operators via programs aimed at the entire rural community (e.g., rural development) versus measures designed to enhance their roles as working farmers. This is reasonable since policies designed to align commodity prices to enhance and stabilize farm incomes have little effect on the small-volume farm business as these programs are geared to production. It is important to remember how price supports may place smaller farmers at a disadvantage (see Section 2.4). Unequal distribution of commodity policy benefits as indicated in Table 2.7 necessitated the focus of official attention to relieve pressure on the small-farmer via rural development. Rural development programs to provide services, non-farm job opportunities, and reduce those special low-income problems associated with health care, housing, transportation, and others for citizens outside urban areas, became the dominant means to help

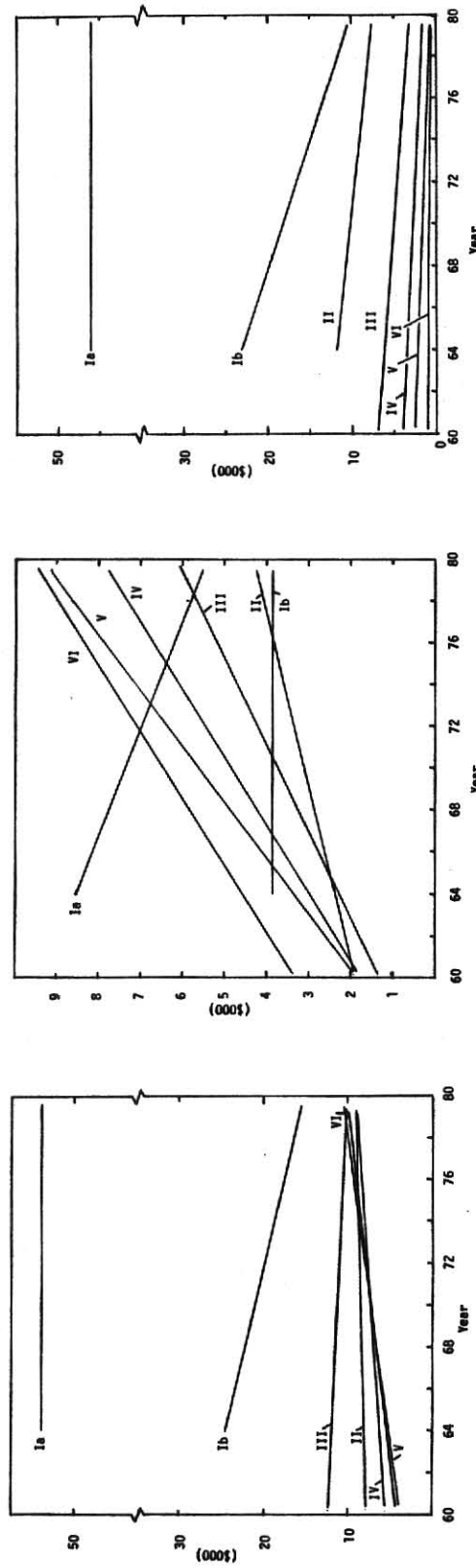


Figure 3.5: Constant dollar (1967 = 100 CPI) trends for net farm income, off-farm income, and total farm family income by sale class, 1960-1980

Source: Table 3.2

Table 3.2 OLS time trend regression estimates for income per farm operator family, by major sources and by value of sales class in constant dollars (1967=100, CPI), 1960-1979

r = correlation coefficient, B_0 = y axis intercept (dollars), B_1 = Slope, n = years of data

Net Farm Income before Inventory Adjustments^a

	Farm Sales Class (dollars)							
	Ia ^b (100,000 & over)	Ib ^b (40,000-99,999)	II (20,000-39,999)	III (10,000-19,999)	IV (5,000-9,999)	V (2,500-4,999)	VI (under 2,500)	All Farms
r	-0.36	-0.71**	-0.74	-0.89*	-0.95**	-0.97**	-0.32**	-0.62**
B ₀	46,196	20,361	10,237	6,572	3,957	2,290	928	3,193
B ₁	-952	-511**	-210	-190**	-130**	-80**	-10**	128**
n	15	15	20	20	20	20	20	20

Off-farm Income

	Farm Sales Class							
	Ia ^b	Ib ^b	II	III	IV	V	VI	All Farms
r	-0.87*	-0.36	0.98**	0.99**	0.96**	0.99**	0.98**	0.91.*
B ₀	8,256	3,750	1,921	1,348	1,873	1,936	3,328	2,873
B ₁	-169*	-19	120**	239**	301**	374**	315**	209**
n	15	15	20	20	20	20	20	20

Total Income from Farm and Off-farm Sources

	Farm Sales Class							
	Ia ^b	Ib ^b	II	III	IV	V	VI	All Farms
r	-0.41	-0.70**	-0.44*	-0.39	-0.92**	-0.97**	-0.97**	0.87**
B_0	53,859	24,055	12,190	7,836	5,831	4,346	4,270	6,009
B_1	-1,097	-541**	-94*	51	171**	287**	308**	351**
n	15	15	20	20	20	20	20	20

Source: Economic Indicators of the Farm Sector: Income and Balance Sheet Statistics, 1979, Stat. Bull. 650 (Washington, D.C.: USDA-ERS, 1979), Table 99, P. 112.

- a Includes Government payments, the value of farm products consumed in farm households, and the rental value of farm dwellings.
b These farm sales class established after 1964.

** significant at 0.01 level.

* significant at 0.05 level.

low-income rural citizens of which the small-farmer was a part.²¹

The relationship between the necessity to find off-farm employment, the decreased reliance on agriculture in the rural economy and declining small-farm numbers in light of a relatively stable rural population at 55 million (see Table 2.2) would indicate that metropolitan impacts on rural America are becoming a dominant feature. Lamb, in a study of urban impacts on rural areas, found through comparison of rural migration and commuting patterns for the period 1950-1960 versus 1960-1970, a new emerging relationship:

"The demands of the metropolis are no longer for agricultural, mineral or forestry products in various stages of processing, or for pools of low-wage labor, but are increasingly for land, residential sites, attractive living environments and recreation. Center size is no longer the sole criterion for attracting new growth industries...the future map of the United States will be dominated by dispersal into amenity-rich clumpings. The national growth pattern, therefore, will be increasingly responsive to the quality of natural and man-made environments, and will be drawn to amenity-rich locations."²¹

3.2.2 Expectations of part-time farmers

The role of expectations, level of income and off-farm opportunities are important aspects affecting the continuation of small-farms. Part-time farming, once mainly thought of as a transition situation for persons either attempting to enter or exit full-time farming during the rapid changes of the 1950s and 1960s, is being reconsidered. Off-farm employment has played an important role for some producers who have used the additional income to meet farm expansion, equipment purchases, or other resources necessary for farming. Importantly, recent research indicates "a significant number of part-time farms are neither in a state of transition nor under economic stress but are stable operations (whose operators took up off-farm employment) in order to increase family income."²³

In this connection, the smallest farms--those selling less than \$2,500

in farm products--would seem to appear to be of greatest interest due to their dominance (more than 31 percent of all farms nationally in 1974). In fact, there is evidence that this group may be thought of as the healthiest of all small-farms and serve as mainly rural residences, hobby farms,* and, to a lesser degree, retirement situations for senior citizens.²⁴ In Thompson and Hepp's study of Michigan farms, the rural resident small-farm operator, more commonly termed the "hobby farmer," represented the largest farm category of all Michigan farms at 29 percent while producing only three percent of all agriculture products and service.²⁵ They further concluded that these hobby farmers were growing in proportion when compared to other small-farms between 1959 and 1969.²⁶ The hobby farms, Saupe notes, act as rural residences whose operators usually have full-time, urban employment and who have taken up farming to mainly increase net worth.²⁷ Hobby farming has become a convenient method to convert ordinary income to capital gains.

Coughenour and Babbard, in a study of part-time farmers in Kentucky in the early 1970s, found dual-career farmers did so to increase income and provide various non-economic gratifications found in rural living.²⁸ Further, two-thirds of the part-time farmers maintained a full-time, off-farm job. Their average farm size was smaller and more specialized than those with more evenly divided farm and off-farm commitments, while in aggregate they controlled more acreage. Also, the dual-career situation was relatively stable for individuals, with a typical part-time farmer having the alternate off-farm job for more than eight years.

* A hobby or gentleman farm, for tax purposes, is considered as farm operated for pleasure or recreational purposes and/or not producing a taxable income for five consecutive years. See U.S. Tax Codes, Section 101.

In the same Kentucky study, the level of commitment to farming* was tested against size of farm and total number of hours of labor to produce each type of unit (e.g., acre of soybeans) using assumed labor coefficients, standard technology, and farm conditions. In this test it was found that "although the typical acreage for a full-time farm was 43 percent larger than the typical part-time farm, the scale of operation (number of hours of labor) of the full-time farmer was twice as great. Part-time farmers, however, used their land resource with about the same degree of intensiveness regardless of their level of commitment or time spent in farming."²⁹ In regards to value of sales, 82 percent of Kentucky part-time farmers with a low commitment to farming were small-farmers (sales under \$20,000 but more than \$2,500) versus 73 percent for moderate and 57 percent for high-commitment-to-farming farmers (see footnote).³⁰

Douglas and Mackie, in a study of part-time farming in Tennessee in the early 1950s, identified necessary conditions to support continuation in farming combined with off-farm employment:

- steady industrial or urban-type off-farm employment;
- good transportation, hard-top roads, dependable private or public vehicles and short commuting distances to keep down costs; and
- good markets for agricultural products.³¹

They further identified that in order to understand the increased rate of part-time farming and its associated problems requires concurrent research and program development considering agricultural, industrial and community

* Low = less than 30 percent of time spent farming; moderate = 30 to 75 percent of time spent farming; high = more than 75 percent of time spent farming.

development.³²

The University of Illinois has provided substantial attention to the role of part-time farming in their state. An Illinois study conducted by Hanson and Spitze in 1975, found increasing dependence of all Illinois farmers upon part-time farming in order to remain in farming versus migration to urban areas. Further, the farmer "may alter the structure of his farming operation to accommodate an off-farm job, thereby actually substituting off-farm employment for certain farming enterprises, more usually in livestock than in crop enterprises."³³ They also identified a group of low-income farmers needing special attention. These farmers, unable to earn an adequate farm income, were also unable to gain off-farm employment. As a group, they were generally in the older age groups, had received inadequate education, or were in poor health.³⁴

Another Illinois study, looking at factors influencing expectations for involvement in agriculture, found that the push/pull factors of age and education were significant indicators of part-time farmer expectations to either remain in part-time farming or leave farming while acres per farm, net farm income, and off-farm income were not statistically significant.³⁵ As may be seen in Table 3.3, low income or small-farmers had significantly different expectations toward farming versus farmers with larger incomes.

Some work has been done on occupations of part-time farmers. Thompson and Hepp in Michigan,³⁶ Hanson and Spitze in Illinois,³⁷ and Coughenor and Gabbard in Kentucky³⁸ all collected information on type of off-farm employment for part-time farmers. Interestingly, small-farmers in all three studies were concentrated in factory employee and trade occupations or low-status positions, whereas high-income part-time farmers tended to have higher-status jobs such as farm and non-farm related sales and business positions. Why this was so was not explained. The Thompson and Hepp work on

small-farms in Michigan went the furthest in the collection of wage levels, job benefits, and types of occupations of these farmers.

Table 3.3 Relationship of off-farm employment to farming expectations for high-income (gross farm sales = > \$10,000) and low-income (gross farm sales < \$10,000) farmers and all farmers in Illinois, 1970

Farming Expectations	Low-Income Farmers		High-Income Farmers		All Farmers	
	have off: farm job	no off: farm job	have off: farm job	no off: farm job	have off: farm job	no off: farm job
	301	85	207	452	508	537
	Percent		Percent		Percent	
Remain full-time:	15	75	62	89	34	86
Become (or remain) part-time:	69	22	31	10	54	12
Leave farming:	16	3	7	1	12	2

Source: A.J. Sofranko and W.R. Pletcher, "Factors Influencing Farmers Expectations for Involvement in Agriculture," Illinois Agricultural Economics, Vol 14 , No. 2 (July 1972), Table 3, p. 9.

Carlin and Gheifi, writing on the impact of off-farm employment and structure in agriculture found that in 1970, if only farm income was considered, almost 75 percent of all farm families would have been classified as low-income (less than \$5,000 total family income).³⁹ They further conclude that there were serious informational gaps concerning off-farm employment in the areas of rural occupations and industries, where farm people will work, as well as workplace conditions, seasonality of employment, wages, and benefits. A review of literature concerning part-time farming made by Jones in 1980 for the National Rural Center confirms this. Jones found that although there was plentiful historical information and studies on the role of off-farm employment for small-scale farm families, lack of current studies and a narrow geographic focus make "much of it of questionable value" as related to the development of

national policies in the 1980s.⁴⁰

3.2.3 Small-farms and migration out of farming

Small-farms have provided the largest proportion of those leaving farming over time as indicated in Table 3.4. A poetic analysis of migration out of agriculture may be found in Steinbeck's Grapes of Wrath⁴¹ which provides insight into the influence the combined elements of income uncertainty due to weather and prices, changing technology, credit, wage differentials, education, age, expectations, and other factors had upon small-scale farmers during the 1930s. Lianos provides an excellent review of the literature and identifies factors influencing labor mobility from agriculture through moves in occupation and/or geographically.⁴² The characterization of those who have left farming and their reasons are numerous, complex and interrelated.

There is evidence that migration out of farming is slowing due to a presumed equilibrium occurring for income, opportunity and resource use between agriculture and the non-agriculture sectors.⁴³ The dynamics affecting migration decisions are constantly changing and are of such a complex nature that further review would not add to the purposes of this thesis, nor could it be treated in adequate detail.

3.3 Small-farms/family farms and the small rural town

Rural areas are the source of America's food supplies. For the populations directly and indirectly involved in the management of this basic resource, the quality and organization of their rural institutions and community facilities are of daily importance. cursory examination of the rural-to-urban migration during this century would lead one to believe that the small rural community too must be in decline. Just the opposite is

Table 3.4 Loss of farm numbers between 1964 and 1978
by gross farm sales class

Gross farm sales class	1964		1978*		Change in Numbers (1,000)	Percent Change
	Number of farms (1,000)	Percent Distribution	Number of farms (1,000)	Percent Distribution		
Ia (over \$100,000)	32	0.9	190	7.1	+158	+593
Ib (40,000-99,999)	114	3.2	398	14.9	+284	+349
II (20,000-39,999)	268	7.8	323	12.1	+55	+121
III (10,000-19,999)	482	13.9	294	11.0	(-188)	(-39)
IV (5,000-9,999)	534	15.4	281	10.5	(-253)	(-47)
V (2,500-4,999)	469	16.6	275	10.3	(-194)	(-41)
VI (under \$2,500)	<u>1558</u>	<u>45.1</u>	<u>911</u>	<u>34.1</u>	<u>(-647)</u>	<u>(-42)</u>
Total Farms	3457	100.0	2672	100.0	(-785)	(-23)

Sources:

1964--Economic Indicators of the Farm Sector, Stat. Bull. No. 650
(Washington, D.C.: USDA-ESCS, 1980), Table 92, p. 105;

1978--A Time to Choose: Summary Report on the Structure of Agriculture
(Washington, D.C.: USDA, 1981), Table 5, p. 43.

* Preliminary 1978 Census of Agriculture count using 1959 farm
definition.

true. In fact, between 1900 and 1970 new incorporations of non-metropolitan towns outpaced dropouts by more than five to one.⁴⁴ Small towns are generally thought of as any community with a population less than 10,000. Communities with this definition in 1970 represented 89 percent of all urban and rural places while providing for only 22 percent of the nation's population (Table 3.5).

Small towns, therefore, continue to be an important aspect of the rural scene although their function as the trading center for their surrounding areas has changed, mainly due to the modernization of transportation and communication. Importantly, towns of less than 2,500 population, places once supporting a wide array of small businesses and centers for agricultural marketing, have now become increasingly residential in nature. From 1950 to 1970, these smallest towns had an average decline in consumer business establishments of nearly one-third, yet, as a group, the same towns showed an average population increase of one-ninth.⁴⁵ These changes narrowed the retail consumer goods and services base and have made small towns more dependent on their function as supply centers for farm production inputs.⁴⁶ As for post-1970 trends, Swanson, et al., report that non-metropolitan places with population under 10,000 grew at 4.9 percent from 1970 to 1973, or almost twice that of places with over 10,000 people.⁴⁷ Preliminary reports from the 1980 census indicate this trend continues.

Brown reports that the renewed growth in small towns is complex but may be traced to three interrelated factors:

- decentralization of nonfarm wage and salary from metro to nonmetro counties,
- a preference for rural living, and
- modernization of rural life, which makes inappropriate the stereotype of rural areas as backward and isolated.⁴⁸

Table 3.5 Number of urban and rural places by population size, 1970

Population Size	<u>Places</u>		<u>Population</u>	
	Number	Percent	Number (10,000)	Percent
100,000 or more	156	0.8	56,464	39.0
50,000-99,999	240	1.2	16,724	11.6
25,000-49,999	520	2.5	17,848	12.3
10,000-24,999	1,385	6.7	21,415	14.8
5,000-9,999	1,839	8.9	12,924	8.9
2,500-4,999	2,295	11.1	8,038	5.6
under 2,500	<u>14,333</u>	<u>69.0</u>	<u>11,235</u>	<u>7.8</u>
Total	20,769	100.0	144,647	100.0
*Gini Ratio = 0.803				
*Index of Inequality = 66.7				

Source: Bureau of the Census, Statistical Abstract of the United States, 1974, (Washington, D.C.: U.S. Department of Commerce, 1975), Table 17, p. 12.

* See Appendix A for discussion

The relationship between the in-migration into the small community coupled with a decline in retail consumer business raises a number of interesting questions. Changing consumer preferences, modern communications, cost of transportation, economies of size in retail sales, and relatively limited alternatives for the small-town proprietors have worked to gradually eliminate small-town business. These relationships, empirically confirmed by Scott and Johnson,⁴⁹ may be understood in part through consideration of two relationships between distance and cost of travel and the cost of an item and the size of operation (Figure 3.6). Shifts in these functions will create disequilibriums between business districts.

Sonka and Heady, in two reports, one with a national focus and the second focused on the North Central region, analyzed the number of farms, total income for the farm sector, net income per farm, cost of food to consumers, employment and income generated in rural communities under four farm-size constraints: small (under \$10,000 sales), medium (\$10,000 to \$39,999 sales), large (over \$40,000 sales), and a mixture of the three.⁵⁰ Sonka, in a later article, provided functional forms generated from these studies, depicted in Figure 3.7. The indicated relationship between farming scale (in this case average farm size) and economic activity in rural areas hints at external diseconomies of scale due to expanding farm size.⁵¹ Conclusions drawn from Figure 3.7 would indicate "that larger farms are associated with lower consumer food costs, less labor and capital required in agriculture, and higher income per commercial farm....That smaller farms are associated with higher total income for the farm sector, greater farm employment, greater total purchase of farm inputs, and greater off-farm generation of employment and income."⁵²

The findings of Heady and Sonka confirm a classic study by Goldschmidt,

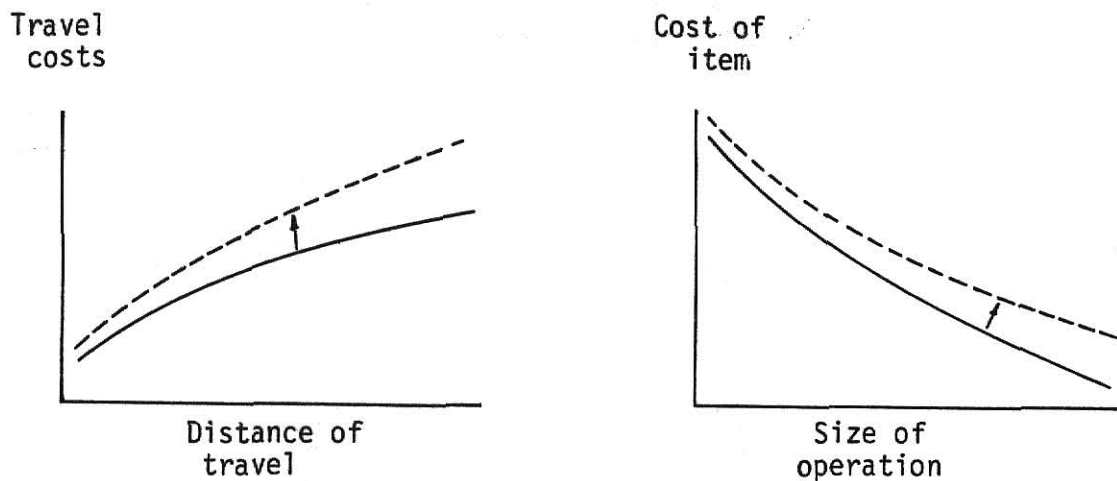


Chart A:
An increase in the cost of travel
due to an added fuel tax

Chart B:
A decrease in economies of size
due to increased cost of labor

Figure 3.6: Effects due to shifts in costs of transportation and/or economies of size for retail sales

Source: James Nelson and Joel Hamilton, The Economic Effects of Population Changes in Rural Small Communities: A Short Course for Community Leaders, Bull. No. 564 (Idaho: University of Idaho - Cooperative Extension Service, 1976), p. 26.

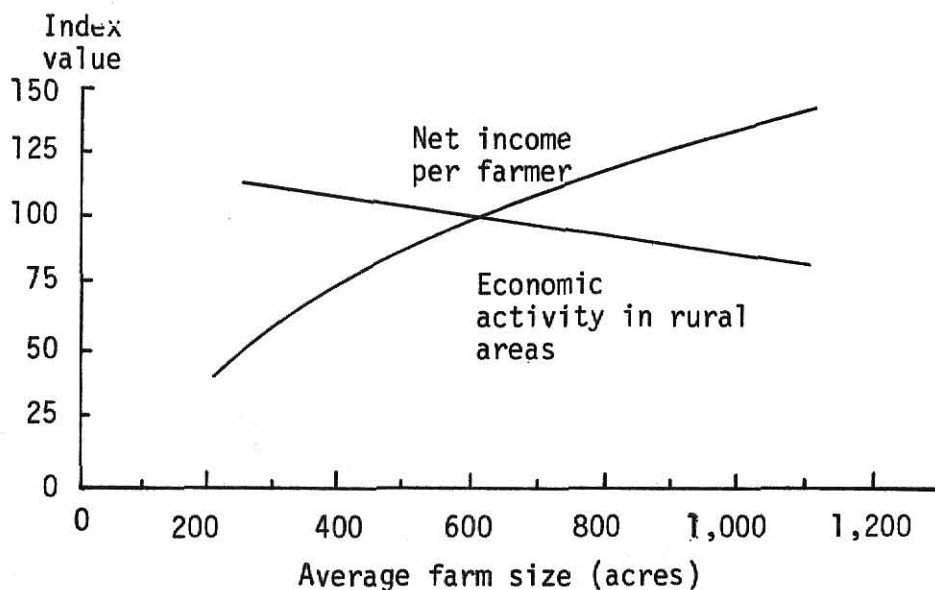


Figure 3.7 Comparison of average farm size to net income per farmer and economic activity in rural areas

Source: Steven T. Sonka, "Research Needs of Small Farmers", Small Farm Issues: Proceedings of the ESCS Small-farm Workshop, May 1978 (Washington, D.C.: USDA-ESCS, 1979), p. 33.

conducted in 1944, concerning the relationship between agricultural structure and the rural community.⁵³ Goldschmidt's 1944 study of two California farming communities of equal size and dependence upon agriculture reveal the consequences of the size and organization of surrounding farms and the quality of life in these rural communities. So controversial were Goldschmidt's findings that the report was published only after two years of suppression. Once published, the author, as well as the USDA bureau which conducted the study, were publicly censured.

"The Dinuba study, which showed that its small family farms makes a better way of life than the large factory farms of Arvin, and that less than 160 acres of irrigated land is enough to support a family, was used to destroy one of the most honest and courageous organizations in Washington, the Bureau of Agricultural Economics (of the USDA)."⁵⁴

The results of the original Goldschmidt study of Arvin and Dinuba were reconfirmed in a 1977 publication by the California Community Service Task Force.⁵⁵ The restudy conducted in 1975 concluded, "The smaller scale farming areas clearly tend to offer more to the local communities than their larger counterparts."⁵⁶ Further, Goldschmidt while indicating other factors may have contributed to the differences in the two communities concluded that:

"The primary, and by all odds the factor of greatest weight in producing the essential differences in these two communities, was the characteristic difference in the scale of farming--large or small--upon which each was founded. There is every reason to believe that the results obtained by this study are generally applicable wherever like economic conditions prevail."⁵⁷

The process of research and evaluation of the scale of farming and the spillover effects on the rural communities which support it continue, most supporting Goldschmidt's findings.⁵⁸ The political question such

reconfirmed findings implies continues to be a sensitive issue as recently as 1981 and for which USDA policy continues to hedge its position:

"While these studies (referring to Goldschmidt's work, the reappraisal of it in 1975, and other works noted) are suggestive about the impact of farm ownership and structure on rural community life, they do not provide sufficient evidence to be definitive. The behavior of owners, workers, and managers is influenced by many factors, and our understanding of the relative importance of the various elements, and the data available to achieve better understanding, are still inadequate."⁵⁹

3.4 Research and Extension for Small Scale Agriculture

3.4.1 Background

Increasingly the Land Grant system of agricultural research and extension has been criticized as being an instrument and voice of authority for agribusiness.⁶⁰ Hard Tomatoes, Hard Times,⁶¹ The Unsettling of America, Culture & Agriculture,⁶² Radical Agriculture⁶³ and numerous lesser known works and research all point to this and suggest an uncomfortable relationship between big-business interests, public research, and agriculture. A agriculture research policy paper prepared for the Experiment Station Committee on Organization and Policy issued in February of 1981, acknowledges the past relationship in both the 1862 and 1890 state agricultural experiment stations.

"Even though the research is not directly slanted toward large farms, and the bulk of research directly applicable to farming is of a size-neutral nature, we conclude that because of the economic environment in which new knowledge is applied, the research in the agricultural experiment stations has contributed to the concentration of production in the larger farm size classes."⁶⁴

The Hatch Act of 1887 created the agricultural experiment stations with the purpose, among others, of promoting "a sound and prosperous agriculture

and rural life...(so as) to assure agriculture a position in research equal to that of industry, which will aid in maintaining an equitable balance between agriculture and other segments of the economy."⁶⁵ This publicly funded research was later complemented through the creation of the Cooperative Extension Service (CES) via the Smith-Lever Act of 1914. The newly established extension service was given the task of "diffusing among the people...useful and practical information on subjects relating to agriculture and home economics...and to encourage the application of the same."⁶⁶

These two acts of Congress have created a system of laboratories, experimental farms, classrooms, and a system of communication which have become a model for many nations. Although the two systems cannot be totally responsible for the out-migration of the millions who have left agriculture, it has played an important role.

By 1955, the rapid changes in rural America and the increasing inequality of life between the urban and rural sector, plus a growing awareness of the developing divergence of farm income groups, resulted in amendment of the Smith-Lever Act. The amendment, Section 347a, created an additional and new focus to extension which, according to Berry, reversed the logical farm-extension relationship: "The farm (as a result of Section 347a) is not to be the measure of the service (referring to the Cooperative Extension Service); the service is to be the measure of the farm."⁶⁷ He develops this conceptualization from presentation of the characteristics of the amended Section 347a:

"Section 347a is based mainly on the following congressional insight: that (quoting from the amended Smith-Lever Act) 'in certain agricultural areas, there is concentration of farm families on farms either too small or too unproductive or both....'. For these 'disadvantaged farms' the following remedies were provided: '1) Intensive on-the-farm educational assistance to the farm family in appraising and

resolving its problems; 2) assistance and counseling to local groups in appraising resources for capability of improvement in agriculture or introduction of industry designed to supplement farm income; 3) cooperation with other agencies and groups in furnishing all possible information as to existing employment opportunities, particularly to farm families having underemployed workers; and 4) in cases where the farm family, after analysis of its opportunities and existing resources, finds advisable to seek a new farming venture, the providing of information, advice and counsel in connection with making such changes'."68

The addition of this section provided the necessary mandate for the entry of the Cooperative Extension Service into the area of rural and community development as well as the capacity to provide a welfare function by determining special needs for "the small, unproductive farm." Unfortunately, the extension service was unable to provide for the needs of these farmers due to the lack of specific funding until the late 1960s and early 1970s, and then the programs were geographically limited and were, for the most part, funded from either state or private sources.

3.4.2 Research for small scale/farm agriculture

3.4.2.1 Determining the research priorities

With the growing concern in Washington, D.C. during the decade of the 1970s regarding the structure of agriculture, there was increasing interest in the small-farm. Unfortunately, little up-to-date work had been done on their situation.

When Secretary of Agriculture Bergland took office in 1976, he did so with a number of years of first-hand experience as a part-time farmer, as a regional director of the ASCS (Agriculture Stabilization and Conservation Service), and six years in the U.S. House of Representatives. He recalls his years in the Congress as it pertained to agriculture as:

"One crisis after another, a seemingly endless debate on agricultural bills, with little or no discussion of agricultural policy...We thought--we hoped--that if we helped the major commercial farmers, who provided most of our food and fiber [and exerted most of the political pressure], the benefits would filter down to the intermediate-sized and then the smallest producers."69

Once confirmed as Secretary, his concern for agriculture policy and its effects upon agricultural structure resulted in an ongoing USDA internal review of these questions followed by a call for public input in March 1979, termed The Structure of Agriculture Project. As a result, it was quickly realized that little, if anything, was generally known about the so-called small-farm other than from a short list of commonly cited works or projects.

Between late 1977 and December of 1981 there appeared a number of reports all dealing with research priorities for the small, limited-resource farm. The general and common conclusions drawn from a limited number of studies available to the small-farm researchers, provided examples of methodology and analysis for specific geographic regions and time periods. The relevance of these studies to the policy issues of the day are questionable due to:

- simplistic definitions used in the study of the heterogeneous small farm;
- obsolescence due to changes in technology, prices and government policies;
- chronic gaps in the collection and analysis of the distribution of benefits and costs due to federal policies and programs related to agriculture in general and to small farms in particular;
- lack of predictive validation due to a host of methodological, empirical, and/or theoretical deficiencies

for predicting the behavior of small-farm families; and
-fragmentation of research results with little relevance to
the solution of real-world problems due to single-discipline
efforts combined with tenuous, sporadic, or nonexistent
linkages between agricultural research and extension.⁷⁰

A current and comprehensive study of the research needs of small-farms funded by the National Science Foundation, was developed between October 1977 and May 1980 by the National Rural Center (NRC), a private, non-profit corporation, located at Pennsylvania State University. The effort at the NRC concerning small-farms was organized in three phases. The first phase gathered together 40 individuals with a varied background to discuss the questions concerning a better small-farm definition and "to identify the major barriers which hinder small-farm families from increasing on-farm income."⁷¹ Phase II was the review, comment and summarization of a number of working papers into a suggested agenda of research in particular areas identified in Phase I. These were: structural change and informational needs, production efficiency and technology, energy conservation, marketing, governmental policies, and taxation.⁷² The final phase was the development of a suggested policy statement concerning small farms.⁷³

Another report, Research, Extension, and Higher Education, published in December 1979 by the Ad Hoc Committee on Small Farms of the Joint Council on Food and Agricultural Sciences, was a narrative providing a wide review including an introduction to the small-farm situation, a discussion of current programs and research aimed at this group, and recommendations for future research and extension.⁷⁴ Saupe in late 1980 prepared a report for the ESCS along similar lines.⁷⁵

Saupe's report provides a concise review of the literature then available concerning small-farm families according to description and

analysis of small-farms, small-farms and rural development, welfare programs and small farmers, extension education for small-farms, small-farm advocates, small-farm legislation, and other small-farm initiatives in the USDA.

Other major reports concerning research may be classified as being regional or state in focus. The four Regional Centers for Rural Development (RCRD) located at Cornell University, Iowa State University, Oregon State University, and Mississippi State University, partially funded through the 1972 and 1978 Rural Development Acts, have developed regional small-farm research agenda reports. The North Central and South RCRD have been most active in this effort. A long-term debate in California concerning the distribution of land irrigated by federal water projects in that state, provided in late 1975 impetus for the organization of a study of small-farms. The study, conducted by the Community Services Task Force was to address "what (could) be done to increase the viability of family farms in California."⁷⁶ Although organized to provide policy guidelines to the State, the report also indicates what social impact could be expected if small-farms were allowed to proliferate.

Overall, these efforts duplicated a small-farm research agenda in the following areas:

3.4.2.1.1 Descriptive data

As shown in Section 3.1, small farms are highly heterogeneous in character and no one policy applies to all. This fact, when combined with a general deficit of records and up-to-date descriptive studies concerning the small-farm, limits the development of policies to assist this group via research and extension. This lack of descriptive information greatly retards the necessary research focus to attain cost effectiveness to

understand a heterogeneous population in the complementary areas of marketing, credit, extension, and appropriate technology requirements for small-farms.

3.4.2.1.2 Production efficiency and productivity

This research area concerning small-farms (and farm structure in general) is most complex requiring increased attention to commensurate analysis of "the technical, social, economic, and legal aspects that constitute a technological system."⁷⁷ The complexity of this issue arises from the historic assumption by publicly funded researchers and institutions that the majority of their research was "scale-neutral" without consideration of the impacts that technology has and continues to have in an implied biased economic environment.

Technology in the substitution of capital equipment for labor has direct influence upon the small and medium-sized farmer. The increased recognition of this problem and its implied social cost resulted in Secretary Bergland's discretionary cutting-off of federal funds concerned with agricultural mechanization research and development which eliminates jobs, dispossesses small family farmers and fosters an agribusiness monopoly over food production.

"We are going to define a proper federal role in the area of research. I do not think federal funds for labor saving devices is a proper use of federal money...I will not put federal money into any project that will result in the saving of labor. The economic uncertainties of the marketplace should be powerful enough so that this kind of research should be left to private industry."⁷⁸

With the change in administrations in 1980, the new Secretary of Agriculture, John R. Block, has apparently reversed this USDA policy position as reported in the March 22, 1981 issue of The High Plains

Journal.79

3.4.2.1.3 Energy and resources

Most energy-related research has focused on two problem areas--supply restrictions and price increases. As a result, energy studies, as they pertain to agriculture, have concentrated on predicting production adjustments via tillage, irrigation, fertility, and crop drying energy conservation and the possibility of on-farm production of alternate fuels such as alcohol and methane. The National Rural Center acknowledges the need for this type of effort, but as they point out: "Research on energy and agriculture would benefit considerably if the future structure of farming and the basic patterns of energy and resource use were not regarded as virtually closed questions."⁸⁰

The small-farm has been, in certain circles, deemed to be a better protector of the soil due to this group's larger percentage of full owners versus large farms and their greater proportion of non-operator land owners.⁸¹ There is also an implied lower energy input per acre on conventionally farmed small-farms which may be true due to a generally lower capacity to use or gain access to energy inputs. Although there may be a soil erosion relationship to size and ownership, energy relationships are unknown.⁸²

In terms of national energy consumption, it must be remembered that agriculture consumes directly only about three percent of the national total. Large energy savings could not be gained from conservation, but individual farms could, by shifting energy consumption and uses, become less vulnerable to fluctuations in supply and price. Organic farming, (e.g., the use of crop rotations, manures, integrated pest management, and limited purchase of nontreated concentrated inorganic minerals) can offer

significant energy savings through substitution of energy intensive inputs.⁸³

Klepper et al., in a study of 14 similar pairs of organic versus conventional farms, found organic farms, while producing total crop values on average 11 percent less than conventional farms, had lower operating costs resulting in comparable net returns for both farm types.⁸⁴ In terms of energy use, organic farms used 40 percent of that required, per dollar of production, on the conventional farms. Another study by Shearer, et al. comparing costs and returns on 250 midwestern organic farms during 1977 and 1978, found under unfavorable weather conditions organic farms were as profitable as conventional farms.⁸⁵ Under favorable growing conditions, conventional farms would out-perform organic farms although the "differences in net returns were modest."⁸⁶

In a 1980 USDA study concerning organic farming, it was concluded: "much can be learned from a holistic research effort to investigate the organic system of farming, its mechanisms, interactions, principles, and potential benefits to agriculture both at home and abroad."⁸⁷ The potentials of organic farming methods for small farms seem to appear numerous although there is rather strong institutional bias against its study.⁸⁸ This "institutional bias" was confirmed in a study of barriers concerning the conversion to organic practices by The Center for Rural Affairs which found, after review of 547 organic farm operators in five midwestern states, that there are a wide variety of barriers to such conversions. But importantly, land grant universities were singled out (by the respondents) as "both biased and unresponsive to the special needs articulated by organic farmers."⁸⁹

3.4.2.1.4 Marketing

Research in the area of marketing options for the small-farm are characterized by Thompson as "descriptive, anecdotal, nonsubstantive, hypothetical, or conceptual."⁹⁰ He does note that marketing studies concerning concentration in certain agriculture sectors and analysis of some cooperative efforts can be applied indirectly to small-farm marketing issues. In a summary of five regional small-farm conferences held during the summer of 1978, Bay, Bell, and Benninger cited the following marketing concerns expressed by the 410 small-farm delegates:

- market manipulations by the federal government and others,
- lack of alternate markets,
- lack of on-farm storage,
- a need for additional training in marketing cooperative efforts, and organization of market outlets, and
- more assistance to improve direct marketing.⁹⁰

Direct marketing has been targeted as one method by which small-farm operators can increase farm income via elimination of middlemen profits. A number of studies concerning direct marketing have been produced as a result of PL 94-463, The Direct Marketing Act of 1976. Funding for this program has expired although there is an on-going lobby to reinstate funds for further and continued efforts along these lines in 1981 agricultural legislation. Important to this and other marketing efforts for small-farm operators is research to identify successful projects to gain insight for future policy measures.

The increasing public demand for chemical residue-free or organic foods provided through more than 6,500 full-time health food stores and an associated 1,000 organic food manufacturers and wholesalers offers one in-situ marketing channel of possible unique potential during the 1980s for

small farms.⁹² The Rodale Press has been the major source of market research concerning organic producers. A recent survey conducted by the Rodale Press indicates that organic producers face major marketing problems. Importantly, there is evidence that organic foods can demand higher or premium prices where the market channel provides some level of organic guarantee.⁹³

3.4.2.1.5 Tax, income and credit policies

The National Rural Center, after an extensive review of the available literature, found the areas of taxation, government price, income and credit policies were well documented as to underlying causes, constraints, and opportunities of conditions and trends.⁹⁴

The Farmer's Home Administration (FmHA) currently is mandated under the 1978 Agricultural Credit Act to provide up to 25 percent of their fiscal year allocations for Limited Resource Farm Ownership and Operating Loans. A FmHA limited resource farmer:

"is a farmer or rancher who is an owner or operator of a small or family farm (a small farm is a marginal family farm)...with low income...who will not have or expect to obtain, without the special help and low-interest loan, the income needed to have a reasonable standard of living when compared to other residents of the community."⁹⁵

A further restriction requires the limited resource farm qualify as a "family farm" and not a "rural residence" under the FmHA definitional requirements. As a result, due to the large number of applicants and limited availability of funds, there is a long backlog of requests. The Center for Rural Affairs located at Walthill, Nebraska has provided, via their quarterly Small Farm Advocate newsletter, case examples of issues related to the limited resource farm loan provisions according to (i) eligibility/approval determination and (ii) post-loan approval terms. Each quarterly issue, beginning in the Summer of 1981, provides a number of case

studies concerning reasons for rejection, special problems and unique applications of this fund. Importantly, due to the FmHA's family farm definition, part-time farm operators do not qualify for FmHA services.

The Small Business Administration (SBA) may also make short-term (5, 7, and 10 year) loans indirectly to small and part-time farmers. In this case, the SBA will underwrite and insure loans made by local banks to these higher-risk farmers but will not provide staff assistance nor funds directly to the small-farmer. Little published research has been done on the analysis of these two sources of credit for small-farm operators.

Research on the impact of taxes, government price supports and acreage controls have generally not been concerned with their structural impacts except for the tobacco and cotton commodity sectors.⁹⁶ The general lack of research on policy and its overall impact on the structure of agriculture has been recognized. The 1981 Task Force reporting to the Experiment Station Committee on Organization and Policy concerning research and the family farm "strongly recommends an increased emphasis on policy research related to structure of agriculture issues."⁹⁷ Additional research on taxation and credit policies, they feel, is integral to issues concerning economies of scale, product and factor marketing systems and the management of risk. "If the intent is to favor the small and moderate-sized farms, then research needs to focus on the question of what kind of tax and credit policies would accomplish or be consistent with that goal."⁹⁸

3.4.2.2 Reasons for small-farm specific research

As noted by Secretary Bergland in previous Section 3.2.1 there is a growing attitude that private industry can provide an increasing share of resources in agriculture-related research and that the land grant

institutions, USDA's Science and Education Agency (SEA) and Community Services Administration (CSA) should refocus a greater proportion of their research efforts to further assist moderate- and small-farms. There is evidence indicating that nationally, a dollar invested in public agriculture research and extension in 1974 provided more than \$12 in benefits for families with incomes less than \$5,000 and only \$1.20 of benefits for families with incomes over \$20,000.⁹⁷ Overall, public investment in agricultural research will continue to be necessary as most farms are too small to provide the research necessary for the public interest. Further, innovations by the larger farms, when it occurs, are within the private sector with its associated rights. These proprietary assets provide relative advantage over the long-run which place the small- and moderate-farms at a further disadvantage. The importance of agricultural research to low-income small-farm operators plus their relative inability to conduct their own research, points out the need for ongoing small-farm specific public research.

3.4.2.3 Small-farm research within the USDA Science and Education Administration and the Land Grant Institutions

Although "the classification of research is not an exact science,"⁹⁸ the 1981 Task Force on Research and the Family Farm reported to the Experiment Station Committee on Organization and Policy, "that the total (agricultural experiment station) production and marketing research effort [FY 1979] (was) slanted slightly toward small farms...(and) not slanted toward the large-farm end of the spectrum."⁹⁹ Conclusions drawn from this statement cannot be extrapolated to provide an estimate of scale biased research nationally, as the experiment station research budget represents approximately one-third of both public and private research in agriculture and between 50 and 60 percent of all such public research as noted by the

Task Force.¹⁰⁰ Distribution of research at the state agriculture experiment stations for FY 1979 may be seen in Table 3.6.

The estimated 5.8 percent of scientific years allocated to small-farm research at the state agricultural research stations will cost approximately \$1.8 million dollars during 1980. These federal funds coming from the Hatch Act, 1890, special grants and other sources.¹⁰¹ Although the 1980 funding estimate is larger than 1977 levels within land grant institutions, in real dollars (CPI, 1967=100) the value of research has declined by an estimated 14 percent. This real dollar decrease in small-farm specific research is not unique as agriculture research within the land-grant system in real terms has also declined.¹⁰²

Small-farm research appropriations did not become a federal line-item until established in the Rural Development and Related Agencies Appropriation Bill of 1979. The only other estimate of federal and state funding prior to FY 1979 was established by West.¹⁰³ Analysis of Tables 3.7 and 3.8 developed by West will indicate that within the national land grant agricultural research system, FY 1977 small-farm research accounted for less than one-half of one percent of all land-grant research expenditures. Importantly, 60 percent of all small-farm projects were conducted within the 1890 Institutions, but these projects received only 47 percent of the total small-farm research funds, 84 percent of the 1890 institution funding coming from federal sources.

In-house USDA expenditures concerning small-farm research were not considered in West's 1979 study. In FY 1979, \$3 million was supplementally allocated by Congress specifically for small-farm research within the USDA; approximately one-third to animal research and two-thirds to crop research. The additional USDA allocation will provide an estimated \$2.2 million for in-house research programs and \$0.8 million for "extramural research

Table 3.6 Research effort distribution within the state
agricultural experiment stations, FY 1979

Research Areas	Scientific Year (SY) Effort Categories						
	percent of total	Basic research	size neutral/ applied	small farms	moderate farms	large farms	public bodies
- - - - -Percent*- - - - -							
Agricultural Production	74.2	28.1 (20.9)	53.3 (39.6)	7.3 (5.4)	4.9 (3.6)	3.2 (2.4)	3.3 (2.5)
Marketing and processing	10.9	27.3 (3.0)	50.7 (5.5)	3.5 (0.4)	6.4 (0.7)	2.4 (0.3)	9.6 (1.0)
Family living	7.3	36.6 (2.7)	39.2 (2.4)				24.8 (1.8)
Community	6.0	22.1 (1.3)	77.9 (4.7)				
Other	1.5	(distribution not provided)					
Total	100.0	27.9	52.2	5.8	4.3	2.7	5.3

Source: Task Force, Research and the Family Farm, a paper prepared for the Experiment Station Committee on Organization and Policy, (New York: Cornell University, February 1981), pp. 7-8.

* The figure not in () is the percent as calculated within SY category while the figure in () is the percent as calculated of total research.

Table 3.7 Total publicly funded agricultural research effort compared with research activity directly related to small-farms¹

Type of Research	Number of Projects	Scientist Years	Total Funds (\$000)	Federally Appropriated Funds (\$000)	State and Other Funds (\$000)
Total State and Federal	25,730	10,983.4	1,004,086	514,343	489,743
Total In-State Agricultural Experiment Stations	20,725	6,556.7	594,230	117,686	416,544
Social Science Oriented Small-Farm Research: ²					
1862 Institutions	30	10.2	606	322	284
1890 Institutions	20	5.3	404	397	7
Technology-Oriented, Small-Farm Research: ²					
1862 Institutions	7	3.7	215	3	212
1890 Institutions	10	7.9	331	219	112
Total Small-Farm Research: ²	67	27.1	1,556	941	615
Projects Classified as Marginal to Small Farm Research Problems	22	8.9	888	600	288

Source: Jerry G. West, "Agricultural Economics Research and Extension Needs for Small-Scale, Limited Resource Farmers," Southern Journal of Agricultural Economics, Vol. 11, No. 1, (July 1979), pp. 49-56.

¹ Total research effort is from SEA/CR published data for fiscal 1977 while small-farm research fund data is from CRIS forms for fiscal 1977.

² All CRIS forms in any way identifying small-farms as subject of inquiry were examined and only those judged to be of direct relevance to small-farms were included. Only projects at 1862 and 1890 Land Grant Institutions were included.

Table 3.8 Small-farm research projects in land grant institutions
by area of emphasis, 1977¹

Research Area	Total Funds		Scientist Years	
	\$	%	No.	%
Typlogy (16) ²	264,866	17.0	3.3	12.2
Enterprise Combination (12)	284,537	18.3	5.9	21.8
Marketing (9)	179,469	11.5	2.4	8.8
Technology (17)	546,107	35.0	11.6	42.8
Other Areas (13) ³	<u>281,245</u>	<u>18.2</u>	<u>3.9</u>	<u>14.4</u>
Total (67)	1,556,235	100.0	27.1	100.0

Source: Jerry G. West, "Agricultural Economics Research and Extension Needs of Small-Scale, Limited Resource Farmers," Southern Journal of Agricultural Economics, Vol. II, No. 1, pp. 49-56, July 1979.

¹ Information taken from CRIS forms with only those projects included which were directly related to small farms.

² Figure in parentheses indicates number of projects.

³ Other areas include finance (3), transportation (1), government programs (2), off-farm employment (2), human capital (3), social dimensions (1), and community impacts (1).

programs to augment or supplement and strengthen in-house programs using expertise, facilities, and equipment at state agricultural experiment stations, 1890 and Tuskegee Institutions, or other research agencies."¹⁰⁴ Within the general allocation between animal and crop research, the broad objectives of the new research programs are to:

- develop and field test effective multi-cropping systems for typical small-scale farmers;
- develop low-energy input systems, including maximum use of organic residues; and
- develop insect and disease-resistant varieties, production practices, and equipment suitable for small-scale farming systems.¹⁰⁵

In-house USDA small-farm research will be concentrated in three regional locations: the Northeastern Region at the Beltsville Agricultural Research Center, Maryland; the Southeast Region at the U.S. Vegetable Laboratory, Charleston, North Carolina; and at the new 1,600-acre South Central Small Farm Research Center (SFRC), Booneville, Arkansas. Currently (FY 1981), there are 52 funded small-farm projects in process of which 48 percent were extramural. The distribution by research area according to their in-house or extramural status may be seen in Table 3.9. All of these projects are administered out of either the North Central and Southeast centers for small-farm research. The new SFRC in Booneville, Arkansas is under process of construction and will begin plot research, pasture establishment, and woodlot research studies in late 1981.

The direction of ongoing small-farm USDA in-house and extramural research, at both the Northeast and Southeast centers, is to provide modular research results for a farming systems approach to small-farm production

Table 3.9 In-house and extramural USDA-SEA small-farm research in process, FY 1981*

Research Area	In-house		Extramural		Total		All	
	small scale	basic	small scale	basic	small scale	basic	No	%
-----Number of projects-----								
<u>Post-harvest</u>								
<u>handling, processing</u>								
<u>and marketing</u>	5	2	3		8	2	10	19
<u>Crop Production:</u>								
cropping systems	3		3	2	6	2	8	15
organic residues	4	1		1	4	2	6	12
breeding/varieties	2		2	2	4	2	6	12
							20	39
<u>Crop Protection:</u>								
decease/insects	2	2		2	2	4	6	11
integr. pest. manag.		2	1		1	2	3	6
							9	17
<u>Livestock:</u>								
production/protection		3	1	1	1	4	5	10
forage			6		6		6	12
							11	21
<u>Economic Studies:</u>	1		1		2		2	4
Total (number)	17	10	17	8	34	18	52	100
(percent)	(33)	(19)	(33)	(15)	(65)	(35)		

Source: Small-farms research lists as provided by: H.W. Kerr, NER Coordinator, Small-Farms Research, Beltsville, Maryland; and E. Wann, Laboratory Director, Charleston, South Carolina-(personal communications).

* Distribution of research projects into research areas within this table were classified by this author and therefore may be open to reinterpretation.

problems for integration at the Small Farm Research Center at Booneville. Research at the SFRC is to concentrate on understanding small-farm operator characteristics in relation to: 1) optimum production systems research through the combination of three subsystems--a fruit, vegetable and nut subsystem, a livestock and poultry subsystem, and a forage subsystem--within a total systems approach to pest management (IPM) and soil and water conservation and management; and 2) marketing and market price research--market availability, market development, and dynamic price analysis.¹⁰⁶

3.4.2.4 Small-farm research within the private sector

Broadly, research in the private sector for small-farm operators may be divided into two general groups: traditional scaled research centers developed to research small-farmer issues due to the lack of public effort in this area; and secondly, what may be termed whole-earth institutes/centers/organizations who are conducting scientific research in order to support a growing population pursuing alternate lifestyles who attempt to practice low-energy, ecologically-neutral farming systems in both urban and rural settings.

3.4.2.4.1 Traditional Scaled Research

This first group of private sector research centers grew out of a need to provide information and research to both equip traditional small-farmers to increase their welfare and to provide funding sources and information to allow increased public debate for purposes of altering governmental policies.

The Rural Training Center
P.O. Box 95
Epes, Alabama 35460

This training and research center was established by the Federation of Southern Cooperatives in the late 1960s in order to provide research and training in management and marketing for small-farm agriculture cooperatives in order to increase marketing power via cooperative efforts.¹⁰⁹

The Frank P. Graham Experiment Farm and Training Center
P.O. Box 95, Rt. 3
Wadesboro, North Carolina 29170

The training and research farm, covering more than 700 acres, was purchased through the tax-exempt Rural Advancement Fund of the National Sharecropper's Fund, Inc. in 1972. As a research center it concentrates on natural or organic farming, "not as a faddish cashing-in on the current popularity that organic foods now have, but as a hard-headed, conservative commitment to time-tested techniques that offer an alternative to rural despair."¹⁰⁸ The approach taken by the combined training/research effort is to devise systems which are economical and productive for small holdings, methods to link small-farm operators into viable cooperative organizations, and methods to improve cooperative marketing.

Center for Rural Affairs
P.O. Box 405
Walthill, Nebraska

This center was organized in 1973 as a nonprofit corporation to promote rural development in Nebraska and throughout the United States. It is supported by both individual donations and private and public grants. The Center provides information on rural trends and changes through research and the publishing of reports and newsletters. It maintained a staff of more than 20 persons for this purpose in 1979. During 1979 the Center expended more than \$95,000 to conduct two research efforts; Barriers to Conversion to Organic Farming and a Rural Electric Utility Study.¹⁰⁹

A third, three-year research/demonstration project, The Small Farm

Energy Project, concluded in 1979 and financed by the Community Services Administration, resulted in significant energy savings for 24 innovators versus 24 control full-time low-income farmers in Cedar County, Nebraska with net incomes within 125 percent of the federally established poverty level.¹¹⁰ The average gross farm income for this group was \$36,000 in 1977. This research project's approach, termed "Community-based Research", lent itself to a self-help strategy which required farmer involvement in on-farm cooperative research between the farmer and a professional project design engineer. Together the farmer and engineer arrived at a final design (fuel-saving measures, solar-heating systems, etc.) which was then submitted for comment/revision to engineers at the University of Nebraska followed by construction and monitoring by the farmer.

Features of Community Based Research used in the Small Farm Energy Projected included:

- the project(s) must be initiated at the request of the community to involve and empower low-income community members,
- the establishment of a strong community advisory committee to establish and set project policy,
- control of innovations which are delegated to under-represented members of the community through the education and the decision-making process, and
- professional staff who reside in the community and who retain sensitivity to community concerns.¹¹¹

Conclusions drawn from the comparison of 24 pairs of record-keeping energy-conserving innovations versus a record-keeping only control group of small farmers, found the conserving/innovating farmers spent 17 percent less

on energy expenses. "Nearly 70 percent of this energy savings may be attributed to the more efficient use of exsisting farm machinery."112

The innovating group constructed 148 new projects which provided an estimated savings of 242 million BTUs or \$1,211 per cooperator."113 Importantly, it was found that "farmers were good judges of the technologies, for the most popular innovations turned out to be the most cost-effective as well."114

Small Farm Research Association
Harborside, Maine 04642

This Association was organized in order to reduce the "hocus-pocus" concerning biological agriculture (organic agriculture) through the "encouragement, funding (when possible), and publication of solid, concise, and dependable information based on facts....about biological agriculture."115 It has become a source of top quality research information for the organic farm sector.

The Rodale New Organic Gardening Experimental Farm
Berks County, Pennsylvania

This experimental farm was established by the Rodale Press in order to provide "a more complete demonstration and evaluation of experimental foods and both old and new methods of agriculture."116 The research agenda established in 1972 is along three primary interests. The first is the investigation of intercropping which can increase productivity per acre (under intensive management in excess of 40 percent). The second area of research is the re-evaluation of forgotten or little known crops. The third area of research is the capture of more free nitrogen by biological methods of fixation. This particular research effort will evaluate legumes, certain types of nitrogen fixing mushrooms, and the symbiotic relationships between Azolla, a water fern, and the blue-green algae Anabaena, in nitrogen fixing.

There are also experiments being conducted concerning fish farming. Recently, the Farm established long-term large plots for the study of the various conventional versus organic methods of farming and costs of conversion to less energy dependent cropping systems.

The Rodale Press has also conducted and funded numerous surveys and studies of organic farming and gardening, markets for organic products, and new products for use within an organic production system. These efforts, when combined with their numerous periodical publications and book printings, have provided the major source of organic farming/gardening information for more than 40 years.

3.4.2.4.2 Whole-earth research

The second group of private small-farm research centers, termed here as whole-earth institutes, trace their origins to the decade of the 1960s. For the most part, these whole-earth centers have evolved out of the increased awareness developed in the 1960s toward the environment and a dissatisfaction with the then "establishment." As a result, a small group of whole-earth intellectuals have formed a number of counter-culture research centers whose research efforts in various energy/agriculture systems and subsystems have gone, until relatively recently, unnoticed. Although there are a number of whole-earth research centers, those which have been successful are few. Most of the successful groups are small, non-profit organizations. Others are associated with schools and established institutes.

The New Alchemy Institute
Box 432
Woodshole, Maine 02543

Of the whole-earth institutes, this group is the most well known for its work with renewable food and energy systems. The Institute has major research centers at Woods Hole and Prince Edward Island, Maine and

educational programs in California, Costa Rica, and Nepal. Their major research effort is in the development and research of wind power, aquaculture, and integrated food-power-waste shelters. They record their annual activities in The Journal of the New Alchemists, as well as publishing numerous pamphlets and books concerning the technical aspects, results and application of their research.

Farallones Institute, The Rural Center
15290 Coleman Valley Road
Occidental, California 95456

This Institute was organized in 1972 by a group of architects, biologists, builders, designers, and agriculturalists to study alternate systems of energy, agriculture, building design, and resource recovery. The holistic approach to alternate systems was to combine knowledge of individual experience with the scientific and educational process. As an institute, the group works out of two urban centers, one in Berkeley, one in San Francisco and the third, its rural center, which provides the Institute's resident apprentice program, located in Occidental, California.

Researchers/apprentices at the Occidental Rural Center provide a living situation where problems of rural areas and small-scale family farms are integrated with research in solar design, horticulture and waste management. Research results are published via a series of pamphlets.

Center for Maximum Potential Building Systems
6438 Bee Caves Road
Austin, Texas 78746

This center was begun in 1972 as a laboratory project of the School of Architecture, University of Texas, by a group of architects, engineers, soil scientists and others to develop appropriate technology living systems and for exploring cultural bases with which such systems could work for the semi-arid and hot-arid Southwestern United States. The Center's effort was

to allow students to find alternate methods and systems to make the environment habitable through the use of natural forces in the environment and readily available resources in the environment or discarded in the environment. The Center has removed itself from the University campus due to the provision of private and federal grants. They have a number of urban and rural research/demonstration projects throughout the state of Texas and provide a large list of available publications.

The Goddard Social Ecology Institute

Box 7
Plainfield, Vermont 95667

The Social Ecology Institute, located at and funded by Goddard College, sponsors education and research in alternate energy and agriculture. The Institute provides a M.A. in social ecology via the College and has a relatively large community outreach program for a private institute, implementing and demonstrating alternate approaches to community needs in the areas of wind and solar power, methane production, biological agriculture, aquaculture, and environmentally-sound housing.

The Land Institute

Rt. 3
Salina, Kansas 67401

The Land Institute is a non-profit educational/research organization to search for sustainable alternatives in agriculture, energy, shelter and waste. An ongoing research agenda is conducted and supported by the dozen or so students and grants made from other private institutions. Primary interest at the Institute is the development of a perennial agriculture system adaptable for the Great Plains which, through selection and breeding, will provide an alternate to wheat and row-crop cultivation in the region. The Institute provides a quarterly review of their research in the Land Report.

3.4.3 Outreach programs and the small-farm operator

3.4.3.1 Background

The Cooperative Extension Service (CES) and the various USDA field agencies have not had a good track record in relation to assisting small-farm operators nationally.¹¹⁷ During the late 1970s (1976 and later), many states increased their extension efforts to assist this group of farmers primarily due to provision of limited federal funding (\$2 million) beginning in FY 1976 in anticipation of the Food and Agriculture Act of 1977. Prior to the 1977 authorization, small-farm outreach programs were mainly conducted by: 1) civil rights groups and funds working in the rural poverty areas of the South; 2) via a limited number of state-funded, small-farm state CES projects such as in Wisconsin, Missouri, and Texas; and 3) by combined funding from state and private foundations and/or quasi-public bodies working with the state CES as found in the multi-state Tennessee Valley Authority's small-farms program and in the Allegheny Highlands Project in West Virginia.

On January 3, 1979, then Secretary of Agriculture Bergland issued a USDA policy memorandum concerning assistance to small-farm operators:

"It is the policy of (the Department of Agriculture) to encourage, preserve and strengthen the small farm as a continuing component of American agriculture....to provide, on its own initiative when appropriate, assistance which will enable small farmers and their families to expand the necessary skills for both farm and nonfarm employment to improve their quality of life. It is a priority of this Department to encourage small-farm operators to participate more fully in all USDA programs."¹¹⁸

This enabling policy allowed the redirection of existing resources of the various USDA agencies and recipients of USDA funds within the limits of present programs and authorities of the involved agencies. As a result, by the beginning of 1981, each state had at least a functioning Small Farm

Committee made up of the state representatives from the USDA agencies (ASCS, FmHA, SCS, and FS), the State Agricultural Experiment Station, 1890 Institutes, the Cooperative Extension Service, the Community Services Administration, and ACTION. These state committees are to coordinate, "refine and implement a plan of action within the state to improve Agency services to small-farm operators and their family in targeted areas." Further, "the committee should consult with and involve small-farm operators in your state to the fullest extent possible."¹¹⁹

By the end of 1979, more than 30 states had a small-farm project or projects in place with the other states having projects in various stages of planning.¹²⁰ The projects ranged from concentrated multi-agency efforts in one or two counties to more broad-based, state-wide efforts. A number of states were generating lists of small-farm operators for project design and/or for the mailing of available programs information. A number of the newer projects were making use, through VISTA, of locally hired paraprofessionals or program/educational aids working with 30 to 50 small-farm cooperators modeled after the longer established small-farm programs as found in Missouri, Texas, and Tennessee.

3.4.3.2 Small-farm development via cooperatives in the South

The Southern region of the United States contains the largest number of small-farms in our country today. The plight of the small-farmer and rural poverty is most acute there and will probably remain so in the near future. Historic social, institutional, legal and political problems faced by black small-farm operators have contributed to the loss by 1969 of more than 90 percent of the number of black-owned farm lands since 1920.¹²¹ More than 800,000 Southern black farm operators left the farm during this period. Importantly, "one-third of the land held by blacks in the rural South cannot

be bought, sold, or traded away."¹²² These lands, which cannot be used for housing or agricultural collateral for various ownership reasons, had their titles established in the post-Civil War years under a "Heirs Property" title, which was designed to protect the property rights of the newly freed slaves.

Due to the long and continued migration of blacks out of the South, the land held under these titles had become increasingly fragmented between the heirs and, therefore, difficult to identify ownership due to the lack of wills and scattering of heirs which could pass the land on in a specified manner. With a fragmented title the land title is not clear and, therefore, cannot normally be used as collateral. This has important implications to poor black farmers or rural residents who attempt to use federal programs designed to assist them. For example, the FmHA, the last source of credit to the rural poor, cannot make loans for housing nor small-farm development if the titles are clouded. As a result, "in 1974, the proportion of FmHA loans to black farmers in 11 Southern states was a mere 12.1 percent....and despite the funnelling of more than 2.9 billion federal dollars into 102 target counties in this region, more than 3.6 million black and poor citizens still live in meager physical and economic circumstances."¹²³

A non-profit organization, The Emergency Land Fund (ELF), has provided funds and legal advice to help reamalgamate the Heirs properties and resolve tenant/landlord conflicts for both black and white small farmers in the South.¹²⁴ But due to the large number of conflicts, the massive acreages and, therefore, heirs, laws, and limited funds and staff, all working against the southern small-farm operator, the ELF's effect is mainly a holding action while it lobbies for improved legislation.

Poverty in the South has not been unique to black farmers, either as sharecroppers (tennants) or owners of small-farms. Unfortunately, they have

faced a long tradition of extra discrimination beyond that associated with poverty in general. Myers indicates that there has been deliberate discriminatory distribution of USDA commodity (tobacco and cotton) benefits and acreage allotments (ASCS programs) against black farms.¹²⁵ This problem arises from the general USDA policy for certain programs which uses area leaders to make localized decisions concerning federal and state acreage allotments and other benefit decisions. Tradition in the South has resulted in this leadership being controlled by the plantation owners whose decisions have led to discrimination excluding blacks from these benefits.

The National Sharecroppers Fund (NSF) has been active since the depression years in bringing to public attention these types of biases against white and black small-farmers. As an organization it has also provided a long history of leadership in the organization of cooperatives for small-farmers and consumer groups. But it wasn't until the civil rights movement began in the early 1960s, that the NSF's 30 years of effort to overcome Southern rural poverty begin to truly bloom.

The national and regional awareness brought on during this period of reconfirming civil rights, provided new outside leadership who saw the South's poverty as the major obstruction to full freedom. These youthful new leaders found a strong ally in the NSF who had strong connections and a history of working toward the elimination of rural poverty. The NSF strengthened itself, its anti-poverty efforts, and the civil rights movement through a number of landmark conferences in 1962-63 which brought the civil rights leadership in contact with the NSF and other organization's local leadership.

The youthful civil rights leadership quickly saw the NSF's long experience in the organization of cooperatives as an important factor in their overall goals. These leaders combined the NSF's talent and experience

in co-ops with alternate sources of federal credit available through a new program, the Office of Economic Opportunity, and hired their own farm advisers to create or strengthen a number of production and consumer cooperatives. This effort eventually resulted in the creation of the Federation of Southern Cooperatives in the middle 1960s.

As the cooperative movement gained momentum, it was realized early-on that "education would be essential if the poor were to develop and control their co-ops themselves...simple literacy first, then book keeping."¹²⁶ Another factor limiting rapid entry of farmers into the new co-ops, was the fear of the diversification away from the allotment crops, tobacco and cotton, as recommended by the farm advisors. This implied risking of income and debt repayment. Further, many co-ops, after good initial success, found they were losing members as the members expected more immediate gains resulting from the cooperative venture.¹²⁷ By the later 1960s these factors threatened the NSF's and civil rights efforts. About this time, a Ford Foundation grant created the Southern Cooperative Development Program (SCDP).

The SCDP was designed to provide technical assistance to aid in recruitment and membership education, and to help secure credit. In 1970, the Federation of Southern Cooperatives (FSC) merged with the SCDP, which provided a needed injection to both. The FSC needed help to overcome a growing tendency of its cooperatives to over-tax their management and marketing capabilities, while the SCDP found a stronger in-situ administrative network through which it could work. This merger was timely as the Nixon Administration was phasing-out the Office of Economic Opportunity at this time and by 1971 the Office had been abolished.

During this time, the cooperative development role of the NSF did not remain idle. By 1968, the NSF had established its tax-exempt Rural

Development Fund and began an assault on the food-chain monopolies by exploiting the growing consumer demand for organic foods.

The use of the Fund to assist in-situe and organizing small-farm cooperatives to produce and market organic products has been mostly successful. Working with small-farm organizations of up to 300 members, the NSF would supply expert extension personnel, farmer training at a specialized organic farming methods research and training center, The Graham Experiment Farm and Training Center (see Section 3.2.3.2.1), and market organization. The pattern of success has varied in and across these private sector programs. Cooperatives continue to be an important aspect in Southern rural development.

The sixteen, 1890 land grant institutions were provided, beginning in the 1970s, with Federal Cooperative Extension funds through a memorandum of understanding between the individual states' Cooperative Extension Service and 1890 Institutes. "The extension responsibilities of the 1890 Institutes (were to be) focused on limited-resource farmers and rural residents, as well as on urban gardening and youth activities."¹²⁸ In 1977, the 1890 Institutes provided an estimated 60 percent of all specialist leadership man-days in 23 small-farm programs in the southern region.¹²⁹ As noted in Table 3.7, the 1890 institutes have been generally under-funded in their small-farm program efforts when compared to the 1862 land grant institutes. Current agriculture legislation will provide, beginning in FY 1983, additional funding for the 1890 land grant institutes' extension in response to correct this imbalance.¹³⁰ Another benefit of the increased awareness of small-farm problems in the South is the expanded efforts by the Economics, Statistics, and Cooperative Service (ESCS) via its Cooperative Development Division to assist small-farms.¹³⁰

The ESCS has received Congressional authorization to set up in Athens,

Georgia a cooperative training center. In addition, the ESCS will provide six cooperative field offices to "assist two to three emerging small-farmer cooperatives on a day-to-day basis."¹³² Three will be in the South. One has been established in North Carolina and two more are scheduled for Alabama and Kentucky; the other three are located one in California, one in Maine, and the third is yet to be announced. Once the cooperatives receiving such assistance are functional, the field offices will be moved.

3.4.3.3 State Cooperative Extension Service programs for small-farms

3.4.3.3.1 Background

Prior to the limited provision of federal funds, \$2 million per year beginning in 1976, for state staffing of small-farm specific extension, several states had already initiated small-farm programs.¹³³ These longer standing programs, due to absence of federal monies, created small-farm extension programs through either reallocation of established Smith-Lever Act funding and staff activities and/or state appropriation of monies which have been, in some cases, combined with other sources, either from quasi-public agencies such as the Tennessee Valley Authority or from private sources including farmer associations and the Ford and Rockefeller Foundations.

According to the Science and Education Administration (SEA), in 1978 there were small-farm specific extension programs in 31 states. All but two, the Texas Intensified Farm-Planning Program and the Missouri Small Farm Family Program, were considered small-scale demonstration projects.¹³⁴ Estimates of funds earmarked for FY 1980 small-farm extension projects were projected at \$52 million; \$2 million from USDA Federal appropriations, \$25 million from Smith-Lever funding (Sections 3[c] and 3[d]) to the state

extension services and \$25 million from state, local or private sources.¹³⁵ An estimate of 1977 allocations of extension funds within 23 small-farm projects in 14 Southern states indicated that 60 percent went to project field staff salaries, 15 percent to supervisory staff, 10 percent to travel reimbursement, and the remaining 15 percent being expended on field demonstration supplies and equipment (6%), office supplies (4%), and miscellaneous expenses (5%).¹³⁶

Although current USDA federal funding for small-farm activities is less than four percent of total federal, state and local expenditures, there is provision (PL 95-113) for a substantial federal increase via a \$20 million authorized annual expenditure, as yet unappropriated, provided for under the 1977 Food and Agriculture Act. The 1981 Farm Bill legislation will most likely extend the 1977 authorization, again without appropriation. Orden, et al., notes that the lack of appropriation under the 1977 authorization has been a result of three factors: 1) a general lack of knowledge concerning the characteristics and needs of small farms, 2) a lack of current information concerning the extent of current program coverage for this group, and 3) little understanding of the extent to which programs identified under 2) can induce improved management and income on participating small farms.¹³⁷

A further problem related to the specialized need for extension services unique for small farms, is a general feeling by the extension services and others that the system is adequate and the needs of small-farm operators can be met within the existing framework. Unfortunately, Paarlberg notes "the voluntary nature of the research and educational system (has) resulted in (a) nonservice to those who lacked the sophistication, the social status, and the political clout to obtain such service."¹³⁸ This has occurred without deliberate intent on the part of the land grant

institutions due to their effort to satisfy the demands of the farming public which have commonly used innovative, risk-taking, aggressive farm operators as the industry's spokesmen. The slow evolution of this implied market bias for research and extension has resulted in a situation that "even if the small farmer should come to the extension meeting, he would find little of value to him. The clientele has been self-selected."¹³⁹

The extension service bias has been recognized by the USDA in a 1980 report concerning the evolution of cooperative extension programs which found "medium and large farms (those farms with gross annual sales over \$20,000) have more contact with extension programs than do small farmers."¹⁴⁰ Importantly, this relationship seems to be continuous even into the smallest farm sales classification (Table 3.10).

Table 3.10 Prior involvement of small-farm program participants in extension activities, by annual farm sales class, Southern region, 1977

Prior involvement in extension activities	<u>Annual Farm Sales</u>				
	Under \$2,500	\$2,500- 4,999	\$5,000- 9,999	\$10,000- 19,999	\$20,000 or more
	-----percent-----				
Some	20.3	33.8	46.4	52.0	72.3
None	79.7	66.2	53.6	48.0	27.0

Note: Chi-square = 338.09; $p < .001$. Questionnaires detailing farmer participant characteristics (N=4,543) as reported by small-farm program field staff (N=187), Southern region, December 1977-April 1978.

Source: David Orden, Steven T. Buccola, and Patricia K. Edwards, Cooperative Extension Small-farm Programs in the South: An Inventory and Evaluation, Research Division Bull. 153 (Blacksburg, VA: Virginia Polytechnic Institute and State University, 1980), Table 5.1, p. 29.

3.4.3.3.2 Classification of small-farms

Importantly related to the improvement of extension contacts with small-farms is the application of the already scarce extension resource to those with greatest need and/or success potential. Carlin and Crecink present a summary of the extension dilemma as presented in Figure 3.8.

Farms within cell "A" are considered small according to farm sales, but due to off-farm employment, these farm families do not have an income problem, i.e., their income level is above the median nonmetropolitan income level. On the other hand, small-farms found in cell "C" represent the largest overall farming group which have an income below the median nonmetropolitan level. This cell's farmers are the most heterogeneous in characterization representing a wide array of future farming expectations, orientation to markets, and capacity and willingness to use and benefit from specialized extension efforts.

Cell "B" represents the profitable commercial farming sector whose farmers may be considered risk-taking innovators who have successfully applied research results and have actively sought out extensions's counsel. They will continue to do so and are the established major producers of food and fiber. Cell "D" represents farms in transition who have a good farm resource base but have been unable to generate an adequate family income. Increased off-farm employment opportunity would lead these farmers toward cell "A", whereas specialized extension combined with technologies proven by farmers in cell "B" could move them into cell "B".

The extension dilemma concerns the selected and specialized assistance of farmers in cells "A", "C", and "D". If extension effort is placed in cell "A", will there be a migration from "A" to "B" or from "A" to "D"? If in cell "C", the extension effort is placed on that subsector's lowest income younger farmers, will the migration be from "C" to "A" or from "C" to

		Gross annual farm sales	
		\$20,000	\$20,000
Well-off families	Cell A 700,000 farms	Cell B 500,000 farms	Median non-metropolitan family income (\$13,000, 1974)
	Cell C 1,000,000 farms	Cell D 300,000 farms	
Poor families			
		Small-farms	Large farms

Figure 3.8: Clientele matrix for a small-farm program

Source: Thomas A. Carlin and John Crecink, "Small Farm Definition and Public Policy, American Journal of Agricultural Economics, Vol. 61, No. 5, (December 1979), pp. 933-939, Figure 1, p. 934.

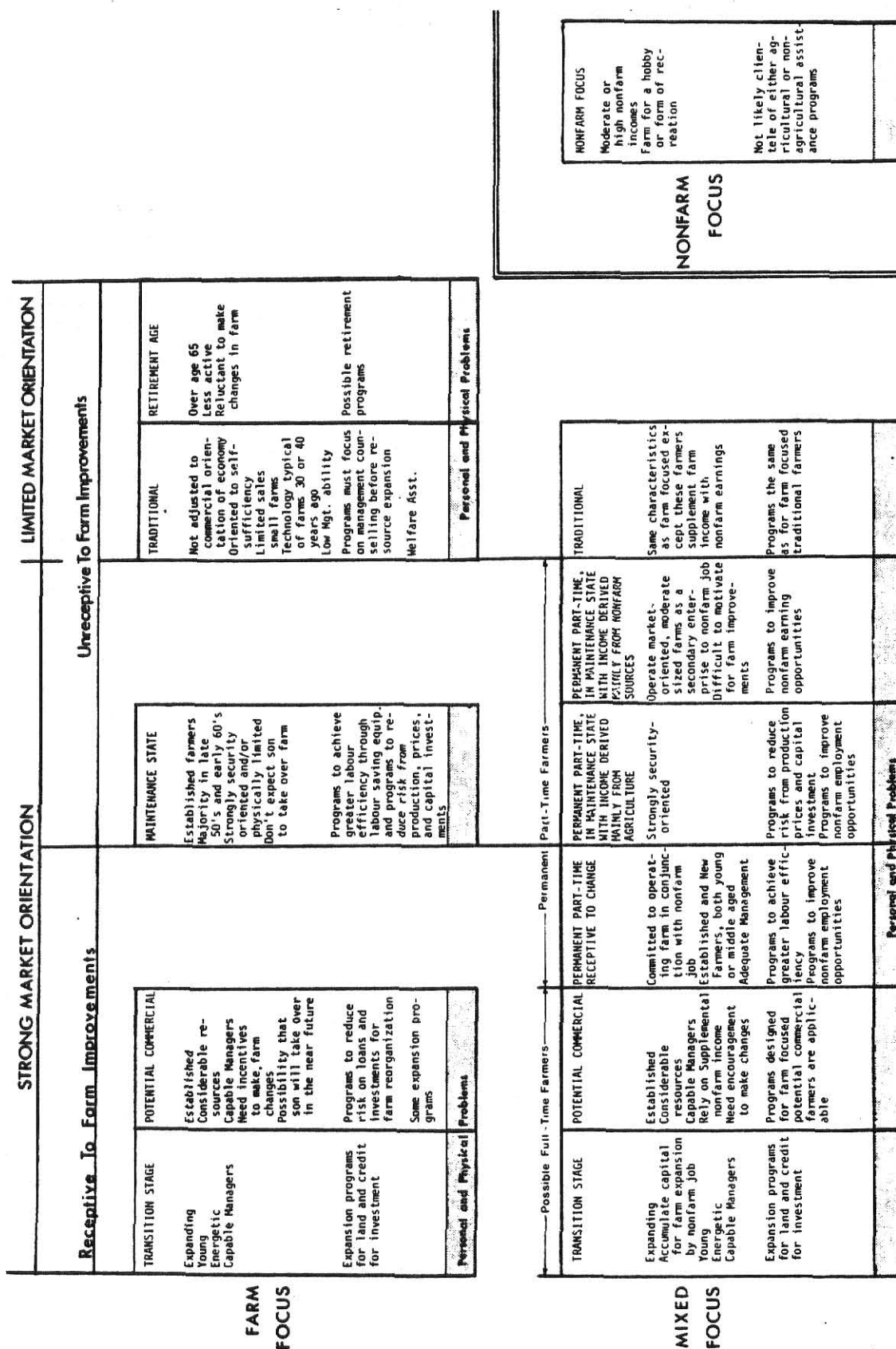


Figure 3.9: Limited resource farmer classification system

Source: Small Farm Issues: Proceedings of ESCS Small-farm Workshop, May 1978, ESCS-60 (Washington, D.C.: USDA-ESCS, 1979), Figure 1, p. 43.

"D"?

Brinkman, Diver, and Blackburn have provided a classification system to help identify "eligible"* small farms according to their behavioral and economic characteristics.¹⁴² They base their classification on market orientation, receptivity to farm improvements, and farm versus nonfarm focus.¹⁴³ Figure 3.9 creates 12 major subcategories for cells "A", "C", and "D" and, therefore, provides an enlarged framework to consider how farmers may migrate within Figure 3.8's matrix cells.

3.4.3.4 Examples of state small-farm extension programs

3.4.3.4.1 Tennessee and the Tennessee Valley Authority (TVA)¹⁴⁴

The TVA has had a long experience in meeting the needs of small, limited-resource farms since its inception during the 1930s. Its Elk River Project, one of the oldest small-farm programs, was initiated in the early 1960s after cooperative research between the TVA, the University of Tennessee, and private groups identified small-farm needs, goals, and programs to satisfy them. Programs were designed for a seven county region to improve livestock and crop production, as well as farm management practices. Local farmers, hired as paraprofessionals, were used to demonstrate the new technologies or inputs. Net income of the more than 12,000 participating farms increased just under seven percent annually over the nine year period 1960-1969. Importantly, livestock sales increased by 75 percent due to increased production; in part due to better and stronger marketing organizations bringing better prices.

* While fully two-thirds of all farmers may be considered small-scale using a \$20,000 gross sales level as the criterion, clearly not all such farmers either desire, require, or stand to benefit from intensive extension assistance.¹⁴¹

From this initial effort, the TVA has gone on to sponsor other small-farm assistance projects. The current TVA small-farms program, The Rapid Adjustment Farm Program, is a joint effort between the TVA and the land-grant universities, both 1862 and 1890, in the seven Valley states. In FY 1978, there were 526 participating small-scale farms in this program. The Program provides limited TVA financial assistance to participants to obtain fertilizer, seeds, and breeding stock, or in developing marketing outlets. The extension service provides educational assistance through paraprofessional education aides and supervising professional staff.

Once a small farm is selected into the Program, all phases of the farming enterprise, resources, and management ability are surveyed to establish a benchmark point. Management ability is evaluated on past and present use of resources, crop yields, livestock production, credit uses, and community leadership. Once this information is gathered, usually by a supervising professional, alternate farm plans are created and then presented to the cooperator. In return for this service, the cooperator must keep farm records, work toward specified goals, identify progress and strengths and weaknesses. They also must agree to share their experiences with other farmers.

An analysis of 250 farms within the TVA program between 1972 and 1975 indicated that participant farms increased unadjusted farm net income by 59 percent, expanded their farm size on average by 40 acres, and improved their operating capital turnover by 18 percent. Although it is uncertain which techniques were responsible for these changes, some of the major factors were:

- keeping good farm records,
- adoption of new technology and farming systems,

- making better use of their land,
- improved capital turnover,
- use of credit under supervised planning to expand their business, and
- more land.

Overall, increased sales were accomplished several ways: the addition of an intensive enterprise, intensifying an existing enterprise, and/or eliminating a relatively unprofitable enterprise (usually cotton). Increased yield per acre was not the major factor contributing toward increasing the incomes of these farmers. When funding permits, there are plans to significantly expand this program.

The state of Tennessee has benefited most from the TVA cooperation. In 1979, all of Tennessee's 95 counties had educational programs for small-farms with additional resource staff for these families in 51 counties; 41 counties with paraprofessionals and 10 counties with professionals.

3.4.3.4.2. Wisconsin¹⁴⁵

Wisconsin, too, has a long history of providing specialized programs to small-farms through the University of Wisconsin Cooperative Extension (UWEX), and Community Action Programs (CAP). The first program began in the late 1950s when Farm and Home Development agents were placed in 30 counties. Their primary duty was to provide intensive farm training to farm families with smaller farms.

Beginning in 1968, UWEX cooperated with the Western Dairyland Community Action Agency (CAA) in four counties. This ongoing CAP program makes use of paraprofessional farm technicians and UWEX Extension faculty to assist small, full-time dairy operators or beginning dairy farmers. This is

accomplished by in-service training for paraprofessionals, meetings for farmer participants, and one-on-one educational visits to farms with special problems. The CAA holds monthly meetings for UWEX Extension faculty and the farm technicians.

A similar program beginning in 1975 was arranged in three counties between UWEX, the Wisconsin Federation of Cooperatives, and the North Central Community Action Agencies. The UWEX has its own small-farm program in four additional counties. This program provides one full-time agent in three counties and one half-time agent in the fourth.

Overall, UWEX small-farm extension activities now work with more than 500 families. Each family is consulted twice per month by either a professional or paraprofessional who provide guidance in farm production practices, financial management, and family living programs. In a recent study of the possible effects of these programs, it was found that cooperators showed a 10-fold increase in dairy cow production testing, forage analysis, and dairy ration balancing; a three-fold increase in acres fertilized according to soil testing; and a two-fold increase in the use of farm records and financial management. Artificial insemination has also been adopted rapidly by all farmers. Farms within the program averaged a \$1,900 annual increase in net income during their first two years as cooperators.

Currently there is a special ASCS watershed project in the Yellow River Watershed. The area has 110 small-farms, most dairy. More than half of these farms have critical water erosion and pollution problems. The effort of this four-year project is to control soil erosion and animal pollution to meet the 1978 Water Pollution Control Act, Section 208, Non-source Point Water Pollution specifications.

3.4.3.4.3 Missouri¹⁴⁶

Missouri's small-farm efforts since 1971 have become a model for cooperative extension. This program is involved in 33 counties with 1,835 small-scale farm family cooperators being served by 49 paraprofessional education aides under cooperative supervision and assistance from Missouri's 1862 and 1890 land-grant institutions. In 1977, 27 percent of the participators had been in the program two or more years, 37 percent less than one year, and 36 percent one to two years. Forty percent of all participants increased farm sales by \$1,047. So successful has this ten-year program been that the Associate Dean of the College of Agriculture, University of Missouri, feels that "funds for an additional 100 small-farm educational assistants (enough for 5,000 small-farm participants) would be an excellent investment in Missouri's future." Unfortunately, "allocation of limited extension resources between commercial and small farms....is a continuing decision."

In 1969, nearly 100,000 (71%) of the state's 137,000 farms were considered small (gross annual farm sales under \$10,000) and accounted for only 21 percent of total agricultural sales. A pilot small-farm project was initiated in early 1971 in two counties, later expanded that year to five counties scattered throughout the state's major farming regions.

The expanded five-county pilot project was a cooperative effort between University of Missouri faculty with research responsibilities and extension personnel to:

- identify small-farm clientele groups,
- develop optimal resource use and enterprise combinations for cooperating small-farms, and
- evaluate the effect of the educational programs.

This resulted in a small-farm farming systems research format which used University research faculty and graduate research assistants in combination with Extension personnel over a three year (1971-1974) evaluation of the five-county pilot project.

The cooperative project was initiated in 1971 through state-wide interviews of 1,600 small-farms defined as having annual gross farm sales of less than \$10,000. The sampled farms were then classified according to resources controlled, size of enterprise, sales, and net income as well as being either a part- or full-time farming enterprise. Having established a base data year, the interviewed small-farms were then asked if they were interested in participation in the program. From this interested group, 173 cooperators were selected on the following criteria:

- farm family was not currently involved in regular extension programs,
- the operator was less than 60 years old,
- annual gross farm sales were under \$10,000.
- they desired to expand their operation, and
- they desired help.

Two paraprofessional education aides were hired from each county involved. These education aides would work with each participating farm family to identify goals, suggest alternate strategies, adapt new technologies, and help with the establishment of sound farm accounts and records. The small-farm cooperators, as well as the educational aides, participated in extension meetings unique to their efforts and interests.

In 1974, the program was reviewed to evaluate the annual and overall progress of 63 of the 173 actively contacted participants versus 67 "control" or non-participants; both groups being selected in 1971 from the

original interview group of 1,600. Each study group was initially similar according to age, original 1971 farm sales, and off-farm employment. Re-interviewing these groups in 1974 with a survey instrument similar to the 1971 base year, was designed to:

- determine if the program had resulted in an improved quality of life as reflected by improvements in housing;
- assess extent to which participants were approaching optimums in terms of enterprise selection, size of enterprise, and level of sales;
- determine the extent to which the program had influenced size of enterprise, farm sales, and net incomes;
- to compare resource utilization and production practices of farmer participants and non-participants;
- identify credit sources and determine if the program had affected their ability to obtain credit;
- determine whether the program had contributed to stabilization of enterprise selection and production levels on small farms; and
- to see what effects the program had on sources of information used by small-farm operators.

Results of the pilot project indicated that "although both participants and non-participants had made changes in their farming operations, participants had made more progress." One point of interest was that participants did not associate the project with the extension service. Overall, the participants differed from the control group in the following areas:

- Higher farm sales, although much of the increase could be

attributed to higher prices, a significant proportion was related to expansion of output.

- Higher net incomes due to lower income variability during the study period.
- Larger enterprises were typical of participants versus non-participants, especially in livestock enterprises.
- Slightly more efficient resource use as measured in a five percent relative increase in cropland use intensity.
- Greater use of credit - 60 percent by participants versus 35 percent by non-participants over the study period. The average amount borrowed by participants being twice that of the non-participants.
- More professional assistance and information were sought out by participants, notably from the existing extension service programs.
- More changes in the home through new construction, additions, renovations combined with increased farm assets.
- Greater stability in production of both field crops and livestock.

Not conclusive between the two farm groups were changes in production practices, nor was it evident that non-participants had achieved fewer of their goals in terms of planned changes.

This control-group study was sufficiently successful that in 1975 and 1976, the program was enlarged by seven more counties. In each case, the county was first surveyed by extension staff as to the needs and interests of that county's small-farm operators' which then served as the basis for that county's small-farm family program.

In 1976, the 1890 land-grant institution in Lincoln, Missouri began

participation in the renamed small-farm program, the Small-Farm Family Program. The inclusion of 11 Home Economics Area Specialists provided additional emphasis in the areas of family resource management, home gardening, food preservation, and home weatherization and maintenance. These programs were carried to the Program participants by the educational aides.

3.4.3.4.4 West Virginia

The Allegheny Highlands Project (AHP) was first implemented in 1970 in two counties of West Virginia. The Highlands area of West Virginia, typical of Appalachia, being hilly and of rough terrain, has not been conducive to mechanization nor intensive agriculture. Therefore, it has a predominance of backward small-farms. The project was unique in that initial funding came from a private source, The Rockefeller Foundation, while the project's staff was drawn from West Virginia University (WVU). The project's purpose was to test an experimental approach, using a multidisciplinary team of specialists, to produce a total farm management package for individual livestock cooperators. In doing so, a professional team made up of a veterinarian, livestock specialist, agronomist (forages), and an economist were to make overall resource evaluations, management and production recommendations, solve problems, collect data and make analyses, and prepare future planning. Within this context of helping assist individual cooperators while reviewing their efforts in a macro-sense, the team was, as an end goal, to "increase the rate of producer acceptance and successful implementation of management practices known to economically increase production and/or return."¹⁴⁷ An important spin-off of this combined effort has been "significant feedback of problems for further study" by WVU.¹⁴⁸

The Project, running from 1970 to 1981 (ten years), was designed in

three phases. Phase I, funded by the Rockefeller Foundation, was the recruitment of 32 to 40 cooperators from two counties who would directly participate with the Project's professional field team for five years. Participant selection criteria, loosely followed, resulted in a group of cooperators who ranged from 24 to 60 years of age, with fourth grade educations to college BS degrees, managing 12 to 200 animal units (average was 75), who were operating from 80 to 2,000 acres with gross annual farm sales of \$2,500 to \$120,000. There were full-time, part-time, and hobby farms (smaller acreages were usually hobby farms) of which 50 percent were beef operations, 45 percent beef-sheep combinations and five percent an all-sheep operation.

Toward the end of Phase I, the University increased its funding share so that during Phase II, WVU was the major provider of funds supplemented by a second Rockefeller Foundation three-year grant. Phase II saw a more indirect role of the project field team, which now used existing county CES agriculture agents in a program expanded to nine counties. The Phase II group of additional cooperators numbered 34 and were generally superior in record-keeping.

Results of these programs have shown increased soil nutrient levels resulting in greater TDN and protein in pasture production of cooperators which were the most limiting factors to greater stocking-rates in this region. Other improvements have been manifested in greater lambing percentages, weights and marketable lamb crops; higher calving percentages due to introduction of better breeding stock, crossbreeding, better nutrition, disease and parasite control, and estrous synchronization and AI.

Marketing received major attention through direction and assistance. Sheep and beef producers benefited from the strengthened Eastern Lamb Producers' Co-op and the Elkins Livestock Market, as well as increased

awareness of regional markets.

The AHP was evaluated in 1976 by the Center for Extension and Continuing Education of WVU. Their recommendation/findings were:

- The Project's close proximity of professional staff to its cooperators has provided a more productive arrangement than by having these experts centrally located at the University. Similar dispersal of specialists to areas on the basis of concentrations of particular client groups was seen as a possible new extension method.
- Local administrative bodies must be willing and able to coordinate their organizational and administrative procedures in order to complement and reinforce this project's specialized goals.
- That further effort to assist small farmers at the local level must be reinforced and complemented by national decisions such that the national policy works for inclusion and not exclusion of these operators.¹⁴⁹

3.4.3.5 Current USDA small-farm policy and assistance projects

Prior to the Secretary of Agriculture's Memorandum 1969 issued January 3, 1979 concerning USDA small-farm policy, the Department conducted five small-farm conferences during the summer of 1978 throughout the United States jointly sponsored by the USDA, the Community Services Administration (CSA) and ACTION. These conferences gathered together 410 small-farm delegates in an open-forum where they could identify local needs and priorities in a "bottom-up" direction versus a "top-down" approach. Small-farm specific problem areas of greatest concern were:

- access to capital and credit,
- production and management,
- marketing,
- additional income (off-farm sources),
- farm family living, and
- alternate energy sources.¹⁵⁰

A sixth conference, held in early 1979, similarly addressed the problems of American and Alaskan Indian small-farmers. Forestry, tribal ranching and farming, individual farming, aquaculture, and horticulture were topics discussed by representatives from the Bureau of Indian Affairs, the National Congress of American Indians, and the National Tribal Chairmans Association, along with the USDA, CSA, and ACTION sponsors.¹⁵¹

As a result of Memorandum No. 1969, a multi-agency, small-farm assistance structure was initiated (Figure 3.10). Within the USDA, the Small-Farm Assistance Committee (SFAC), made up of the several Assistant Secretaries and the Director of Economics, Policy Analysis and Budget, was mandated to "establish, provide policy guidance and supervise a USDA Small Farm Working Group (SFWG) comprised of representatives from the various agencies which will conduct small-farm activities."¹⁵² Similarly, the SFAC directed the State Rural Development Committees to create a State Small-Farm Committee (SSFC) made up of the state representatives of the various USDA agencies, the Community Services Administration, ACTION, the land-grant schools and the Agricultural Experiment Station.

In general, all states developed a small-farm assistance committee structure along lines found in Figure 3.10. Some states created small-farm project committees at the project, county or region level made up of local representatives of state and federal agencies involved, small-farmers, and local leaders.¹⁵³

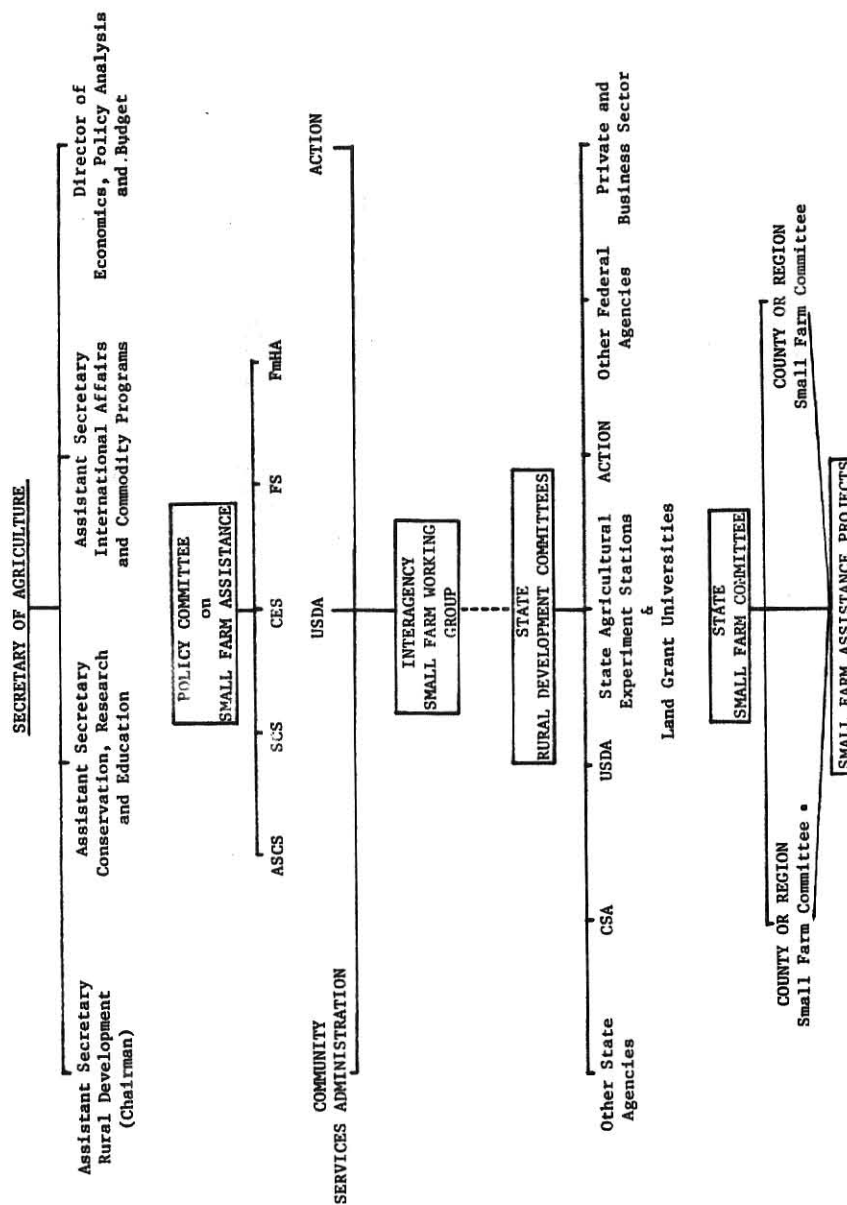


Figure 3.10: Organization chart of U.S.D.A. Farm Assistance Projects, 1980

Commensurate with the creation of this administrative infrastructure, the various USDA agencies redirected and earmarked established funds for use in small-farm assistance. The Farmers Home Administration (FmHA) doubled its allocation for Limited Resource Ownership and Operation Loans and surpassed its 25 percent expenditure goal for loans made for these purposes in 1980.¹⁵⁴ Limited Resource Farm Ownership Loans, valued at \$452 million in 1979, were increased to \$970 million in 1980 and Operating Loans made to 7,895 limited-resource farm operators in 1979, valued at \$213 million, were increased to \$875 million in 1980.

The Agricultural Stabilization and Conservation Service (ASCS) provided \$1.2 million in 1979 and \$0.8 million in 1980 for assisting small-farm operators in applying conservation and pollution abatement on their operations.¹⁵⁵ The Soil Conservation Service has worked with the ASCS in several such projects and in 1980, had redirected \$24 million or about 25 percent of its budget toward small-farms.¹⁵⁶

The Economics, Statistics, and Cooperatives Service has established four field offices and one center for cooperative training as mentioned at the end of Section 3.4.3.2. They have also conducted a small-farm field research survey in 1980 which, when combined with a 1979 farm finance survey conducted by the Bureau of the Census, should provide a better understanding of the small-farm situation nationally.

The Forest Service is working in Alabama, Kentucky, Mississippi, Oregon, and West Virginia to help low-income and limited resource farmers to better utilize their farm woodlots.¹⁵⁷

In addition to the reallocation occurring in the USDA agencies, the Community Services Administration has provided funding to supplement 17 Small-farm Assistance Projects (SFAP) initiated in 1979. ACTION, via its VISTA program, has provided a number of volunteers into these same 17

projects in addition to its nation-wide efforts.

These 17 SFAPs were selected by the national SFWG from 46 projects designed and/or submitted by the State Small Farm Committees in 1979. The projects were selected "on the basis of the attention the plan gave to assisting small-farm operators and their families, and where the potential existed for USDA, CSA, and ACTION to cooperate at the state and local level."¹⁵⁸ The overall scope of these 17 projects was limited as no new funds, only redirected funds, could be expended within them. Further, the projects were to test a variety of ways through which the USDA, CSA, and ACTION could cooperate to improve economic viability of small farms.

The 17 projects selected were diverse in type and location.* Expected duration of the projects were from one to five years in length. Ten of the projects were multi-purpose, in that the project was designed typically to "provide on-the-farm training to improve efficiency and productivity...(such as through) farm financial management, farm planning, assembling cash flow statements and analyzing credit and financial needs, crop and livestock problems, and marketing alternatives."¹⁵⁹ Most of these multi-purpose projects were of three years duration.

For example, the Oklahoma Small Farm Intensive Assistance Program, which spans 11 counties of the Five Civilized Tribes, was initially to be five years in length. Its objectives and time table were as follows:

Year 1 - Identify personnel
Train personnel
Identify 110 families
Establish farm resource base
Establish farm recordkeeping system
Identify needed joint efforts
Needs assessment
Begin implementation

* The following discussion of the Small Farm Assistance Projects and later evaluation has drawn on mimeograph project outlines and project evaluations provided by the Small-Farm Working Committee.

- Year 2 - Establish individual farm plans
Begin implementation of farm plans
Implement joint programs
Evaluation
- Year 3 - Continue implementation of farm plans
Begin analysis of farm plans
Continue joint efforts
Evaluation
- Year 4 - Continue implementation process
Consider program expansion
Continue analysis and evaluation
- Year 5 - Continuation of implementation
Continue evaluation and analysis
Establish some type of method
for program self-sufficiency¹⁶⁰

This five-year Oklahoma program began with the allocation of project responsibilities to the participating agencies within the State Small Farm Committee. The CES would provide agriculture and home economics educational and technical services. CSA and ACTION would concentrate on project and agency coordination via the establishment of the project's Small Farm Management Service consisting of a state and project counties coordinator, and CSA Outreach worker and two VISTA (ACTION) volunteers. This group would coordinate all technical, educational, social services, rehabilitative, and job opportunity programs available from the coordinating agencies. The ASCS, SCS, FmHA would target funds to the 11-county project area. Oklahoma State University and CSA would develop, guide and assist in the use and analysis of cooperator baseline and on-going data. Documentation would be carried out the by Kerr Foundation and the SCS. Overall estimated five-year funding may be in Table 3.11.

Table 3.11 Oklahoma Small Farm Family Intensive Assistance Program,
1980 estimated funding

Agency	Service	Contribution
FmHa	Loans Farm Ownership	-- \$ 3,720,000
	Loans Operating	-- 3,000,000
	Loans Other	-- 2,000,000
	Technical Staff	-- 22,000
		\$ 8,742,000
SCS	Technical Education	22,000
ASCS	Cost Sharing (90%)	100,000
CES	Technical Education	220,000
Kerr Foundation	Technical Management Asst.	---
TOTAL		\$ 9,084,000

Three of the 17 projects were exclusively orientated to small-farm livestock production. The Missouri Bootheel Small Farm Swine Project will work initially with 15 producers. The Federation of Southern Cooperatives will provide each cooperator five gilts and one boar and will pay the salary of one full-time extensionist provided through the local small-farmer cooperative. The ASCS, FmHA, and SCS will help establish up to five acres of permanent pasture for each of the cooperators. The CES will assist cooperators upon request.

The Nebraska Limited Resource Family Farm Livestock Projects will select small-farm operators for inclusion in a special livestock assistance program if they:

- have a dairy herd of 4 to 40 milk cows, with either an A or B grade dairy facility;
- have a swine operation of 4 to 20 sows in a farrowing or farrowing-to-finish operation;

- a beef cow herd from a few to as many as 20 or 25 beef cows and one bull; or
- a small sheep operation with anywhere from a few to 30 ewes and a ram.

All cooperators will have to use existing farm resources although county field staff will assist cooperators in using existing programs and funds. The project ear-marked an expenditure of \$1 million dollars annually from all participating agencies and was to be organized and run on a year-to-year basis.

The Northern New Mexico Sheep Improvement Program will work with 130 mainly Spanish surname, small-farm operators from which eight cooperators would be selected for training as sheep management/production paraprofessionals. The project was designed as a demonstration project which hoped to increase cooperator sheep marketings by 100 percent which should raise family incomes by 10 percent. The project is to be funded mainly by the Four Corners Regional Commission with help from the NMCS, ACTION and the Northern New Mexico Community College.

Two of 17 projects were single purpose in character. The Nevada Walker River Indian Reservation Project will drill two irrigation wells and provide lined irrigation delivery ditches for 20 to 25 limited-resource small farmers who will contribute 20 percent of the project's out-of-pocket costs.

The Georgia Conservation Tillage Systems Project will be conducted in seven counties of Georgia's lower Piedmont coastal plain. Approximately 1,000 small farmers reside in this area and, via cooperative efforts of the ASCS, SCS, ES, local agribusiness, and State 208 funds (Non-source Point Pollution Abatement), will be encouraged to carry out new farming operations and technology which will save time, fuel, and greatly reduce soil erosion.

The last two projects were projects to assist small-farm cooperatives. The Maine Kennebec Valley Growers Cooperative has assisted 12 farmers to develop a vegetable marketing co-op. Included in the project was the construction of a passive solar-heated greenhouse and a refrigerated vegetable storage room for the storage of carrots, cabbage, winter squash, turnips, beets and apples. The principal objectives of the one-year project were to: 1) gain a larger share of the market price which increases as much as 100 percent in the winter months, and 2) develop wholesale markets historically inaccessible due to small-farmers' limited volume and processing capabilities.

The second cooperative effort was the strengthening of an established small-farmers' co-op, the Four Corners Rabbit Producers Cooperative in Cortez, Colorado. This effort is expected to upgrade an established processing facility, improve and coordinate sale of live rabbits, work with the rabbit producers to implement practices learned in the training program, and supervise the operation of a research and demonstration rabbitry then under construction.

Approximately one year after the initiation of these 17 pilot projects, the Small Farm Working Group made evaluation visits to 6 of the 17 projects. Identified recurring problems included:

- As the projects depended upon redirection of existing programs and funds, it was found rules and regulations for existing programs were sometimes not flexible enough to accomodate the special needs of individual small-farm projects.

- There was a lack of coordination, management structure, and communication among the three major agencies, USDA, CSA, and ACTION. This was traced to a general lack of firm agency

commitments of funds and personnel.

-Where on-going projects were selected, there was a lack of input and participation by small-farmers.

-Some projects were not small-farm specific.

-The SFAPs in general did generate increased awareness of the problems and needs of small-farm operators.¹⁶¹

With the election of the Reagan administration in 1980, inter-agency cooperation in small farm assistance programs by the USDA, ACTION, and CSA became for the most part impossible due to the elimination of the CSA and break-up of ACTION. Despite the loss of these other rural development efforts, the USDA expanded small-farm assistance to 82 countries in ten states in effort "to help part-time and beginning farmers and ranches to become full-time and successful."¹⁶² The expanded program was still considered as a USDA "pilot" effort essentially following the Bergland organizational format but placed greater emphasis on "local representatives of public and private sectors to help family farmers and ranchers to plan for successful operations."¹⁶³

The expanded program was again not to be dependent on new funds but rather redirected USDA funds applied in conjunction with increased reliance upon local lending institutions of the county. Interested farmers were to submit applications to the county's Family Farmer and Rancher Development Committee. The coordinating committee (made up of USDA county civil servants from its various sub agencies, farmers and ranchers already on local committees or boards who assist local operation of the USDA agencies, as well as local financial leaders) was to evaluate and help candidates prepare annual and long-range farm or ranch plans.

Implementation of accepted plans depended on the selected candidates

working one-on-one with volunteer counselors recruited from available retired farmers and ranchers. The combination of practical expertise implementing locally workable plans backed-up by the communities financial leaders as well as the technical expertise of the USDA's county personnel should greatly enhance the success potential of selected part-time or new-entrant farmers.

In general, the diverse requirements of small-farm operators requires the joint cooperative effort of all active rural development agencies. Future success of projects along this pattern will require some type of formal interagency local management structure, relaxation of any inhibiting agency rules and regulations, and establishment of confirmed funding to carry a program through to completion. Further, a greater emphasis on non-farm activities would broaden the overall impact of the cooperative effort. And finally, ground-level paraprofessionals in an on-going training program are an appropriate means to achieve project goals.

CHAPTER III

REFERENCES

1. David Brewster, "Perspectives on the Small-farm" in Small-farm Issues: Proceedings of the ESCS Small-farm Workshop, May 1978, ESCS-60, (Washington, D.C.: USDA-ESCS, 1979), p. 5.
2. Thomas F. Davis, Persistent Low-income Counties in Nonmetro America, Rural Development Research Rpt. No. 12, (Washington, D.C.: USDA-ESCS, 1979).
3. Food and Agriculture Act of 1977, 91 Congress, Stat. 913.
4. Ovid Bay, USDA Small-farm Policy: Emphasis on the Family Background, USDA Issue Briefing Paper No. 28, (Washington, D.C.: Office of Governmental and Public Affairs, September 19, 1980).
5. Donald K. Larson and James Lewis, "Small-farm Profile" in Small-farm Issues: Proceedings of the ESCS Small-farm Workshop, May 1978, ESCS-60, (Washington, D.C.: USDA-ESCS, 1979), pp. 5-30.
6. Harold F. Breiminger, "Can the Family Farm Survive?--The Problem and the Issues", in Can the Family Farm Survive?, Special Report 219, (Columbia: University of Missouri/Agricultural Experiment Station, 1978), p. 17.
7. William Lin, George Coffman, and J.B. Penn, U.S. Farm Numbers, Sizes, and Related Structural Dimensions: Projections to Year 2000, Tech. Bull. No. 1625, (Washington, D.C.: USDA-ESCS, 1980), p. iii.
8. The Task Force, (Hal O. Carter, Willard W. Cochrane, Lee M. Day, Ronald C. Powers, and Luther Tweeten), Research and the Family Farm, a paper prepared for the Experiment Station Committee on Organization and Policy, (New York: Cornell University, February, 1981), p. 14.
9. Brewster, op. cit., p. 6.
10. Thomas A. Carlin and John Creink, "Small Farm Definition and Public Policy," American Journal of Agricultural Economics, Vol. 61, No. 5, (December 1979), p. 937.
11. Patrick Madden and Heather Tischbein, Creation of a Small Farms Policy Statement, Phase III of the NRC Small Farms Policy, Staff Paper 31, (University Park, PA: National Rural Center, Pennsylvania State University, 1980), p. 2.
12. Carlin and Creink, op. cit., p. 937.

13. Alvin L. Bertrand, "Research on Part-time Farming in the United States," Sociologia Ruralis 7(3), 1967, pp. 295-304.
14. Ronald L. Thompson and Ralph E. Hepp, Discription and Analysis of Michigan Small Farms, Research Rpt. 296 (East Lansing: Michigan State University-Agricultural Experiment Station, 1976), p. 5.
15. William Saupe, Informational Needs Relating to Small-Farm Programs and Policies, ESCS Staff Report, (Washington, D.C.: USDA-ESCS, 1980), p. 3.
16. Herbert F. Lionberger, J. Patrick Smith, and John S. Holik, Reasons and Philosophies for Living in the Country, Research Bull. 1032, (Columbia: University of Missouri-Columbia/Agricultural Experiment Station, 1979).
17. Larson and Lewis, op. cit., p. 10. (see Table 3.1 in this report)
18. A Time to Choose: Summary Report on the Structure of Agriculture, (Washington, D.C.: USDA-ESCS, 1981) p. 43.
19. Ibid., p. 44.
20. Robert A. Hoppe, Agricultural Counties: Their Location, Farms and Economies, ESS Staff Rpt. No. AGESS810213, (Washington D.C.: USDA-ESS, 1981).
21. Brewster, op. cit., pp. 6-7.
22. Richard Lamb, Metropolitan Impacts on Rural American, Department of Geography Research Paper No. 162, (Chicago: University of Chicago, 1975), pp. 187-188.
23. A Time to Choose: Summary Report on the Structure of Agriculture, op. cit., p. 38.
24. Thompson and Hepp, op. cit., p. 9; Saupe, op. cit., p. 3.
25. Thompson and Hepp, op. cit., p. 9 and 11.
26. Ibid., p. 6.
27. Saupe, loc. cit.
28. C. Milton Coughenour and Anne V. Gabbard, Part-time Farmers in Kentucky in the Early 1970s: The Development of Dual Careers, RS-54, (University of Kentucky: Department of Sociology, Agricultural Experiment Station, 1977).
29. Ibid., p. 22.
30. Ibid., Table 13, p. 23.

31. George V. Douglas and Arthur B. Mackie, Some Social and Economic Implications of Part-time Farming, Report No. T 57-1 AE, (Knoxville: Tennessee Valley Authority, 1957) p.iii.
32. Ibid., p. 22.
33. R.J. Hanson and R.G.F. Spitze, An Economic Analysis of Off-Farm Income in the Improvement of Illinois Farm Family Income, AERR 139, (Urbana-Champaign: University of Illinois-Agricultural Experiment Station, 1976), p. 1.
34. Ibid., p. 34.
35. A.J. Sofranko and W.R. Pletcher, "Factors Influencing Farmers' Expectations for Involvement in Agriculture", Illinois Agricultural Economics, Vol. 14, No. 2 (July 1972), pp. 6-12.
36. Thompson and Hepp, op. cit., pp. 14-15.
37. Hanson and Spitz, op. cit., pp. 27-33.
38. Coughenor and Gabbard, op. cit., pp. 18-21.
39. Thomas A. Carlin and Linda M. Gheifi, "Off-farm Employment and the Farm Sector" in Structure Issues of American Agriculture, Ag. Econ. Rpt. 438, (Washington, D.C.: USDA-ESCS, 1979), pp. 270-273.
40. J. Patrick Madden, Heather Tischbein, and Jerry G. West, "An Agenda for Small Farms Research--A Report on Phase II of the NRC Small Farms Project", Staff Paper 10 Final Report to the National Science Foundation, (Pennsylvania State University: Department Agriculture Economics and Rural Sociology, 1980), p. 139.
41. John Steinbeck, The Grapes of Wrath, (New York: The Viking Press, 1939).
42. Theodore P. Lianos, Labor Mobility from Agriculture--Review of the Evidence, Econ. Research. Rpt. No. 32, (Raleigh: North Carolina State University-Department of Economics and Business, 1975).
43. J.B. Penn, "The Structure of Agriculture: An Overview of the Issue," in Structural Issues of American Agriculture, Ag. Econ. Rpt. 438, (Washington, D.C.: USDA-ESCS, 1979), p. 4.
44. Bert E. Swanson, Richard A. Cohen, and Edith P. Swanson, Small Towns and Small Towners: A Framework for Survival and Growth, Vol. 29, Sage Library of Social Research (Beverly Hills: Sage Publications, 1979), p. 18.
45. David L. Brown, "Farm Structure and the Rural Community" in Structural Issues of American Agriculture, Ag. Econ. Rpt. 438, (Washington, D.C.: USDA-ESCS, 1979), p. 284.

46. The Changing Character and Structure of American Agriculture: An Overview, Staff Study CED-78-178, (Washington, D.C.: U.S. General Accounting Office, 1978), p. 144.
47. Swanson, Cohen, and Swanson, op. cit., p. 19.
48. Brown, op. cit., p. 286.
49. John T. Scott, Jr. and James D. Johnson, The Effect of Town Size and Location on Retail Sales, (Ames: North Central Regional Center for Rural Development-Iowa State University, 1976).
50. Earl O. Heady and Steven T. Sonka, Farm-Size Structure and Off-farm Income and Employment Generation in the North Central Region, (Ames: North Central Regional Center for Rural Development-Iowa State University, 1975); and

Steven T. Sonka and Earl O. Heady, American Farm Size Structure in Relation to Income and Employment Opportunities of Farm, Rural Communities and Other Sectors, (Ames: Center for Agricultural and Rural Development-Iowa State University, 1974).
51. Steven T. Sonka, "The Research Needs of Small Farmers" in Small Farm Issues: Proceedings of the ESCS Small-farm Workshop, May 1978, ESCS-60, (Washington, D.C.: USDA-ESCS, 1979), pp. 31-35.
52. Sonka and Heady, op. cit., p. 64.
53. Walter Goldschmidt, As You Sow: Three Studies in the Social Consequences of Agribusiness (Montclair: Allanheld, Osmun & Co. Publishers, 1978).
54. Ibid., p. 485--quote by Alden Stevens from The Nation, September 28, 1946.
55. Community Service Task Force, The Family Farm in California: Report of the Small Farm Viability Project, (Sacramento: State of California, 1977).
56. Ibid., p. 242.
57. Goldschmidt, op. cit., p. 281.
58. see: William D. Hefferran, "Agricultural Structure and the Community" in Can the Family Farm Survive?, Special Report 219, (Columbia: University of Missouri-Agricultural Experiment Station, 1978), pp. 27-37; and

Carol F. Nuckton (ed), Farm-Size Relationships, with an Emphasis on California, (Davis: University of California-Department of Agriculture Economics, 1976).

59. A Time to Choose: Summary Report on the Structure of Agriculture, (Washington, D.C.: USDA, 1981), p. 38.
60. Paarlberg, "The Land Grant Colleges and the Structure Issue", American Journal of Agricultural Economics, Vol. 63, No. 1 (February 1981), pp. 129-134.
61. Jim Hightower (ed.), Hard Tomatoes, Hard Times--A Report of the Agribusiness Accountability Project on the Failure of America's Land Grant College Complex, (Cambridge: Schenkman Publishing Company, 1973).
62. Wendle Berry, The Unsettling of America, Culture and Agriculture, (San Francisco: Sierra Club Books, 1977).
63. Richard Merrill (ed.), Radical Agriculture, (New York: Harper & Row, Publishers, 1976).
64. Task Force, Research and the Family Farm, a report prepared for the Experiment Station Committee on Organization and Policy, (New York: Cornell University, February 1981), p. ii.
65. Berry, op.cit, p. 145.
66. Ibid., loc. cit.
67. Ibid., p. 152.
68. Ibid., p. 151.
69. Bob Bergland "Foreward" in A Time to Choose: Summary Report on the Structure of Agriculture, (Washington, D.C.: USDA, 1981), pp. 3 and 5.
70. J. Patrick Madden, Heather Tischbein, and Jerry West, An Agenda for Small Farms Research, A Report on Phase II of the NRC Small Farms Project, Staff Paper Series, (University Park: Pennsylvania State University-Agricultural Economics and Rural Sociology Department, 1980), pp. 3-4.
71. J. Patrick Madden and Heather Tischbein, "Toward an Agenda for Small Farms Research", American Journal of Agricultural Economics, Vol. 61, No. 5 (December 1979), pp. 940-946; p. 942.
72. Madden, Tischbein, and West, 1980.
73. J. Patrick Madden and Heather Tischbein, Creation of a Small Farms Policy Statement, Phase III of the NRC Small Farms Policy, Staff Paper 31, (University Park: Pennsylvania State University-Agricultural Economics and Rural Sociology Department, 1980).

74. Ad Hoc Committee on Small Farms, Research, Extension and Higher Education for Small Farms, (Washington D.C.: USDA-Joint Council on Food and Agricultural Sciences, 1979).
75. Saupe, 1980.
76. Community Services Task Force, The Family Farm in California, Report of the Small Farm Viability Project, (Sacramento: State of California, 1977), p. 1.
77. Madden, Tischbein, and West, 1980, op. cit., p. 53.
78. Bob Bergland, "Press conference in Fresno, California, December 13, 1979, concerning 'Structure of Agriculture'," as found in Small Farm Advocate, winter 1979-80, (Walthill, Nebraska: The Center for Rural Affairs, 1980), p. 2.
79. "Block Reinstates Funds for Mechanization Research", High Plains Journal, (Dodge City, Kansas), March, 1981
80. Madden, Tischbein, and West, op. cit., p. 126.
81. Linda K. Kee, "The Impact of Land Ownership Factors on Soil Conservation," American Journal of Agricultural Economics, Vol. 61, No. 5 (December 1979), pp. 1070-1076.
82. Madden, Tischbein, and West, op. cit., pp. 129-130.
83. Task Force, Organic and Conventional Farming Compared, Report No. 84, (Washington D.C.: Council for Agricultural Science and Technology, 1980), pp. 20-25.
84. Robert Klepper, William Lockeretz, Barry Commoner, Michael Gerther, Sarah Fast, Daniel O'Leary, and Roger Blobaum, "Economic Performance and Energy Intensiveness on Organic and Conventional Farms in the Corn Belt: A Preliminary Comparison", American Journal of Agricultural Economics, Vol. 59, No. 1 (February 1977), pp. 2-12.
85. G. Shearer, D.H. Kohl, D. Wanner, G. Kuepper, S. Sweeny, and W. Lockeretz, "Crop Production Costs and Returns on Midwestern Organic Farms, 1977 and 1978," American Journal of Agricultural Economics, Vol. 63, No. 2 (May 1981), pp. 264-269.
86. Ibid., p. 268.
87. Study Team on Organic Farming, Report and Recommendations on Organic Farming, (Washington D.C.: USDA, 1980), p. xiv.
88. Madden, Tischbein, and West, op. cit., pp. 125-126.

89. The Center for Rural Affairs, Barriers to Conversion of Small Farms to Ecological Methods, (Minnesota: National Center for Appropriate Technology, 1980), p. 48.
90. Allen Thompson, Marketing and the Small Farmer, NRC Small Farms Project Report No. 5, (Washington D.C.: 1980).
91. Ovid Bay, Theron Bell, and Marjorie Beringer, Regional Small Farms Conferences: National Summary, (Washington D.C.: USDA-CSA-ACTION, 1978), p. 8.
92. Task Force, 1980, op. cit., p. 18.
93. Ibid., pp. 17-18.
94. Madden, Tischbein, and West, op. cit., p. 2.
95. Farmers Home Administration, FmHA Instruction 1943-A(g), (Washington D.C.: USDA-FmHA, 11-20-78).
96. David Lins and Peter Barry, "Availability of Financial Capital as a Factor of Structural Change in the U.S. Farm Production Sector" in Farm Structures, A Historical Perspective on Changes in the Number and Size of Farms, 96th Congress, 2nd Session Committee Print, (Washington D.C.: U.S. Government Printing Office, 1980), pp. 74-100.
97. Research and the Family Farm, op. cit., p. 16.
98. Ibid., loc. cit.
99. Ibid., op. cit., p. 11.
100. Ibid., p. 8.
101. Ovid Bay and Tom Carlin, "USDA Small-Farm Policy: Emphasis on the Family Background", Issue Briefing Paper, No. 28 (Washington, D.C.: USDA, Sept. 1980), p. 4.
102. Research and the Family Farm, op. cit., p. 18.
103. Jerry G. West, "Agricultural Economics Research and Extension Needs of Small-scale, Limited Resource Farmers", Southern Journal of Agricultural Economics, Vol. 11, No. 1 (July 1979), pp. 49-56.
104. Task Force, A Small Farm Research and Extension Center at Booneville, Arkansas, (Fayetteville: University of Arkansas-Division of Agriculture, 1979), p. 7.
105. Ibid., loc. cit.
106. Ibid., pp. 15-19.

107. Joe Belden, G. Edwards, C. Gayer, and L. Webb (eds.) New Directions in Farm, Land and Food Policies--A Time for State and Local Action, (Washington D.C.: Conference on Alternate State and Local Policies, 1979), p. 72.
108. Paul Good, "An Organic Training Farm" in Organic Farming: Yesterday's and Tomorrow's Agriculture, Ray Wolf (ed.), (Emmaus, PA: Rodale Press, 1977), pp. 321-324, p. 322.
109. Board of Directors, Center for Rural Affairs Annual Report, 1979, (Walthill, Nebraska, 1980).
110. Center for Rural Affairs, Final Report on the Impact of Various Energy Innovations on Energy Consumption and Net Income for 48 Small Farmers--The Small Farm Energy Project, (Walthill, NE: Center for Rural Affairs, 1980), pp. 6-7.
111. Ibid., p. 2.
112. Ibid., p. 19
113. Ibid., loc. cit.
114. Ibid., loc. cit.
115. Richard Merrill and Thomas Gage (eds.), Energy Primer-Solar, Water, Wind, and Biofuels, (New York: Dell Publishing Co., Inc., 1978 [revised and updated edition]), p. 167.
116. Gene Logsdon, "Rodale Research" in Organic Farming: Yesterday's and Tomorrow's Agriculture, Ray Wolf (ed.), (Emmaus, PA: Rodale Press, 1977), pp. 107-156, p. 108.
117. see: SEA-USDA, Evaluation of Economic and Social Consequences of Cooperative Extension Programs, (Washington, D.C.: U.S. Government Printing Office, 1980).
118. The Secretary of Agriculture, B. Bergland, "Assistance to Small Farm Operators," Secretary's Memorandum No. 1969 (January 3, 1979), Washington D.C.: United States Department of Agriculture.
119. Policy Committee on Small Farm Assistance, letter to: State Rural Development Committee Chairpersons concerning the USDA's Policy concerning Small Farm Families (Secretary's Memorandum No. 1969), (dated: February 26, 1979), Washington, D.C.: USDA.
120. Ovid Bay, Small Farm Programs and Activities, State Reports, 1979, (Washington D.C.: USDA-SEA, 1980).
121. Joseph F. Brooks, "Problems Facing Small Farms" in Small-Farm Issues: Proceedings of the ESCS Small-farm Workshop, May 1978, ESCS-60, (Washington, D.C.: USDA-ESCS, 1979), pp. 39-41.

122. C. Scott Garber, "A Blight Hits Black Farmers", The Nation, March 11, 1978, pp. 269-272, p. 269.
123. Brooks, op. cit., p. 40.
124. Joe Belden, Gibby Edwards, Cynthia Guyer, and Lee Webb (eds.), New Directions in Farm, Land and Food Policies, A Time for State and Local Action, (Washington, D.C.: Conference on Alternate State and Local Policies), p. 149.
125. Robin Myers, "The National Sharecroppers Fund and the Farm Co-op Movement in the South" in Radical Agriculture, (New York: Harper & Row, Publishers, 1976), p. 131.
126. Ibid., p. 133.
127. Ibid., p. 138.
128. David Orden, Steven T. Buccola, and Patricia K. Edwards, Cooperative Extension Small-Farm Programs in the South: An Inventory and Evaluation, Research Division Bull. 153, (Blacksburg: Virginia Polytechnic Institute and State University, 1980), p. 21.
129. Ibid., Table 4.1, pp. 18-19.
130. "Ag Research Bill Passed by House Subcommittee", High Plains Journal, (Dodge City, Kansas), April 20, 1981, p. 21-B.
131. Ovid Bay and Tom Carlin, op. cit., p. 3.
132. Ibid., loc. cit.
132. Saupe, 1980, op. cit., p. 22.
134. USDA, Science and Education Administration, The Science and Education Administration's Research and Extension Programs for Small Farms, a paper prepared for the U.S. House of Representatives Subcommittee on Agriculture, Rural Development, and Related Agencies (March 1, 1979).
135. Ad Hoc Committee on Small Farms, Research, Extension and Higher Education for Small Farms, (Washington, D.C.: USDA-Joint Council on Food and Agricultural Sciences, 1979), p. 22-23.
136. David Orden, Steven T. Buccola, and Patricia K. Edwards, Cooperative Extension Small-Farm Programs in the South: An Inventory and Evaluation, Research Division Bulletin 153, (Blacksburg, VA: Virginia Polytechnic Institute and State University, 1980), p. 23.
137. Ibid., p. 2.

138. Don Paarlberg, "The Land Grant Colleges and the Structure Issue," American Journal of Agricultural Economics, Vol. 63, No. 1 (February 1981), pp. 129-134, p. 132.
139. Ibid., p. 131.
140. USDA, Science and Education Administration, Evaluation of Economic and Social Consequences of Cooperative Extension Programs, (Washington, D.C.: 1980), p. viii.
141. Ad Hoc Committee on Small Farms, 1979, op. cit., p. 32.
142. G.L. Brinkman, H.C. Driver, and D.J. Blackburn, A Classification of Limited-Resource Farmers Based on Behavioral and Economic Characteristics, Extension Education Pub. No. 77-3, (Ontario, Canada: University of Guelph-School of Agriculture Economics, 1977).
143. William E. Saupe, Information Needs Relating to Small-farm Programs and Policies, ESCS Staff Report, (Washington, D.C.: USDA-ESCS, 1980), p. 16.
144. This section is an amalgamation of several sources:
Rodger Blobaum, "An Issue of the Day" in Organic Farming: Yesterday's and Tomorrow's Agriculture, Ray Wolf (ed.), (Emmaus, PA: Rodale Press, 1977), pp. 301-336, (see pp. 313-314).

Ad Hoc Committee on Small-farms, 1979, op. cit., p. 16.

Roger C. Woodworth, Porter L. Russ, and Harold C. Young, Can Small Farms be Successful, circular Z-97, (Muscle Shoals, AL: Tennessee Valley Authority-Agricultural Resource Development Branch, 1979).

Ovid Bay, Small Farm Programs and Activities, State Reports, 1979, (Washington, D.C.: USDA-SEA, 1980), pp. 30-31.
145. This section is an amalgamation of several sources:
William Saupe, Farm Poverty, Farm Entry Problems and the UWEX Small Farms Program, No. 176, (Madison: University of Wisconsin Extension, 1980).

William Saupe, Maynard Nelson, Larry Fitzmaurice, and David Erikson, UWEX Small Farms Program, 1976 Report, (Madison: University of Wisconsin Extension, 1977).

Ovid Bay, 1980, op. cit., p. 80.

146. This section is an amalgamation of several sources:
Jerry West, V.R. Harrold, K.C. Schneeberger, L. Williamson, Missouri Small Farm Program: An Evaluation with a Control Group, SR 176 (Columbia: University of Missouri - College of Agriculture - Agriculture Experiment Station - Department of Agriculture Economics, 1975).

G. Enlow, C. George, J. Holik, and E. Wiggins, Missouri Small Farm Family Program, MD 445, (Lincoln: University of Missouri Extension Division, 1979).

Roger Blobaum, "Helping Missouri's Small Farmers" in Organic Farming, Yesterday's and Tomorrow's Agriculture, Ray Wolf (ed.) (Emmaus, PA: Rodale Press, 1977), pp. 325-330.
147. Frank E. Woodson, Barton S. Baker, John B. Peters, Marvin R. Fausett, and E. Keith Inskeep, A Progress Report on the Allegheny Highlands Project: Agriculture January - December 1976, (Elkins, WV: West Virginia University - College of Agriculture and Forestry, 1977), p. 1.
148. Ibid., p. 27.
149. Ibid., p. 25.
150. Ovid Bay, Theron Bell, and Marjorie Benninger, National Summary, Regional Small Farms Conferences, (Washington, D.C.: USDA-SEA Extension, 1978), p. 3.
151. Ovid Bay, "USDA Small-Farm Policy: Emphasis on the Family," USDA Issue Briefing Paper No. 28, (Washington, D.C.: Office of Governmental Affairs, September 19, 1980), p. 1.
152. Secretary of Agriculture, (Bob Bergland), "Secretary's Memorandum No. 1969," U.S. Department of Agriculture, January 3, 1979.
153. Ovid Bay, Small Farm Programs and Activities by State, 1979, (Washington, D.C.: USDA-SEA, 1980).
154. Ovid Bay, USDA Issue Briefing Paper No. 28, 1980, p. 3.
155. Ibid., loc. cit.
156. Ibid., loc. cit.
157. Ibid., op. cit., p. 4.
158. Evaluation Committee, Evaluation of Six Small Farm Family Assistance Projects, (Washington, D.C.: USDA - Small Farm Working Committee, 1981), pp. 4, p. 1.

159. Alabama Small Farms Committee, Bullock County Small Farms Project (Available from USDA - Small Farm Working Group, Washington, D.C.), no date.
160. Oklahoma Small Farms Committee, Oklahoma Small Farm Family Intensive Assistance Program (Available from USDA - Small Farm Working Group, Washington, D.C.), no date.
161. Evaluation Committee, 1981, op. cit., p. 2-3.
162. J.R. Block, "USDA projects helps new farmers, ranchers" in The High Plains Journal, (Dodge City, Kansas), November 9, 1981, p. 12-c.
163. Ibid.

CHAPTER IV

Kansas Farm Structures During The 1970s

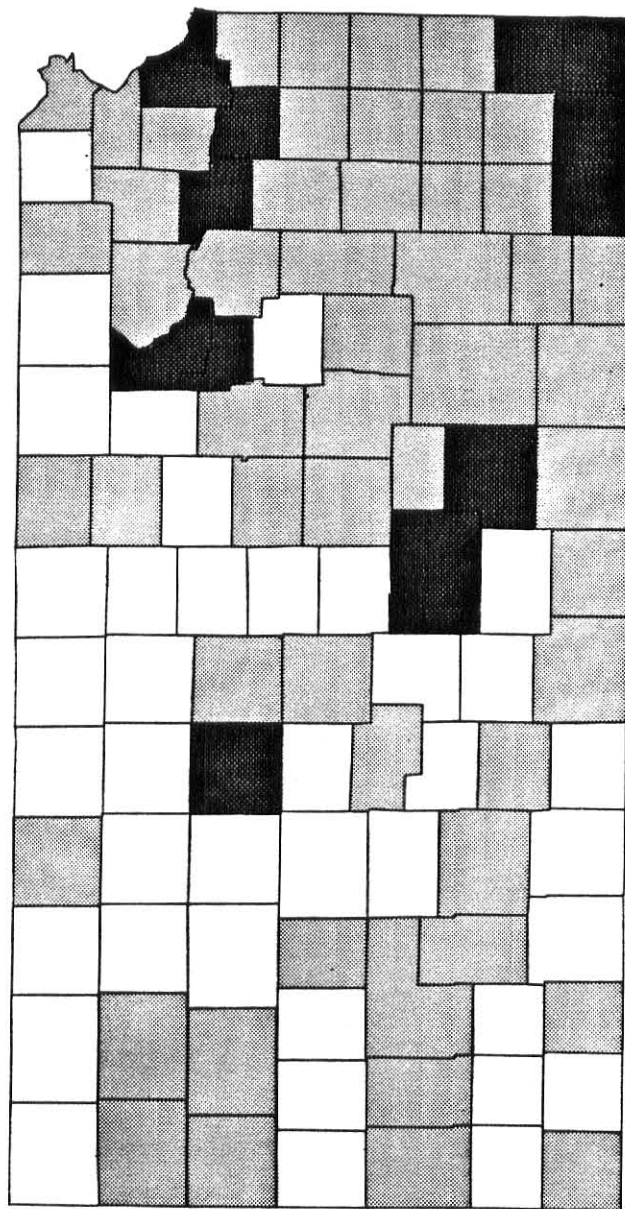
4.1 Background

Agriculture is the number one industry in Kansas. Its food commodity exports flow importantly within the national and international community. It is a leader amongst the states in meat animal numbers as well as food and feed production. As a state, it also has many of the problems currently under discussion as regards to farm structure. Due to the climatic extremes present within the State analysis of an aggregate farm structure may draw conflicting conclusions if dryland versus humid or rain-fed animal or crop agriculture is compared. This analysis of selected economic characteristics during the 1970s provides an aggregate view of the State. Its content and conclusions must therefore be tempered if applied to specific regions within the State.

4.2 Selected Economic Characteristics of Kansas Agriculture in the 1970s

4.2.1 Shifts in the rural economy

As may be seen in Map 4.1, the Kansas rural economy has undergone significant change. In 1950 nine out of ten counties largely relied on agriculture to support its economy. By 1976, less than two out of five were considered as agricultural in character. The growth in other economic sectors relative to agriculture has important consequences and future



Agricultural Counties in 1950 and 1975-1977

Agricultural Transition Counties; Agricultural 1950, Non-agricultural 1975-1977

Urbanized Counties: Non-agricultural in 1950 and 1975-1977

Map 4.1

Shifting pattern of agricultural counties (at least 20 percent of county's labor and proprietors income from farming) between 1950 and 1975-1977, Kansas

Source: USDA, *A Time to Choose: Summary Report on the Structure of Agriculture* (Washington, D.C.: USDA, 1981. Figures 3 and 4, pp. 36-37.

implications. The urbanization of rural area economics brings greater amenities as well as alternate employment opportunity for marginal and/or small farm operators. Further, greater economic diversity of local economics helps provide greater stability to rural communities.

4.2.2 Farm numbers and size

In 1978 there were 77,129 farms in Kansas, a decrease of 2.6 percent from the 79,188 farms identified in the 1974 Census of Agriculture. As may be seen in Figure 4.1, there has been a continual decrease in Kansas farm numbers of approximately 45 percent since 1945, or an annual average decrease of about 1.25 percent. The annual rate of change appears to have decreased to around 0.5 percent over the 1974 to 1978 period. This reduction may be, in part, related to a greater effort on the part of the Bureau of the Census in 1978 to enumerate small-farms as well as the Bureau's change during the 1970s of the definition of a farm.¹

Farm size in terms of acres operated increased from 605 to 619 acres between 1974 and 1978 representing continued expansion in the average farm's acreage operated (see Figure 4.2). As may also be seen, farm expansion appears to be increasing at a decreasing rate. This may indicate increased stability in Kansas rural opportunities.

Kansas farms, when classified by gross annual farm sales as found in Table 4.1, indicates that the largest farms (sales over \$100,000) represented nine percent of all farms in 1978 versus 7.7 percent in 1974. This increase represented an absolute increase of 857 operations. At the other end of the sales spectrum, the smallest farms (sales under \$20,000) maintained their relative proportion of 55 percent of all farms although there was an absolute loss of slightly more than 1,100 operations between 1974 and 1978. Farms in the medium sales group (\$20,000 to \$99,999 in

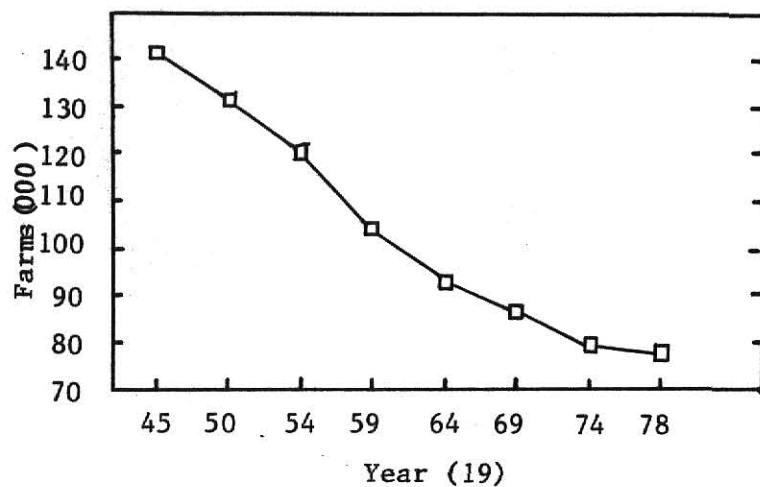


Figure 4.1 Total Kansas farms, 1945-1978

Source: Bureau of the Census, 1978 Census of Agriculture, Kansas, Vol. 1, Part 16 (Washington, D.C.: U.S. Department of Commerce, 1981), Table 1, p. 1.

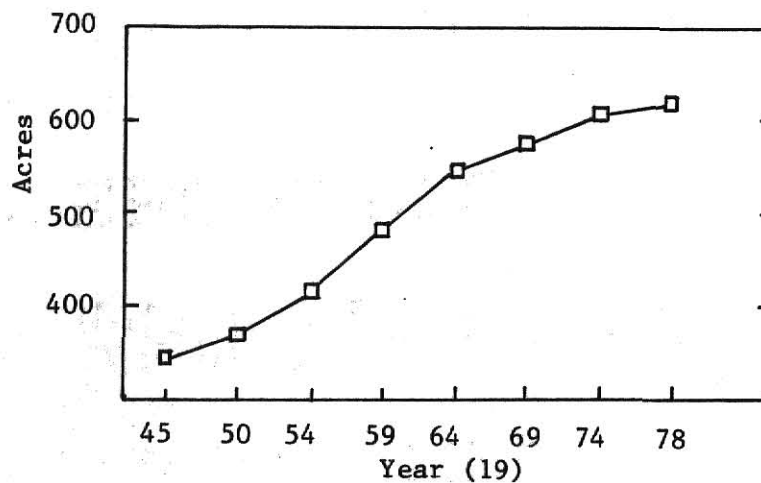


Figure 4.2 Average farm acreage, Kansas, 1945-1978

Source: Bureau of the Census, 1978 Census of Agriculture, Kansas, Vol. 1, Part 16. Table 1, p. 1.

Table 4.1 Percent distribution of all farms by farm sales size class,
Kansas and the U.S., 1974 and 1978

Year and Sales Class	Kansas	United States
<u>1978:</u>		
	-----percent-----	
\$500,000 or more	0.8	0.7
200,000 - 499,999	2.5	2.5
100,000 - 199,999	5.7	5.7
40,000 - 99,999	17.9	14.7
20,000 - 39,999	18.1	12.3
10,000 - 19,999	17.4	12.5
5,000 - 9,999	14.3	13.4
2,500 - 4,999	10.7	13.4
less than 2,500	<u>12.6</u>	<u>24.8</u>
Total (number)	77,129	2,672*
<u>1974:</u>		
\$500,000 or more	0.5	0.5
200,000 - 499,999	2.0	1.6
100,000 - 199,999	5.2	4.1
40,000 - 99,999	18.1	13.2
20,000 - 39,999	19.2	13.1
10,000 - 19,999	17.5	12.6
5,000 - 9,999	14.0	12.0
2,500 - 4,999	10.8	11.8
less than 2,500	<u>12.7</u>	<u>31.1</u>
Total (number)	79,155	2,464*

Source: Bureau of the Census, 1974 and 1978 Census of Agriculture:
National Summary, Vol. 51; and Kansas, Vol. 1, Part 16.

* 1,000s

sales) showed a relative proportional decrease from 37.3 percent to 36 percent during this period, representing an absolute loss of nearly 1,800 farms.

Interpretation of these relative and absolute changes should, in part, consider inflation effects upon migration of operations upward between sales class. Inflation in the prices received by farmers for all farm products between 1974 and 1978 indicates a general farm commodity price increase of nine percent.²

Overall comparison of the distribution of Kansas farms by sales class versus the national distribution, as found in Table 4.1 for both 1974 and 1978, would suggest that Kansas had a more equal distribution of its farms across the range of farm sales classifications.

4.2.3 Land use

The average Kansas farm in 1978 was typically 56.5 percent cropland and 40 percent pastureland with the balance in woodlands and homestead constructions (Table 4.2). Crop-orientated farms, classified according to the Bureau of Census' Standard Industrial classification*, fell from 67.5 percent of all farms in 1974 to 53.2 by 1978 with a commensurate rise in livestock enterprises. Shifts in classifications being due to real changes in farm resource make-up as well as definitional shifts brought about due to stable meat animal prices versus declining food and feed grain prices between 1974 and 1978 (see Figure 4.3).

Although there was a sizable shift toward livestock orientated

* The Census Bureau's Standard Industrial Classification (S.I.C.) system for agricultural enterprises classifies the farm according to which commodity produced and/or sold by the farm contributed at least 50 percent toward the farm's annual gross sales.

Table 4.2 Kansas land use by major standard industrial classification (S.I.C.) for all farms, 1974 and 1978

Standard Industrial Classification	Total All Farms		Cropland not pasture or grazed		All Pasture Land		Forest Land not pastured		Other Land ¹	
	1974	1978	1974	1978	1974	1978	1974	1978	1974	1978
State, all farms (000 ac.)	47,946	47,574	26,382	26,860	19,167	18,917	723	324	1,674	1,473
	100.0	100.0	55.0	56.5	40.0	39.8	1.5	0.7	3.5	3.1
	(percent distribution by row)									
<u>Farm S.I.C.</u>										
	Percent distribution --by column-- ³									
Cash grain	63.7	50.1	65.7	72.3	29.8	24.2	1.2	0.7	3.4	2.8
Other field crop	1.4	1.3	62.6	67.3	31.0	27.8	2.0	1.3	4.4	3.6
General, primarily crop	2.4	1.8	50.7	59.0	44.3	36.8	1.8	1.1	3.1	3.1
Livestock ²	29.0	43.6	32.9	38.1	61.4	58.1	2.0	0.7	3.6	3.1
Dairy	2.3	2.0	51.9	54.0	40.6	41.3	2.8	0.7	4.7	6.1
	98.8	98.8								

Source: Bureau of the Census, 1974 & 1978 Census of Agriculture, State and County Data, Vol. 1. Part 16 (Washington, D.C.: U.S. Department of Commerce), 1974: table 32, 1978: table 34.

¹ Other land: house lots, ponds, roads, wasteland, etc.

² Not including poultry, dairy, or animal specialty farms

³ Column will not equal 100% as there are numerous minor farm enterprise classifications.

operations by 1978, total area in cropland showed an increase of 478,000 acres, coming from pasturelands, forestlands, and homestead as the State's total land in farms decreased from 91.6 percent in 1974 to 91.2 percent in 1978.

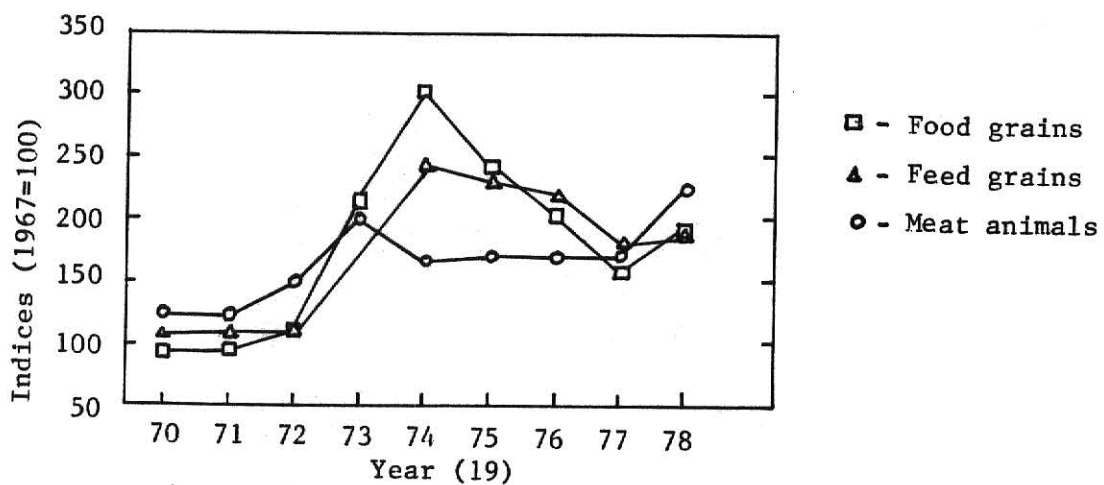


Figure 4.3 Selected indices of prices received by U.S. farmers, 1970-1978

Source: ESCS-USDA, Agricultural Statistics, 1979 (Washington, D.C.: U.S. Government Printing Office, 1979), Table 649, p. 452.

4.2.4 Farm tenure

Between 1974 and 1978, Kansas agriculture land tenure structure saw a decline in full owners and a rise in both part owner and tenant operations. Importantly, after continuous decline since the 1930s, farm tenancy rose by more than 10 percent between 1974 and 1978, moving from 15.2 to 16.8 percent of all farm operators (Table 4.3). In addition, the role of non-farming landlords increased their ownership of all farm land from 43.1 to 44.8

percent during this period which, in 1978, represented 86.9 percent of the land available for rent.³

In 1978, the average full owner farm operated 289 acres; the part owner operation managed 987 acres, 57 percent rented; and the average tenant farm leased 499 acres.⁴

Consideration of Figure 4.4 provides some insight to the pool of rental lands controlled and used by farm operators. As can be seen, the smaller the farm acreage classification the greater the proportion of owned land rented to others. In addition, an indirect interpretation of the percent of land owned, less owned land rented to others, indicates the role land rented back from others plays within the farm acreage class. In example, for farms of 100 to 139 acres (see Figure 4.4), the typical 1974 farm owned just under 80 percent of the land operated within this class. Further these operators rented to others about 25 percent of their owned land. Therefore, in aggregate, this group ended up renting upwards of 45 percent of their operated average. It must be noted that this explanation represents the aggregate pool of land within the size class and not individual farms.*

Distribution of 1978 land tenure according to farm acreage is shown in Charts A, B, and C of Figure 4.5. As may be quickly seen, there is an inverse relationship between increasing size according to farm acreage and full ownership of land versus a positive relationship to part ownership of farm land. Proportions in Table 4.5 had not significantly changed from

* The 1974 distributions shown in Figure 4.4 had not significantly changed (Chi-squared test) in the 1978 census, although there was some evidence of a greater proportion of owned land rented to others for farms of 50-or-more but less-than 500 acres: no significance with 11 degrees of freedom at the 0.05 level of confidence of a larger value for land owned (Chi-square = 2.23) and land owned but rented to others (Chi-square = 16.21). There was a significantly higher rate of land owned but rented to others for farm sizes of 50 but less than 500 acres in 1978 versus 1974 (Chi-square = 15.27) for 6 degrees of freedom and 0.025 level of confidence of a larger value.

Table 4.3 Distribution of land tenure by farms and land operated, Kansas, 1974 and 1978

Item	<u>Full Owners</u>		<u>Part Owners</u>		<u>Tenants</u>	
	1974	1978	1974	1978	1974	1978
	percent					
All farms	43.8	41.2	39.8	42.0	15.2	16.8
Land operated	21.0*	19.4	65.9*	67.0	13.1*	13.6

Source: Bureau of the Census, 1974 and 1978 Census of Agriculture, Kansas, Vol. 1, Part 16. 1974: Table 28, p. 32; 1978: Table 29, p. 22.

* farms with sales of \$2,500 or more (for 1974 land only)

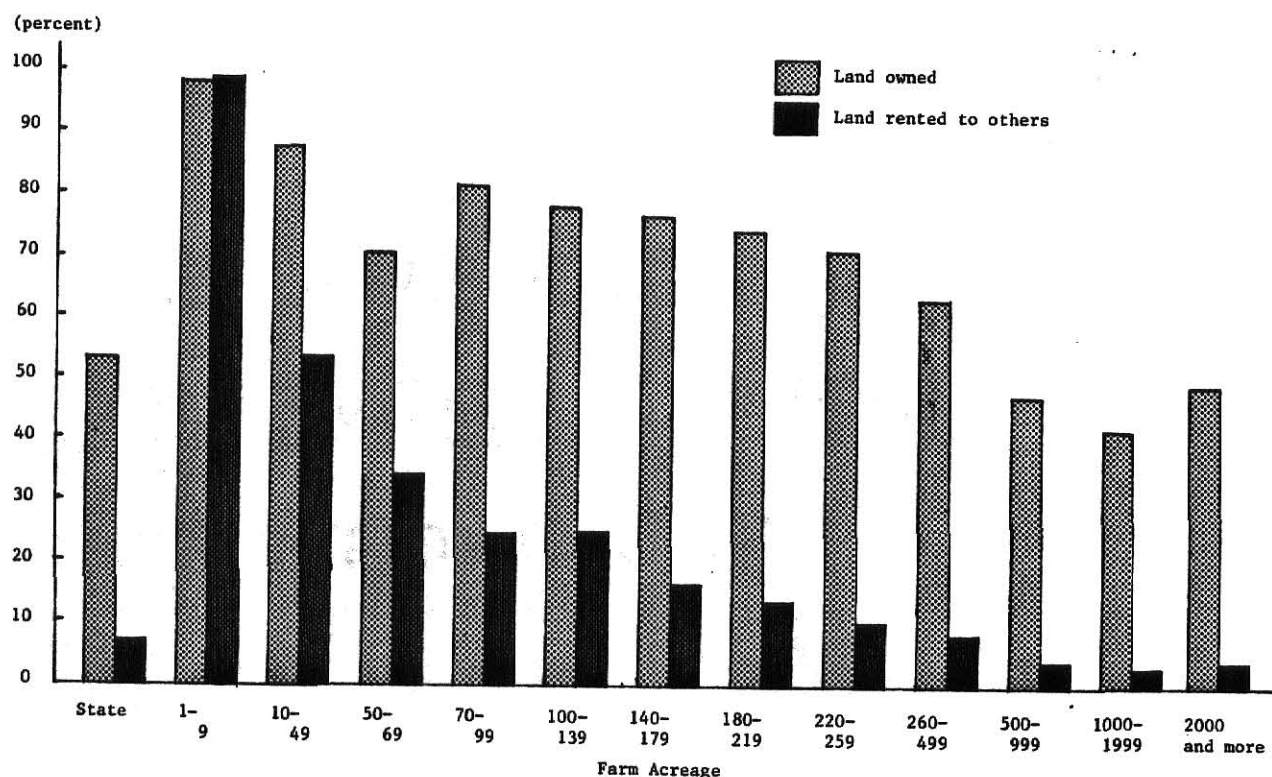


Figure 4.4 Proportion of owned farm land to owned farm land rented to others within farm acreage class, Kansas, 1974

Source: Bureau of the Census, 1974 Census of Agriculture, Kansas, Vol. 1, Part 16. Table 30, pp. 52-53.

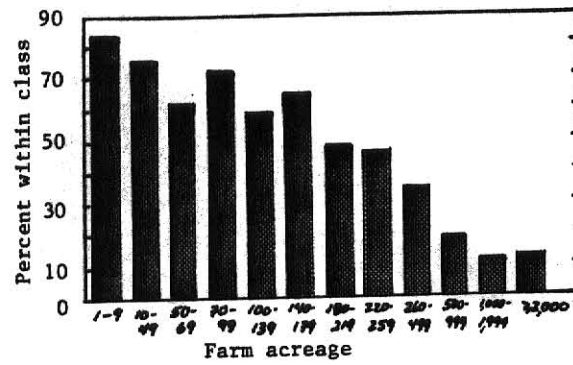


Chart A
Full owner farms

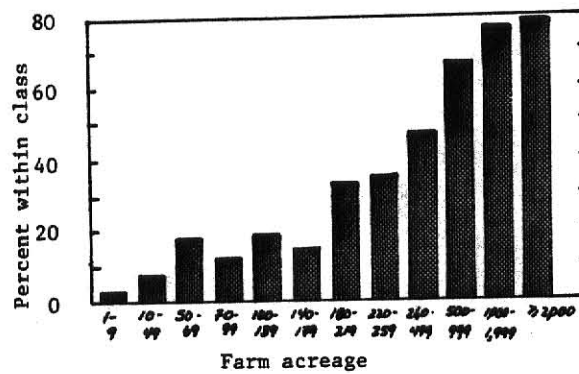


Chart B
Part owner farms

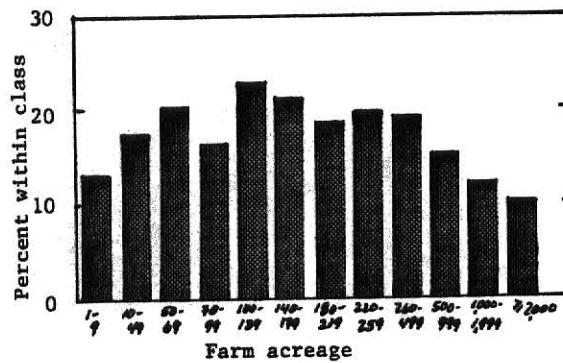


Chart C
Tenant farms

Figure 4.5 Kansas distribution of land tenure relationships according to farm acreage, 1978: Chart A, B, and C

Source: Bureau of the Census, 1978 Census of Agriculture, Kansas, Table 33, pp. 70-71.

tenure patterns found in 1974.*

Looking at tenure patterns according to another measure of farm size, gross annual sales, indicates some possibly interesting trends between 1974 and 1978 (Table 4.4).

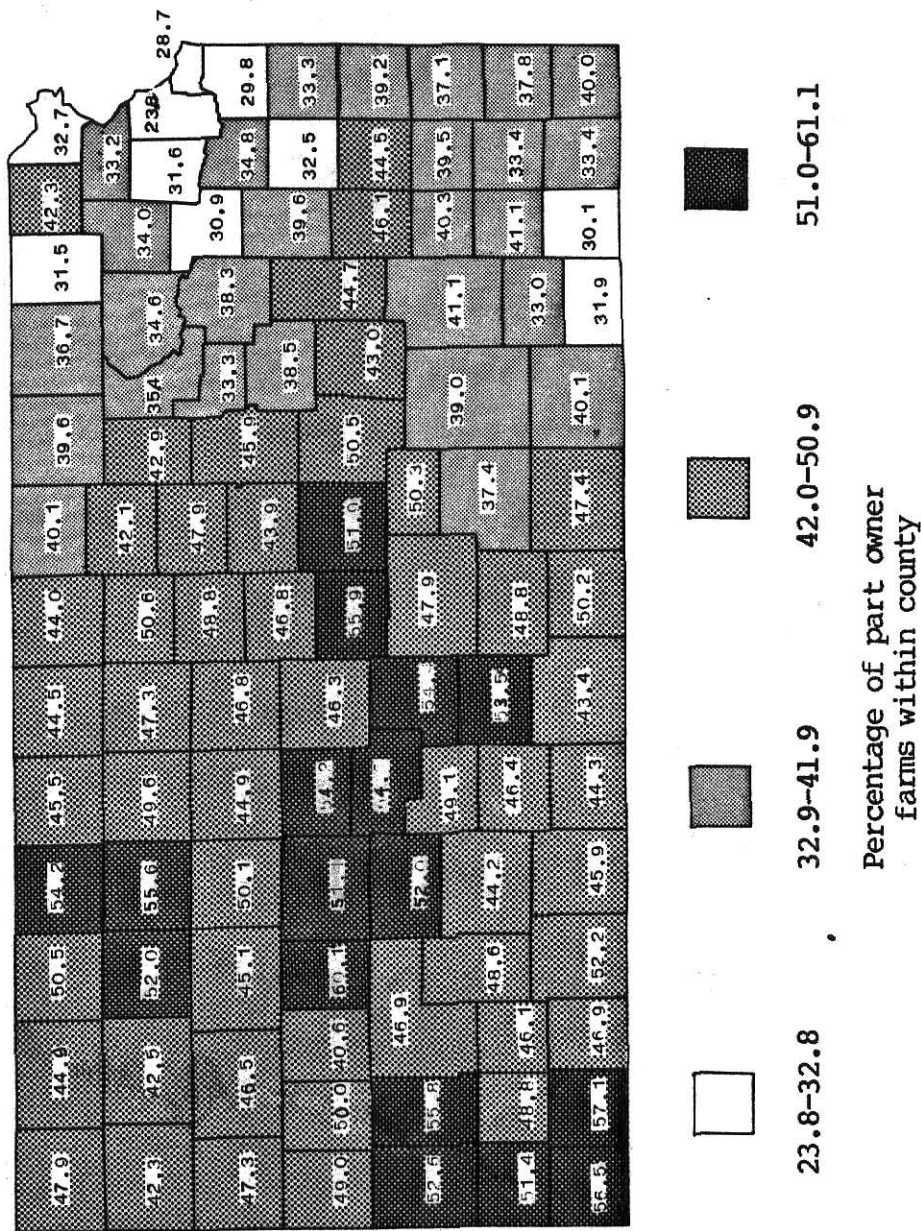
Table 4.4 Land tenure distribution for all Kansas farms by farm sales class, 1974 and 1978

Farm Sales Class	FARM TENURE					
	Full Owner		Part Owner		Tenant	
	1974	1978	1974	1978	1974	1978
	-----percent with sales class-----					
\$500,000 or more	32.3	28.5	55.8	61.3	11.9	10.3
\$200,000-499,999	12.5	15.2	76.0	74.7	11.5	10.1
\$100,000-199,000	14.6	14.2	74.6	74.3	10.7	11.5
\$ 40,000- 99,000	17.4	18.3	69.4	68.0	13.2	13.6
\$ 20,000- 39,000	27.9	27.4	55.0	55.6	17.1	17.1
\$ 10,000- 19,000	43.6	41.1	37.1	39.2	19.3	19.7
\$ 5,000- 9,999	60.2	55.9	21.9	22.4	17.9	21.7
\$ 2,500- 4,999	72.2	65.7	13.6	16.8	14.2	17.5
less than \$2,500	80.7	74.3	9.4	10.4	9.9	15.2

Source: Bureau of the Census, 1974 and 1978 Census of Agriculture, Kansas, Vol. 1, Part 16. 1974: Tables 9, p. 6 and 33, pp. 92-93; 1978: Table 34, pp. 86-87.

Most interesting is a shifting pattern of tenure in sales classes under \$20,000 towards decreasing full ownership operations apparently replaced by increases in tenant operations. As will be shown later (Section 4.2.8.2), these shifts may, in part, be explained by new entrants, mostly young farmers, 25 or less years old, moving into these sales classifications through tenancy relationships. The proportional distribution of tenant and part owner operations by Kansas county in 1978 may be seen in Maps 4.2 and

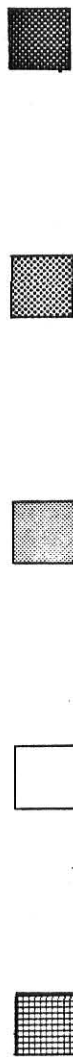
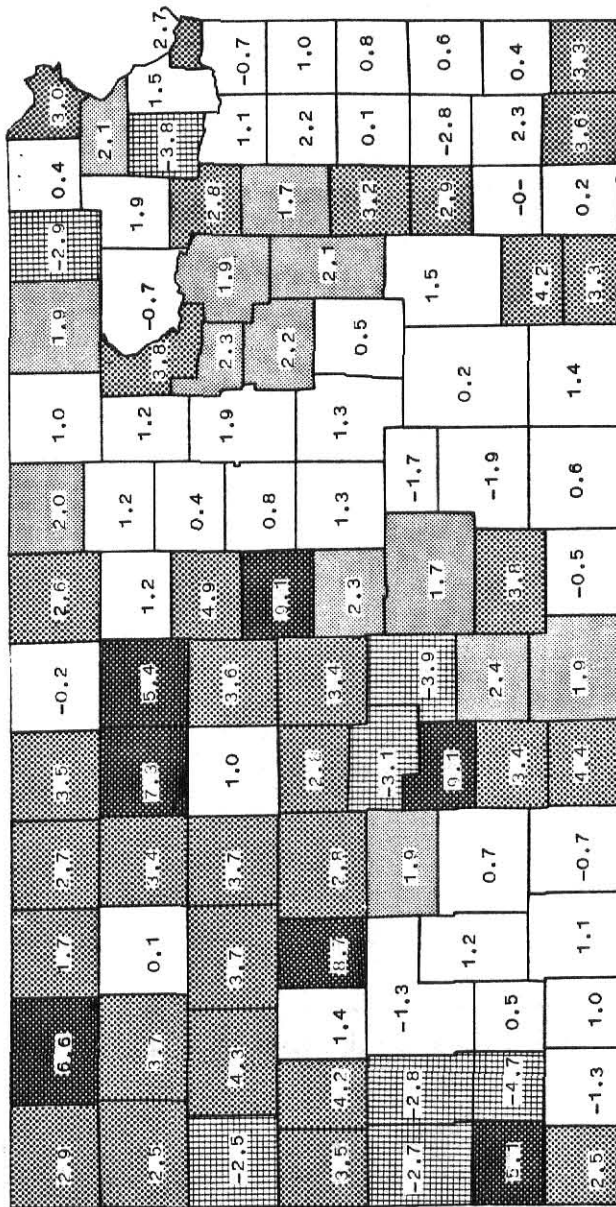
* Chi-squared test: no significant differences by acreage class for: full-owner farms ($\chi^2 = 2.47$), part-owner farms ($\chi^2 = 4.68$), and tenants ($\chi^2 = 3.20$) for 11 degrees of freedom at the 0.05 level of confidence of a larger value.



Map 4.2

Percent of all farms that were part owner operations by Kansas county, 1978

Source: Bureau of the Census, 1978 Census of Agriculture, Kansas, Vol. 1, Part 16. Table 4, pp. 124-125.



-4.7 to -2.5 -2.4 to 1.5 1.6 to 2.5 2.6 to 5.0 more than 5

Percentage difference in farm tenancy

Map 4.4

Percent change in tenant farms, 1978 versus 1974 for Kansas counties

Source: Bureau of the Census, 1974 and 1978 Census of Agriculture, Vol. 1, Part 16. 1974: Table 4, pp. II-7-8; 1978: Table 4, pp. 124-125.

4.3. Change in tenancy between 1974 and 1978, also by county, may be seen in Map 4.4.

Before leaving this section, it must be noted that in 1978 small acreage farms of less than a quarter section (180 acres) which represented only 4.7 percent of all farm land provided 14.1 percent of all farm marketings. Farms of 180 to 499 acres which represented 13.9 percent of farm land had sales amounting to 25.9 percent of all sales. Therefore, farms operating 500 acres or more which represented more than 81 percent of all Kansas farm land only had 60 percent of all sales in 1978.⁵

4.2.5 Farm family income

Family farm income is comprised of (1) net farm income resulting from the production and sale of agricultural commodities, plus (2) farm related income less associated expenses resulting from provision of farm related services, and (3) off-farm income. Kansas average farm family income in 1974 by farm sales classification may be seen in Charts A and B of Figure 4.6. As shown, in 1974 the majority of Kansas farms were at best marginal livelihoods if their operators were to depend exclusively upon net farm income.

A composite outline of the sources of income of an average farm family in the state, based on the 1974 and 1978 Census of Agriculture, is presented in this section. The 1974 Census of Agriculture provides, when compared to the Census of 1978, a more complete description of farm family income as in the 1978 enumeration. Off-farm income as well as other aspects concerning certain expenses were deleted in the 1978 census. ⁶

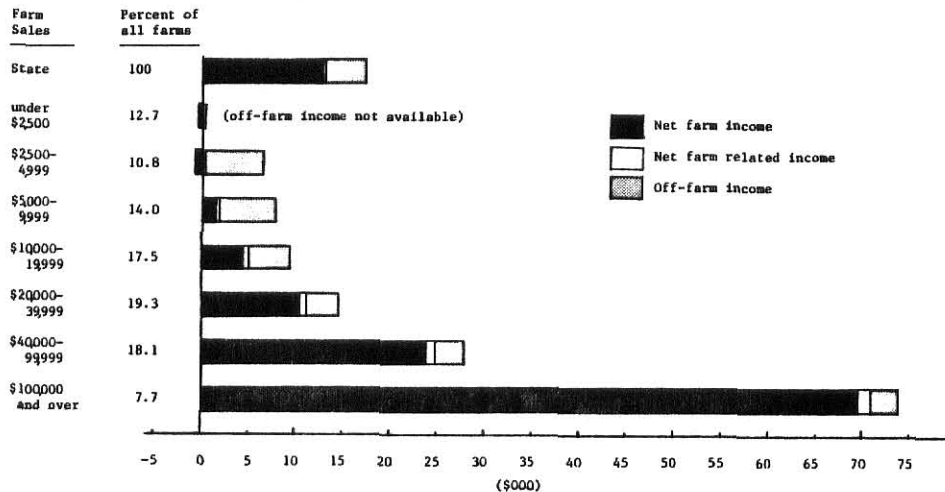


Chart A
Kansas average total farm family net income from all sources
by farm sales class for all farms, 1974

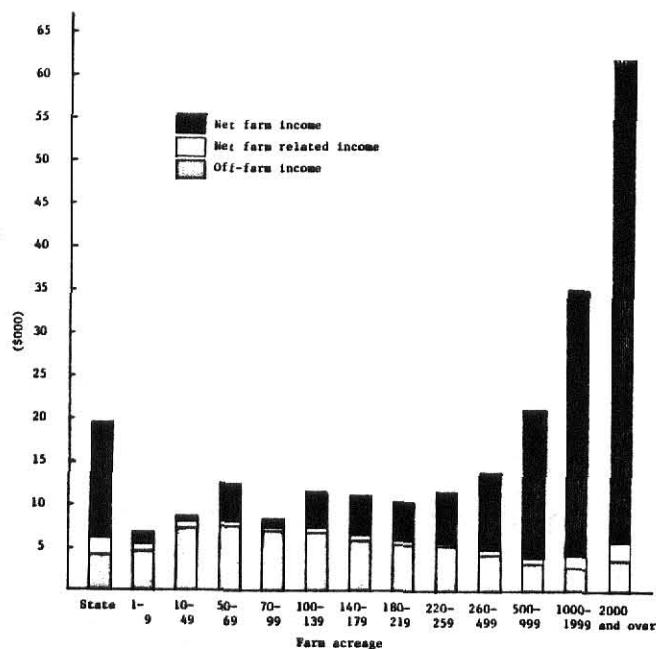


Chart B
Kansas average farm family net income from all sources for farms
with farm sales of \$2,500 or more by farm acreage class, 1974

Figure 4.6 Kansas average farm family income from all sources by size of farm sales and acreage, 1974

Source: Bureau of the Census, 1974 Census of Agriculture, Kansas, Vol. 1, Part 16. Chart A: Table 30, pp. 52-54; Chart B: Table 31, pp. 64-66.

4.2.5.1 Farm sales

The average annual per farm value of agriculture sales in Kansas during 1978 was \$64,984, an increase over the similar 1974 statistic, \$46,497, or 40 percent. Again, part of this increase may be attributed to general inflation in prices received of 9 percent between the periods as discussed in Section 4.2.1.

The proportional distribution of all Kansas farms and their production for 1974 and 1978 may be seen in Table 4.5. Looking at the relative concentration of sales, the largest five percent of farms (3,850 operations) in 1978 had sales amounting to approximately 61 percent of the State's total agricultural output. At the opposite end of the sales spectrum in the same year, farms with annual sales of less than \$20,000 represented 55 percent of all Kansas farms but produced only 6.3 percent of the total output in terms of sales.

Gini Ratios of Concentration and Indices of Inequality* for Kansas were 0.684 and 51.1 in 1969, 0.694 and 53.5 in 1974, and 0.748 and 61.1 in 1978 based on 12 sales classes.⁷ This would suggest that in relation to farm sales there is an increasing trend toward greater dominance by fewer and larger farms in the State's agriculture commodity markets. Comparison of national versus Kansas' Gini Ratio for these same years indicates that, prior to 1978, Kansas agriculture sales were generally more equally distributed than the national situation, i.e., the national Gini Ratios for 1969, 1974, and 1978 were 0.607, 0.669, and 0.758 respectively.⁸

* See Appendix A for a discussion of these indices of relative concentration. The Gini Ratio with a range of 0.0 to 1.0 indicates greater relative concentration or inequality as its values approach 1. Likewise, the Index of Inequality (range of 0 to 100) indicates greater inequality with larger values.

Table 4.5 Proportion of all farms and annual gross receipts from farm marketings by sales class, Kansas, 1974 and 1978

Sales class ¹	1978		1974	
	% of farm numbers	% of total sales	% of farm numbers	% of total sales
	percent			
\$500,000 or more	0.8	45.2	0.5	27.9
\$200,000 - 499,999	2.5	11.4	2.0	12.2
\$100,000 - 199,999	5.7	11.9	5.2	15.3
\$ 40,000 - 99,999	17.9	17.3	18.1	28.0
\$ 20,000 - 39,999	18.1	7.9	19.2	11.9
\$ 10,000 - 19,999	17.3	3.8	17.5	5.4
\$ 5,000 - 9,999	14.4	1.6	14.0	2.2
\$ 2,500 - 4,999	10.7	0.6	10.8	0.8
less than \$2,500	<u>12.6</u>	<u>0.3</u>	<u>12.7</u>	<u>0.3</u>
TOTAL	77,1292	\$5,012,183 ³	79,1552	\$3,678,610 ³

Source: Bureau of the Census, 1978 Census of Agriculture, Kansas, Vol. 1, Part 16. Table 10, p. 6.

¹ Annual gross receipts from farm marketings

² All farms (number)

³ Total farm sales (\$1,000)

Table 4.6 Standard industrial classification of Kansas farms distributed according to gross farm sales class, 1974 and 1978

Farms by Standard Industrial Classification	All Farms		Under \$2,500		\$2,500-\$4,999		\$5,000-\$9,999		\$10,000-\$19,999		\$20,000-\$39,999		\$40,000-\$99,999		\$100,000 and over	
	1974	1978	1974	1978	1974	1978	1974	1978	1974	1978	1974	1978	1974	1978	1974	1978
State Total (all farms)	79155	77129	10067	9690	8528	8227	11067	11142	13884	13355	15239	13922	14299	13827	6071	6928
	percent ²															
Cash Grain	61.41	48.11	NR	28.8	44.8	41.3	57.1	47.1	45.5	51.6	67.5	53.6	67.3	50.2	55.6	35.6
Other Field Crops	1.8	1.8	NR	8.4	3.1	4.7	2.4	2.4	2.0	1.6	1.0	1.0	0.9	1.0	2.3	1.3
Vegetable & Melon	0.1	0.1	NR	0.3	0.1	0.4	0.2	0.2	0.1	0.1	*	0.1	*	0.1	*	0.1
Fruit & Tree Nut	0.1	0.1	NR	0.9	0.1	0.2	*	0.1	0.1	0.1	*	*	0.1	*	*	--
Horticulture Spec.	0.3	0.3	NR	0.3	0.3	0.4	0.2	0.3	0.2	0.3	0.1	0.2	0.3	0.3	0.5	0.5
General, primarily crop	2.1	1.6	NR	2.6	1.3	0.5	1.6	1.4	2.3	2.1	1.8	2.1	2.4	1.6	3.6	1.2
Livestock	29.5	43.6	NR	48.9	48.4	50.3	36.4	46.7	26.5	41.2	22.7	38.8	21.9	39.2	33.9	53.4
Dairy	3.4	2.7	NR	0.2	0.5	0.2	1.1	0.6	2.4	1.3	4.9	2.6	6.4	5.8	4.0	5.9
Poultry & Egg	0.3	0.2	NR	2.2	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	1.1	1.0
Animal Specialty	0.2	0.5	NR	4.7	0.7	1.6	0.3	0.7	0.3	0.3	0.1	0.2	*	0.1	0.1	*
General, primarily livestock	0.8	1.1	NR	2.6	0.4	0.3	0.7	0.5	1.0	1.2	1.1	1.4	0.8	1.5	0.5	1.1

Source: Bureau of the Census, 1974 and 1978 Census of Agriculture, State and County Data, Kansas, Vol. 1, Part 16 (Washington, D.C.: U.S. Department of Commerce), 1974: Table 31, 1978: Table 34.

* = less than 0.05% NR = not reported -- = 0

1 percent distribution within column based on farm with sales of \$2,500 and over

2 = Percent total may not equal 100 due to rounding error.

From Table 4.6, the State's farms when distributed according to their standard industrial classifications (S.I.C), confirms similar shifts in land use within the S.I.C. classifications as previously shown in Table 4.2. Examination of the distribution by sales for cash grain versus livestock farms as found in Table 4.8 indicates that, in 1974, smaller farms were dominantly livestock operations. Further, in 1978, when the number of farms classified as S.I.C. livestock operations increased by 68 percent, farms in the larger sales classes showed the greater relative increase. This would indicate, in the Kansas case, that larger sales volume operations, whether cash grain were livestock, are more able to adapt to changing markets.

Looking in greater detail at two of the five major S.I.C. farm enterprise types in Kansas, livestock and general farms (primarily crop-based) shows that farm operations which depended upon livestock sales (Tables 4.6 and 4.8) were more concentrated in terms of sales than grain orientated or dairy operations (Table 4.7). Further, livestock operations, in addition to their greater relative concentration in sales, also control proportionally more of the State's agriculture economy in terms of overall sales; thereby increasing further their dominance as related to other farm enterprise types.

Table 4.7 Percent of farms versus percent of sales by major farm enterprise types for 1974 and 1978 and their measures of concentration in 1974, Kansas

Standard Industrial Classification	Percent of farms		Percent of sales		1974*	
	1974	1978	1974	1978	Gini Ratio	Index of Inequality
Cash grain	61.1*	48.1	46.2*	25.2	0.527	40.7
Other field crops	1.8	1.8	1.7	0.8	0.714	60.4
General, primarily grain	2.1	1.6	1.7	0.9	0.531	41.1
Livestock	29.5	43.6	45.3	68.8	0.769	66.5
Dairy	3.4	2.7	3.3	2.6	0.378	28.7
Other	2.1	2.2	1.8	1.7	NA	NA
	100.0	100.0	100.0	100.0		

Source: Bureau of the Census, 1974 and 1978 Census of Agriculture, Vol. 1, Part 16. 1974: Table 33, pp. 92-131; 1978: Table 35, pp. 102-117.

* Based on farms with sales of \$2,500 or more, 6 sales classes

NA - not available

The nature of the livestock industry which has strong economic and technical incentives for operations of larger size, as pointed out in Chapter II, in part explains the continued and increasing dominance of livestock in the Kansas agriculture economy. Interestingly, cash grain farms which in 1978 represented 50.1 percent of all Kansas farm land and more than 7 out of 10 acres of cropland also showed strong differences in technical economies of size, as related to sales, regarding yield (Figure 4.7).

The yield disadvantages associated with decreasing farm size as indicated in Charts A, B, and C of Figure 4.7 are likely numerous and interrelated. Land quality may be the most important factor as well as short-term credit use which influences variable input use such as

Table 4.8 Kansas average farm sales and variable production expenses by major sources within standard industrial farm classifications, 1974 and 1978

Average farm Income/Expense			Cash Grain		Other Field		General, primarily crop		Livestock, Except Dairy Poultry & Specialty		Dairy		All Farms	
			1974	1978	1974	1978	1974	1978	1974	1978	1974	1978	1974	1978
<u>Sales</u>		(\$)	40,073	35,907	50,885	19,361	43,926	33,897	81,368	101,017	51,546	71,763	46,497	64,968
Grain	(%)		82.8	81.9	23.7	20.7	40.6	39.6	10.7	7.3	15.8	9.8	45.1	26.7
Seed & hay	(%)		2.6	2.4	55.5	64.6	20.3	20.0	0.8	0.5	0.9	1.0	2.5	1.7
Poultry	(%)		0.1	*	*	0.1	0.5	0.2	0.1	*	0.1	0.1	0.6	0.5
Dairy	(%)		0.4	*	*	*	1.5	0.6	0.2	0.2	69.1	74.2	2.7	2.3
Cattle	(%)		12.0	13.3	5.2	3.8	28.1	32.1	78.8	83.7	12.8	13.5	42.4	61.8
Hogs	(%)		1.6	1.7	0.7	0.5	5.8	4.0	9.2	7.9	1.2	1.4	5.1	6.0
Sheep	(%)		0.2	0.2	0.2	*	0.4	1.0	0.2	0.3	0.1	0.1	0.2	0.3
Other	(%)		0.3	0.4	14.6	10.1	2.8	2.5	0.1	0.1	*	*	1.4	0.7
<u>Production Expenses</u>		(\$)	12,584	16,433	13,184	9,907	18,291	17,125	62,794	77,358	25,999	34,309	28,281	43,822
Livestock	(%)		14.7	11.8	11.4	7.7	25.0	26.6	49.8	60.0	8.1	9.0	37.7	49.6
Feed	(%)		9.2	5.4	5.2	2.7	18.2	7.8	38.4	27.3	56.8	49.2	30.6	23.8
Fertilizers	(%)		27.4	26.9	21.0	18.6	17.8	18.8	3.2	3.0	10.2	10.5	10.5	7.5
Energy & Pet.	(%)		16.8	22.8	16.3	26.1	12.4	17.5	2.6	3.6	7.9	12.6	7.0	7.4
Customwork	(%)		10.9	9.0	12.7	10.9	6.9	7.3	1.1	1.0	2.5	2.2	4.0	2.5
Other variable	(%)		31.0	24.1	33.4	34.0	19.7	22.0	4.9	5.1	12.9	16.5	10.2	9.2
<u>Net Farm Income</u>		(\$)	27,489	19,474	37,701	9,454	25,635	16,772	18,574	23,659	25,547	37,454	18,216	21,146

Source: Bureau of the Census, 1974 & 1978 Kansas Census of Agriculture, Vol. 1, Part 16 (Washington, D.C.: U.S. Department of Commerce), 1974: Table 32, 1978: Table 35.

* less than one-half unit

1 Net farm income before deducting depreciation, taxes, interest, rent and insurance.

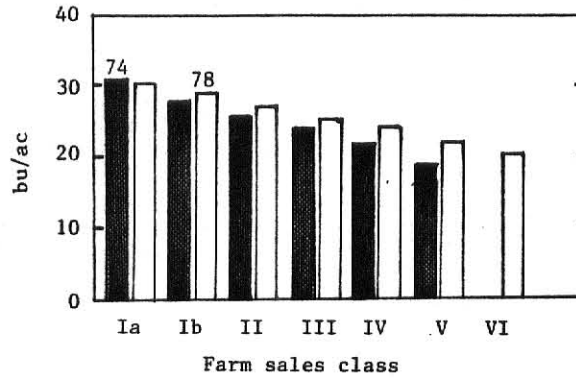


Chart A
Kansas per acre wheat yield

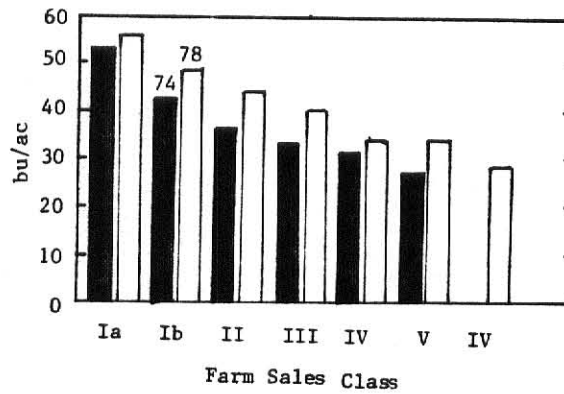


Chart B
Kansas per acre grain sorghum yield

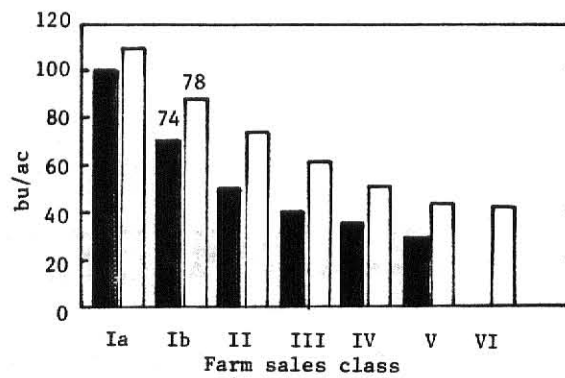


Chart C
Kansas per acre corn grain yield

Figure 4.7 Food and feed grain per acre yields for cash grain (S.I.C) farms by farm sales class, 1974 and 1978: Charts A, B, and C

Source: Bureau of the Census, 1974 and 1978 Census of Agriculture, Kansas, Vol 1, Part 16. 1974: Table 33, pp. I-74-75; 1978: Table 34, pp. 98-99.

fertilizer. Contacts with the Cooperative Extensive Service and seed dealers may also be a contributing factor. Importantly for other than short-term credit use (see Figure 4.15, Chart D), these other factors are unknown.

4.2.5.2 Farm expenses

The makeup of production related expenses by S.I.C. farm enterprise group may be seen in Table 4.8. Kansas livestock and dairy operations had the largest expense structures on an average farm basis in both 1974 and 1978. Expensewise, feeds purchased were major expense items as would be expected for these farms. Interestingly, energy and petroleum expenses, when compared in aggregate terms for the entire state, increased by approximately six percent, whereas for the individual enterprise groups energy costs shifted from a minimum of 25 percent for cash grain enterprises to as high as 37 percent for other field crop and dairy farms. Other variable production expenses as found in Table 4.8, including expenses such as animal health, planting materials, other agricultural chemicals including lime, hired farm labor, and contract labor, appear to be correlated to those cash grain operations shifting toward greater livestock marketings. This assumes those cash grain farms which were relatively more diversified as to livestock in 1974 were more likely to shift towards a livestock dominated enterprise in 1978, which pulled along an additional cost structure directly linked to livestock: increased requirements for hired labor and animal health costs.

Analysis of the relative concentration of variable expenses, excluding accounting for depreciation, taxes, rent and insurance, for all Kansas farms in 1974 and 1978, reveals that, while the larger farms in either year controlled the larger proportion of all sales, they also incurred a greater level of general expenses. Recalculating Gini Ratios for sales and expenses

due to fewer fractiles (9) in the tables used, it was found that for 1974 the overall Kansas sales ratio was 0.706 with an associated expense Gini Ratio of 0.768 indicating greater concentration of expenses versus gross income. The respective ratios for 1978 were 0.778 for sales and 0.817 for expenses.⁹

Two implications from these statistics may be drawn. First, resulting aggregate net income should not be as concentrated as the sales ratio indices would indicate as found in Table 2.16. Secondly, and more importantly, the State's aggregate agriculture economy in this short-run example may not be utilizing its resources in an efficient manner. This is to say, that the gradual structural transformation towards increased dominance by larger farms results in relatively greater average variable costs than might occur if medium and small-farms were to gain in relative proportional terms for either numbers of sales.

It must be noted that confirmation of variable cost relationships between years and derived from census data is tenuous at best (see Section 2.4). Importantly, the Gini Ratios calculated in the above example do not include important fixed expenses such as depreciation, taxes, rent and insurance. In relation to these items, the 1978 Census of Agriculture notes "because of the burden to the respondents and inaccuracy in reporting (these) All other production expenses no inquiry was made" in the 1978 report form.¹⁰ While these expenses were collected in 1974, they have not been included in this Chapter's tables other than in calculating the values used in Figures 4.6 and 4.7.

"All other production expenses" were collected in 1974 and heavily weighted total production expense values. If the fixed cost estimates were included in Table 4.10, they would have represented, according to sales class (see page 16 for definitions), the following "total expense"

proportions on a per farm basis: Ia = 17.9%, Ib = 38.7%, II = 41.3%, III = 41.2%, IV = 39.3%, V = 39.5%, and VI = 31.9%. Recalculating the 1974 production expense, including the fixed costs estimates, drops the expense Gini Ratio from 0.768 to 0.720 which remains still above the 1974 sales Ratio of 0.706.

To further understand the role of the fixed expenses as represented in "other production expenses", disaggregation by major S.I.C farm enterprise groups for 1974 is presented in Table 4.9. As may be seen, when the fixed expenses are withdrawn, the resulting Gini Ratios, more reflective of the variable cost structure of the enterprise group, increases. Again, there appears to be more questions associated with cost structures for operations depending more heavily upon livestock sales. Such would imply that State cost structures in 1978 would have been generally more concentrated versus the 1974 situation due to the shift of farm operators towards greater dependence on livestock sales.

Table 4.9 Gini Ratios of concentration for variable versus all production expenses by major S.I.C. farm enterprise groups, 1974

Standard Industrial Classification	1974 Gini Ratio of Concentration		
	Sales	Production Expenses Variable*	All
Cash grain	0.527	0.514	0.502
Other field crops	0.714	0.648	0.659
General, primarily crop	0.531	0.557	0.525
Livestock	0.769	0.796	0.768
Dairy	0.378	0.375	0.363

Source: Bureau of Census, 1974 Census of Agriculture, Kansas, Vol. 1, Part 16. Table 33, pp. 92-131.

* All production expenses less "other production expenses" (depreciation, taxes, interest, rent, and insurance).

The conclusions drawn from Table 4.9 would indicate that variable

expense structures for different enterprise groups are generally more concentrated when compared to all expenses which include fixed costs. This implies that fixed costs were increasingly lower on a per unit basis for larger farms, except where livestock, excluding dairy and poultry operations, are included.

4.2.5.3 Net farm income

Net farm income in Kansas has fluctuated widely over the eleven years from 1967 to 1978 (Figure 4.9). From a peak in 1973, net income for Kansas farm operators plunged from \$1.4 billion to \$0.53 billion in 1977. In real terms (CPI, 1967 = 100), Kansas farmers in 1978 were able to generate only 101.1% percent of their 1967 purchasing power with their farming efforts; the lack of real growth in their purchasing power being the combined effects of lower yields in some crops plus lower product prices for grains in general (see Figure 4.3) and increasing production costs (Table 4.10).

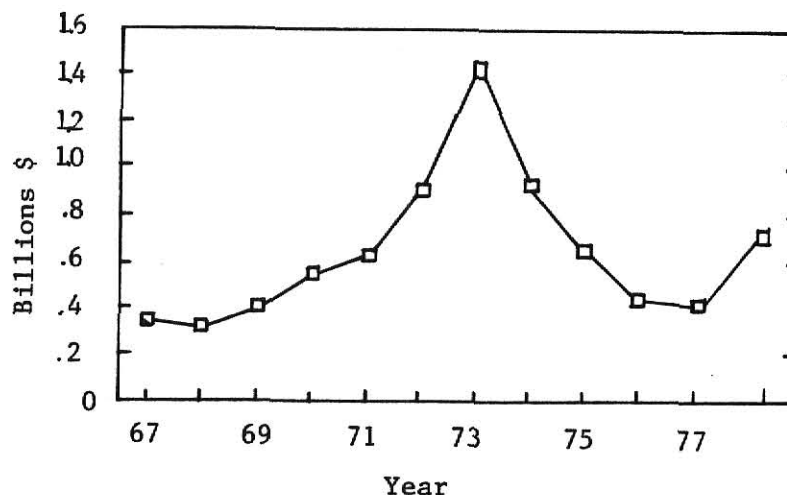


Figure 4.8 Kansas net farm income, 1967-1978

Source: Kansas State Board of Agriculture, 62nd Annual Report and Farm Facts (Topeka, Kansas, 1978), p. 233.

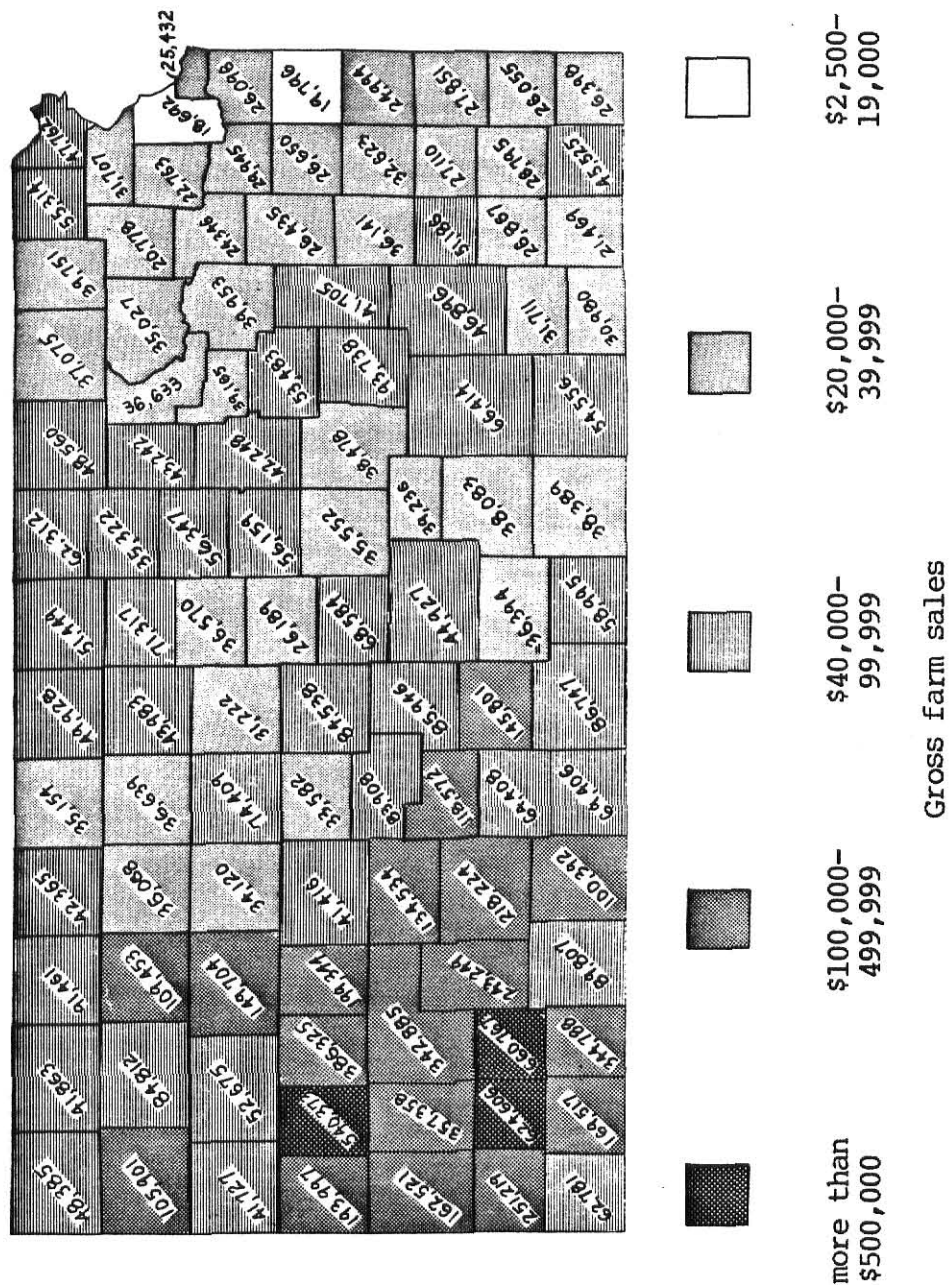
Net per farm income in 1974 and 1978 before deducting fixed costs, is presented in Table 4.10. As may be seen, 1978 was a tough year for those farms with gross farm sales of less than \$100,000. For the 55 percent of Kansas operators in 1978 whose per farm sales were less than \$20,000, they were marginally, if at all, better in average gross sales terms. Any increase in sales for the small-farm business group were more than offset by increased production expenses, thereby giving them lower net farm incomes in 1978 versus 1974. The case was similar for larger sales classes except for the largest farms, which were able to manifest almost an 8 percent increase in their farms' net income despite the poor conditions.

Just how the picture would change if fixed expenses were included in Table 4.9 is not clear. These costs represented an addition of 35-40 percent in total expenses and with their inclusion, certainly few farms would have made acceptable profits from their farm operations. Consideration of Table 4.9 in light of the previous discussion of Kansas agriculture during this five year period further indicates the importance of having livestock as part of the farming enterprise.

Map 4.5 provides the average per farm gross income for the different Kansas counties in 1978. Comparison of Map 4.5 to Map 4.6, county net value of agricultural products sold before deducting fixed production costs, provides another measure of the State's regional per capita concentration of agricultural income.

4.2.5.4 Other family income

Increasingly, farm operators have turned to other sources of income with which to supplement their family's standard of living. In Kansas, 67.2 percent of all farm operators reported having some off-farm income during 1974 with 33.7 percent of this group reporting off-farm income



Map 4.5

Average gross farm sales by Kansas county, 1978

Source: Bureau of the Census, 1978 Census of Agriculture, Kansas, Vol. 1, Part 16. Table 11, pp. 134-135.

greater than the value of all farm products sold from their farm.¹¹ As seen previously in Charts A and B of Figure 4.6, off-farm employment represented more than 50 percent of the farm family's average total income for the smaller farm sales and acreage classes.

Off-farm employment during the 1970's has increased. In 1974, 26.2 percent of all farmers felt their farm operation were not their major occupation. By 1978 this group had increased to 35 percent of all operators, or a one-third increase. The increasing reliance on other sources of farm family income, i.e. farm related and off-farm, allowed marginal producers new rural opportunity without abandonment of their farmstead.

4.2.5.4.1 Farm related income

In addition to net farm income, 29.2 percent of all farms in Kansas reported farm related income in 1974. The various sources of this income (not related to farm production) may be seen in Table 4.11. The 1978 census provided only a partial listing of farm related income as reported in 1974, i.e., for customwork farm services and a new account, direct farm marketings. Although the two years cannot be directly compared, some useful information can be gleaned through a composite of information from both census years.

In 1974, payments received from all government farm programs averaged \$1,267 per farm for the 10.6 percent of all farms participating. The Gini Ratio for participant payments in that year was 0.213. In 1978, some additional details were provided disaggregating this account according to federal Credit Commodity Corporation (CCC) loans and federal land set-aside programs.

CCC loans in 1978 were made to 28.8 percent of all farms reporting

Table 4.11 Average farm-related and off-farm income for farms reporting these income sources by gross farm sales class, Kansas, 1974

ITEM	Gross Farm Sales Class							
	under \$2,500	\$2,500-4,999	\$5,000-9,999	\$10,000-19,999	\$20,000-39,999	\$40,000-99,999	\$100,000 and over	
<u>Farm Related</u>	(\$)	1,560	2,210	2,134	2,452	2,797	3,500	6,835
Custom work	(%)	25.2	28.1	37.7	42.0	53.8	52.7	44.6
Rec. services	(%)	1.2	1.0	1.4	0.4	0.3	0.3	0.3
Govn. farm program	(%)	7.5	12.5	15.0	17.2	17.4	15.7	14.3
Rent: farm land	(%)	60.9	52.1	41.4	34.1	22.3	24.9	27.9
Other	(%)	4.3	6.3	6.1	6.2	6.3	6.4	12.9
Less: expenses	(\$)	1,226	2,138	1,749	2,268	2,276	2,556	4,641
Net farm related	(\$)	334	72	385	184	521	952	2,194
<u>Family Off-Farm</u>	(\$)	NR	10,079	8,880	7,972	6,402	5,755	7,702
Non-farm related	(%)	NR	17.9	15.0	20.0	20.3	21.2	22.1
Wages, salaries, tips, commissions	(%)	NR	67.5	67.6	59.5	55.2	46.7	39.1
Interest, dividends	(%)	NR	6.0	7.1	10.6	15.4	23.7	32.3
royalties	(%)	NR	6.9	8.3	7.7	6.8	5.5	3.1
Fed S.S. & pension	(%)	NR	1.7	2.0	7.2	2.3	2.8	3.5
Rent: non-farm	(%)	NR						

Source: Bureau of the Census, 1974 Census of Agriculture, State and County Data, Kansas, Vol. 1, Part 16 (Washington, D.C.: U.S. Department of Commerce), Table 31.

NR = not reported

grain production which, on a per-participant farm basis, amounted to \$28,348. The Gini Ratio for the 1978 CCC program was 0.520. Another program, land set-aside, was participated in by 46.1 percent of all farms, 61 acres per farm, with the total acreage placed in fallow or pasture amounting to 4.5 percent of all Kansas farm land. The Gini Ratio for this program was 0.338 (farm numbers vs. participating acres).

Income from custom work and other agricultural services was reported in both years. In 1974, the Gini Ratio for this income source was 0.146 and 0.222 in 1978. Interpretation of these relative concentration measures between the years should not be strictly compared.¹²

Direct farm-consumer marketing information was collected in 1978 only. Direct sales to consumers were carried out by only 3.2 percent of Kansas farms totaling \$4.3 million or approximately \$2,700 per direct retailer. The Gini Ratio for these retailers versus their sales was 0.326.¹³

Farm related income while only a small proportion of the State's aggregate farm family income had some unique characteristics during the 1970's. Custom work for hire had a relatively low index of concentration although the larger the farm the greater its activity in custom services in general. This may indicate over-capitalization on larger farms and a possibly growing farm service sector.

Participation in government programs in 1974 aggregate terms had a low index of benefit concentration. When these programs were disaggregated in 1978, the CCC price support programs for the state indicated a low level of general participation for which its benefits were unequally distributed; larger farms receiving a greater proportion of benefits. Conversely, land set-aside, another form of indirect price support, i.e. preventive versus prescriptive, was participated in more widely with a lower degree of benefit concentration.

Income from rental of farm land was inversely related to farm size on a proportional basis. This was expected based on interpretation of Figure 4.4. Direct farm to consumer marketing can provide additional profits to the farmer, but such efforts also require commensurate investment in road-side facilities as well as in crops or products of interest to consumers.

4.2.5.4.2 Off-farm income

Figure 4.9 graphically illustrates relationships in 1974 for farms with sales of \$2,500 and more concerning farm sales versus farm numbers as well as how off-farm employment was used to supplement farm-derived income. As may be seen, the smaller sales classes accounted for a larger proportion of the total reported off-farm income, a relationship opposite to their proportion of the State's total farm sales. Viewing this and referring to Table 4.11, a composite understanding of off-farm income and its different sources may be gained.

From Table 4.11 some interesting relationships which correlate to farm size in terms of sales may be examined. As noted in the previous section, rental of farm land is an important source of income for the small-farm operator. Also noticable is the behavior of wages versus interest income. Small farms depended upon wages and salaries to a greater extent than larger farms, whereas larger farms have been able to invest in non-farm related interest bearing assets.

It should be noted that for both farm related and off-farm income in Table 4.11, these sources of income are distributed according to the totals within the sales class, therefore, representing aggregate proportions.

As may be seen in Figure 4.10, of the 37.4 percent of all farm operators in 1974 and 49.9 percent in 1978 reporting any work off-farm (an

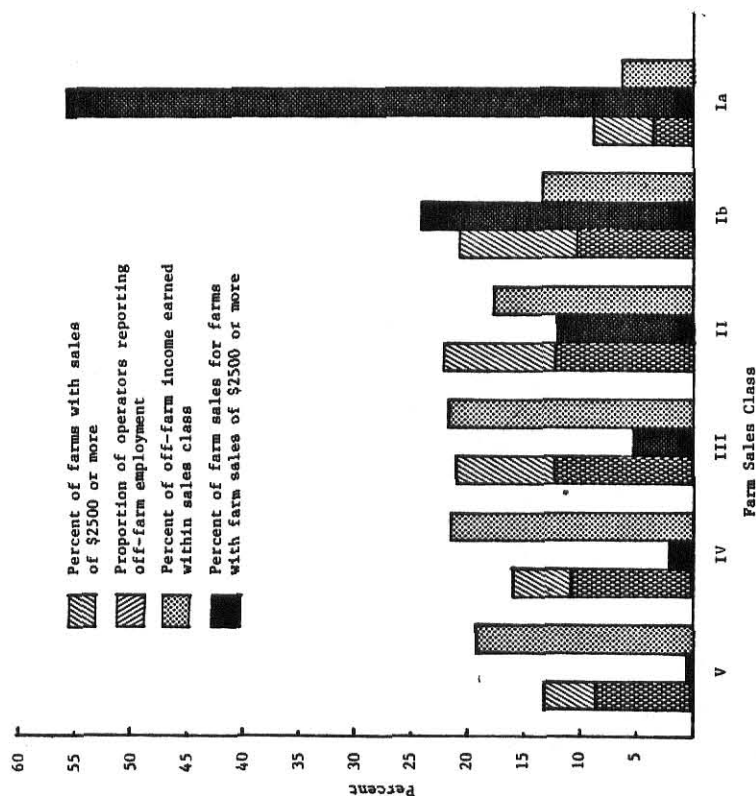


Figure 4.9

Comparison of proportional distribution of farms with sales of \$2,500 or more for farm numbers, gross farm sales, and reported off-farm income by farm sales class, Kansas, 1974

Source: Bureau of the Census, 1974 Census of Agriculture, Kansas, Vol. 1, Part 16. Table 31, pp. I-68-75.

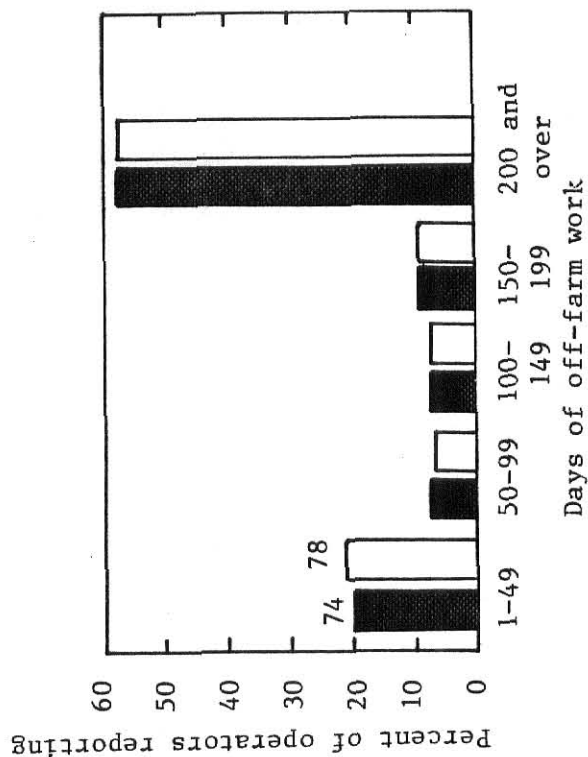


Figure 4.10

Proportional distribution of farm operators reporting any days of off-farm work, Kansas, 1974 and 1978

Source: Bureau of the Census, 1978 Census of Agriculture, Kansas, Vol. 1, Part 16. Table 4, p. 3.

increase of 32 percent), there was no significant change in the distribution of these operators according to days worked off-farm. Importantly, operators working more than 200 days off-farm or part-time farmers, represented the large majority, more than one in two, of off-farm workers. Additional details concerning the distribution of these part-time farmers in 1974 may be seen in Figure 4.12 according to the acreage of these farms.

Farm operators falling into the part-time operator classification are strongly related to operators reporting an occupation other than farming. Correlation coefficients calculated using the 105 Kansas counties for their respective 200-or-more-days of work off-farm and occupation other-than-farming operators were 0.94 in 1974 and 0.96 in 1978 (Table 4.12).

Table 4.12 Off-farm work of 200-or-more days versus non-farm occupation farm operators, all farms by Kansas counties, 1974 and 1978

	Work of 200 days or more off-farm		Non-farm occupation	
	1974	1978	1974	1978
Mean (operators/county)	158.8	197.1	197.3	238.1
Standard deviation	126.2	142.3	152.6	166.2
Coefficient of variation	79.5	72.2	77.3	69.8
n (counties)	105.0	105.0	105.0	105.0

Sources: Bureau of the Census, 1974 and 1978 Census of Agriculture, Kansas, Vol. 1, Part 16. 1974: Table 5, p. II-8-9; 1978: Table 6, pp. 126-7.

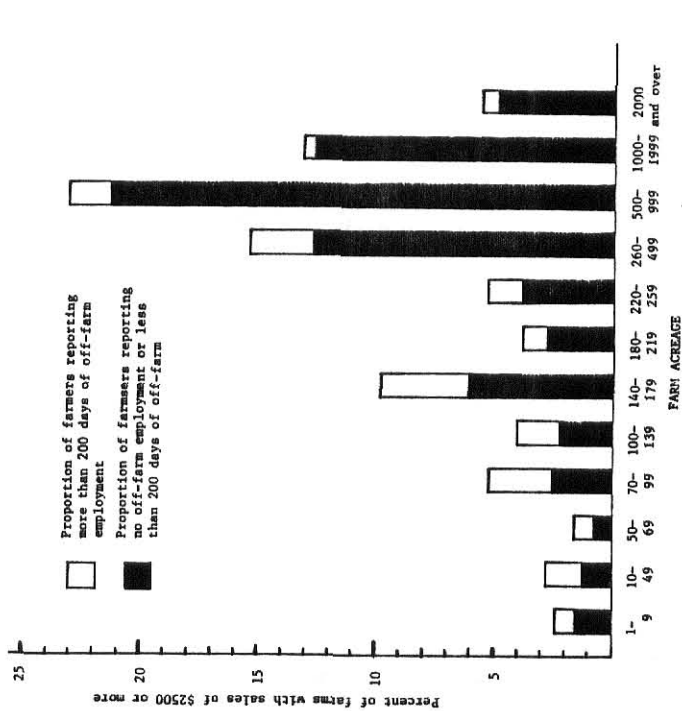


Figure 4.11

Proportional distribution of farms with farm sales of \$2,500 or more and the proportion of those operators considered as part-time farmers (days of off-farm work of 200 or more days per year) by farm acreage class, Kansas, 1974

Source: Bureau of the Census, 1974 Census of Agriculture, Kansas, Vol. 1, Part 16, Table 30, pp. I-52-63.

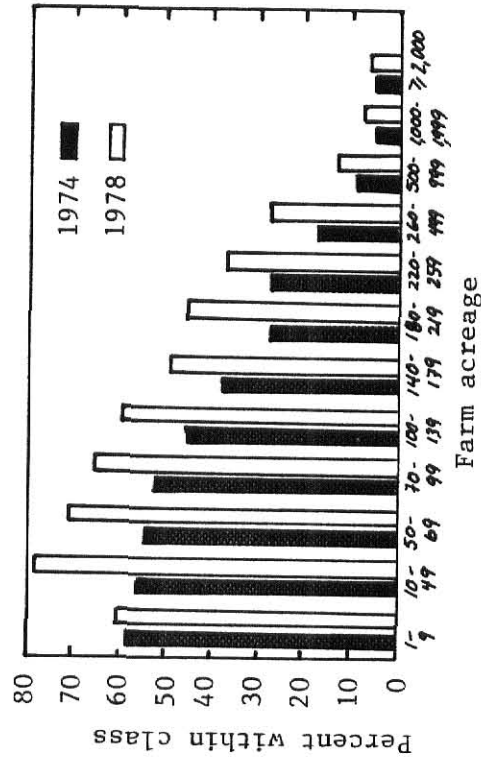


Figure 4.12

Proportional of farm operators reporting a non-farm occupation by farm acreage class, Kansas, 1974 and 1978

Source: Bureau of the Census, 1974 and 1978 Census of Agriculture, Kansas, Vol. 1, Part 16, Table 30, pp. I-52-63; Table 33, pp. 72-73.

Although the mean of the two measures of attachment to the farming occupation (Table 4.12) in 1974 were significantly different (two-tailed) in 1974 ($Z = 1.99$), they were not in 1978 ($Z = 1.92$) at the 0.05 confidence level. When testing if the state-wide county mean for non-farming operators and work off-farm of 200-or-more days was the greater between the two years (one tail: e.g., 1978 > 1974), these tests also proved true at the same level of confidence. Results of this second test would imply an increasing trend toward non-farming occupation farm operators, of which about four out of five were working off-farm at least 200 days per year.

A more detailed look at the proportion of farm numbers by their acreage size reveals that for small acreage farms of under 180 acres, more than one-out-of-three operators reported a non-farming occupation in 1974. This increased to more than two-out-of-three by 1978. Considering this trend (Figures 4.12 and 4.13) in combination with Chart B of Figure 4.6, the following may be concluded. For farm acreages of 180 acres and less, the majority consider their farming efforts as a part-time endeavor. These operators depend upon off-farm income to reduce the uncertainty of income associated with agriculture in general as well as to supplement the total family income.

It would be expected that small-farms (farm sales under \$20,000), due to their limited capacity to provide sufficient income to their farm families, would consider farming as a secondary source of income. Testing this relationship against eleven S.I.C. farm enterprise characterizations*, the following relationships were found in 1974 and 1978 (Figure 4.13).

* See Table 4.15 for a list of these S.I.C. (Standard Industrial Classifications) enterprise groups.

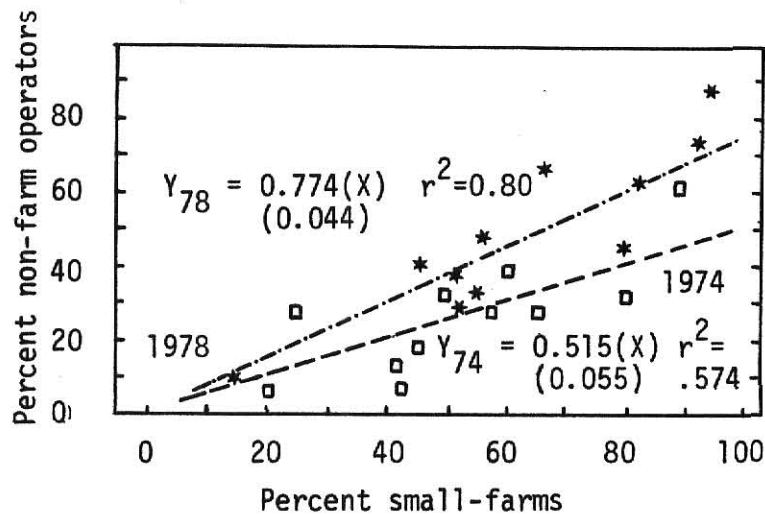


Figure 4.13 Scatter diagram of the relationship between the proportion of small-farms (farm sales under \$20,000) and the proportion of operators reporting a non-farming occupation for 11 S.I.C. farm enterprise types, 1974 and 1978.

Source: Bureau of the Census, 1974 and 1978 Census of Agriculture, Vol. 1, Part 16. 1974: Table 32, pp. I-78-79; 1978: Table 35, pp. 105-109.

As shown in Figure 4.13, the proportion of non-farming operators had a close and positive relation to the enterprise group's small farm proportion (correlation coefficients $n=11$ for 1974 and 1978 were 0.761 and 0.899 respectively).

Conclusions concerning the role of off-farm income in Kansas during the 1970s would indicate off-farm employment is an increasingly important source of income for the farm family. Or conversely, rural residents increasingly are turning to farming as an added source of family income. Further, about one in two farmers in 1978, an increase over one-in-three in 1974, had an off-farm job with one out-of-three regarding these jobs as their major occupation. These facts would indicate that rural employment opportunities had significantly increased during the 1970's although the types of jobs and their related characteristics are unknown.

4.2.6 Farm assets

Farm assets are generally valued at their market value and are made up of fixed assets such as land, buildings, equipment, and other physical improvements, as well as year-end or current inventories of such things as livestock, grains and feeds, and chemicals. The Census of Agriculture provides a good measure of physical assets such as land, buildings and equipment. It also provides some measure of inventories although interpretation of the value of these items, other than at the county level, was not possible as breakdowns relevant to the various total State size classifications were not made in either census year.

Table 4.13 breaks down the combined value of land and buildings as well as the value of equipment and machineries according to per-farm and per-acre values. As may be seen, the smaller the farm in terms of sales, the greater its per acre value for these combined assets.

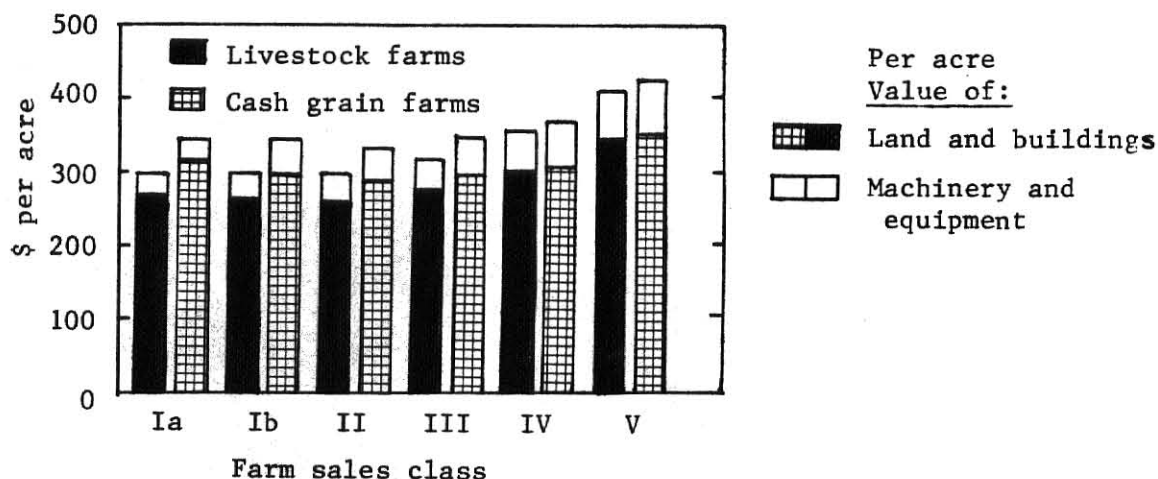


Figure 4.14 Comparison of the total per-farm value of land, buildings, and equipment for cash grain versus livestock S.I.C. farm enterprise type by farm sales class, farms with sales of \$2,500 or more, 1974.

Source: Bureau of the Census, 1974 Census of Agriculture, Kansas, Vol. 1, Part 16. Table 31, pp. I-92; I-124.

Table 4.13 Average per farm and per acre value of land , buildings, machinery and equipment by farm sales class, Kansas, 1974 and 1978

Farm Sales Class	Value of Land and Buildings		Estimated Value of Machinery		Total Value of Land, Buildings, and Equipment	
	1974	1978	1974	1978	1974	1978
<hr/>						
	<hr/> dollars <hr/>					
<u>\$100,000 and more</u>						
per farm (000)	650	1,060	80	135	730	1,195
per acre	298	494	37	63	335	557
<u>\$ 40,000 - \$99,999</u>						
per farm (000)	307	516	44	67	351	873
per acre	293	474	47	63	340	547
<u>\$ 20,000 - \$39,999</u>						
per farm (000)	177	819	28	41	205	360
per acre	282	490	44	64	326	554
<u>\$ 10,000 - \$19,999</u>						
per farm (000)	108	186	20	25	128	211
per acre	290	495	48	68	338	563
<u>\$ 5,000 - \$ 9,999</u>						
per farm (000)	70	115	15	17	85	132
per acre	304	556	52	80	356	636
<u>\$ 2,500 - \$ 4,999</u>						
per farm (000)	56	80	12	15	68	95
per acre	330	589	85	110	415	699
<u>Under \$2,500</u>						
per farm (000)	39	68	9	8	48	77
per acre	429	916	102	104	531	1020

Source: Bureau of the Census, 1974 and 1978 Census of Agriculture, State and County Data, Vol. 1, Part 16 (Washington, D.C.: U.S. Department of Commerce), 1974: Table I-31, 1978: Table 34.

Noteable, the smallest farms were capitalized at a level almost twice that of the largest farms, placing their annual depreciation schedules on a per-acre value significantly higher.

Disaggregating 1974 data according to cash grain versus livestock S.I.C. enterprise farm type may be seen in Figure 4.15. As depicted, the per-acre cost structure for land and buildings, and equipment and machineries places cash grain farms significantly more valuable versus livestock operations at the 0.05 level for both asset groups (paired t - land and buildings: 3.77; equipment: 3.38, df = 5).

An estimate of the return on assets by sales class for net income before including fixed costs as calculated from Table 4.10 may be seen in Table 4.14. The annual return on assets, land, buildings and equipment, was on average greater in 1974 versus 1978. Also notable is the effect the generally lower per dollar of sales investment in these assets has upon estimated annual returns on capital.

Table 4.14 Annual return on assets before deducting fixed costs (Table 4.10), Kansas, 1974 and 1978

Farm Sales	Per Farm Estimated Return on Assets before deducting fixed costs	
	1974	1978
	-----percent-----	
\$100,000 and over	16.2	10.7
\$40,000 - 99,999	11.0	5.3
\$20,000 - 39,999	8.9	3.9
\$10,000 - 19,999	7.6	3.2
\$ 5,000 - 9,999	4.5	2.2
\$ 2,500 - 4,999	13.0	1.1
under \$2,500	6.0	-0.3

Source: calculated from Tables 4.10 and 4.13.

4.2.7 Farm debt

Farm debt information was not collected in the 1978 census. In 1974, this information was collected and revealed that 41.1 percent of the State's farms with farm sales of \$2,500 or more, used some form of credit. The average outstanding total loan made to these reporting farms was \$47,172; 59 percent being of a long-term nature secured by land with the balance, 41 percent, being generally short-term production credit but excluding CCC Commodity program loans.¹⁵ More than seven-out-of-ten farms using credit had debts secured by their land; similarly, two of every three operators used short-term credit not secured by real estate.¹⁶

Figure 4.16 provides a series of 1974 charts which disaggregate either type of debt for cash grain and livestock farms (S.I.C.) which represented 49.7 and 40.4 percent respectively of all farm credit used. As may be seen in Chart A and B, livestock operations generally used credit in a greater proportion and amount versus cash grain farms across all farm sales classes. Further, the proportion of farms using credit within the sales classes reveals a positive relation, e.g. greater use, with larger farm sales.

As may be seen in Charts C and D of the same figure, smaller farms using long-term debt were greater in proportion as compared to larger farms. The reverse was true for production or short-term credit. In addition, there is some difference between cash grain versus livestock operations regarding long and short-term credit use. The larger cash grain farms relied to a greater extent on long-term debt thereby capturing land appreciation. Large livestock operations, on the other hand, make greater use of short-term credit to finance their operations.

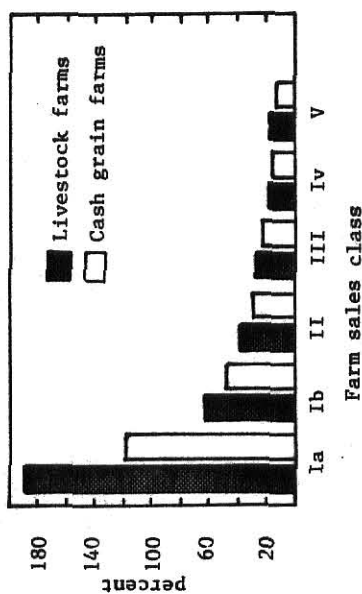


Chart A

Per farm credit use by farm sales

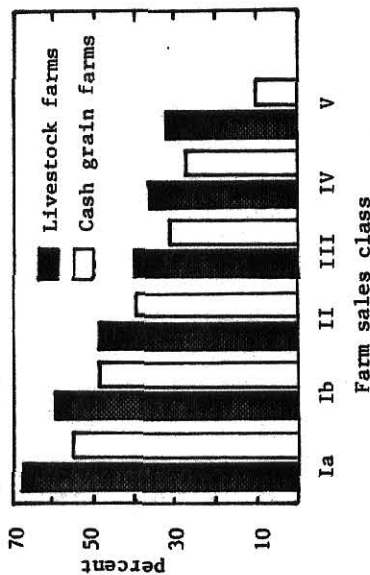


Chart B

Proportion of farms reporting use of any credit by farm sales class

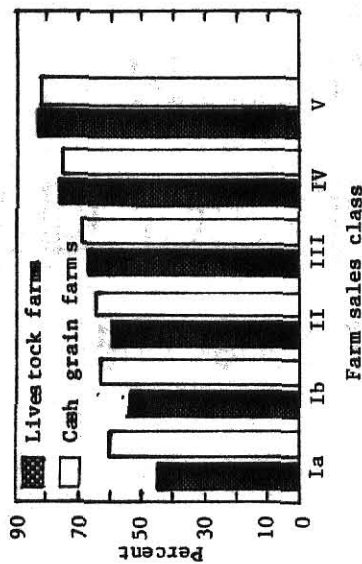


Chart C

Percent of all credit secured by land (long term credit)

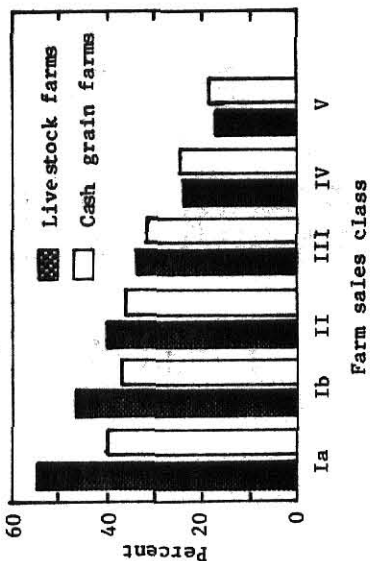


Chart D

Percent of all credit secured by non-real estate assets (short term credit)

Figure 4.15 Long and short term credit use for cash grain and livestock S.I.C. enterprise type for farms with sales of \$2,500 or more, Kansas, 1974

Source: Bureau of the Census, 1974 Census of Agriculture, Kansas, Vol. 1, Part 16. Table 31, pp. I-68-75.

4.2.8 Other aspects

4.2.8.1 State distribution of large, medium and small farms

Table 4.15 provides a breakdown according to small, medium and large farms by S.I.C. farm enterprise type in 1978. As may be seen, cash grain and livestock farms represented collectively 89 percent of all small farms (gross sales under \$20,0000), 90.7 percent of all medium farms (sales of \$20,000 to \$99,999), and 89 percent of all large farms (sales of \$100,000 or more). Livestock farms had a greater proportion in the large farm category versus grain farms which were more strongly dominated by small and medium-sized operations. The other nine farm enterprise types listed in Table 4.15 were dominantly represented by a large proportion of small farms.

In Map 4.7 the distribution of small, medium and large farms within each Kansas county for both 1974 and 1978 may be seen. Map 4.8 indicates counties showing significant changes between these years (Chi-squared test). Small farms dominated the east and southeastern counties of the State whereas large farms dominated the west and southwest portion of the State. A pattern for medium-size farms was not readily apparent.

4.2.8.2 Age of farmers

By 1978, 65.8 percent of all farm operators were 45 years of age or older, down from 70.0 percent in 1974 (Table 4.16). Young farmers aged 25 and younger, while representing less than five percent of all operators in either year, showed a relative increase of more than 36 percent between 1974 and 1978. Medium-size farms had the showed the greatest loss of farms during this period for operators in the 45 to 65 year age range. Importantly, for young new entrants aged less than 45 years, the small farm sales classes were important ways of entering the farm sector (Table 4.16).

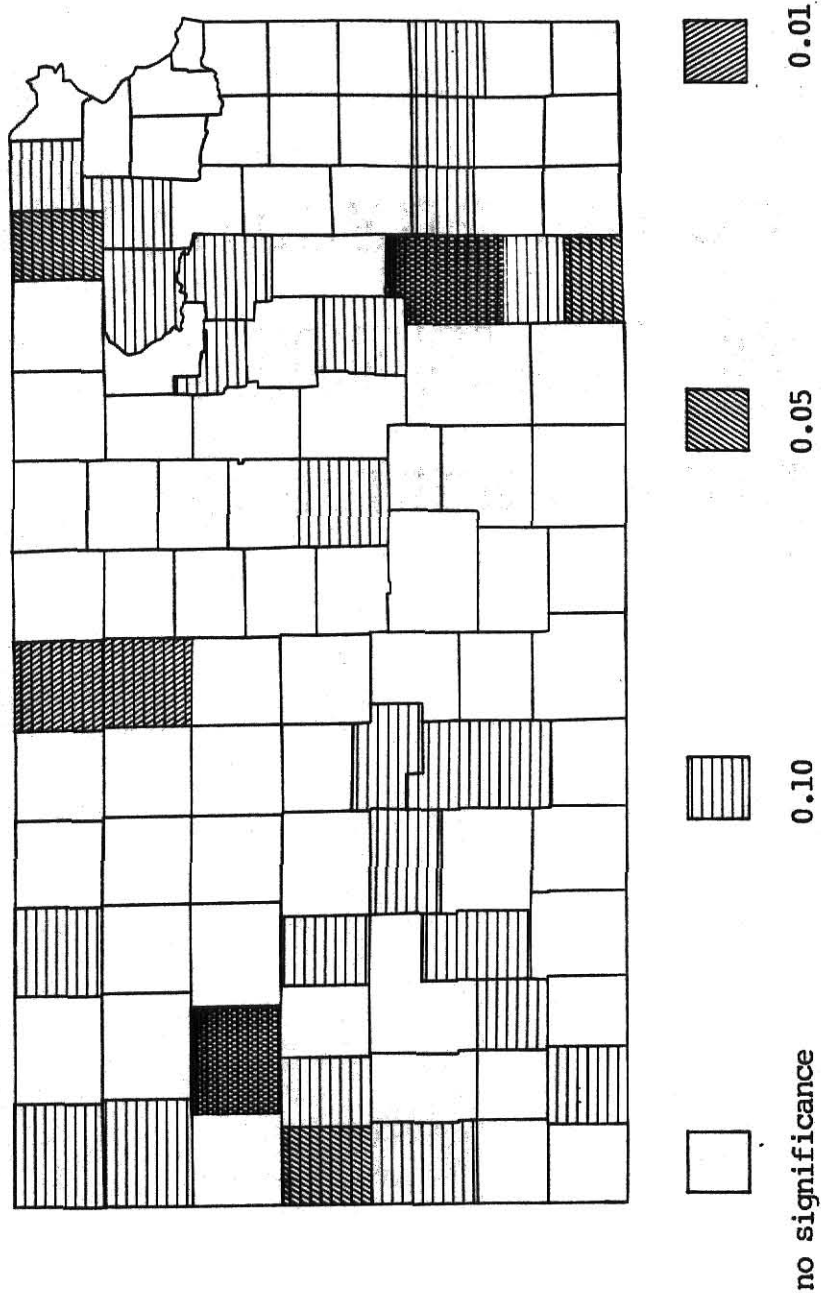
Table 4.15 Distribution of farms according to S.I.C. farm enterprise type for large (\$100,000 and more), medium (\$20,000-99,999), and small (under \$20,000) farms within the state and type, Kansas, 1978

Standard Industrial Classification of farms	Percent of all farms	Percent of all farm**			Percent of all farms in S.I.C. farm enterprise type**		
		under \$20,000	\$20,000- 39,999	\$100,000- and over	under \$20,000	\$20,000- 39,999	\$100,000- and over
<u>All farms</u>	77,019 (100.0)	100.0	100.0	100.0	--	--	--
Cash grain	45.6	35.6	51.7	35.6	52.0	40.9	7.0
Other field crops	2.7	1.3	0.1	1.3	82.2	13.1	4.3
Vegetable and melon	0.2	0.5	0.3	0.1	79.5	17.3	3.1
Fruit and nut tree	0.2	0.0	*	0.0	91.5	8.6	0.0
Specialty horticulture	0.3	0.5	0.3	0.5	56.0	29.7	14.4
General, primarily grain	1.7	1.2	1.8	1.2	55.2	38.6	6.3
Livestock	44.2	53.4	39.0	53.4	45.8	31.8	10.8
Dairy	2.4	5.8	4.2	5.9	14.9	62.9	22.1
Poultry and egg	0.5	1.0	0.2	1.0	66.8	13.3	18.9
Animal specialty	0.1	0.1	0.1	0.1	94.1	5.3	0.7
General, primarily Livestock	1.3	1.1	1.4	0.5	51.7	40.7	7.7

Source: Bureau of the Census, 1978 Census of Agriculture, Kansas, Vol. 1, Part 16. Table 35, pp. 104-105.

* less than 0.05

** may not total 100% due to rounding errors



Probability of a Type I error: Rejection of the Hypothesis that there was no significant change between 1974 and 1978 (Ho: 1974 = 1978)

Map 4.8

Kansas counties showing a significant change in large, medium, and small farm proportional distribution (see Map 4.7) between 1974 and 1978

Source: Map 4.7

Note: Chi-square values calculated using 1974 farm size distribution (expected value) versus 1978 observed, from county figures in Map 4.7 and degrees of freedom = 2

Table 4.16 Age of Kansas farm operators within gross sales class, 1974 and 1978

		Age of Operator				
Total		under 25	25-44	45-65	over 65	
		Percent				
<u>STATE</u>	1974	79,188	3.3	25.7	49.4	20.5
	1978	77,129	4.5	29.9	47.0	18.8
	% change	-2.8(100)	36.4(100)	16.3(100)	-4.9(100)	- 8.3(100)
<u>By Farm Sales Class</u>						
<u>\$100,000 and over</u>						
	1978	6,928	1.4	36.4	57.8	4.5
	1974	6,071	1.4	40.4	46.1	12.1
	% change	14.1(41.6)	*37.9(3.0)	31.1(22.6)	82.7(68.7)	-46.0(-14.7)
<u>\$40,000-99,999</u>						
	1978	13,827	3.2	34.9	52.0	9.8
	1974	14,299	1.8	27.9	58.5	11.5
	% change	-3.3(-22.9)	59.9(18.5)	13.5(20.8)	-19.8(-64.3)	-22.9(-21.4)
<u>\$20,000-39,999</u>						
	1978	13,922	4.4	27.5	50.4	17.7
	1974	15,239	3.1	25.7	53.6	17.7
	% change	-8.6(-64.0)	39.7(20.6)	5.4(7.7)	-7.4(-22.0)	1.8(2.6)
<u>\$10,000-19,999</u>						
	1978	13,355	4.8	26.4	45.4	23.4
	1974	13,884	4.0	22.7	53.5	23.8
	% change	-3.8(-25.7)	20.2(12.9)	16.9(19.9)	-14.5(-40.3)	-1.2(-2.1)
<u>\$5,000-9,999</u>						
	1978	11,142	5.7	26.8	39.7	31.2
	1974	11,067	4.7	23.0	41.2	27.7
	% change	0.7(3.6)	23.3(14.3)	18.2(18.0)	-2.5(-4.4)	-10.1(-20.0)
<u>\$2,500-4,999</u>						
	1978	8,227	4.9	28.1	40.7	26.2
	1974	8,528	4.8	24.8	39.8	30.6
	% change	-3.5(-14.6)	0(0)	9.8(8.1)	-0.6(-0.8)	-16.9(-24.8)
<u>under \$2,500</u>						
	1978	9,690	6.4	40.4	35.3	18.0
	1974	10,067	4.2	32.1	40.2	23.6
	% change	-3.7(-18.3)	61.3(30.7)	33.5(42.3)	-6.8(-10.7)	-19.2(-26.3)

Source: Bureau of the Census, 1974 and 1978 Census of Agriculture, Kansas, 1974, 1978, Vol. 1, Part 16 (Washington, D.C.: U.S. Department of Commerce). 1974: Table 31, Section I; 1978: Table 34.

* Figures in () represent the percent of State total.

These facts when interpreted with Table 4.4 concerning land tenure, indicates that the new entrants are dominantly young in their careers, operate smaller farms, which allow greater off-farm employment opportunities, under tenant lease arrangements.

4.2.8.3 The Kansas Farm Management Associations

The evolution of farm management extension in Kansas began in 1909.¹⁶ By 1913, a year before the formal organization of the Cooperative Extension Service, the Kansas State College in conjunction with the Office of Farm Management of the USDA and Rock Island and Sante Fe railroads were extending improved farm management practices and accounting methods within 35 counties. Changing requirements in national tax laws at this time was a driving force behind increased farmer demand for management guidance from county agents and the state Farm Management Demonstrator. By 1922 the farm management program was active in 75 Kansas counties through the distribution of 2,250 farm account books. That year also saw the creation of the precursor of the Farm Management Association through the organization of a number of Senior and Junior Farm Accounting Clubs.

Subsequent to these formative years, students of Agricultural Economics at the College increasingly helped to crank-out the annual summaries for 15 to 25 percent of the distributed accounting books. This benefited the student's education and assisted the county agents, the state Farm Management Demonstrator, and the Department of Economics in the provision of example accounts to better serve the expanding program as well as the Department's and the Extension Service's research interests. By the late 1920s, similar programs in Illinois and Iowa had organized their cooperators into Farm Management Associations. Such an evolution was seen as the next logical step in Kansas.

In 1930, the first Kansas Farm Management Association was created. Membership was available to "any farmer in the counties in which (the) association operated" on the provisions he was a member of his county's Farm Bureau.¹⁷ Secondly, the county's Farm Bureau, the official conduit for all Kansas Cooperative Extension programs until 1951, had to be sufficiently organized to qualify for any county extension services (a minimum membership of 250 or 25 percent of the county's farmers).¹⁸ Membership then required the signing of a three year contract and payment of an annual fee based on the farm's acreage. In return, the operator would receive a set of farm and family record books, four farm visits a year by an Association hired fieldman, a weekly newsletter, and an end-of-year financial summary and management analysis of their operation prepared by the statistical laboratory of the Department of Economics.

In 1931, the Director of Extension decided to actively expand the Association system throughout the State with the goal of "covering the State with sufficient numbers (1500) of farmers participating to supply authentic farm data for analysis figures which would be representative of the true picture of farming in all areas of the State."¹⁹ The guiding purpose therefore became one of research (to design better extension programs and understand management decisions of farmers), and service to and education of farmers.

As the Association system enters its second fifty years and the decade of the 1980s, it has evolved and grown since 1931 from two Associations with one fieldman each working with a total of 328 farms. By 1979 there were six Associations providing their services in all Kansas counties via 29 fieldmen working with more-than 3,300 farms and 4,300 farm families. Importantly, while the Association's fieldmen are for the most part paid by the Association membership dues, they are also members of the University staff

and the Cooperative Extension Service who are hired or fired by the Director of Extension with approval of the Association in question.

The fieldman is the link between the University and the cooperators. In this regard, the fieldmen may draw on county Extension personnel to supplement their own expertise in technical areas not directly related to fiscal and tax management. "The Association is a part of the Cooperative Extension program a fact which has strengthened its image as an educational program rather than as a personal commercial venture by the fieldman."²⁰

In 1969 the Associations entered the era of the electronic computer through the formation of the K-MAR-105 non-profit corporation. Softwares developed for the Associations are the property of the University and provide analysis and summary not practical under the previous manual system. In 1980, K-MAR-105 purchased their own computer thus opening-up the future possibility of field access and interpretation of the farmer's records. This facility now provides the major University data base for statistical analysis of Kansas agriculture. Unfortunately, distribution of the Association membership's by sales class during the 1970s has increasingly not been representative of the Kansas farming population (Table 4.17).

One of the listed benefits cited by the Extension Service for the Association system is "it will benefit all the farmers in each community because these farms will be demonstrators of the application of better business principals to farming."²¹ While it can be pointed-out that research of farm resource organization based on the current K-MAR-105 records is dominately reflective of those operators producing of the majority of Kansas agriculture production, policy decisions concerning extension influenced by such research, may be detrimental to smaller farm operators. This is to say that farm operators with under \$20,000 in gross

Table 4.17 Distribution of the K-MAR-105 farm record data base versus all Kansas farms by sales class, 1974 and 1978

Sales Class	1974		1979	1978
	K-MAR-105	State	K-MAR-105	State
	-----Percent-----			
\$100,000 and over	30.9	7.7	62.7	9.0
\$40,000-99,999	43.3	18.1	28.3	17.9
\$20,000-39,999	17.1	19.3	6.2	18.1
\$10,000-19,999	4.8	17.5	1.3	17.3
\$5,000-9,999	1.4	14.0	0.5	14.4
\$2,500-4,999	0.0	10.8	0.2	10.7
less than \$2,500	2.1	12.7	0.8	12.6
Total number	2,606	79,155	2,972	77,129

Sources: K-Mar-105: Department of Economics, Kansas Farm Management Association's Whole Farm Data Bank and Retrieval System (Manhattan, KS: Kansas Agricultural Experiment Station and Cooperative Extension Service, 1980), Printout 10/80.

State: Table 4.5 of this report.

Note: There is a high degree of difference (level of significance < 0.001) between the 1974 percent distribution for K-MAR-105 farms versus the State (Chi-square value = 144.6 with 6 d.f.).

annual farm marketings with little representation in the K-MAR-105 data base (less than nine versus 55 percent of all Kansas farm operations in 1974) may find county extension programs, management and marketing techniques tailored for larger operations of little application or utility.

4.3 Conclusions

The structure of Kansas agriculture in the 1970s compares readily to the national situation. Transformation during the 1970s concerning the make-up and size of the various farm enterprise operations, as well as their relative impact on farm structure within this State, were importantly linked to the demand and supply situation for livestock. For Kansas, a leading producer of livestock and livestock products, this period of relatively good conditions for farms selling these products meant a more rapid transfer of economic power from small and medium grain farmers toward livestock dominated enterprises.

In this relation, farms in a position to swing from grain to livestock (or vice versa) dominated resource mixtures ride a market advantage which can assist in financing purchases of additional land and/or new technology. During the middle 1970s there was a major shift from grain to livestock enterprise types in Kansas. Farms with this capability were generally the larger farms within the State. As farms with agricultural sales of more than \$100,000 were able to provide an adequate family income from farming alone under either market situation, it can be concluded new entrants or operations migrating upwards through the sales classes would balance their resource mix to reflect stability through diversity; in this case, being able to quickly expand their livestock sub-activity.

Important to gaining this flexibility is the operator's ability to gain access to large amounts of short-term credit associated with livestock

operations not normally secured by real-estate. This has important implications for part-ownership farm operators which increasingly dominate Kansas agriculture and cannot capture large amounts of capital gains on their land enterprise. In this connection, capital gains on land appreciation are increasingly going to non-farming landlords.

There are two results arising from the shift in farm enterprise groups from cash grain to livestock operations. Firstly, large established operations gain added advantage resulting from good conditions for all livestock operators due to this commodity's associated economies of size and scale. Secondly, large farms were able to adapt to these conditions more quickly. This resulted in an increase of concentration of total production within the State. These two effects are complementary to placing smaller farms, which are generally less diverse, with higher average fixed costs, at a further disadvantage in product, input and credit markets.

In response to this added uncertainty, small-farm operators during the 1970s have increasingly turned to off-farm income opportunities to smooth out their family's income as well as to hold on to their operation.

Importantly, the concentration of production in Kansas is related in part to a 'yield-gap' between the largest and smallest food and feed grain producers. (Yield gaps may also be present in the livestock sector although could not be determined via census data.) During the '70s decade, small-farms which produced grains were unable to match per acre yields achieved by large-farms. In this case, apparent scale-neutral technologies, such as in seed and fertilizer use, are being constrained by other factors. If small farms were to match or surpass large farm yields through intensification as a result of added or increased use of credit, extension, and/or development of other appropriate scaled technologies, Kansas could preserve an economic door for the farmers of tomorrow.

CHAPTER IV

REFERENCES

1. Bureau of the Census, 1978 Census of Agriculture, Kansas, Vol. 1, Part 16 (Washington, D.C.: U.S. Department of Commerce, 1981), p. vii.
2. ESCS-Crop Reporting Board, USDA, Agricultural Statistics, 1979 (Washington, D.C.: U.S. Government Printing Office, 1979), Table 649, p. 542.
3. Bureau of the Census, 1974 and 1978 Census of Agriculture, Kansas, Vol. 1, Part 16. 1974: Tables 1 and 30, p. 5 and p. 30; 1978: Table 33, p. 70.
4. Ibid.
5. Bureau of the Census, 1978 Census of Agriculture, Vol. 1, Part 16. 1974: Table 33, pp. 70-71.
6. For an estimate of total farm family income in 1979, refer to: Bureau of the Census, "Farm Finance Survey" in 1978 Census of Agriculture, Vol. 5, Special Reports (Washington, D.C.: U.S. Department of Commerce, 1981). (Unavailable at time of this writing).

For a discussion of information available in above report see: W.E. Saupe, Information Needs Relating to Small-farm Programs and Policies, ESCS Staff Report (Washington, D.C.: USDA-ESCS, 1980), pp. 26-30.
7. Bureau of the Census, 1978 Census of Agriculture, Kansas, Vol. 1, Part 16. Table 10, p. 6.
8. _____, 1978 Census of Agriculture, United States, Vol. 1, Part 51 (Washington D.C.: U.S. Department of Commerce, 1981), Table 10, p. 6.
9. _____, 1974 and 1978 Census of Agriculture, Kansas, Vol. 1, Part 16. 1974: Tables 9 and 31, pp. 6-7 and 70 respectively; 1978: Table 34, pp. 88-91.
10. _____, 1978 Census of Agriculture, Kansas, Vol. 1, Part 16. p. A-7.
11. _____, 1974 Census of Agriculture, Kansas, Vol. 1, Part 16. Table 31, p. 69.

12. _____, 1974: Ibid; 1978: Table 34, 88-91.
13. _____, 1978 Census of Agriculture, Kansas, Vol. 1, Part 16. Table 34, pp. 92-93.
14. _____, 1974 Census of Agriculture, Kansas, Vol. 1, Part 16. p. C-22, section 33.
15. Ibid., Table 31, p. 69.
16. see: L.C. Parker, Extension Farm Management Associations - A model for Kansas Agriculture (Manhattan, KS: CES, Kansas State University, 1981); and J.H. Coolidge, Extension Farm Management in Kansas 1909-1972, Emphasizing 42 Years of Farm Management Association Development (Manhattan, KS: Kansas State University, 1973).
17. L.C. Parker, Extension Farm Management Associations - A Model for Kansas Agriculture (Manhattan, KS: CES, Kansas State University, 1981), p. 12.
18. Ibid., p. 8.
19. Ibid., p. 20.
20. Ibid., p. 19.
21. Ibid., p. 18.

CHAPTER V

Summary and Conclusions

The current American rural scene has changed significantly from its once homogenous perception as being agrarian, amenity poor, and out-of-touch with the national pulse. The previous chapters have explored a wide assortment of factors which must be concurrently addressed to understand these changes. The most fundamental point which must be made is the rapid transition of the rural economy has occurred in a relatively short period of time, a half century or less.

While agriculture remains the most dominate economic sector within our Nation, its role within the rural community has become secondary in a large proportion of rural counties. In this regard, the farm structure debate which has recently come to the public attention is the result of the informed majority reaching conclusions about the stewards of the agricultural resource as well as their reappraisal of the of the historic and democratic opportunities offered there. The conflicting goals of production efficiency versus equity and the preservation of the farm opportunity in a nation built by agrarians has a strong set of arguments on either side.

This thesis in Chapter II develops a historical background concerning changes brought about by an increasingly mechanized and exogenous input dependent system of food and fiber production. These trends have been explained in-part by a general model currently accepted as explaining the

economic drift within this sector. Importantly, the innovative dynamics of the model depend upon the elimination and out-migration of smaller or limited resource farm operators combined with concurrent investment in cost reducing and technologically superior capital. The model also supports the position that despite these forces, a farming system based on more and smaller farms could evolve without loss of efficiency in production.

Stepping from Chapter II, Chapter III explores the dilemma of smaller farm survival in such a economic system. As a result of the structure debate there has been an increasing awareness of the small-farm by agricultural and social researchers as well as political leaders. A review of the literature indicates that the rural community is more healthy where a smaller scale of family farm agriculture predominates. This is the result of generally greater economic diversity in such communities allowing an off-farm supplement to a smaller farm income. The role of public and private research when reviewed in terms of its impact within farms of differing size indicates bias in favor of larger farm operations. Such bias in the application of scale-neutral technologies is, for the most part, a result of the economic environment and may be overcome through an intense educational effort. A number of such educational programs and approaches are reviewed.

With the understanding gained from the previous chapters, Chapter IV explores structural transformation of agriculture in Kansas during the decade of the 1970s to provide added detail of the processes of change outlined in earlier sections. In this case, it was found that changing markets for food and feed grains versus livestock had important impact on the success of all farms. Generally, operations with diversity between livestock and grain were more able to take advantages of the market's cycles than were more specialized operations. The result was an increase in the

concentration of wealth and income in the largest operations with farms of moderate and small size declining in numbers and economic influence. The smaller farms which have remained have turned to off-farm employment in increasing numbers making farming a part-time enterprise. It was also found that farm tenancy and part-ownership of farms in Kansas was on the increase. In the case of tenancy, the increase represents a change away from fewer tenant operations which has continued for almost forty years. Interestingly, tenancy has provided an entry-door for Kansas agriculture and new and younger farmers.

A summary of a few of the more important conclusions resulting from the review of the literature and the analysis of Kansas agriculture follows.

- 1) The issues of farm structure are political in content and therefore are debated on the basis of changing political landscapes. The fundamental issue in agricultural and food policy, and therefore eventual farm structure, are the numerous conflicting goals of an urban versus rural perception of the national and international demands upon the agricultural resource. In addition, there appears to be a growing desire for a now urbanized population to ruralize which in today's reality leads to small-farms, fragmentation, and reduced productivity of land nearby urban areas.

- 2) The agricultural sector both nationally and within Kansas is increasingly dominated by the larger producers whom have the capacity and need to be at the forefront of innovation in this industry. The growth in farm size both in physical and gross income terms has allowed agriculture in aggregate to approach the standards of well-being enjoyed by the non-rural sector. This increase in general welfare is

the result of farm extensification by use of land rented from outside investors and smaller operators unable or not wanting to compete. In fact, it is the non-farming investors who seek speculative profits and inflationary hedges for their assets through purchases of agricultural land, which have become the dominate source of land for lease or rent.

3) Government policy in the areas of credit, prices and taxes has had major impact on the evolution of the current structure of agriculture. Importantly, it has been the policies of price supports which has accelerated the elimination of moderate size and small-farms. In this case, a supported price aimed at aggregate costs of production neglects important aspects of the distribution of expenses associated within the general farming population as well as available economies of size of the larger producers. As a result even in poor market conditions, the larger more efficient producers gain an economic profit which allows them to bid-on the assets of less efficient producers. The availability and use of credit by larger operators has assisted this process as have the tax rules.

4) The small-farm sector may be considered as either a small business and/or as a low income group. Nationally and within Kansas, these small operations makeup the large majority of agricultural enterprises but produce only a small proportion of the Nation's or State's total agricultural output. There is increasing evidence that the yield gaps between the larger and smaller operations has resulted from the research and support industries feeling it is more

appropriate to represent the large commercial producer versus the social interest of agrarian communities established at an earlier time.

5) As the small-farm, in population terms, remains an important aspect of the rural economy and will likely increase in importance for the remainder of this century, increased emphasis on intensifying and enhancing their efficiency under conditions of scarce public research investment will be a difficult trade-off between social and efficiency issues. The marginal returns to added investment in small-farm scaled research will likely not be as great as might be achieved on farms of larger size. Welfare can and has been increased for the smaller operator and their communities through increased and directed extension. In this case, the use of para-professional extensionists drawn from the community who are backed-up by professionals in an on-going program, can have significant results.

6) The small farm operation has and will continue to be an important but poorly understood dimension of the rural landscape. Currently, farms which fall into this group are very heterogeneous in goals, cultural/husbandry practices, and available resources. They are generally considered as non-commercial farming operations which, as a single source of income, either support the operator at near or below poverty level or are simply a rural residence, hobby, and/or tax loophole. While disaggregation of this population for a better understanding by researchers is currently underway, it can be said that a large proportion of these farmers are

increasingly using the small-farm to supplement income earned off-farm or vice versa.

7) The use of Gini Ratios and Schutz's Index of Inequality can provide good relative measures for identifying inequalities in income and resource distribution. Care must be taken to assure comparison of such indices are based on similar size and numbers of fractiles. Problems associated with the study of change in economic structure requires: (1) knowledge of the influence inflation can have on historic statistics due to upward migration within static income intervals between years; (2) that categorization of farm or other business enterprises into coarse income or resource use/ownership intervals neglects important aspects of differences in management, resource use, and other factors associated with individual enterprises; and (3) changes in the dependence by the units of interest upon exogenous versus endogenous inputs used can create misleading results.

In conclusion, the increased diversity and change in the needs of a modern agriculture does not justify the scraping of original plans and attitudes toward historical opportunities available within farming. Our current farming system has evolved in a very short time. There is a growing body of evidence that many of the innovative factors which have contributed to changing current farming methods may in the longer run place that system in jeopardy. A case can be made that modern attitudes toward soil fertility and productivity are increasingly allowing pollution of both surface and finite groundwaters, that certain now banned pesticides still remain in the environment, that in time of economic recession large credit dependent operations may not succeed, and changing land ownership patterns may

contribute to a less-than optimal use of the soil resource.

Emphasis on investments to enhance the smaller farm operator's potential are not easily determined due to their diversity in their needs and goals. If future projections of the population/food dilemma on an international scale hold to be true, increased understanding of how this system of agriculture copes and adjusts to changing conditions must help in the understanding of other agricultures undergoing moderization transformations. Importantly, increased efficiency on small-farms in this country without the need to vastly change the scale of those operations has many advatages including greater opportunity, stability and quality of life in rural communities. Further, the understanding and improvement of farming systems which can exist outside high energy, capital, and credit consuming production systems will add new alternatives in technology.

APPENDIX A

In this appendix, a review of the most commonly cited works on the measurement of income inequality will be provided. As economists have interest in the results of policy or fundamental economic changes on the distribution of resources and/or income, this review will summarize and identify problems, methods and interpretation of commonly used indices of income concentration or inequality. As the Lorenz curve and its associated index of concentration, the Gini Ratio of Concentration (Gini Ratio), are most commonly found in the economics literature, they will be treated in greater detail, although other measures and methods will be briefly discussed.

Champernowe provides an excellent introduction to the relative merits and dangers of a number inequality indices, diagrams for depicting income distributions (Lorenz and Pareto diagrams, and People and Income Curves), and methods to determine the best index given an income distribution and the type of inequality in which the researcher is interested.¹ The author provides seven criteria to be satisfied by any such index.

Within the same article, six common statistical parameters were evaluated. This included development of required transformations for several of the proposed indices in order to conform to his requirements of indices. Following these adjustments, of six commonly used indices/parameters were calculated using known property distributions to test and compare their relative sensitivity and ranking between and within three major income distributions. The three known distributions provided models for three aspects of income distributional inequality: (i) inequality due to extreme wealth, (ii) inequality among the less extreme incomes, and (iii) inequality due to extreme poverty.

Results of Champernowe's analysis showed that the six adjusted indices "do differ noticeably in their reaction to different types of inequality."² It was found that either an index based on the standard deviation of the logarithm of income or the ratio of the harmonic to the arithmetic mean were most sensitive to inequalities associated with poverty. In the case of inequality associated with the exceptionally rich, an index based on either the coefficient of variation of income or Theil's Entropy coefficient would be the best measures. The last two indices based on either the standard deviation of the logarithm of income or the Gini coefficient were best suited to measure inequality of a wide spread of the less extreme incomes. "This suggests that the choice of index could frequently decide the answer to such questions as whether inequality had increased or decreased in a county over a decade."³

The Gini coefficient can be interpreted and used in different situations. Via disaggregation, this coefficient may have application in the study of migration and discrimination where migration includes non-geographic mobility, such as a change in educational status.⁴

The most commonly used method to measure inequality of income is via Lorenz curves and the calculation of a Gini Ratio or Index of Concentration, not to be confused with the Gini coefficient. The Gini Ratio is the area proportion of the triangle ABC lying above the Lorenz curve AB in Figure A.1.

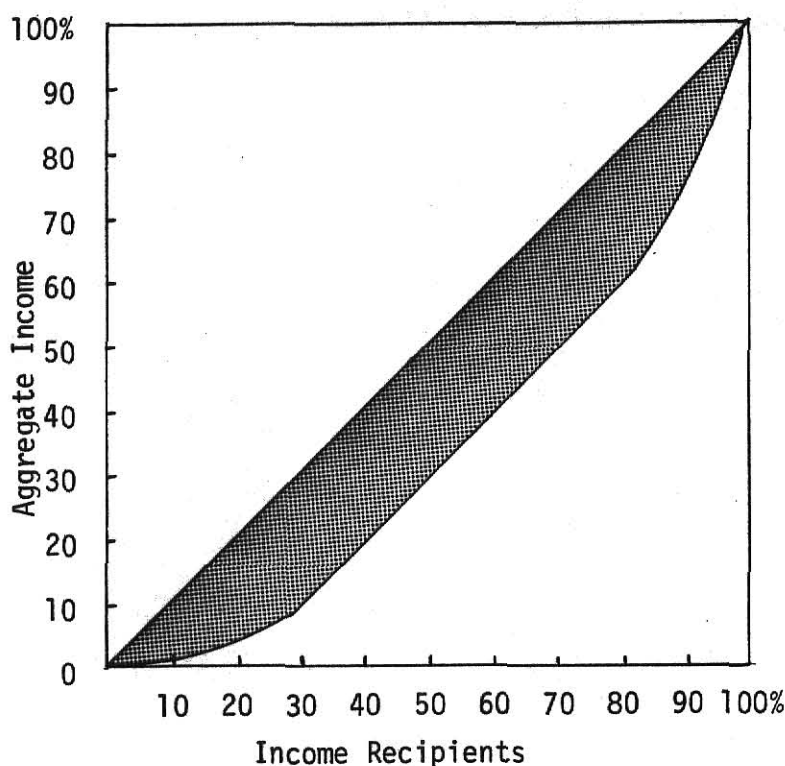


Figure A.1 A Lorenz Curve

Source: Columns 5 and 9 of Table A.1

Morgan describes the Lorenz curve as "a plotting of the cumulative share of the aggregate income accounted for by these units.⁵ The actual shape and functional form of the distribution has been discussed in detail by a number of authors. The importance of understanding the theoretical issues underlying the Lorenz curve and its estimation provides clearer insight to the interpretation of Gini Ratios calculated directly from an estimated density function or indirectly by the presumption of role of such curves.

Conceptual issues of the Lorenz curve and the effects upon the Gini ratio are numerous. Schutz notes that the Gini ratio can take on ambiguity "from the fact that the shapes of these areas may be infinitely varied, due to different distributions of inequality, without being particularly apparent to the eye, and without any change at all in the value of the ratio

of concentration (Gini Ratio)."⁶

The value of the Gini ratio, apart from its ability to indicate inequality, relates to its use in comparison between points in time. This requires the necessity for the measurement of significant differences in the compared Lorenz curves. Further, the comparison of Gini ratios as a measure of change takes on questionable interpretation whenever the rich and poor loose in relation to middle-income groups which implies an intersection of the two Lorenz curves in question.⁷

Another set of factors in the estimation of a Lorenz curve which can create problems, is the numerous underlying problems of sampling and the associated problems of fitting continuous functions to discontinuous relationships. Further, because of the culmulative nature of the Lorenz curve, the presence of negative incomes can also create interpretive problems although both Schutz⁸ and Budd⁹ provide methodologies to handle this.

In terms of methodologies to estimate density functions for the Lorenz curve from which the Gini Ratio may be calculated via integral solution, KaKwani and Podder¹⁰ provide a detailed presentation of several models and a method which will provide confidence intervals on the Gini ratio for the models. Budd¹² provides practical insight in model selection when dealing with negative incomes as well as intersecting Lorenz distributions.

As most income distributions are provided via categorization from which Gini Ratios may be directly calculated, a short discussion of methods and problems in the analysis of it is warranted. Most critical are problems of categorization into unequal fractiles. Schutz suggests that the current, almost universal practice of coarse and variable income classifications versus equal and small percentage increments (1%) of income receivers, will provide much better sensitivity and accuracy of measurements of

inequality.¹² Gastwirth provides via equation (17) a method to determine a priori grouping intervals required to give a desired degree of accuracy for the Gini ratio.¹³

The number of fractiles required to gain accuracy and sensitivity in the Gini Ratio is an important consideration. Gastwirth points this problem out when developing a method to put a lower and upper bounds on the Gini Ratio. "The standard method of estimating the Gini Ratio is to approximate the area of concentration by choosing 'K' fractiles and computing the area of the polygon vertices formed by the fractiles."¹⁴ This leads to an underestimate of the true Gini ratio as the straight line connecting the values of the fractiles lies above the convex curve of the Lorenz function. Therefore, as the number of fractiles decrease, this underestimation of the true Gini ratio value will increase. A lower boundary of the number of fractiles required to detect changes in the Gini index of 0.5 percent would require more than 8 groups.

Another problem with the use of fractiles is the nature of a unimodal income distribution. It is a common assumption to use the midpoint of the fractiles as representing the mean of the category for estimation of the Lorenz function, although the distribution within groups is generally unknown. When the midpoint is assumed as being representative of the mean, this will underestimate the true mean of the low-income brackets and overestimate that of the upper-income brackets. Such phenomenon is the result of the rise and fall of unimodal distributions and, therefore, will overestimate the relative inequality. The use of the geometric mean of the two end points of the fractile will overcome some of this bias. But this problem is most acute in the case of the open-ended bracket at the upper end of the income scale.

Methods to handle the upper-income, open-bracket problem have been

discussed in the works of Budd, Morgan, and Gastwirth previously noted. Morgan provides a rule of thumb that, if the mean of the open-ended bracket is unknown, it may be approximated by adding 25 percent to the lower limit of the open-ended bracket. A more detailed treatment of this problem can be found in Solow.¹⁶

Within the body of this report, the calculation of the Gini index as presented by Morgan¹⁷ will be used to represent empirical inequalities. When appropriate and illustrative, the use of Schutz's coefficient and slope measures by group classification will be presented. The Schutz coefficient of group and/or total inequality and slopes of the Lorenz curve at various points will give "a clearer picture of inequality than is ordinarily derived from the Lorenz curve."¹⁸

The Schutz coefficient is derived from the analysis of the slope of the Lorenz function by "multiplying the distance between the two slope lines (for equal and unequal points) by the distance (in percent of recipients--Y axis) over which this slope may be assumed to hold good."¹⁹ The size of the coefficient will vary with the number of categories used as well as the Gini Ratio and may be more perfectly estimated by development of a fitted Lorenz function and solved via calculus. The following Table, A.1 is provided by Schutz.

As the sum of the negative coefficients (column 11, Table A.1) will equal that of the positive, either may be used as a coefficient of inequality disregarding the sign.

In conclusion, there are numerous indices and diagramatic methods which may be used to analyze income or resource inequalities. This discussion focused on a number of these. An entire other dimension of the use and application as well as fundamental problems of the discussed indices lies in the actual definition and aggregation of the basic data. Sub-category

income population groups and their definition have major impact upon income distributions. An introduction to these effects and concerns may be found in Morgan.²⁰ Schutz's article ²¹ also provides a section on disaggregation of the total income distribution into sub-categories.

Table A.1 A hypothetical simple income distribution

Order	<u>Income Recipients</u>				<u>Income</u>		<u>Slope</u>		(Slope-one)	
	Number in Category	Percent in Category	Amount Received	Percent of Total	Amount Received	Percent of Total	(8/4)	X	Percent	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(Coefficient) (11)
	#	#'	%	%'	\$	\$'	%	%'	\$/#%	
1	1	1	10	10	\$20	20	2	2	0.2	-8.0*
2	1	2	10	20	50	70	5	7	0.5	-5.0
3	1	3	10	30	80	150	8	15	0.8	-2.0
4	1	4	10	40	100	250	10	25	1.0	-0-
5	1	5	10	60	100	450	10	45	1.0	-0-
7	1	7	10	70	100	550	10	55	1.0	-0-
8	1	8	10	80	120	670	12	67	1.2	2.0
9	1	9	10	90	150	820	15	82	1.5	5.0
10	1	10	10	100	180	1000	18	100	1.8	8.0

Total Negative coefficient -14.0
 Total Positive coefficient +14.0

* Calculation
 for column:
 $[(\$/\#) - 1] * (\#)$

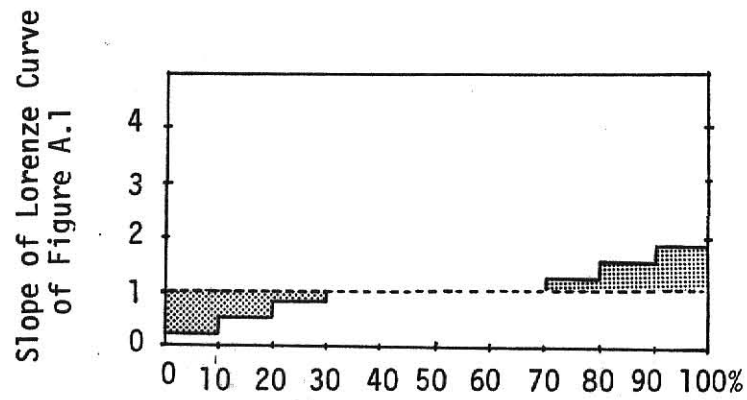


Figure A.2 Equality and inequality curves cognate to Lorenz diagram of Figure A-1

Source: Columns 5 and 10 of Table A.1

APPENDIX A

REFERENCES

1. D.G. Champernowe, "A comparison of measures of Inequality of Income Distribution" in The Economic Journal, (December, 1974), p. 787-816.
2. Ibid., op. cit., p. 806.
3. Ibid., op. cit., p. 807.
4. Braham Pyatt, "On the Interpretation and Disaggregation of Gini Coefficients," in The Economic Journal, 86, (Great Britain: June 1976), pp. 243-255.
5. James Morgan, "The Anatomy of Income Distribution" in The Review of Economics and Statistics, 44, (August 1962), pp. 270-282: p. 281.
6. Robert R. Schutz, "On the Measurement of Income Inequality," in The American Economic Review, Vol. 41, No. 1, (March, 1951), pp. 107-122: p. 110.
7. Edward C. Budd, "Distributional Issues: Trends and Policies--Postwar Changes in the Size Distribution of Income in the U.S." in American Economic Review, Vol. 60, No. 2, (May, 1970), p. 247-260.
8. Schutz, loc. cit.
9. Budd, loc. cit.
10. N.C. KaKwani and N. Podder, "On the Estimation of Lorenz Curves from Group Data" in International Economic Review, Vol. 14, No. 2 (June, 1973), p. 278-291.
11. Bud, op. cit., 249-250.
12. Schutz, op. cit., p. 119.
13. Joseph L. Gastwirth, "The Estimation of the Lorenz Curve and Gini Index," in The Review of Economics and Statistics, Vol. 54, No. 3 (August, 1972), p. 306-316: p. 309-10.
14. Ibid., loc. cit.
15. Ibid., loc. cit., p. 312.
16. Robert Solow, "Some Long-run Aspects of the Distribution of Wage Income," Econometrica, Vol. 19 (July, 1951), p. 333-334.
17. Morgan, op. cit., p. 281.
18. Schutz, op. cit., p. 109.
19. Ibid., op. cit., p. 111.

20. Morgan, 1962.

21. Schutz, 1951.

FARM STRUCTURE AND SMALL FARMS:
A STUDY OF THE UNITED STATES AND KANSAS
DURING THE 1970s

by

NEIL C. HAVERMALE

B.S., COLORADO STATE UNIVERSITY, 1975

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Agricultural Economics
Department of Economics

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1982

Farm structure results from the dynamic interrelated forces of ownership, organization, and control of resources used in the production of food and fiber. Adjustment of farm structure in the United States over the last half-century has resulted in increased productivity which has also created a vast out-migration of farm families, concentrated wealth and income within this sector, increased the sensitivity of farm net income to changes in input and product prices, and decreased the stability of the production environment as an ecology.

Public policy during this period contributed importantly to structural transformation of the agricultural economy. It can be argued that without the provision of public intervention in this economic sector, the problems with readjustment may have been much worse.

Amalgamation of land and therefore wealth has been a result, in part, of economic profits captured by aggressive innovating and risk-taking farm operators. Cost reducing technologies permitted this and provided singly or when combined with other farm resources, economies of scale and size which permitted adopting farmers further relative advantage. Smaller economically weaker operators comparing their rural situation to urban opportunities found the transition out-of-farming a rational decision when the stronger farm operations and outside monies offered to purchase or lease their land.

The small farm has played an important and continuing role in the United States. Although within the national population these operators only total a small proportion, they represent the majority of all farm operations. Further, their generally low-income status has made them of continuing importance as a public welfare issue. A high utility for the lifestyle associated with the small-farm inlight of their relatively low-income, has forced small operators to increasingly find off-farm employment. In general, the small-farm sector is typlified as more

heterogenous when compared to other farm groups with their operators being young and old, working full- or part-time, on- or off-farm, using the farm as a place of business, a residence or retirement situation, etc.

Major conclusions based on a review of the literature concerning farm structure, small-farm issues, and a description of Kansas farm structure during the 1970s indicates the following. (1) Public debate over the current organization and control of United States agriculture is based in the conflicting goals of efficient production versus equity and opportunity in this economic sector. (2) Introduction of new technologies have increased these conflicts as larger farming units have been more able, due to economic reasons, to use and demand technologies which may or may not be scale biased. (3) Transformation of farm structure is importantly related to cyclic and producer response shifts in the supply of certain commodities. (4) There is growing evidence that farmers can reduce their dependence upon modern energy intensive farming systems by reliance on less energy intensive traditional or organic approaches without loss of income. (5) Small-farms have been and will continue to be an important dimension in United States agriculture and will increasingly demand more attention from public research and extension programs.